CONNECTIONS 39

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R&M
Convincing cabling solutions

Future Ready

The economic crisis triggered by presumptuous, greedy managers and misguided business models is still having an impact. And we are forced to observe that many regions of the world still have not recovered. There has been a shift in customer requirements, and markets have become more turbulent. So to remain successful you need nowadays to be very flexible and efficient, and willing to go the proverbial extra mile.

Unlike listed companies we do not have to distribute our profits to investors. Nor have those profits been squandered on high-risk business activities. Our healthy financial situation combined with a deep conviction of continued future success allows us to invest in innovative, promising technologies and services, like setting up a World Class Supply Chain. The new R&M Cube, our new innovation, development, production and logistics center, has come to symbolize both these aspects. The R&M Cube is also a prime example of the corporate responsibility we live and breathe each day, and that we documented at length in our first CRM Report.

This Magazine showcases not only our new products and services, but also pioneering customer solutions such as the Spiez Safety Laboratory, one of only three laboratories worldwide operating at maximum bio-safety level, where R&M's proverbial high safety standards have come to bear. In the previous issue of *CONNECTIONS* our readers' survey showed that there is a great deal of interest in background information, and we are happy to expand the section in this issue. We also bring you more news of events at our company itself.

Last but not least we have changed the layout of *CONNECTIONS* – adapting it to the new trends in corporate publishing, but without compromising the Magazine's identity. I hope it appeals to you and wish you enjoyable reading.

Peter Reichle | COO
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Contents

R&M is committed to preserving the environment. This picture of a butterfly was taken on the Cube construction site.

Assuming Corporate Responsibility

When companies are aware of their responsibility to society and act accordingly, everyone's a winner in the long term: society, the environment, and the company itself. R&M has integrated this notion, which underlies the term CSR, in its activities.

CSR is also aimed at the long term and includes all stakeholders.

The term Corporate Social Responsibility (CSR) stands for the business community's voluntary contribution to sustainable development. CSR is not limited to the company's own products and services; it also applies to ecologically relevant aspects (the environment), to relations with the workforce, and to the way in which the company interacts with its stakeholders.

What is CSR?

The principle of corporate responsibility is not as new as it sounds: The concept of the honorable merchant existed already in the Middle Ages. The honorable merchant was expected to stand out through conduct based on virtues aimed at long-term economic prosperity without running counter to the interests of society.

While CSR demands a certain investment on the part of the company, as a strategy it is clearly aimed at benefiting the organization in the long term. This may be in a financial sense (higher financial performance, lower costs), but equally may be non-monetary (favorable reputation, risk avoidance, product and process innovations). CSR is also aimed at the long term and includes all stakeholders. In this respect, CSR contrasts sharply with the notion of shareholder value, which is aimed at short-term benefits for shareholders.

Sustainable action is founded on three interacting mainstays. They are the three dimensions of sustainability, i.e. economy, ecology and society ("three-pillar model"). This approach first gained worldwide attention in 1987 when the Brundtland Commission (United Nations World Commission on Environment and Development) published its report entitled Our Common Future. It defines sustainability as the demands on today's generations to meet their needs without compromising the ability of future generations to meet their own needs. Even though the Report was published twenty years ago, its themes are as topical as ever. The Brundtland Commission's Report was in response to the call for sus-

tainable development postulated by the Club of Rome in 1972. This organization founded in 1968 deals with the economic, ecological, political and demographic situation and development of the world. It examines causes and connections and then issues recommendations.

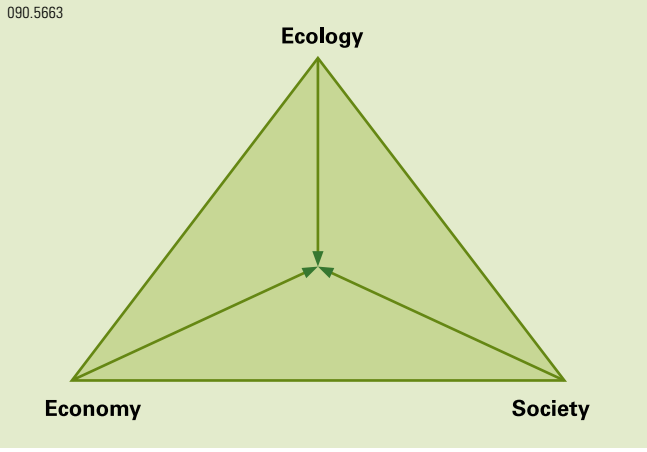
Current status of CSR worldwide

In a global survey conducted by Regus, the world's largest provider of flexible workplace solutions, 75 % of companies worldwide said they were in favor of government tax breaks aimed at promoting investment in climate protection measures. One unexpected finding from the study was the sense of responsibility of companies in Asia's emerging economies: According to the Regus survey, the proportion of companies that monitor their carbon footprint is higher in India and China than in Western Europe and North America.

The Regus study states that only 37 % of companies worldwide measure their emissions, and less than one fifth (19 %) monitor the carbon footprint left by their operations. 46 % of companies worldwide stated that they would only invest in climate-friendly technologies if their running costs were either the same or lower than those of conventional plants. Only 40 % had invested in climate-friendly technologies, and only 38 % had implemented a relevant corporate guideline.

Besides the automotive and building sectors, the ICT sector (information and communication technology) is one of the key starting points for improving climate protection. According to a study by the Gartner Group, the global IT sector is responsible for 2 % of CO_2 emissions, on a par with the aviation industry. A quarter of these emissions are said to come from large data centers, whose server rooms require constant cooling.

Smaller companies are below the average in terms of eco-friendly investments, either implemented or planned. This indicates that they are subject to greater cost pressure when it comes to the acquisition of climate-friendly installations; so, clearly, the short-term needs of SMEs are often more important than long-term investments. Only 19 % of small and medium-sized companies monitor their carbon footprint, compared with 43 % among large companies. Similarly only 36 % of SMEs have already invested in eco-friendly installations compared to 59 % of large companies. Ambitious government objectives evidently do not take account of the genuine difficulties encountered by



The three areas of the Triple Bottom Line

R&M operates a corporate policy that does not simply pursue economic objectives; it also observes ecological boundaries and at the same time strives to achieve a social balance.

smaller companies when switching to eco-friendly technologies.

The study also highlighted a number of sector-specific differences. For example only 43 % of companies in the ICT industry measure their carbon footprint. Yet 53 % of companies in this sector have already invested in green technologies, and 57 % have implemented an appropriate corporate policy. By contrast while only 25 % of companies in the consulting sector monitor their carbon footprint, 71 % stated that the majority of their installations were already energy-efficient.

R&M's first CSR Report

Contrary to the rather sobering findings of the Regus study, R&M is able to showcase its social responsibility credentials through a number of investments. R&M is guided by the definition of sustainability of the Brundtland Commission and conducts its entrepreneurial activities accordingly. This means that R&M operates a corporate policy that does not simply pursue economic objectives; it also observes ecological boundaries and at the same time strives to achieve a social balance. In 2010 R&M published a Corporate Social Responsibility Report for the first time. It describes the ways in which R&M is committed to fair, responsible and sustainable action. It provides information on objectives, values and consequences for management, workforce, partners, customers and the environment.

During the second half of 2010 R&M moved into its new production and logistics center at its headquarters in Wetzikon, a.k.a. the R&M Cube. It is one of the largest and most advanced low-exergy corporate buildings in Switzerland. Its CO_2 emissions are 30 % lower than that of conventional buildings, and

The R&M Cube is one of the largest and most advanced low-exergy corporate buildings in Switzerland.

R&M works alongside universities, technical colleges, institutes and other companies in the R&D sector.

R&M also supports young sporting talent.

The number of truck journeys has been greatly reduced thanks to weekly deliveries.

no fossil fuels are required. R&M seized the opportunity of the construction of the new building to optimize its global logistics, which means for example that goods now only have to be shipped out once a week, which has helped to reduce the number of truck movements.

R&M has also doubled the number of apprenticeships at the company headquarters in Switzerland since 2008. This benefits in particular young people from the Zurich Oberland region in Switzerland. The apprenticeship quota is 8 %, i.e. 2.3 % higher than the average for Switzerland. R&M intends to further promote initiatives aimed at the health and satisfaction of its 600 employees as well as their innovation capabilities.

Many meeting rooms at R&M are equipped with pedestal desks.

"Responsible, far-sighted and exemplary corporate action has always been a key feature of our business activities, ever since the company was founded 46 years ago. Our CSR Report is designed to demonstrate to the public the demands we place on the sustainability of our actions," says CEO Martin Reichle. In deciding to issue a CSR Report, R&M joins the ranks of publicly listed companies that regularly publish the efforts they make with regard to sustainability. R&M is therefore one of the CSR pioneers in its industry. R&M is guided by the Brundtland Commission's 1987 definition of sustainability and has shaped its entrepreneurial activities accordingly. "The objective is to create a company that benefits all sides," says Martin Reichle. ■

> "Responsible, far-sighted and exemplary corporate action has always been a key feature of our business activities, ever since the company was founded."
>
> Martin Reichle, CEO R&M

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KKUH network team: Syed Afzal Ali, Mohammed Amir (Manager Networks), Nayeem Akhtar (left to right)

090.5672

King Khaled University Hospital – main building

R&M's Shielded Cat. 6 Revives King Khaled University Hospital's Data Network

R&M implemented an end-to-end network solution for one of Saudi Arabia's leading government health care facilities, King Khaled University Hospital (KKUH), utilizing its innovative line of the revolutionary shielded cabling.

Established in 1982, King Khaled University Hospital is a full service university hospital with currently 840 beds with plans for expansion into a campus style Medical City over the next five years. It has all general and subspecialty medical services such as a special outpatient building, more than 20 operating theaters, and a fully equipped and staffed laboratory, radiology, and pharmacy services. The hospital provides primary and secondary care services for Saudi patients in the Riyadh area as well as tertiary care services to all Saudi citizens on a referral basis. All care, including medication, is free of charge for eligible Saudi patients.

GET MORE

- **Performance**
- **Reduced EMI**
- **End-to-end solution**
- **Quality**
- **Modularity**

THE R&M SOLUTION FOR KKUH
Provided R&M enterprise cabling including:

- **End-to-end Cat. 6A Shielded STP connectivity**
- **Fiber backbone (OM2)**

Due to the Saudi government's initiatives to provide world-class health care services for its citizens, KKUH needed to upgrade and implement a state-of-the-art network infrastructure as the foundation for offering top-line health care services.

Reduced EMI needed

KKUH, however, had to take into consideration the presence of electromagnetic interference from the x-ray machines and radiology equipment located throughout the hospital which can cause serious data transfer problems and affect the performance of the daily medical and operational requirements in the hospital. Already, slow data transfer and bad network connections were delaying important procedures. Thus for KKUH's new network, it was imperative that a suitable secure cabling infrastructure was implemented to ensure a robust network with zero downtime and to safeguard against electromagnetic interference.

The R&M shielded cabling solution serves all end user requirements.

R&M advised that their most innovative shielded solution, the Cat. 6A shielded STP (Shielded Twisted Pair) cables, be used throughout the site to achieve optimal channel performance and eliminate the effects of medical imaging equipment and machinery. Shielded cabling was also preferred by KKUH due to its scalability and flexibility to handle future data transmission speeds and demands on the network. It also has the advantage of reducing the effects of electrical hazards when properly grounded and bonded.

R&M won the project due to its ability to offer high-quality zero-defect components coupled with modular design in line with KKUH's needs for planned future expansion. It was also the only in-country vendor at the time to offer an end-to-end fully shielded cabling solution implemented by certified installers.

360° shielded

The Cat. 6A shielded STP is the only product on the market in which the copper module is 360° shielded against electromagnetic and radiofrequency interference. It enables uninterrupted optimized data transmission, elimination of cross talk and protects against network instability.

R&M's Cat. 6A shielded STP also provides enhanced security and support to deliver maximum conductivity for high-speed data transmission, performance, and enables more bandwidth for faster data transmission (of up to 10 Gigabit Ethernet) versus other Cat. 6 shielded and unshielded versions.

Modularity

R&M installed a flexible, high-performance network that can handle the complex operations and daily medical routines in the hospital. The implementation was finished on schedule thanks to R&M's certified local partners, and, while ongoing, the hospital IT staff was pleased with the strong support shown by the local Saudi office. R&M's modular design also provides the requisite scalability needed by KKUH and allows the hospital to expand and upgrade the network with little to no increase in hardware.

KKUH is a university hospital and the e-learning system which is used for education also runs on the R&M solution.

Now, post implementation, KKUH has in place a trouble-free, high-performance network scalable for future applications. ■

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QPP: Paving the Way to a Quality Network

R&M has brought its training program for installers, planners and network pros in line with current requirements. Partners who sign up to the Qualified Partner Program (QPP) are able to offer their customers long-term warranties and be part of a quality assurance system that is unique worldwide.

Customers want to be certain that their data network is up and running correctly at all times. And the best way of ensuring that is to implement consistent quality assurance right across the entire value added chain – from component manufacture through professional installation and commissioning to the competent maintenance of a cabling installation. Years ago R&M established QPP, a modular training, support and warranty package guaranteed to bring about the desired success. It ensures a standardized level of training and installation quality worldwide in keeping with R&M's exacting quality requirements.

