Case Study ›

PROJECT OVERVIEW

- Powercat 6 UTP & FTP solution
- Optical Fibre backbone
- LS0H Cabling
- 26 floor building

Molex PDS Delivers Voice and Data Streams around Shanghai Unicom Tower

Unicom Tower, the headquarters office of China Unicom Shanghai Branch, is a 26-floor building located at 1031 Changning Road, Shanghai. The cabling system (PDS) to be installed here is to carry all the voice and data traffic around the building to its occupants.

In addition to high compatibility, scalability and upgradability, the owner also poses demanding requirements for the PDS' adaptability to various applications inside the building.

To cater for its changing office and business demands, the owner, through careful investigations and comparisons, decided to award the contract to Molex, a world leading manufacturer of structured cabling systems, for the design and implementation of a safe and reliable cabling infrastructure.

The project was successfully completed in September 2005 through the concerted efforts of Molex, Shanghai Jinhai Electromechanical Equipment Co., Ltd, an Authorised Distributor of Molex in China, and Shanghai Twenty First Information Technology Co., Ltd, a Molex-Certified System Integrator.

Choice Of System: Molex Category 6 and Optical Fibre Cabling Solution
To adapt to various application demands around the building, the project team, including Molex, designed a well-planned, comprehensive and flexible PDS solution that delivered data and voice streams to its occupants. The proposed solution comprised of five subsystems, i.e. the work area subsystem, the horizontal cabling subsystem, the riser backbone subsystem, the IDF subsystem and the MDF subsystem.

In addition to a MDF (Main Distribution Frame) on the fourth floor, there is an IDF (Intermediate Distribution Frame) on each of the other floors to manage all the I/O points. Each floor is served by an indoor single-mode 12-core fibre, stranded cable for the backbone and Category 6 cables are used for the horizontal data cabling. The single- and double-position wall plates are used for the termination of data and voice traffic at the work areas.

System Design
The cabling system designed for Shanghai Unicom Tower, composed of Molex PowerCat 6 and optical fibre cables, fully demonstrates reliability, cutting-edge technology, flexibility, manageability and outstanding price/performance ratio of Molex PDS.

Sophisticated End-To-End Cat 6 Solution
The end-to-end Cat 6 solution provided for this project comprises of Molex Cat 6 UTP Cable (PowerCat 6 UTP), Cat 6 FTP Cable (PowerCat 6 ScTP), DataGate Cat 6 UTP connecting hardware, Cat 6 FTP connecting hardware, Synergy series of versatile faceplates, and high-performance Cat 6 patch cords.

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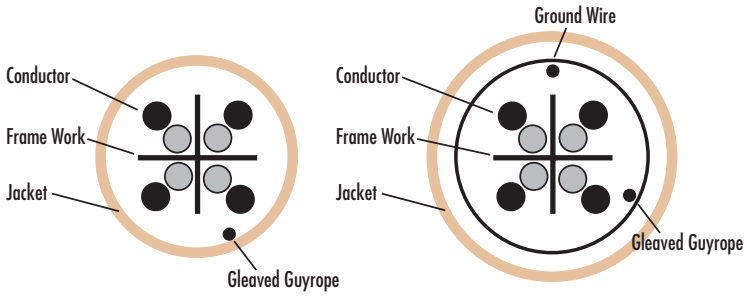
The optimum combination of the pair twisting and balancing technology with the “spine” cable design ensures better channel insertion loss, near-end crosstalk (NEXT), attenuation to crosstalk ratio (ACR) and structural return loss (SRL) performances than the requirements specified in the latest Cat 6/ClassE international standards. It is able to support the increasingly higher-rate communication applications, and provide high scalability for 250MHZ services, including 1000 Base-T, 1.2 Gbps (ATM) and higher rate communication in the future.

Molex PowerCat 6 cabling system features a range of patented designs, including the insulated central spine in PowerCat 6 cable, as illustrated in the following figure:



The central spine in the cable rotates with the cable length. The four twisted pairs are snapped into the four grooves of the spine to maintain the relative position between them, improving the cable balance and crosstalk performance, and protecting the balanced cabling structure from damage during installation.

