

A computer for every child



Republic of Macedonia is the world's first nation to provide a computer for every student, a goal successfully met by wiring all schools for computer access

Called "Computer for Every Child", the programme required cabling school buildings to handle the latest digital communications. Nexans Cabling Solutions, and its regional partner KABTEL Ltd., successfully won the coveted cabling contract based on a LANmark cabling system.

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Executive Summary

END-USER • Ministry of Information Society,
Republic of Macedonia

PROJECT • Cable all primary/secondary
schools for digital access

NEXANS PARTNER • KABTEL Ltd., Skopje

NEXANS SOLUTION • LANmark-5 shielded
cabling system



Progressive policy

Situated on the Balkan Peninsula in southeastern Europe, the Republic of Macedonia has thrived as an independent country since formal recognition in 1993. Its Ministry of Information (MOI) Society has proactively promoted Information Technology as a means to enrich the country culturally as well as develop a knowledge-based economy.

In late 2006, the MOI and Macedonian government embarked on a progressive policy called "Computer for Every Child", part of a national initiative through 2015 designed to enrich and enlighten students. Key program goals are to increase the quality and quantity of IT-based studies in Macedonia, and provide access to all students to advanced teaching tools available on the Internet.

But how to achieve this noble goal? Macedonia has limited funds and infrastructure. It explored buying low-cost educational laptops for each of 360,000 public school students, but at \$175 (USD) per laptop, the total price of \$63 million was prohibitive. And with laptops come other costly problems – loss, theft, or damage when dropped, as well as continually repairing broken units.

"Computer access for all Macedonian school students made possible with help from Nexans."

The government finally opted for low-cost, desktop computers that, with special 'thin client' (TC) technology, allow up to seven students to access a single server simultaneously from the security and safety of classrooms. Each TC unit consists of a monitor, keyboard and mouse, which is shared by students who rotate computer time throughout the school day. Each client server has enough memory to accommodate multiple student accounts. Most classrooms have three or more client servers, and each

student has a secure network card to access their individual account.

Nearly 18,000 client servers, 99,000 flat panel monitors and keyboards, and approximately 81,000 TC units were acquired and dispersed amongst all primary and secondary schools. The nation's Minister of Information Society, His Excellency Ivo Ivanovski, explains how this program improves teaching.

"It first facilitates one-on-one computer instruction, thereby raising the number of students actively participating in the educational process," he says. "As a result, there will be equal opportunities for all students regardless of the school's location, and equal treatment of every student, regardless of where they sit in the classroom."

The challenge then shifted to wiring school buildings nationwide to accommodate the classroom-based computers, as well as link them in local and wide-area networks (LAN/WAN) and tie each to a high-speed Internet connection.

Project of immense proportions

The project's first phase involved wiring 105 secondary school buildings, the majority of which are located in Macedonia's capital, Skopje, and smaller cities including Bitola, Tetovo, Veles and Prilep. In all, the project involved interconnecting more than 2,000 classrooms requiring 15,724 links.

"A key test was cabling inside a wide range of buildings, a mix of old and new construction, each with its own special hurdles to overcome," says Goran Mitreski, General Manager, KABTEL Ltd, a valued Nexans regional distributor headquartered in Skopje and amongst four firms responding to a tender from government-owned Macedonia Telecom assigned to oversee the first phase.

Challenges

- Cable all Macedonian primary and secondary schools for digital access – “A Computer for every Child”.
- Mix of old and new, pre-existing buildings.
- Cabling installation must progress smoothly with minimal disruption.
- WAN/LAN networks between classrooms and schools must perform quickly, reliably

Solutions

- Nexans LANmark-5 shielded copper cabling system
- Nexans’ advisory and support services

Benefits

- Narrow, flexible cable easily pulled through ducts.
- Ideal for use in wide range of existing construction – old and new.
- Shielded cable construction greatly reduces crosstalk; EMI.
- Allows communications and power lines to share single duct for cost savings.
- Supports WAN/LAN architecture with no signal loss.

“It also involved working both during and after school hours, cabling five classrooms at a time whilst students moved to other parts of the building,” he added. “Speed and efficiency were paramount in properly completing each project area with minimal disruption of school activities.”

KABTEL won the contract because of its strong regional presence and experience throughout the Balkans including Albania, Kosovo and Serbia, its Nexans Training Centre in Skopje, and some novel attributes of the cable it recommended for the project: a LANmark shielded twisted pair cable.

The highly resilient yet flexible cable became the primary network foundation because its narrow diameter allowed multiple cables to be easily pulled in PVC ducts shared with electric power lines. Its construction consists of two insulated conductors twisted together to form a pair, with four such pairs laid up to form the basic unit. It’s shielded with an overall polyester aluminum foil and jacketed with PVC.

Benefits include reduced alien crosstalk and electromagnetic interference (EMI) issues from adjoining power wires whilst reducing signal emissions for more secure transmissions.

Adds Goran Mitreski, “the other proposals all recommended separate PVC ducts for telecom and power at considerable cost and added disruption to the schools. However, thanks to the excellent shielding of the LANmark cable, we were able to place multiple communications and power cables together in a single duct without concern for EMI or crosstalk. This helped speed installation through each area of the school buildings, and eliminated added disruption and delay that would result from running separate sets of ducts to isolate power and communications.”

More than 261 kilometres of LANmark-5 cable were used throughout the total installation requiring 15.724 links.

Program goals achieved

Work on Phase One was successfully completed in 2008. Since then, KABTEL won a second contract to cable nearly 400 primary schools nationwide involving about 5,000 classrooms.

“The task here is even greater,” says Goran Mitreski. “Not only are there significantly more schools and classrooms than in Phase One, but these buildings are located all over the country, versus being concentrated in the cities like the secondary schools. Many are in small villages, which require more complex and demanding logistical challenges.”

“Thanks to LANmark’s excellent shielding, we ran communications and power cables in single ducts without concern for EMI.”

Goran Mitreski, General Manager at KABTEL Ltd., Skopje, Macedonia

“We’ve been very satisfied with the cabling network’s performance to date,” says Minister Ivanovski,

Goran Mitreski adds, “Our firm has demonstrated its installation capabilities supported by the high quality LANmark product and Nexans technical support. We know what we’re talking about... and it shows.”



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