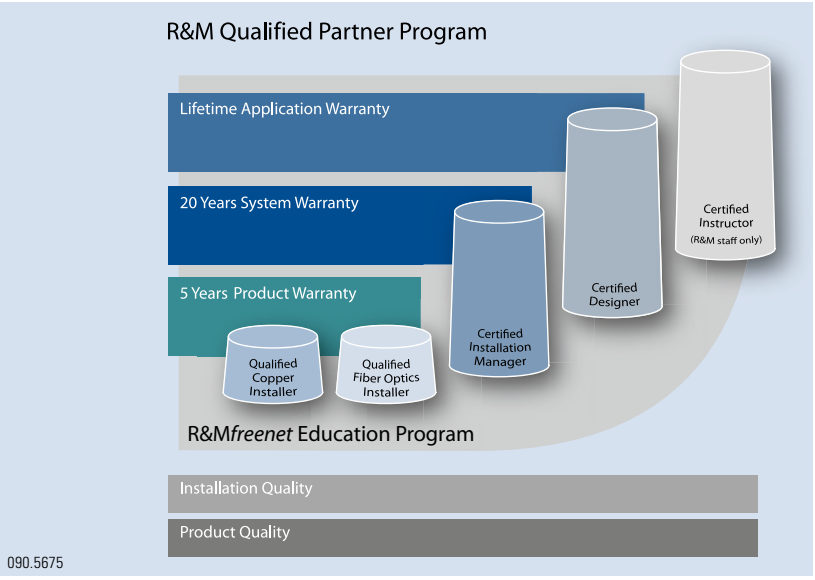
Quality certified & guaranteed

As part of the current regionalization process QPP has been updated and reintroduced to all the sales regions over the past few months. The R&M market organizations are responsible for the qualification and certification of the partners. R&M only uses its own, highly qualified employees as instructors, and their knowledge and expertise are recertified in the course of annual audits.

Technically experienced network professionals from the partner companies invest one day to familiarize themselves with the R&M*freenet* cabling system and its handling. On successfully completing the training module they are awarded the title R&M*freenet* Qualified Copper Installer. After another day's training they are able to acquire know-how in fiber optic technology and the title R&M*freenet* Qualified Fiber Optics Installer. R&M grants a five-year product warranty on installations set up by Qualified Installers.

R&M also offers two further QPP levels with certification for experts, project managers, planners and executives at partner companies. After a two-day training course and a successfully completed final test they achieve the level of R&M*freenet* Certified Installation Manager and R&M*freenet* Certified Designer.

Certified Installation Managers are entitled to offer their customers a 20-year R&M system warranty for correctly installed networks. With QPP, Certified Designers acquire the opportunity to obtain a lifelong R&M application warranty for their projects. R&M therefore offers operators and users of data and communication networks one of the most comprehensive warranty programs in the structured cabling sector. ■



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Overview of the Qualified Partner Program (QPP)


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The newly developed Optical Distribution Frame.

Concentrated Fiber Management

Step by step R&M is broadening the range of applications of its innovative SCM system family. The new Optical Distribution Frame (ODF) is now available as a platform for splice, patch and combination modules. Its strength: concentrated management of up to 2304 fibers.

In launching its Single Circuit Management (SCM), R&M achieved a quantum leap in distribution technology for next generation networks. From central offices to building entry points (BEP), network operators will in future use a standardized, modular splice tray system to handle large volumes of optical fibers. The quick-assembly technology, user convenience and packing density of the SCM system family have boosted the efficiency and value added potential of FTTx and FTTH projects.

Following the acclaimed debut of the SCM splice closure as a compact solution for the fine distribution of fiber optics and last-mile subscriber management (see *CONNECTIONS 37* and *38*), R&M now presents the platform for central offices and data centers. The new Optical Distribution Frame (ODF) can be fitted with three different ODF modules: the SpliceModule, PatchModule and CombiModule. Each ODF module is installed and operated in just a few easy steps. With the click-in system, screws and special tools are now superfluous. R&M complements the offer with pre-terminated and factory-tested units. The SCM system guarantees a 40 mm bending radius in any case – a key safety and quality criterion for future high-power and xWDM applications.

Network operators use the SpliceModule as a cable-to-cable splicing solution in combination with loose tube cables and blow-in applications. For subscriber management, SCM splice trays are simply clicked into the fold-out splice tray holder that also doubles up as an integrated work surface. A SpliceModule holds up to 576 fiber optic terminations. The PatchModule has space for up to 288 connections and is suitable for breakout applications with pre-terminated cables. Twelve patch plug-ins with twelve connectors each all fit onto one frame. They can be equipped with both LCduplex and SC-RJ or E-2000™* compact. Available cabling solutions include mini-breakout, multipatch cord, harness cables and the VARIO*line* system. The CombiModule combines splice and patch areas into a single unit that is also scalable up to 288 connections. A 24-fiber system patch cord combines the two and guarantees a simple, secure and swift retrofit.

The large number of configuration options with ODF modules opens up new ways for users to achieve competitive network expansions in central offices, collocation centers and street-side cabinets, right through to building entry points. ■

** E-2000™ manufactured under license from Diamond SA, Losone*

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Short, Strong, and Flexible: the Cat. 6 Coupler Module

R&M is adding to its R&M*freenet* range with a Cat. 6 coupler module. It will be available as a shielded and unshielded version and feature an extremely compact design of only 2.88 cm. The connection piece for Cat. 6 links is ideally suited for a multitude of applications in office, building and industry cabling.

With the new Cat. 6 coupler module from R&M users can now achieve even greater flexibility in office, building and industry cabling. It combines two RJ45 jacks on less than three centimeters.

It means that many cablings can now be extended in next to no time. Likewise certain installation tasks can be resolved simply by clicking patch cables together. The Cat. 6 coupler module is particularly well suited for use in consolidation points and cross-connect distributors or in the DeskBox from R&M's Extended Office Cabling range. Coupler module solutions are also ideal for the space-saving integration of cabling inside office furniture.

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The Cat. 6 coupler module

Network services can be connected quickly and flexibly inside distribution cabinets by snapping coupler modules into the patch panel and connecting only patch cords to the front and rear. The coupler module is therefore especially suitable for network components whose output interface is at the back. Using the coupler module also helps to avoid typical lead-through errors. No special connecting cables are required with connectors and jacks at either end.

The Cat. 6 coupler module also supports Industrial Ethernet. The double connector socket can be used in the intermediate distributor (ID) or used to set up point-to-point connections between network interface (NI) and automation or apparatus.

R&M's new development meets all the requirements of the relevant Cat. 6 cabling standards ISO/IEC 11801, EN 50173 and TIA/EIA 568B/C. In a permanent link consisting of R&M*freenet* components the coupler module supports Class E performance. The Cat. 6 coupler module is compatible with Cat. 6 standard connectors. It fits all R&M*freenet* patch panels, most R&M outlets, and many platforms by other manufacturers. R&M provides four adapter systems for quick assembly: snap-in, adapter No. 1, Keystone and a support plate for R&M*freenet* components. ■

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The new security laboratory in Spiez

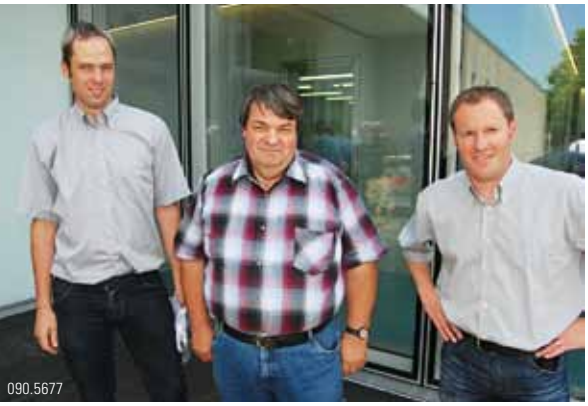
Maximum Security Virology

The world's most dangerous pathogens now have a new opponent to contend with: SiLab, the high containment security laboratory of the Federal Department of Defense, Civil Protection and Sport (VBS). The laboratory designed to comply with the highest biological security standards has been built in Spiez on Lake Thun. R&M cabling is part and parcel of its security package.

Very few facilities on the planet are as secure as this one. Indeed the SiLab's concrete containment walls are designed to prevent any unicellular organisms from getting out. Any such organism intent on escaping, whether a virus or a dust particle, is suctioned back into the building by the negative pressure installation. All the walls, floors and ceilings are coated with several layers of epoxy resin. The laboratory is 76 000 times more insulated than an ordinary low-energy home built to the Swiss Minergie standard. It can even withstand severe earthquakes. Every liquid, even waste water, is uncompromisingly sterilized – for at least 20 minutes at more than +120 °C. Special gases and powerful acids with a pH value of 2.3 handle the remaining sterilization and cleaning tasks.

All these efforts are vital – literally – for the researchers working inside the building and for the people outside. As of next year the SiLab will be conducting research into the most dangerous pathogens, hazardous microorganisms and biological weapons. The SiLab is part of the Spiez laboratory campus, a facility set up by the Federal Department of Defense, Civil Protection and Sport (VBS) to protect against nuclear, biological and chemical hazards.

The SiLab's tasks include conducting research work as well as carrying out diagnostics and tests for the civilian and military domain. In the event of a critical incident the SiLab has to be able to analyze pathogens as quickly as possible, advise the authorities and suggest protective measures. For the first time in Switzerland the new laboratory will enable comprehensive, secure laboratory



From left to right: Matthias Maurer, Project Manager; Fritz Schneider, Construction Manager; and Daniel von Dach, Managing Director of Elektro Hunziker AG, Thun

diagnostics of risk group 4 viruses such as the Ebola virus. These viruses are highly infectious in humans; they are characterized by a high mortality rate and are extremely difficult to combat effectively. The SiLab also trains external specialists in biological weapons and civilian laboratory technicians. The Swiss Confederation invested just under CHF 30 m to plug a gap in civil protection and national security.

Eight years in the planning

Every aspect of the new laboratory building was thought through, which is why the planning took over eight years. The SiLab features exceptionally processed materials, special construction methods, and operations secured at multiple levels. Every component has to satisfy stringent quality requirements.

After the relevant material testing procedures, the decision for the cabling components went to R&M. The managers in charge at armasuisse Immobilien, the Federal Department's real estate competence center, followed the recommendations of the installer Elektro Hunziker AG from Thun, part of the Burkhalter Group, and the planning agent SSE Engineering AG in Zurich.

> "This project far exceeds ordinary security criteria."
>
> Architect Rolf Nöthiger, of ANS-Architekten

"I've been working with R&M products for over 30 years and use them in practically every building project. I have complete trust in their quality," says

R&M cabling as part of the complex technical infrastructure.

Fritz Schneider, Chief Installer at Elektro Hunziker AG, who along with 14 other installers worked on the building site for two years. He also has nothing but praise for the ease of installation. "Insert, press down, and that's it: the connection's done – with their quick-installation solutions R&M really makes the installer's life a lot easier," says Fritz Schneider.

Cabling with added security

"For the high-security laboratory we developed a separate LAN with fiber optic backbone and copper cabling," explains Winfried Falk, Head of Electrical Engineering at SSE Engineering. The copper cabling complies with Class EA/Cat. 6_A high-performance standard. The LAN covers the laboratory areas that comprise the Administration, Technology, Physics and Chemistry, and also handles control and security tasks. The building services management is redundant in design so that it continues to operate without interruption should any individual system fail.

IP video cameras monitor all the premises. Incubators and refrigerators need to be monitored around the clock. With the R&M color-coded and locking security system, the patch cords cannot be mistakenly allocated or pulled out unintentionally. R&M IP54 protection solutions keep dust and fluid splashes away from the connectors. Outlets were dispensed with on the Level 4 Biosafety premises to ensure the microorganisms have nowhere to hide. Here all the apparatus is connected directly with the LAN using pre-terminated color-coded patch cords.

Constructive solutions from R&M

"For the door magnets we needed a clever connection idea. All it took was one call to R&M and the problem was solved," recalls Matthias Maurer, Project Manager at Elektro Hunziker AG, referring to one of the project's quirks. Usually door magnets use fixed cabling to connect with their control system. In the SiLab the control boxes are housed on the upper floor for security reasons and the lines run through pressure-tight walls. That pressure-tight seal would be broken if a door magnet had to be repaired and its fixed-connection control cable replaced. The laboratory room in question would then have to be resealed and subject to a pressure test. "It's the sort of effort and expense we wanted to avoid at all costs," says Maurer.

The solution: Instead of fixed cabling R&M recommended a connection with a field-terminable FM45 connector. The FM45 connects the magnets with outlets situated next to the doors. In the event of a fault the laboratory personnel itself could, in a few quick steps, replace the magnet, the short connecting line and the FM45. The cabling from the outlets to the control boxes through the pressure-tight walls would then remain unaffected.

> "I have complete trust in the quality of R&M products and use them in virtually every building project."
>
> Fritz Schneider,
> Chief Installer at Elektro Hunziker AG

Fritz Schneider: "That was not the only challenge, and yet R&M solved each and every one quickly, flexibly and constructively. R&M even made the impossible possible." As a result the high-security laboratory was completed on schedule. Winfried Falk of SSE Engineering concurs: "I am very satisfied with the level of cooperation and the solutions." ■

At the SiLab, maximum security is the order of the day: when working with bacteria and at every interface, including the cabling.