A Full Range of High-Performance Fibre Solutions
As one of the largest optical fibre cabling suppliers in the premise cabling world, Molex is able to provide a full range of fibre products and solutions, including all types of fibres necessary for PDS. In addition, all its fibre products have been UL listed.

For this project, Molex provided the indoor fibre with 900µm tight buffer layer. Its indoor/outdoor fibre cable for trunk and pressurization applications are strengthened with Kevlar and anti-flame jacket which are made of LSZH, anti-flaming and environmentally-friendly materials. As it is free of halogen, the fibre does not emit any poisonous halogen gas when it is burnt.

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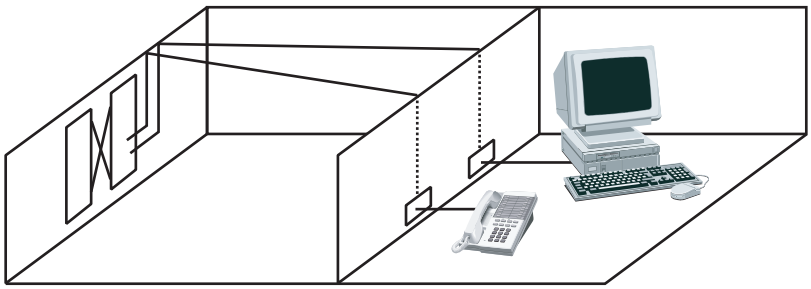
Project Execution

Five Interconnected Subsystems
As stated above, the PDS deployed at Shanghai Unicom Tower consists of five interconnected subsystems, i.e. the work area subsystem, the horizontal cabling subsystem, the riser backbone subsystem, the IDF subsystem and the MDF subsystem.

■ **Work Area Subsystem**
The work area subsystem comprises various patch cords, including Cat 6 patch cords for data and voice cords. The work area subsystem is illustrated as below:



According to the work area size, Molex 7-feet or 5-feet patch cords are used as the data patch cords that are connected with the data plugs. The high-performance Cat 6 patch cord features stable performance and adaptability to various demanding data applications and environments. Building upon Molex' elaborate design and reliable process technology, the patch cord realizes excellent impedance matching to deliver minimum signal reflection, optimum transmission, as well as attenuation performance much better than conventional patch cords.

■ **Horizontal Cabling Subsystem**
The horizontal cabling subsystem consists of the horizontal connecting hardware and horizontal cables, using Molex LS0H Cat 6 cabling products. In line with EIA/TIA-606 colour coding and identification management requirements, the voice and data points are marked with different colours.

To follow the principle of TIA/EIA568-B Star topology, the copper-wire points supplied for this project all employ the Cat 6 DataGate that supports 1Gbps data services and features backward compatibility with 10 Mbps Base-T, 100Base-T and 155Mbps/622Mbps ATM applications and voice communication. Each point can be flexibly connected with a telephone, a PC or any other data terminal. Further, this subsystem may also cater for such future applications as access control, CCTV monitoring, 28*VHF CATV and multimedia video conferencing, if appropriate adapters or converters are introduced.

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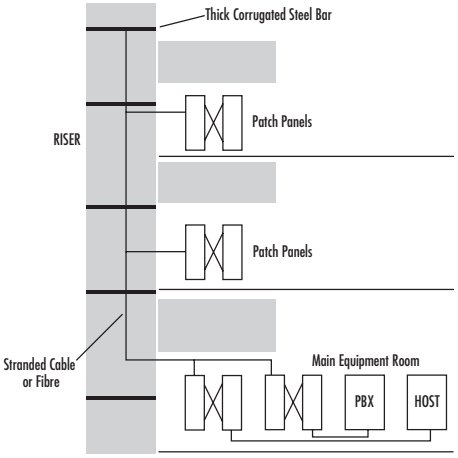
■ Riser Backbone Subsystem

The riser backbone subsystem is made up of the indoor backbone cabling that connects the MDF on the fourth floor and all the IDF's on each other floor. For data applications, 12-core single-mode indoor fibres are used between the MDF and the IDF's. For voice services, 25/50-pair multipair copper UTP cables are applied, which are configured in proportion of 1:1.2 to number of voice points in the administered area.