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Designing a Fiber Optic Network with Statistics

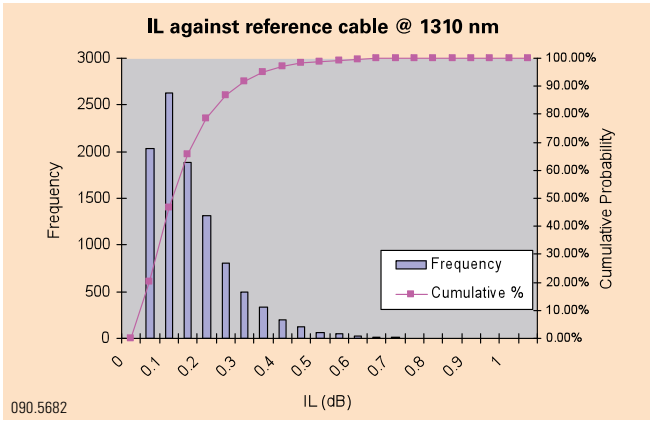
The design and optimization of modern optical fiber transmission systems strongly rely on computer modeling techniques. The models are continuously improved and validated through comparison against experimental measurements. In particular, the connector losses of an optical channel can be simulated using statistical models and Monte Carlo techniques.

Random-mated attenuation and attenuation against reference connectors

Every fiber optic connector family can be characterized by a certain attenuation distribution, which describes the probability of observing a certain attenuation level when two random connectors are mated. This characteristic attenuation distribution is estimated by means of a random-mated attenuation test. For single fiber connectors, this test is defined by IEC 61300-3-34. A similar test is at the moment under development for multifiber MPO type connectors (IEC 61300-3-45) and is expected to be published in June, 2011.

The first step defined in IEC 61300-3-34 consists in randomly selecting several connectors and adapters from production. Every connector is then mated against all others using the adapters. Finally, the resultant attenuation is recorded for each case (usually @ 1310 nm and 1550 nm for single mode connectors and @ 850 nm and 1300 nm for multimode connectors). Note that the method used to measure the attenuation itself is described in IEC 61300-3-4. Every attenuation measurement will likely show different values since each time different connectors and adapters are involved. The loss values recorded are then plotted as a histogram (see Figure 1, below) from which a cumulative probability curve can be extracted. This curve represents the probability of achieving a loss level equal to or smaller than a certain given value. Note that the cumulated probability is indicated in the secondary y-axis of the diagram. In our example, 50 % of the connections on the field will display losses lower than 0.30 dB and 97 % of the connectors will display losses lower than 1.25 dB. Since the attenuation generated in mated connectors is not a fixed quantity, it is said to be a random variable, which may take any value represented in the histogram of Figure 1.

In the fiber optic connectors industry, the quality of a connector is evaluated immediately after fabrication by measuring what is referred to as attenuation "against reference". This is a much sim-



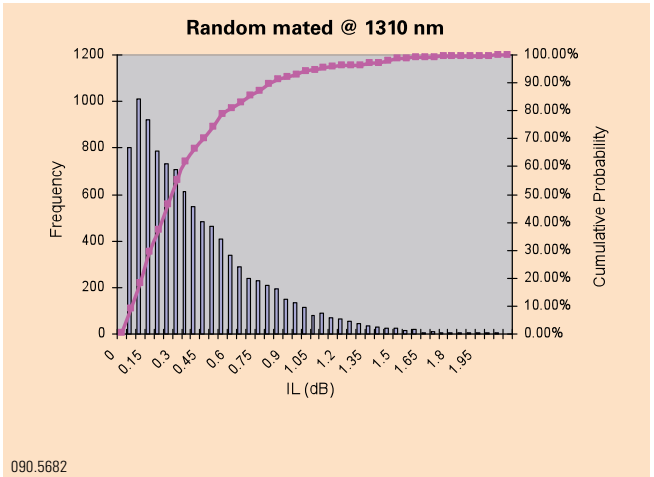


Figure 1:

Simulated insertion loss histograms of not tuned (low quality) single mode connectors.

Above: Measurements against reference connector. The maximal IL values are close to 0.70 dB.

Below: Same connectors measured against each other (random-mated procedure). Maximal values are close to 2 dB.

Table 1: Monte Carlo simulations for different multimode channels using the optical coupling definitions given in ISO IEC 11801 and EN 50173-1

	NUMBER OF CONNECTIONS IN THE CHANNEL (values in dB)					
	1	**2**	**4**	**6**	**8**	**10**
ILmax	0.75	1.50	3.00	4.50	6.00	7.50
IL99 %	0.72	1.35	2.18	2.90	3.48	3.83

pler test where every finished connector is mated against a high precision "reference" grade connector and the loss is recorded. The measurements are usually performed using selected couplers as well. The attenuation values so obtained are useful to detect any production bias. The loss values measured against reference cables are typically included in datasheets and delivered together with patch cables and pigtails, which has created some confusion in the community. Some people believe that a reference attenuation value "is" the attenuation of the connector itself. This is clearly an error since a connector does not possess any attenuation per se. Attenuation in the signal will only arise when mated against another connector.

The attenuation values measured against reference grade connectors are in general not comparable with those measured by random-mated tests. In fact, the measurements against reference connectors tend to be very optimistic since one of the connectors in the mated pair is actually a reference grade connector. This fact is especially true for low quality single mode connectors (see Figure 1) where the measurements against reference cables can be reported to mask a very poor random-mated performance. For high quality connectors (max. attenuation close to 0.3 dB) the random-mated measurements and the values measured against reference grade cables can, however, be compared.

Using Monte Carlo simulations to evaluate losses in a channel due to connectors

Since most optical channels feature more than one optical connection, Monte Carlo techniques allow us to develop an attenuation histogram for the channel, which will depend among other factors on the number of mated connectors in the channel and on the type of connectors used. The technique is especially useful in multimode applications such as data centers, where LC and MPO connectors are commonly found. The random-mated attenuation characteristics of both families of connectors are first measured. In the case of multimode connectors, the proper modal power distribution should be used since this is known to affect strongly the connector loss measured. A method to evaluate a given modal power distribution or "launch condition" is defined by IEC 61280-1-4 (Encircled Flux method). The proper launching conditions for multimode measurements are defined in IEC 61300-1 and are intended to simulate the modal power distribution generated by vertical cavity surface emitting lasers (VCSEL) since this kind of laser is mostly used in multimode applications. Once the random-mated losses have been determined, the histograms are used as input for the optical channel simulation program. The result is a new histogram that represents the distribution of the combined attenuation losses in the channel due to all the connectors present in the optical link.

The calculation is customized for every particular channel design, simplifying enormously the determination of the channel power budgets.

In addition, the power budget calculation is based on much more realistic values due to the precise knowledge of the statistical distribution of the total connection losses. Nowadays it is common practice to estimate the total connector losses by adding the maximal loss expected for each mated pair in the channel. For instance, if the maximal loss expected for a connector family is 0.75 dB, then the connector losses in a channel with two mated pairs is said to be 1.5 dB. This simple approach strongly overestimates the real connector losses. Indeed, this procedure does not take into account that the probability of actually having two or more optical connections in a channel where all of them are formed by "bad connectors" is very low. In order to illustrate the point we simulated the connector losses in a channel assuming the mated pair definitions given in EN 50173-1 & ISO IEC 11801 for multimode connectors (100 % IL< 0.75 dB, 95% IL< 0.50 dB, 50 % IL< 0.35 dB).

The results of the Monte Carlo calculations are represented as the cumulative 99 %, meaning the maximal loss values expected for 99 channels out of 100 (Table 1). The losses calculated by the "standard" procedure are also included for comparison. As the number of connections in the channel increases, the difference between the 99 % cumulative values and the "standard" maximal values also grows. Consider for instance a channel with eight mated pairs. The addition of the maximal loss values (0.75 dB) gives 6.0 dB. The simulations of the channel indicate that in 99 % of the cases, the total connector loss values will be smaller than 3.48 dB. Following the model predictions, the probability of actually having values close to 6.0 dB is smaller than one in a million channels! In summary, Monte Carlo modeling provides a more realistic estimation of the connection losses on the channel. Note that other levels of cumulative probability can also be calculated (i.e. 90 %, 99.9 %, etc.) ■

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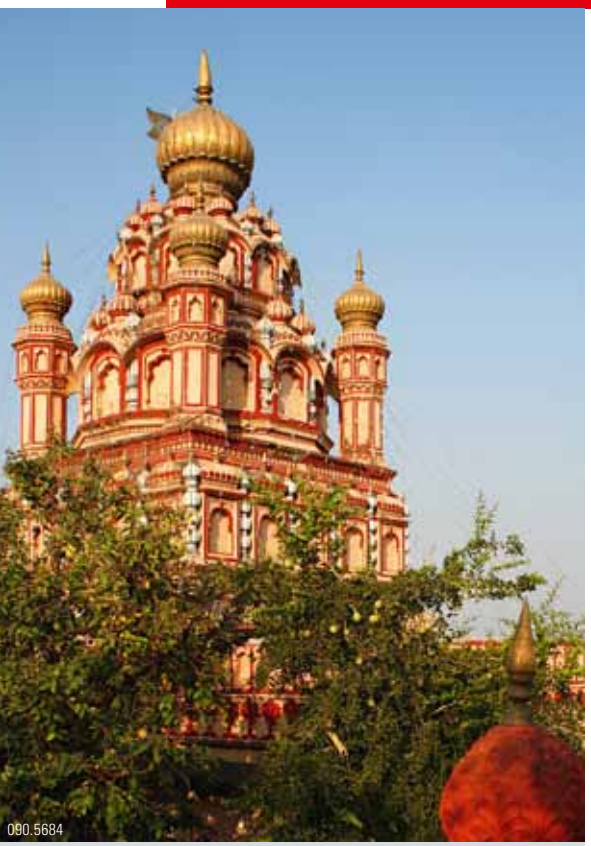
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Real10 Solutions from R&M Power Tech Mahindra's Expansion Plans

WHY R&M?

- **Value added products along with technical and logistic support**
- **Took time to understand customer requirements and suggested the use of the global panel**
- **Despite space constraints delivered solution that met expansion requirements with interbuilding connectivity on three-tier architecture**

FACTS AND FIGURES

- **Cat. 6 solutions with all color codes – for office area**
- **LC adapters**
- **3U global panel**
- **Cat. 6A and OM3 fiber solution for data center**
- **Hinge dust covers**
- **Cat. 6 UTP cable – 1450000 m**
- **Cat. 6 I/O**
- **OM3 cables for the backbone – vertical and campus wide**

Riding on its current growth, Tech Mahindra is moving to the next level of expansion with its new establishment. R&M not only provided value added products, but also played the role of a trusted advisor to help Tech Mahindra achieve interbuilding connectivity through Real10 solutions.

Tech Mahindra, a global leader in providing end-to-end IT services and solutions to the telecom industry, is India's fifth largest commercial group. Tech Mahindra is a global systems integrator and business transformation consulting firm focused on the communications industry. In partnership with BT, it has grown rapidly to become the fifth largest software exporter in India (Nasscom 2009) and is Europe's second largest telecom service provider. It currently employs over 30 000 service staff working across various telecom segments from multiple offshore development centers in America, Europe, the Middle East, Africa and Asia-Pacific.

Headquartered in Pune, Tech Mahindra has seven software development centers, of which six are in India (Mumbai, Pune, Bangalore, Chennai, Kolkata and Noida) and one in the UK. Tech Mahindra was looking for a vendor who would not only offer value added products, but would also lend technical and logistic support. R&M met all the requirements and has already cabled other premises of Tech Mahindra in India and the UK.

Tech Mahindra's new data center houses close to 50 server racks, and was supplied with a total of 28 000 nodes. The new premises consist of two towers with two blocks each. Each floor in these blocks has a hub room, summing up to 12 hub rooms in total. Each of these network rooms is connected to three-tier architecture with the maximum redundancy possible at the link and switch level. In the case of such architecture, at the core there is the main network that is connected to the distribution frame. This distribution frame is further connected to access switches that connect to the workstations. This interbuilding connectivity was one of the focal points of the entire project.

Yet another highlight of the project was the use of 3U hybrid global panels with copper and fiber solutions. This was done on the recommendation of R&M to meet the space constraints in the data center. By virtue of its modular design, these panels can be fitted with up to 15 4 x 1-port connection module holders or blind elements (max. 60 x RJ45/u, RJ45/s, SC-RJ or E-2000™* compact ports). It is installation-friendly due to its snap-and-go fastening system. Its shielded version includes a complete integrated grounding system and is suitable for the Data Safe Lock coding system.

Additionally, R&M's Real10 Cat. 6 connection modules, from the R&M *freenet* cabling system, are ideal for voice, fast data transmissions and high bandwidth applications. This high-performance Cat. 6 module is perfect for use in 10 Gigabit Ethernet (10GBASE-T) applications to 500 MHz. When installed as part of an R&M Real10 Cat. 6 shielded 4-connector channel, it exceeds the IEEE 802.3an minimum requirements for 10GBASE-T performance, as well as the requirements for class EA performance in accordance with/IEC 11801ed.2002, Amendment 1, and Cat. 6A performance in accordance with TIA/EIA 568-C.2. ■

** E-2000™ manufactured under license from Diamond SA, Losone*


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Global 4U equipped with FiberModule trays with LC quad adapters

PTC data center

FACTS AND FIGURES

- **Cat. 6A STAR Real10 S/FTP cables**
- **Fiber optics: OM4 multimode cables**
- **R&M LC/PC connectors**
- **Three-stage safety system**
- **52U 19" racks**
- **96-fiber OM4 cables**
- **Copper: 24 ports Cat. 6 STAR Real10 1U patch panel**
- **Fiber optics: Global 3U equipped with FiberModule trays (24 fibers per tray)**

Individual Connections

Poland's largest mobile telephony network operator not only ensures the personal connections between its subscribers – when it came to its own data center it, too, wanted a network tailored specifically to its individual needs.

Polska Telefonia Cyfrowa Sp. z o.o. (PTC) is a leading cellular phone operator and wireless Internet supplier. PTC supports over 3.5 million customers and covers almost 100 % of Polish territory. As one of the biggest telecommunication companies in Poland, PTC has significant influence on the development of the local providers market.

In order to ensure continuous development of its own activity, PTC decided to build a new data center in Warsaw. The modernity of this investment is emphasized by the fact that it fulfils the strongest requirements for TIER IV in accordance with the TIA 942 standard. Right now only a few objects in Europe can boast such a functionality.

To achieve this goal PTC started to search for suppliers of building cabling infrastructure. As a result of careful selection and analyses of tenders, Reichle & de-Massari (R&M) was chosen. There were a few factors which determined that choice. First of all it was the top quality and reliability of R&M products that had already been verified during cooperation of the two companies in the past. The second issue was the flexibility and innovation of the whole system; direct supervision throughout the installation process was regarded as added value. This challenging task was assigned to Leszek Sroślak, Key Account Manager at R&M Poland. He was responsible for ensuring that all the work progressed at a good pace while fulfilling the requirements of the customer. Leszek did an excellent job and R&M was able to fully satisfy PTC.

In accordance with PTC's demands, whole cables were laid via the ducts in the ceiling enabling more efficient management of connections. The copper cable of Cat. 6A Real10 S/FTP was used. When it came to fiber optics, singlemode OS1 and multimode OM4 cables were chosen. As a novelty 52U 19" distribution racks were installed enabling better space usage. These racks were equipped with two kinds of patch panels: 4U global patch panels filled with FiberModule trays and 1U Unirack. For the first time, in the case of MM, the FiberModule trays contained the LC quad adapters increasing port density to 24 ports a unit. For the same reason, LC duplex adapters were installed in the Uniracks. Thanks to these solutions, 4U global patch panels could accept 288 terminations and Uniracks up to 48. For SM E-2000™*/APC connectors were used. The standard port density was obtained (144 terminations for global and 36 for Unirack). For functional and economic reasons, PTC decided to use 96-fiber cable. To better handle fiber optic connections, specially designed cable dividers were used. This meant that each tube with fibers could be connected directly to patch panels or trays, protecting them throughout the cabinet area.

Special distributors were developed to handle connections with active equipment. These were hung directly underneath the cable containers on the ceiling. The data center thus supports fiber optic and copper connections. Terminations are made in 1U 24-port patch panels for copper and in Uniracks for FO.

Thanks to a considered choice of components and due diligence of installation in such a demanding environment, PTC was able to achieve its objective. The network is working properly and PTC is already considering an extension based on the R&M solution. The high standards offered by R&M resulted in an extremely satisfied end user. ■

** E-2000™ manufactured under license from Diamond SA, Losone*

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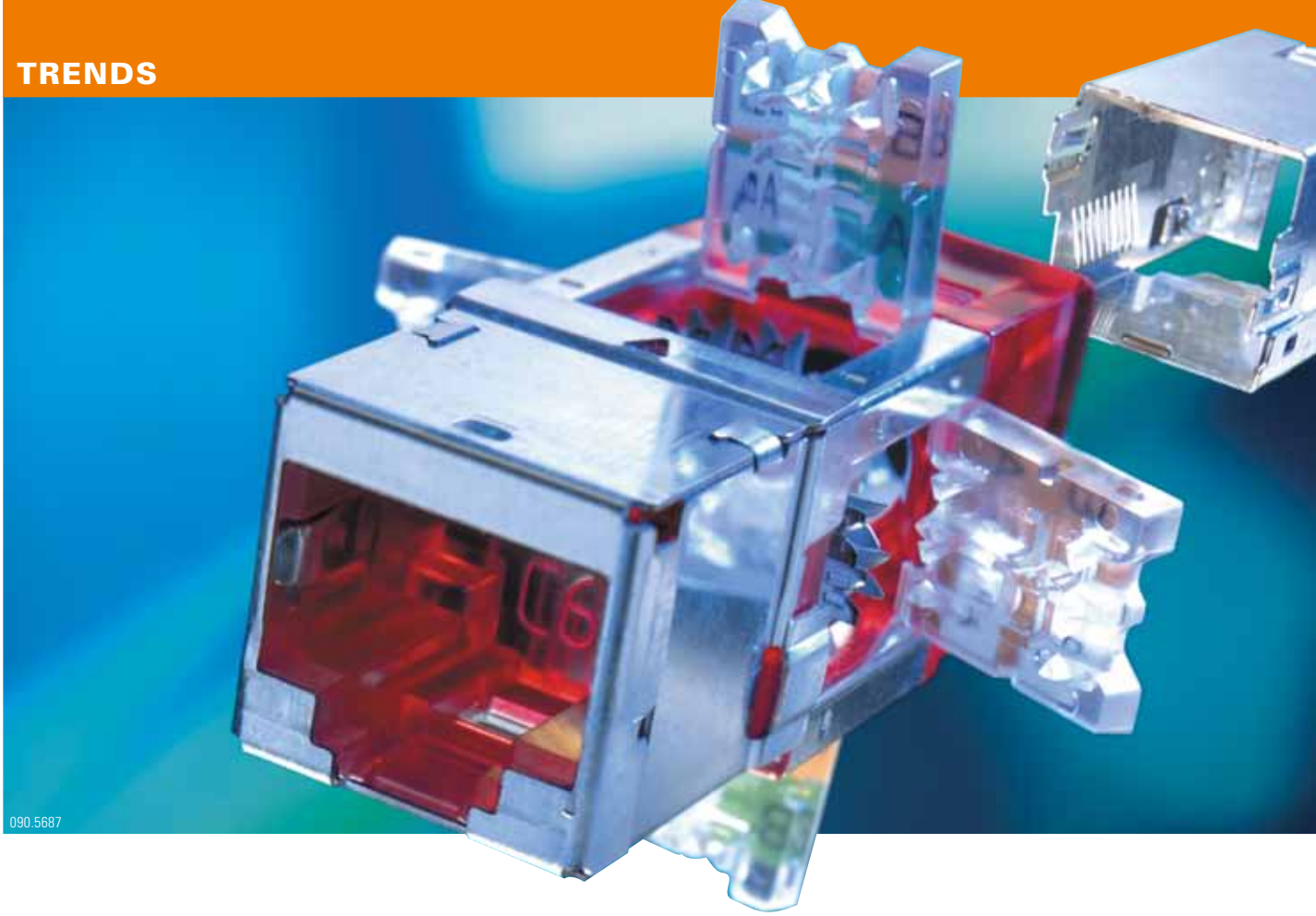


Quality Confirmed: Cat. 6_A Module in Practice

The first acceptance measurements confirm that the Cat. 6_A module from R&M is setting new standards in copper cabling. The installations implemented in various customer projects boast exceptional NEXT reserves. R&M's Cat. 6_A module is proving to be the most high-performance RJ45 connection technology of all times.

Since the market launch of the Cat. 6_A module in spring 2010 R&M has had the opportunity to complete various projects on customer premises. The consistently favorable and exceptionally high NEXT reserve has proved particularly satisfying in practice. It is regarded as the standard for signal transmission quality and preventing crosstalk between wire pairs. The high NEXT reserves were noted during the acceptance measurements on all projects – and were of an order of magnitude previously unheard of in twisted-pair copper cabling.

In fact the NEXT reserves with the new RJ45 connection module are so high that undercutting minimum link lengths is not a problem. The standard requires a link length of 15 m. But with the Cat. 6_A module from R&M it is possible to install links with minimum lengths of 2 m without affecting transmission quality.

This is very good news indeed for data centers. Often they do not achieve the prescribed minimum length for connections between neighboring racks. As a result they are forced to install space-consuming and ultimately costly cable reserves beneath the racks. With cabling equipped with the Cat. 6_A module from R&M many of these cable reserves are now superfluous. The limited scatter in measured values within a cabling project is also regarded as exceptional. The statistical scatter in NEXT value – adjusted for systematic changes due to link lengths – showed a standard deviation in all acceptance measurements of 1.1 dB. An extremely low value, especially when you consider that it caters for all the influencing factors from production tolerances to the installer's skills.

Aiming to be the best ever RJ45 module

All of which confirms the development objective. R&M has come up with the

best quality, best performance RJ45 connection module for twisted-pair copper cabling. It outperforms the requirements of ISO/IEC 11801 and opens up new dimensions for high-frequency data transmission in terms of operational reliability, value added, and ease of installation.

Performance: perfect
Wiring: brilliant
Shielding: uncompromising
Safety: instant
Format: compatible

When designing the module, R&M focused from the very outset on achieving the best possible transmission quality. Even the wiring of the cable onto the module was to have as little influence as possible on the transmission technology. No longer was the installer's work to impact the NEXT performance, as has frequently been the case in the past.

R&M achieved its ambitious objective with a series of design measures. The key development stage was introducing the central shielded cross in the connection block. Each twisted pair is contacted in a separate chamber. The shielded cross prevents any crosstalk between the pairs. Variations in the wiring have no effect on the end result.

When the twisted pairs are inserted into the wiring cover, the pairs are drawn apart into the four directions immediately after exiting the cable jacket. This creates the greatest possible spacing between the pairs – and also serves to reduce crosstalk. The pyramid inside the contact block prevents the twisted pairs from coming together uncontrollably in the wired state and forces regulated guiding. This principle is also used in the de-embedded measurement technique to feed twisted pairs from cable extremity to measurement balun subject to as little influence as possible. The compensation technology also contributes to the outstanding quality of the Cat. 6_A module. With crosstalk already effectively sidelined in the connection block, it became possible to adopt new approaches when developing the compensation element, unburdened by external influences.

Using state-of-the-art computer simulations, R&M found a three-stage compensation solution. It compensates both the amplitude and the phase of the crosstalk, resulting in the exceptional NEXT reserves mentioned earlier.

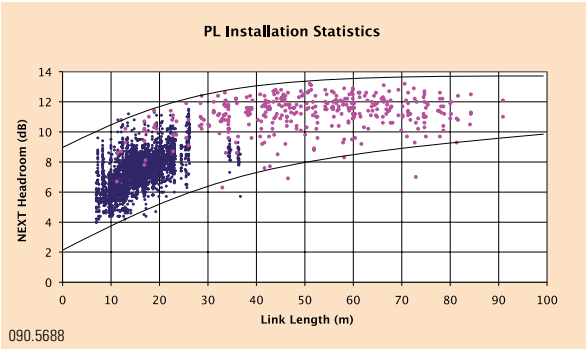
The design of the compensation element already takes account of typical process tolerances. Special layout methods were used to keep these tolerances as low as possible.

One hundred percent quality

R&M incorporates stringent quality tests in all stages of the manufacturing process to ensure that only good modules make it onto the market. A complete functional check completes the manufacturing process. Every single module is 100 % tested – for continuity and short-circuit, high-voltage strength at 1000 V, and observance of the NEXT and RL values on all pair combinations.

And so once again R&M has succeeded in setting new standards in transmission technology and offering its customers unparalleled reserves for future-proof, reliable cabling, regardless of the skills of the individual installer. ■

Cumulated measured values from acceptance measurements on the first installations completed using the new Cat. 6_A module from R&M. The NEXT reserve achieves unprecedented orders of magnitude, underscoring the outstanding quality of the innovative Cat. 6_A solution. Graphic: R&M



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The Traditional and the Modern – STAR Real10 for Switzerland's Biggest Brewery

Switzerland's biggest brewer, Feldschlösschen Getränke AG in Rheinfelden, is proof positive that tradition and state-of-the-art cabling technology are not incompatible. For its new office building, the brewing company with a history going back more than 130 years is relying on a 10 Gigabit Ethernet-compatible infrastructure from R&M.

During working hours all beverages are free and, as tradition has it, there is an established right to a beer during lunch breaks and another one after 5 pm; indeed the workforce at Swiss brewers Feldschlösschen AG benefits from a generous tradition. The company, which now belongs to the Carlsberg Group, takes its traditional values very seriously, as its concern for the well-being of its workforce demonstrates. On request the beer can still be delivered the old fashioned way, i.e. by horse-and-cart drawn by horses from the brewery's own stables. Feldschlösschen is also fully committed to the brands it has bought up and continues to market them unchanged. One example is Cardinal beer, well known in western Switzerland, which is still brewed in Fribourg according to the old traditional recipes.