CMR rated flame-retardant Cat 3 25/50-pair copper cables are laid from the Voice Main Distribution Frame (VMDF) on the fourth floor to each IDF in a star topology, and extended to each voice point to support various voice applications, including digital and analog telephone, ISDN telephone and fax machine. With flexibility rendered by patching management, it is also possible to configure low-speed data network, voice network and telco channels inside the building. The riser backbone also supports high-speed LAN applications and eases the interchange between voice and data services.

The riser backbone, consisting of Cat 3 25/50-pair UTP cable for voice and 12-core single-mode fibres for data, is configured as follows:



The data riser composed of 12-core single-mode fibre that features high bandwidth, and long haul, goes from the MDF to the IDF's in a star-like topology. The use of fibre as transmission media enables long-distance, high bandwidth, and large-capacity transmission free of EMI and RF interference. There is no crosstalk between adjacent firer cores in one same cable. The fibre core features seamless sealing, small diameter and size, light weight, low attenuation and BER, which not only significantly improves the transmission reliability, but also provides the necessary scalability to support the state-of-the-art network technologies such as FDDI, ATM, 100BaseT and 1000Base-T, and even 10GBase-T.

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■ **IDF Subsystem**

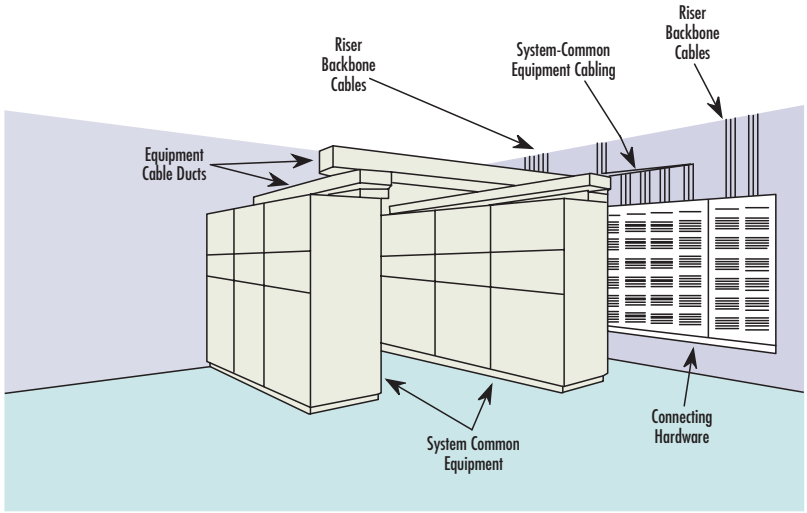
The IDF subsystem comprises of cross-connect and interconnect patch panels, providing connection for other subsystems. With such cross-connect and interconnection, the communication line may be directed or re-directed to different parts of the building, easing management of the communication line and enabling convenient swam when the terminal equipment is relocated.

The distribution cubicle is where the IDF subsystem is installed, in which the patch panels and LAN network equipment are mounted. To facilitate management, usually one IDF is shared by several floors where there are fewer homogenous points, and one IDF is mounted on each of the floors having more points.

In this project, the IDF subsystem uses 24-port Cat 6 modular patch panels. The voice riser backbone is managed by a 200-pair quick-to-connect copper patch panel. A 24-core fibre patch panel is installed to manage the fibres. Each fibre enclosure is complete with an appropriate number of single-mode ST couplers , depending on the actual demand of each floor. In each IDF room, a standard 19” rack (42U) is used to contain all the patch panels and associated LAN devices.

■ **MDF Subsystem**

The MDF subsystem is made up of cables, connectors and related supporting hardware, which links connects the trunk cross-connect point, cabling cross-connect point and common system equipment (such as PBX), as is illustrated in the following figure:



The MDF subsystem includes the VMDF and the Data Main Distribution Frame (DMDF) on the fourth floor, from where cables run vertically to each IDF inside the building.