For all the tradition, a large brewery such as Feldschlösschen can only be run successfully if it is backed up by an efficient administration and state-of-the-art office communications – indeed, in Switzerland alone it supplies 7000 events a year on top of all the bars and restaurants.

With office premises spread out across six different buildings such a pace was proving difficult to maintain, and so at the end of 2008 the company gave the go-ahead for a new office building in Rheinfelden that would accommodate all 250 administrative employees under one roof for the very first time.

The horse, an emblematic symbol in front of the new office building

The same standard at all the locations saves time and costs.

Quality plus a standardized solution

Highly qualified local experts took the project in hand: the planning was the responsibility of Herzog & Kull and the installation partners were Rechsteiner AG and Ruther AG. These are certified by R&M as part of its Qualified Partner

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Program (QPP), which means they are able to offer their customers high installation quality and long-term warranties (see also page 10).

Alongside the planning for the new building in Rheinfelden, an Installer's Manual was also drawn up for all 16 Feldschlösschen locations in Switzerland. All the products to be used at Feldschlösschen are defined: for the cabling the STAR Real10 Cat. 6 STP from the R&M*freenet* cabling system; for the riser zones the fiber optic products from the R&M*freenet* range. Fiber optic products are also to be used for the campus cabling at the larger locations so the sites are perfectly equipped for future increases in data volumes.

Reliable cabling
is the mainstay
for all the other layers.

The network managers at Feldschlösschen opted for the strategy of a standardized product range, the reasoning being that it simplifies certification procedures. IT Manager Filippo Costanzo appreciates R&M for its proverbial high standards of quality and also the 20-year system warranty: "The warranty and the fact that we have the same standard at all our sites – that saves time and costs."

A mainstay for other layers

The new offices at Feldschlösschen in Rheinfelden, which were occupied at the end of 2009, are equipped with Wireless LAN as part of an open-space philosophy. There is also a range of cabled connections, for example in the meeting rooms.

The hybrid use calls for an interruption-free network with stable connection technology. "Everything has to be neatly planned and cabled," says Filippo Costanzo, who believes that cabling's subordinate status in the world of IT is unjustified. "Reliable cabling is the mainstay for all the other layers and the applications that run on them." ■


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For all the tradition, success is also founded on efficient administration and state-of-the-art office communications.


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R&M Answers LSI's End-to-end Networking Needs

With its rapidly expanding business, LSI Corporation India is aiming to become an integral part of the international Group. To cater to this demand the company planned for a bigger establishment – one that would enable them to meet new business requirements and also house an expanded workforce. All this was not possible without a strong end-to-end networking solution. For this, LSI trusted R&M with its unique high frequency cables and zero halogen connection modules, coupled with the color coding security feature.

LSI Corporation is a leading provider of innovative silicon systems and software technologies that enable products which seamlessly bring people, information and digital content together. LSI Corporation was founded under the name LSI Logic in 1981 in Milpitas as a semiconductor ASIC company. The company offers a broad portfolio of capabilities and services including custom and standard product ICs, adapters, systems and software that are trusted by the world's best-known brands to power leading solutions in the storage and networking markets.

The new building is six stories high and is spread across two hundred thousand square feet. From a networking standpoint, this new building – with 8541 nodes, a massive data center with 90 server racks, and a large testing lab – intends to become the hub for LSI's global operations.

WHY R&M?

- **Constant interaction with LSI on design, supply and installation**
- **Unique products especially for I/Os and cables**
- **The color coding feature was the focal point**

FACTS AND FIGURES

- **Cat. 6 solutions all with color codes**
- **Hinge dust covers**
- **Cat. 6 UTP cable – 249 000 m**
- **Cat. 6 I/O**
- **OM3 fiber cables six-core and 12-core – indoor/outdoor**
- **LC connectors**

The LSI building

LSI was looking for a vendor that would take care of the supply of end-to-end networking needs. Joseph Thomas, Head of Workplace Solutions Asia Pac at LSI said, "We were looking for a partner who has the expertise to deliver a complete solution involving design, products and installation and we found this capability in R&M. The R&M team was responsible for interacting with various installation partners to execute a solution that is compliant with global standards."

The products delivered to the customer included the OM3 cables for the backbone. These cables were able to achieve 10Gb Ethernet performance which today has become a basic requirement for most customers. High bandwidth cables and toolless connection modules (I/O) ensured better connectivity for the network and also made sure that the project timelines were met by minimizing the time required for termination. R&M, from a security side, had recommended that the client use external color coding, one that can be adapted to any system and one that would nullify the downtime involved with installations. In data centers, unused ports are often left exposed to dust and other foreign particles. R&M was able to counteract this by installing hinge dust covers. These covers help seal RJ45 jacks on the outlet and on the patch panels when unused. ■

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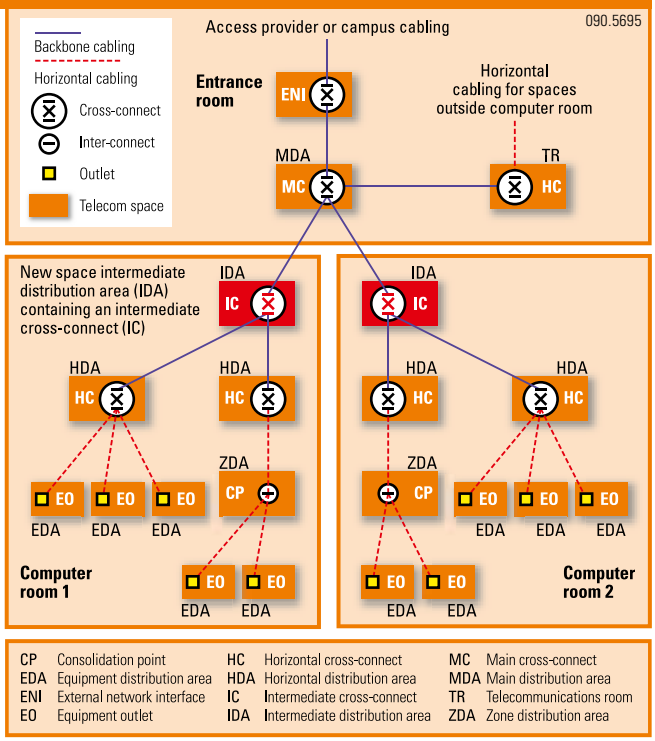

Draft TIA-942-A example data center topology: An intermediate level for a subordinate backbone distributor could be introduced between the main distribution area and the horizontal distribution area.

TIA-942 under Review

One of the main standards for data centers, the TIA-942, is currently under scheduled review and is most likely to be reissued in 2011 as TIA-942-A. Planners and users who work according to TIA can expect a few changes, but also a higher level of harmonization and flexibility.

In the version adopted in 2005, the TIA-942 standard was broad and practical in its remit in order to take account of all aspects of the data center infrastructure. It is something of a cookery book for data centers, with different recipes for building and room planning, network design, distributor structure and cabling systems. Although compiled for the US market, its comprehensive approach has meant that TIA-942 has also established itself in other regions, too.

Unlike the TIA-942 standard, the equally relevant ISO/IEC 24764 and EN 50173-5 cover only partial areas. What's more, TIA-942 does not simply give a recommendation for a standardized defined data center: It also looks into the diversity that prevails in practice. So it considers different expectations with regard to a data center's availability and redundancy, performance and safety.

Current reports seem to suggest that the new TIA-942-A is likely to shift from a comprehensive approach to a more networked approach. In the overall scheme of TIA standards, a number of aspects are to be reallocated and referenced for communication cabling. This also means that planners will have to incorporate several standards simultaneously into their work more often.

The new ISO/IEC 24764 and the European cabling standard EN 50173-5 are expected to have a certain influence on the wording of the TIA-942-A. This would reflect the wishes of many experts and users for greater harmonization among standards. TIA will not adopt the terminology of other ISO and EN standards, but adapt a number of elements for the definition of network infrastructure: for example the external network interface (ENI) and the equipment outlet (EO).

Already under discussion is the introduction of a new level between the main distribution area (MDA) and the horizontal distribution area (HDA). The proposal is for an intermediate distribution area (IDA) with a subordinate backbone distribution, the intermediate cross connect (IC). This approach reflects the requirements and practical experience of large data centers that often operate several computer rooms side by side. The individual rooms would be easier to administer via the intermediate level and the expanded topology.

TIA-942-A is also expected to do away with a number of restrictions on the length of horizontal cabling links. This would mean for example that fiber optic cabling could be designed more flexibly for a storage area.

Until now TIA-942 has not specified any connectors. The current debate shows that the new TIA-942-A version could indicate the use of LC and MPO connectors. This means that TIA would also pave the way for a high-density cabling infrastructure and parallel-optical transmission for 40/100 Gigabit Ethernet for next generation data centers (see also page 33). ■

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R&M Delivers Industrial Protection Rated Products in an Operating Factory Environment

For Toyota Kirloskar Motor (TKM), one of the leading car manufacturers on Indian soil, it became imperative to expand to meet the ever growing automobile demand in the Indian market. However, this required a best-of-breed solution, and that's where R&M came into the picture with IP rated products that are stable and in line with the industry standards to withstand harsh industrial conditions.

Toyota Kirloskar Motor (TKM) is a joint venture between Toyota Motor Corporation and the Kirloskar Group established in 1997 to manufacture and sell Toyota cars in India. Currently, it is the seventh largest car manufacturer in India. TKM believes that the success of this venture depends on providing high-quality products and services to all valued customers.

In 1999, TKM rolled out its first car in India. The factory data networks were supplied by R&M. This factory is located in Bidadi and has a capacity of rolling out 80 000 cars every year. This factory was commissioned to develop the very popular Toyota Qualis for the Indian market and is now used to manufacture the Toyota Innova, Corolla and Fortuner.

Due to an increase in demand and development of newer models, TKM sanctioned the development of a second factory in 2008 which is located within the same premises as the first factory. With an initial capacity of 70 000 vehicles per annum, TKM is looking to increase capacity to 200 000 vehicles per annum depending on demand. This plant will manufacture new as well as existing models. These models are passenger vehicles, including the Corolla, as well as a new compact vehicle. The new compact vehicle is also expected to be exported to other countries in the future.

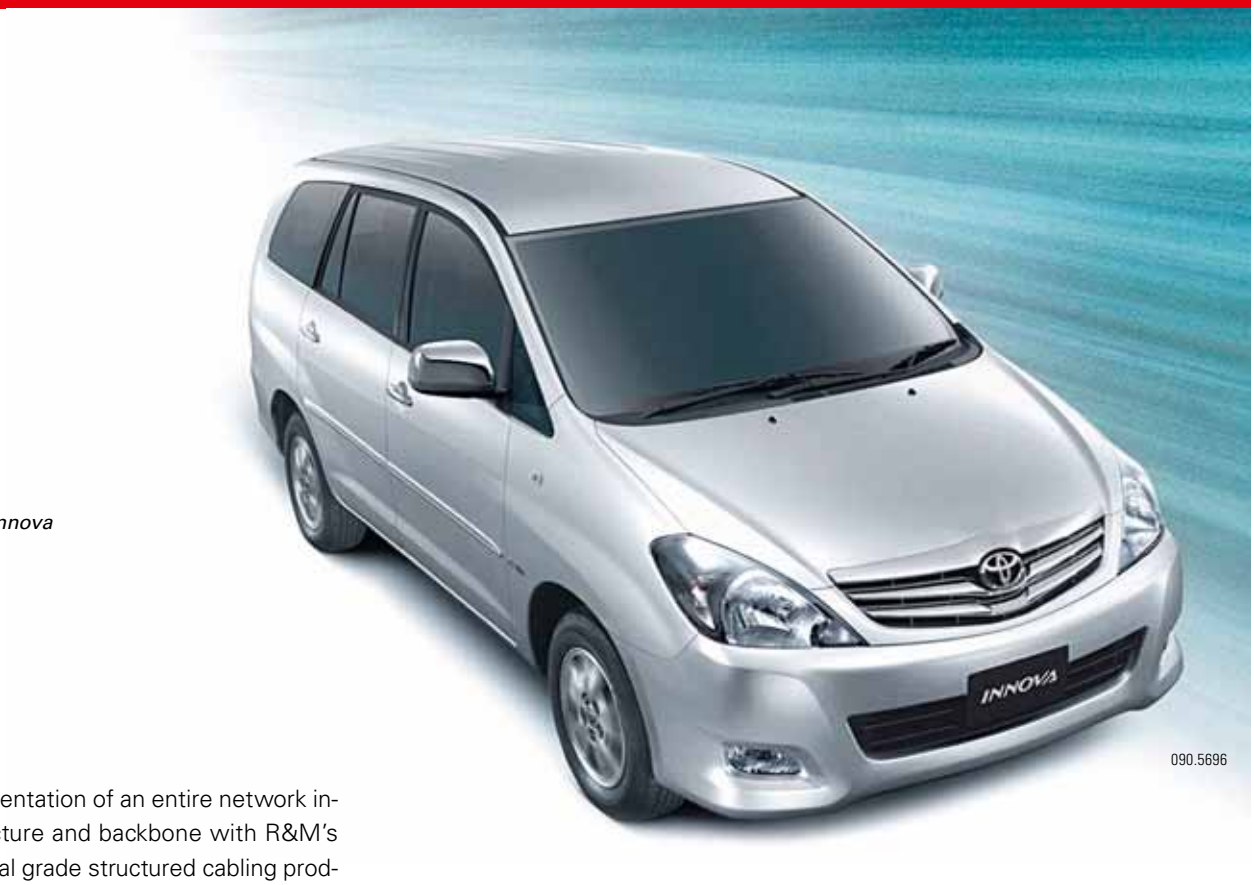
For both factories, TKM was looking for a solution that was stable, in line with industry standards, and one that would withstand harsh industrial conditions. It was this requirement that helped earn R&M a spot in the bidding process. The project in the first factory involved the

FACTS AND FIGURES

- **24 core SMF outdoor FO cable – 2000 m**
- **SC pigtails SM – 108**
- **19" 1U Unirack 12 x SC duplex unloaded – 2**
- **6 core MMF indoor/outdoor FO cable – 23360 m**
- **3U global patch panel – 31**
- **Installation cable CAT 5e F/UTP, 4P, 200 MHz, LSZH – 26840 m**
- **SM connections Splash line IP54 – 488**
- **Splash cap IP 54 – 608**
- **Cable gland IP67 M20 – 608**
- **CAT 5e information outlet shielded – 1181**
- **Splash sleeve transparent – 728**

WHY R&M?

- **Assisted the client in design of the network – played a critical role in building confidence with the client**
- **Invested time to understand client requirements**
- **Quality and modularity of product design on the global panels**
- **IP rating products – R&M industrial grade products and solutions**



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Toyota Innova

implementation of an entire network infrastructure and backbone with R&M's industrial grade structured cabling products. The R&M solutions for IP categories 54 to 67 (as per IEC 60529) and MICE environmental classes 2 and 3 (as per ISO/IEC 24702) ensure security in the case of critical environmental influences. Hence, the network connection is fully protected against water vapor, hot water, salt water, splash water, oil, any type of dust, and general air pollution.

The entire project is in line with the relevant industry standards to be able to withstand industrial conditions. The challenge during the installation process was that it had to be undertaken in a fully operating factory (which meant moving machine parts). In spite of such circumstances, R&M along with project partners was able to deliver a solution that ensured best practices. In addition to delivering quality products and installations, R&M was also able to win the customer's confidence by providing complete network design. During the process R&M also ensured extended support in delivery and regular site visits.

R&M along with project partners was able to deliver a solution that ensured best practices.

Vidya Prakash, DGM, Information Systems Division, Toyota Kirloskar Motor, said, "We appreciate the commitment of R&M in providing excellent innovative solutions, quality, delivery, and support meeting our expectations and requirements."

Shajan George, Technical Director India, RO-IND, R&M India said, "This project is an example of the persistency shown by R&M in the face of such a challenge. The entire R&M team worked closely with the clients not only in delivering innovative products but also in developing practical design solutions."

R&M, through its exemplary efforts in the first project, has also bagged the order for the second factory, where the link redundancy is being taken care of at each node level. ■

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IP54 SM outlet, splash-proof

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A New Way to Winning Our Customers' Hearts

Increased demand for triple play services and competition among telecom providers are driving the customization of FTTx solutions. With its customization approach R&M is leading the way in providing MEA telecom operators with optimized FTTx solutions.

Telecom network operators are busy gearing up their networks for triple play services to provide voice, data and video without compromising on the quality levels required to satisfy new customer demands and fend off the competition. Newly licensed operators are reaching out to customers with bundled packages in a bid to compete with existing service providers. Existing telecom operators for their part are striving to reach as many subscribers as possible within the shortest possible time. Most operators of fixed telecom networks are turning to GPON or GEPON technologies to meet the growing demand for broadband. With these systems the network performance depends not only on the performance of the active components, but first and foremost on the quality of the network's passive components. And therein lies the challenge, given that the technology has been around for at most five years and cannot boast the same history as traditional copper networks. Likewise vendors cannot lay claim to a long track record in providing passive optical networks. To date most of the expertise in fiber optics is in the OSP market, but now the demand in terms of technology is for FTTH, FTTB and FTTN network design and installations.

> The driving force behind the telecom carrier business is the ability to understand customer demand and to use market experience to come up with new solutions.

The expanding network in the Middle East is driven mainly by the new telecom operators who emerged following deregulation. The circumstances and the demand on site are completely different to those in the European market. Very few operators in this market have been able to demonstrate their performance capability. While existing operators carry the legacy of copper networks, newly licensed operators are accelerating the

An impression of the huge city of Dubai

pace with which they are launching their new services. Both scenarios rely first and foremost on the expertise of vendors capable of supplying the systems and solutions that meet individual operator requirements, so the bulk of the passive network has to be customized and the products supplied on time. The launch of any new product takes time, from factory and field testing to network implementation, so the availability of a customized solution is subject to even greater constraints.

The next consideration is how to make a product that can be delivered on site within the set deadline so the project can be handed over on schedule. With most operators driven by customer demand, ultimately the contract is awarded to whoever first delivers the required quality of service. This growing demand for fiber networks has been the driving force behind the R&M Public Carrier team in recent years. As a proven manufacturer operating to Swiss quality standards and with a wealth of experience in the Middle East, R&M was already best placed to take on these challenges, i.e. these success stories where R&M provided FTTx solutions to the MEA region. With its experience of, and expertise in, copper networks and with its broad product range, R&M easily adapted to fiber optics. This saved a great deal of time when it came to designing and testing new systems and solutions. R&M's modular concepts and versatility are the mainstays of its customerization. All the product platforms already developed are designed with future demand in mind as well as the present complexity of FTTX networks.

R&M MEA has been a very successful player in the region's customerization race. The driving force behind the telecom carrier business is the ability to understand customer demand and use market experience to come up with new solutions. We have manufactured an FTTx version of the Venus box traditionally used for copper or direct splicing/termination, but in a new revised model capable of handling FTTH applications with built-in splitters for both indoor and outdoor applications. It was developed in joint cooperation with the customer's team for a green-field application with intermediate delivery as a requirement.

Demand drives the evolution of new products, which is why the splitters were incorporated within the fiber enclosures and also inside the ODBs, creating a future-proof version for high-density applications. All the new products are manufactured on the same, existing platforms, facilitating early delivery to the project installation. But the new product development does not end there: The new outlet at the customer end is designed to provide both fiber and copper modules in the same outlet, demonstrating once again the versatility and expertise of R&M engineers in the field. All the field requirements are studied in depth from the point of view of installation, maintenance and application prior to the final design for the end customer. In other words R&M's technical expertise is fully geared to its customers' demands and requirements and the challenges they face in the field. The team is able to ensure that customers benefit fully from the advantages of our solutions. R&M is also able to broaden its support when designing complex network installations and implementing solutions for its customers through its key account management approach. ■

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Data on Fiber Optics: Faster, Denser & Further

With data rates of up to 40 Gbps (directly modulated), transmission systems are edging towards the technical limits of optical networks. And here the polarization mode dispersion of the transmission channel plays a crucial role.

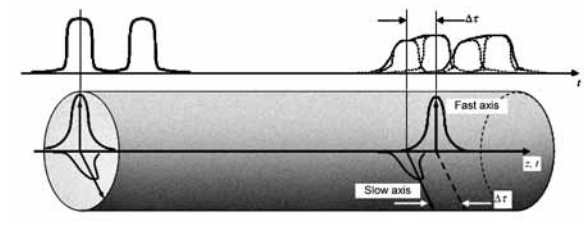
PMD coefficient

The polarization mode dispersion of fiber optics is characterized using a PMD coefficient, expressed in ps/√km (delay difference in picoseconds in relation to the square root of the section length in km). New fibers typically achieve values well below 0.2 ps/√km. Older fibers or "outliers" in new cables can achieve more than 0.5 ps/√km.

Bit rate	Section length
2.5 Gbps	25600 km
10 Gbps	1600 km
40 Gbps	100 km

Lengths of section theoretically feasible with a PMD coefficient of 0.2 ps/√km. The criterion is a delay difference of 6 % of the pulse length.

Parameters which until a few years ago played a secondary role have suddenly become pivotal for fiber optic networks. Polarization mode dispersion (PMD) is one such parameter. PMD is due to the asymmetry in the optical fiber: Polarizations of light in a waveguide, which normally travel at the same speed, travel at different speeds (see diagram). As a result pulses along the fiber link are broader and flatter, which increases the bit error frequency or can even distort the signal to such an extent that it is unrecognizable (intersymbol interference or ISI). There is therefore a simple ratio between the bit rate, i.e. how short the pulses are, the PMD coefficient and the potential range (see table).



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The asymmetry in the optical fiber can occur already during manufacture, as a result for instance of unequal doping or mechanical tension. By the time the fiber is twisted inside the cable and the cable is laid and connected, many other factors may influence the outcome. Torsion, strain, compression, bending, water and hydrogen ingress – these are all factors that are likely to accentuate PMD.

The links are usually comprised of several sections. In the calculations of the overall PMD individual components are squared, which means that a short but poor section will have a disproportional impact. For this reason it is essential to implement uniform standards and precise measurements for all link sections.

All the partners involved need to do their bit to help safeguard the high investments in optical networks:

- Suppliers, with seamless and trackable quality control
- Installers, with professional installation work and proof of technical measurements
- Operators, through far-sighted planning, precise definition of requirements, and complete monitoring during installation and operation. ■

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R&M and GBM Boost Qatar's Social Coverage


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R&M and GBM cooperate with Qatari governmental organization GRSIA to implement its network infrastructure

The General Retirement and Social Insurance Authority (GRSIA) aims to secure the future of Qatari society, its values and way of life by extending retirement coverage to all Qatari citizens. To help achieve this objective, however, the GRSIA needed to install a state-of-the-art network for its planned new building. To better serve the needs of citizens, GRSIA also wanted to begin providing enhanced online services. Thus the newly installed network would serve as an important foundation capable of handling the increase in data traffic and future data loads stemming from GRSIA's provision of online services.

The project was implemented by one of the region's leading systems integrators, Gulf Business Machines (GBM). GBM contributed to the Qatari government's initiatives by installing a new network infrastructure for GRSIA, using R&M's Swiss-quality, powerful enterprise copper and fiber cabling range.

GET MORE

- **Future-proof network**
- **Scalability**
- **Optimal design**
- **Ease of installation**

THE R&M SOLUTION

Solution utilized R&M Enterprise cabling including:

- **End-to-end Cat. 6**
- **Fiber backbone (OM3)**
- **1300 ports**

Future-proof network

GRSIA's new network needed to handle existing operations and be scalable enough to manage current online tasks and services such as administering and handling citizens' daily inquiries, maintaining subscribers' data, responding to subscriber and employer enquiries, managing the termination of subscriber services, returning deducted subscriptions and following up on modification requests from retirees and their beneficiaries. Equally important was the necessity of ensuring that the network could scale to handle the additional traffic created by future users or by the addition of new online services.

GBM was able to provide a complete and fully integrated solution for the installation and commissioning of GRSIA's entire network infrastructure and backbone for its new building in Doha. This entailed the implementation of an end-to-end copper and fiber solution deploying R&M's powerful enterprise level cabling solutions including its modular Cat. 6 copper cabling and fiber OSM. In total, 1300 ports were connected throughout the entire office with fiber OSM connecting some of the points for an ultra high-speed connection.

Certified installation

GBM has been a certified partner and R&M regional partner for over 10 years, having successfully completed a multitude of projects throughout the UAE, Qatar, Kuwait, and Oman on behalf of R&M. GBM utilizes R&M's broad range of Swiss manufactured copper and fiber cabling products knowing that they are of the highest cabling specifications resulting in error-free network performance post installation.

Implementation of the cabling project began in July 2008 and was successfully completed in September of the same year within the specified time frame. GRSIA was also extremely pleased with the strong levels of support shown by GBM from its local office in Qatar. GBM designed an effective solution customized to address GRSIA's stringent requirements for a secure scalable future-proof network and also provided consultation services on how to maintain the new network.

Optimal design

GRSIA's IT staff was pleased with the result from the outset due to the high performance of the network with the assurance of zero downtime. To date, no problems have occurred with the network in the nearly two years post implementation.

An optimally designed network also ensures the flexibility and scalability to handle future demands on the network. Additionally, R&M's modular design throughout its entire product range enables ease of installation and future additions with minimal tool and hardware requirements. ■


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dSPACE is a leading supplier of mechatronic control systems.
Photos: © dSPACE

Expanding Further with Quality and Security

dSPACE is relying on cabling from R&M for the construction of its new company premises. High quality and guaranteed reliability were top priority for the world's leading producer of engineering tools for developing mechatronic control systems.

Mechatronic control systems are used in many fields such as the automotive industry, aviation and aerospace as well as electric drive units. Developing and testing these control systems involves tools – i.e. hardware and software – that are capable of highly realistic simulations. dSPACE is the world's leading specialist in development environments for mechatronic control systems. The high-tech company is domiciled in Paderborn in north-west Germany. The success of the company's business operations has been such that new company premises had to be built in order to group the entire workforce in a single location.