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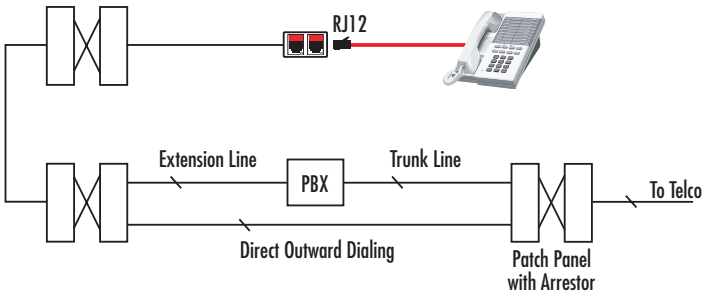
The horizontal data access patch panel incorporated into the management of the MDF subsystem adopts 24-port Cat 6 modular patch panels. The horizontal voice cable is directly accessed into the VMDF, which is managed by using a 200-pair quick-to-connect copper cable patch panel. A 24-core fibre patch panel is used to manage the fibre of the riser subsystem. Each fibre enclosure features an appropriate ST single-mode adapter plate. This subsystem adopts standard 19-inch rack (42U) to install the data patch panel and associated devices. The voice patch panel is wall-mounted.

The VMDF on the fourth floor adopts a 200 Pair PDS patch panel, providing management for the purple area (the cable fed from the PBX) and the white area (the Enhanced Cat 5 25-pair stranded copper cables connecting to various IDFs). It is used for such applications as low-speed LAN, voice, multi-user and telco. The 200 Pair PDS patch panel works with the cable management tray to manage the patch cords, allowing convenient change of voice and data configuration. In addition, the VMDF features high density, reduced footprint, convenient patch management and lowered labour intensity. The topology of the VMDF is illustrated as below:



The DMDF on the fourth floor is the building's data centre, managing the data fibre riser that connects the IDF's and MDF. Fibre patch panels are used to manage all the indoor fibres provided with ST connectors that are ideally suited for high-speed LAN applications thanks to their low loss and easy swap.

The DMDF is mounted in an imported 19'' rack that is complete with a special power supply and fan for LAN and MDF devices. Such mounting ensures neat and nice appearance, reliability, dust protection and security.

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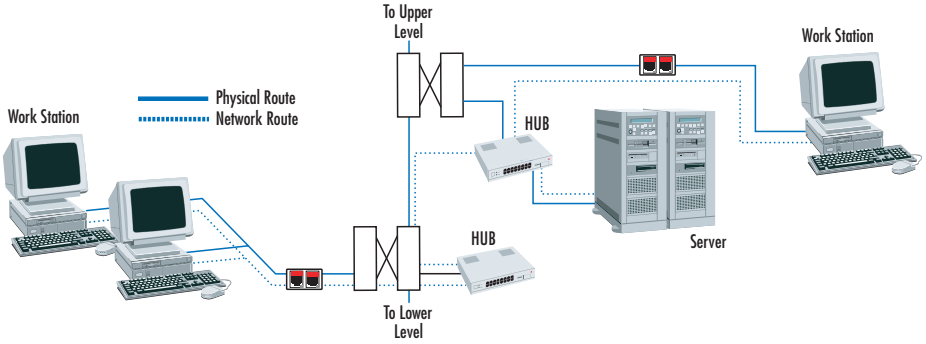
The topology of DMDF is illustrated as below:



A Sophisticated Cabling Infrastructure that Caters for Diversified Applications at Present and in Future.

In summary, Molex provides a complete cabling system that links all the office and equipment floors across Shanghai Unicom Tower. It provides not only the necessary voice and data transmission capability needed by the business of the owner, but also the scalability that allows the owner to implement such new applications as magnetic door (access control), LED/LCD display and building automation systems in the future. In addition, the 25-year System Warranty certificate granted by Molex after the project completion shall protect the owner's investment in its cabling infrastructure.

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one company › a world of innovation

Americas
2222 Wellington Court, Lisle, IL 60532-1682, USA
Tel: +1 630 969 4550
www.molexpn.com

EMEA
1000 Lakeside, North Harbour, Western Road, Portsmouth
England, PO6 3EN Tel: +44 2392 205800
www.molexpn.co.uk

APAC
60-78 Abbey Rd, Melton, VIC 3337, Australia
Tel: +61 3 9971 7111
www.molexpn.com.au