It is no coincidence that R&M, with its comprehensive product range, was called in for the structured cabling. Indeed, the emphasis from the outset was on high quality and security requirements. The brief was not only to comply with the standards for 10 Gigabit Ethernet applications, but also provide a 20-year warranty for the installed cabling system.

Besides R&M's acknowledged quality other crucial aspects for the choice of R&M as system supplier were the security system and the RMS45 Microsplitter solution. R&M's three-tier security system is used to configure individual security levels adapted to each application. For its data cabinets dSPACE uses color-coding with Easy Latch lock protection. Connections inside the data cabinets and at the workstations are secured using R&M's Patch Guard.

The RMS45 Microsplitter with its color-coding also blends in seamlessly with the security concept. Based on the RJ45 connector system the Microsplitter is the ideal solution for expanding horizontal cabling capacities simply and effectively. It provides a quick and versatile means of responding to increased demand for channels without having to rearrange the entire planning and installation.

The supply and installation of a total of 170 km of data cables, 810 floor box inserts, 194 patch panels and 7700 RJ45 connection modules by a single system supplier demands a great deal of trust on the part of the customer. Trust which R&M was able to gain through the high quality standard of its products, its consistent system concept, and the 20-year warranty. And with Elektro Beckhoff GmbH from Verl contracted as the installer R&M also had a reliable installation partner likewise capable of guaranteeing the high standard of quality. ■

- **High-quality system**
- **Compliance with standards for 10 Gigabit Ethernet application**
- **20-year system warranty**
- **R&M product diversity and system concept**
- **Comprehensive system accessories, in particular security systems and Microsplitter**

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Multi-Fiber Connector to Become Data Center Standard

40/100 Gigabit Ethernet will soon be a feature of any data center. The IEEE 802.3ba standard is already defined. So what does that mean for fiber optic cabling? Greater emphasis will now be placed on parallel optical transmission. It demands more precision and more quality than ever.

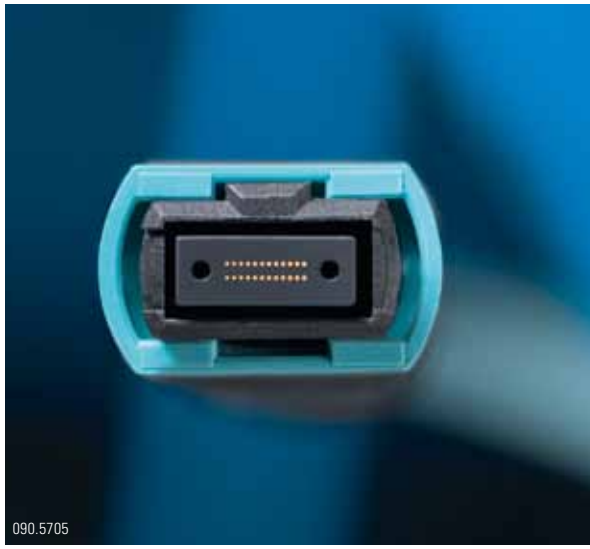
Faster memory access. Even faster backbone connections. So the need for 40/100 Gigabit Ethernet is obvious. Data centers will now have to adapt to it. With IEEE 802.3ba and applications such as 40GBASE–SR4 and 100GBASE–SR10 they already have a reference framework.

High-grade parallel connections are to provide the necessary transmission capacity. It means for example that a 100 GbE multimode link over 100 m can be set up with 10 parallel 10 GbE connections; it requires OM3 fibers and 10 ports or 20 fibers per link. With the future OM4 fiber even 150 m links will be possible.

A parallel optical transmission with conventional components would take up too much space. So compression is the buzzword for the future. Multi-fiber connectors or Converged Network Adapters (CNA) are set to become the data center standard. They have already been tried and tested in the market as MPO connectors. They are capable of connecting 12 or 24 fibers (MPO = Multipath Push-On, IEC 61754-7, TIA/EIA 604-5) in the smallest of spaces – comparable with the size of an RJ45 connector.

With 40/100 GbE the demands on the transmission quality are set to rise. IEEE 802.3ba was based on a maximum bit error rate of 10^{-12}. For OM3 fibers an insertion loss (IL) budget of 1.9 dB is defined for the channel, of which 1.5 dB IL for the connection or splice. 1.5 dB and 1 dB are required for OM4 fibers.

These low attenuation budgets are particularly important when it comes to planning the network and choosing the cabling components. Optimized MPO solutions such as the MTP™ connector will be selected to ensure the optical performance (MTP = Multifiber Termination Push-On). R&M anticipated these trends early on and is now in a position to offer tried-and-tested complete MPO/MTP™ solutions for future data centers. ■



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24-fiber MPO/MTP™ connector interface

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Trunk cable: terminated at both ends with MPO/MTP™

090.5791

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First Certified European ISO Cat. 6_A Data Installation at GGD Zuid-Holland Zuid (NL)

Unprecedented high quality: more than 10 dB "headroom"

In order to be properly prepared for the future, the GGD (Municipal Health Service) of Zuid-Holland Zuid has relocated to more modern premises. With a view to optimal quality and sustainability, the GGD has become the first in Europe to opt to apply the new R&M ISO/IEC certified Cat. 6_A concept.

The GGD ZHZ monitors, protects and promotes public health by means of health surveys, preventive activities, the provision of information on healthy lifestyles and the carrying out of epidemiological research into residents' health perceptions. At the Dordrecht branch, approximately 150 experts carry out statutory tasks on behalf of 19 local authorities in fields such as youth health care, infectious disease control, medical environmental science and health promotion. The new building is located closer to other health organizations, like the Albert Schweitzer hospital. The building also offers the GGD more space (through the application of a flexible workplace concept) and quality both for now and in the future.

"That is exactly the basic principle underlying this entire building: quality and sustainability for an attractive price", explains Henri Nahon, controller and head of ICT/DIV at the GGD Zuid-Holland Zuid, while proudly demonstrating the smart card secured lockers. "So it's only logical that we require the new data network to be high-quality and future-proof. The contact with R&M and the suggestion to use their latest Cat. 6_A components in accordance with the most stringent ISO standard came at exactly the right moment. Although the RJ45 components themselves are slightly more expensive, they were still our first choice because using them would give us the best and most future-proof data network currently available. Making savings in that area would be counterproductive. We write off PCs and other hardware in three years, but our network still has to offer sufficient quality and bandwidth in twenty years' time."

Quality and sustainability for an attractive price!

Extremely high test values

The new Cat. 6_A data network certainly offers sufficient quality and bandwidth. This is demonstrated by the validated measurements in accordance with the most stringent ISO/IEC 11801 amendment 2 measurement settings.

The headroom is the extra backup over and above the requirements of the ISO standard. During laboratory tests with the R&M Cat. 6_A cabling system, values of between four and ten dB were achieved. The practical measurements at the GGD in Dordrecht revealed a headroom of between no less than seven and thirteen dB.

"The first question I asked was, of course, whether the measurements had been carried out correctly", Nahon continues. "But that really turned out to be the case. Of course we are very happy with this outcome because, de-

spite our confidence in R&M as the Swiss manufacturer, we were still rather critical about a data installation which had never been used in the Netherlands before. The outcome more than exceeded our expectations. What is more, the installation went very smoothly."

Simple to process

Of course it always takes a while to get used to things in the beginning. However, on the basis of a flexible approach and excellent cooperation, Westrade Optical in Dordrecht, a specialized data installer, completed the job well within the schedule.

As Eric Beijleveldt, Managing Director of Westrade Optical explains, "Our engineers are also very enthusiastic about the new module. I heard one of them say that working with it gave him a real buzz. We think it is important that our people find it easy and enjoyable to work with."

This is confirmed by Kenneth, who is one of the engineers. "It takes a bit of getting used to but once you worked out a procedure you can assemble the Cat. 6_A RJ45 module just as quickly as a traditional module."

As Beijleveldt concludes, "The quality of R&M is consistently second to none and the investment is certainly going to pay off." ■

090.5780

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R&M Defines Corporate Responsibility

First Corporate Social Responsibility Report

With the publication of its first ever Corporate Social Responsibility (CSR) Report R&M is signaling its social, ethical and ecological responsibility. The Report describes the ways in which R&M is committed to fair, responsible and sustainable action.

As a quality leader in cabling technology R&M plans far beyond the scope of product development, manufacture and distribution. Indeed the management approach also takes in economic, ecological and social aspects. R&M is guided by the Brundtland Commission's 1987 definition of sustainability and has shaped its entrepreneurial activities accordingly. The CSR Report, now published for the first time, sets out in detail the many aspects of R&M's responsible corporate action. "The objective is a successful company that benefits all sides," says CEO Martin Reichle.

With the building of the Cube, the new production and logistics center in Wetzikon, R&M has reduced its energy consumption by 30 percent compared with conventional buildings. And since 2008 R&M has doubled the number of apprenticeships at the company headquarters in Switzerland. R&M also intends to further promote the health and satisfaction of its workforce of 600 employees as well as its innovation capabilities.

R&M recently optimized its global logistics operations so that goods now only have to be shipped once a week. This has dramatically reduced the number of truck movements. The CSR Report also takes a close look at R&M's relations with its suppliers and partners, likewise characterized by quality, mutual respect and sustainability.

As Martin Reichle remarks: "Responsible, far-sighted and exemplary corporate action has always been a key feature of R&M's business activities, ever since it was founded 46 years ago."

To download the CSR Report:
www.rdm.com, section "about us"

Cat. 6_A and Green IT at the Cube Data Center

As a trendsetting and climate-friendly industrial building, the new R&M Cube represents the state of the art in every respect – also with regard to green IT and cabling. R&M has implemented a data center with high-end technology from the R&M world.

For R&M's IT department the construction of the new development, production and logistics center, or R&M Cube, was a unique opportunity to benefit from the performance of its very own cabling solutions. And so the electronic brain on the second floor of the new building was equipped with a trendsetting network infrastructure built to the latest specifications – an exemplary R&M data center solution.

The most advanced RJ45 connection system around – R&M's new Cat. 6_A module – was installed at the 80 m^2 data center to make sure the LAN operates reliably.

To optimize the space available for the racks, R&M implemented 24 port angled panels from the R&M data center range. The angled patch panels and preterminated cables also help speed up the patching process and the cable management.

Providing the highest performance, future-proof and high density infrastructure was also the top priority for the fiber optic installation. The solution drawn from R&M's data center construction kit: MPO modules, fitted with LC Quad connector systems, and twelve-fiber multimode trunk cables for high-speed data flow from rack to rack. The R&M Raceway System ensures that the fiber optic cables above the racks are fully protected and routed safely, without stress and strain.

The data center is also as green and as low-energy as the entire R&M Cube itself. The cooling system is based on the cold aisle concept. This means that cold air is blown only into the rack cabinets and the aisles between them, not the entire room. This reduces typical energy requirements by 60 percent. Heat exchangers in the floor transfer the heat generated in the data center to the building's heating system.

Trendsetting solutions right through to the workstations

The R&M Cube's structured cabling system is the blueprint for modern communication solutions. Besides the data traffic, it also supports the entire building automation. Telephony revolves around VoIP (Voice-over-IP) technology that allows the use of unified communications applications. The IP phones and other terminals are also powered via the data network (Power over Ethernet) making the use of a multitude of power cables, outlets and power supply units unnecessary. ■

> The new data center is as green as the entire new building itself.

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Rui Louro, Managing Director of CBE, and Elena Iglesias, R&M Spain

The Cabling System for the Home of the Future

In July 2009, one of the most important Portuguese carriers, Sonaecom, required a solution for its 150 000 home subscribers. CBE (founded in 1998), the market leader and main telecom subcontractor and integrator with a global turnover of more than € 20 m, planned to supply its subscribers with a special signal providing data and video. Rui Louro, Managing Director of CBE, chose the R&M solution because of its high quality level and design flexibility.

The CBE project was to provide voice and data signals to all its subscribers. To improve access to its subscribers, a new box model was modified and adapted to fully use the new solution. At first, CBE specified a 19" 1U Fibereasy Rack without video signal; but this was one of the requirements of Sonaecom. João Delgadinho (CBE, Project Manager), knew of R&M and its reputation for quality and adaptability to the needs of end users through the R&M local distributor, LanCom Comunicações, Lda. He contacted R&M to ask them to develop a new end-user design.

CBE was asked to put forward a design, to Sonaecom, offering to each of its 150 000 home subscribers access to data and video.

João Delgadinho, contacted Luis Alves from LanCom Comunicações and David López, Public Network Business Director for Spain and Portugal at R&M, and asked them to design and develop a new solution for Sonaecom.

R&M designed and developed a solution meeting Sonaecom's requirements in which all the trays are equipped with splitters, which means that each tray is equipped with a video signal.

The solution was presented by R&M and CBE to Sonaecom. The company expressed its satisfaction with the joint offering. Sonaecom was especially satisfied with the speed with which the solution was put forward, its design and the quality of the product.

From then on all the splice box trays for the Sonaecom project were equipped with splitters 2 x LC/APC 0.5 m + 4 SC/APC 2 mm 3 m. This enabled the project to be classified as "turnkey" as it met all of Sonaecom's requirements especially regarding bandwidth for data and video.

According to Rui Louro, Managing Director of CBE, the client was extremely satisfied with the quality of the components and the speed at which the product was adapted to the needs of the end user as well as the service rendered by R&M.

With the objective of offering perfect high-resolution video and data signals, R&M had to adapt the trays one by one and equip them with splitters to increase the image quality and signal speed.

> "R&M was excellent and their deliveries were always on time."
>
> João Delgadinho, CBE, Project Manager

The products were recommended, assembled and supplied by the local QPP partner LanCom Comunicações, Lda. and were chosen for their quality, design and the ease with which they can be installed.

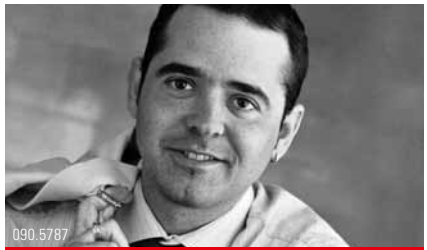
Once again, R&M's expertise in fiber optic technology has contributed to bringing video and voice signals to local residents. Sonaecom has joined the long list of home subscriber projects in which R&M has participated worldwide. ■

WHY R&M?

- **Quality and design**
- **Ease of use**
- **Understanding of end customer needs**
- **Proximity to the end customer**

FACTS AND FIGURES

- **2676 x R508398 – splitter 2 x LC/APC 0.5 m + 4 x SC/APC 2 mm 3 m**
- **2676 x R502966 – adapter LC/APC – Duplex**
- **55 x R306855 – splice box for 24 x LC/Duplex**
- **15 x R305340 – Fibereasy tray**



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New CSO

In mid-August Ingo Kübler took up his new position as Chief Sales Officer (CSO) at R&M. After graduating as a materials processing engineer at the Swiss Federal Institute of Technology in Zurich (ETH) he began his professional career with the Bühler Technology Group, working first as a development engineer and later as a sales engineer before heading up the Business Unit. He then held a number of executive positions as Head of Division at various international corporations, including COO Wired Solutions & Networks for Huber+Suhner.

Given his wealth of experience of the international connectivity market Ingo Kübler is very much looking forward to his new role at R&M and the opportunity to incorporate that experience.

The 48-year-old engineer holds an MBA degree (INSEAD/Fontainebleau). Ingo Kübler likes to offset the challenging demands of his work by spending time with his family; he is also a keen sports enthusiast. Besides sailing he enjoys competing in endurance events such as marathons and triathlons. Ingo Kübler will have the opportunity to present himself to you in person in the next edition of *CONNECTIONS*.

New Head Region West Europe

Richard Eichhorn has been in charge of the Region West Europe since May 2010. With many years of industry experience in Europe and Asia, he has held various posts at Alcatel, Anixter and Nexans. Asked why he chose to move to R&M, he replied: "It's the sort of opportunity you normally get only once in a lifetime!"

Richard finds the cabling industry enthralling: "It's my world, it's where I feel at home." He also very much appreciates the fact that even in these tough times R&M is fully committed to innovation and sustainability. "Financially R&M is very sound, and it's a company that's led by a very good management." Richard sees the fast growing significance of fiber optics as fundamental and R&M's commitment to the technology as absolutely the right decision at both the strategic and operating levels.

From his workplace in the Netherlands and at the company headquarters in Switzerland he plans to move quickly to implement within his territory his more than 20 years of experience of international sales and management. True to his motto of "customer first" he aims to put in place a policy of customer orientation and transparent communications, even more consistently than in the past.

Looking to the near future he sees a sharp increase in the pace of the product-to-market process. Richard will spare no effort in making this process as lean and as efficient as possible.

New Power in Innovation and Development

Recent months have seen a strengthening of human resources in Innovation and Development. Raoul Stöckle is now in charge of the innovation team while Gianfranco Di Natale heads up the development department.

Both come from a technical and business management background and have many years of experience of the international business-to-business and communication environment. In recent years they have been closely involved with change management projects for large companies. And in the past few weeks they have taken a close look at the existing organization and made minor adaptations. Processes have been realigned in keeping with the principle of "from output to organization", with the focus very much on customer orientation.

Among the many aspects they appreciate at R&M are the open and constructive culture of communication, the innovative, international environment, and the opportunity to contribute their many years of experience in a way that is direct, straightforward and sustainable. Asked about their future cooperation Raoul Stöckle and Gianfranco Di Natale envisage an approach that is based on seamless, smooth-running connections rather than "interfaces".

Visitor Survey at www.rdm.com

The Internet is one of the most important communication tools at R&M, and visitor numbers are rising all the time. In spring 2010 we carried out an extensive visitor survey to help us gain an insight into what our visitors were looking for and what they expect of our website. More than 900 people took part in the survey, providing us with some valuable answers. 84 % rated the site as "good to very good". Between now and the end of the year we will be adding a number of elements to our website to optimize it as part of its soft relaunch.

These optimization measures include:

- Setting up a new homepage tailored to our target groups
- Simplifying the structures, with shortcuts to the relevant information
- Integrating quick link navigation aids in all areas
- Integrating graphical navigation interfaces in the industry solution area
- Integrating related content wherever useful for visitors
- Integrating new functions such as Tell A Friend, social bookmarking, etc.
- Integrating area-specific contact interfaces

R&M believes these measures accurately reflect the wishes and requirements of our website users.

Steve Coucheman | Head of Electronic Media
steve.coucheman@rdm.com

POF Fast Becoming a Standard

Polymer optical fiber (POF) is the attractive alternative for cabling in private homes and industrial plants. Research and industry worldwide are working on common standards to make POF even more accessible and more powerful.

The current discussions revolve around issues such as the optimum fiber, the best possible modulation process, and interfaces. The connectors and end faces of plastic fibers have a considerable impact on the performance and quality of the signal transmission in POF cabling – after all, the ambitious objective is to achieve transmission rates of 1 Gbps over 50 m of POF. A study recently published by Prof. Dimitris Syvridis of Athens University, initiated by R&M, confirms the extent to which connectors influence POF links.

In Switzerland R&M supports the work of standardization bodies at DKE/VDE (AK 412.7.1) and IEC (TC86 WG6) with test series on Hertzian contact stress in POF connectors and suggestions for ways of improving POF interfaces. For this R&M uses an image-generating 3D process (10 nm typical resolution) and a newly developed nanoindenter, which analyses the end-face distortions of a POF cable in the nanometer range. One of the objectives of these tests is to determine the optimum operating pressure for connectors depending on temperature.

With POF connectors, the contact pressure at the fiber end face must comply with strict tolerances. If the pressure is too high, the elastic plastic fibers compress, which in turn negatively affects the transition of light between the fibers. Conditions can be improved further with the right grinding geometry at the end faces. Here, too, R&M is at the cutting edge of the development work. The aim is to be able to recommend the optimum grinding formula.

The standardization bodies are also working on industry-standard application rules and procedures so that future POF products are compatible. The ultimate goal is a globally standardized, cost-effective and reliable POF interface – along the same lines as the RJ45 interfaces used in copper cabling.

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Terrace on the fifth floor, with wooden acoustic ceiling

View of the patio between Cube and high-bay warehouse

A Word from the Architect

North-easterly view with the glass connecting building to the high-bay warehouse

Panoramic "to-and-fro" walkway on the Cube roof, with the facade cladding the building services area

Service point; behind it, a meeting room with glass corner element

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The photographs featured here perfectly illustrate our conceptual approach, namely from the inside to the outside and vice versa; and also later on, during the planning phase, it ensures that neither design nor function predominate as individual elements; instead both components are perceived as a logical entity.

The cubic monolith bathed in light optimizes the workflows in everyday business operations.

The cubic monolith with its four arms of equal length is designed to optimize the workflows in everyday operations, with the additional incident light provided via the patio facade flooding the area with light.

The building extends further to the high-bay warehouse via a three-story glass connecting building, an arrangement that enables short routes from ramps to warehouse via the conveyor system.

The ground floor houses the logistics together with the workplaces on the first floor. The middle floors were laid out first and foremost to accommodate Production. Adjacent to it are the areas allocated for the laboratory, process engineering, application technology and the data center.
The two top floors comprise office workplaces, including the departments for procurement, technology, innovation and production planning. There are also several meeting rooms and a generously appointed staff lounge with adjoining terrace.

The design of the building takes account of the surroundings and the interplay between the client's corporate and brand contents. R&M's corporate identity is expressed in the building architecture and is the result of our corporate architecture.

From the outside the Cube has all the appearance of an ultra-modern gem set in the surrounding landscape. The construction and building technology combine to provide an unparalleled level of energy efficiency for a building project such as this, along with very low running costs. The sustainable building concept is based on the use of natural and renewable energy sources.

The building concept achieves maximum flexibility through its reductionist design and clear structure.

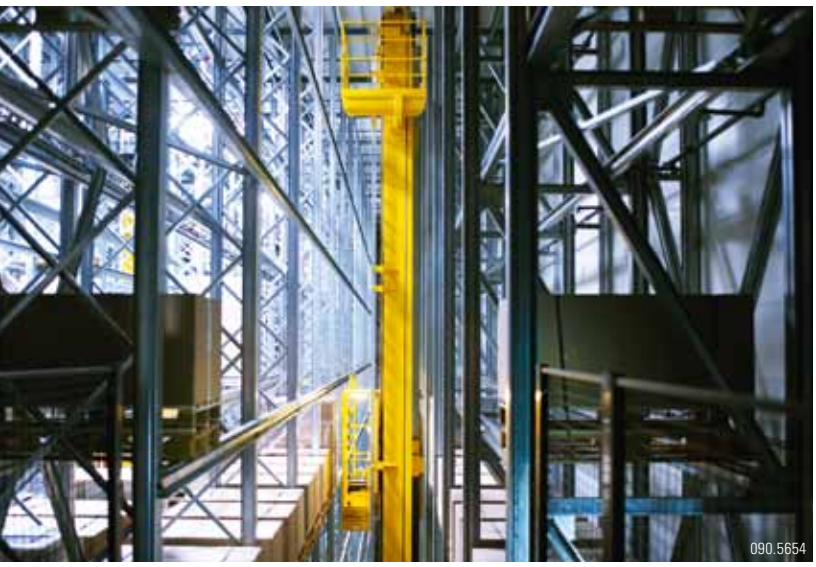
The building style adopted is rational, with the structural elements consisting of elementary geometric shapes. Decorative elements were used wherever they served to underscore a functional intent. The building concept achieves a maximum of flexibility through its reductionist approach with essential building elements and a clear structure, creating a graceful aesthetic and sense of space, with emphasis on functionality and economy of style. ■

West view towards the ramps,
with the sun/heat protection system deployed

Staff lounge on the fifth floor
with views of the terrace

Design and function poised in equilibrium.

Data center



High-bay warehouse

Landing in the stairway of the first floor south,
with glass-surround elevator

The Secret of the Swing

On my last vacation I nearly gave up golf altogether. I was playing a round when all of a sudden my swing deserted me; by the end of the round I had "gifted" more than 12 balls to the undergrowth and the lakes. Exhausted, but still hopeful, I booked a session with the golf pro for the following day:

The learning curve

"And – what am I doing wrong?" I asked after five practice swings.

"You're doing more right than wrong. But first tell me how your swing feels to you," he replied.

A voice inside my head began to wonder whether this coaching session was going to be worth the money if after five practice swings the golf pro couldn't even tell me what I was doing wrong. Nonetheless I decided to give him a chance and replied, somewhat provocatively: "My swing doesn't feel smooth; I seem to have lost it in space somewhere."

"You are the swing," came the mystical reply.

"If I'm the swing, then… I'm sorry, I don't understand," I answered, giving up on the self-analysis.

"Martin, your golf swing is not a purely mechanical system that can be improved by adopting an analytical and inquisitive approach to the principles of cause and effect. These systems cannot learn by themselves. Your golf swing is performed by a living being that's guided by a (sub)conscious mind. The movement itself is too fast for the brain to control it. You know the basic technique behind the golf swing, so what I want you to do now is practice your swing without the ball until it feels right to you."

After five or so "dry runs" that felt right to me I asked whether I could at last start hitting the ball again.

"Yes, of course, but what's your objective now?"

"I want to be able to strike the ball perfectly," I answered.

"Stop!" I heard him say before I'd even started my downswing. "Striking the ball is not the aim of golf. What's your motivation for playing?" was the next question.

And so it went on for another half hour or so …

What I learned

After only a short while I was reacquainted with my swing and able to rebuild the bridge between the swing feeling (awareness) and the mechanics of it. What's more, my "swing sensor" now gives me the confidence to repeat the process at any time.

In this sport, analytical self-restraint – no doubt triggered by the fear of making mistakes – is a particular hindrance. The motivation is not to achieve the perfect swing, but simply to enjoy your own personal swing.

The life lesson

If you haven't found your own personal swing in life, sooner or later that will be reflected in stress, tension and illness. That's also true of employees in a company, in which case it is reflected in a tough and exhausting organization rather than a smooth-running, self-learning one.

And so, for me, supporting my people every day and helping them to find their own personal swing is still my most important and gratifying task. ■

Film tip:
"The Legend of Bagger Vance"

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