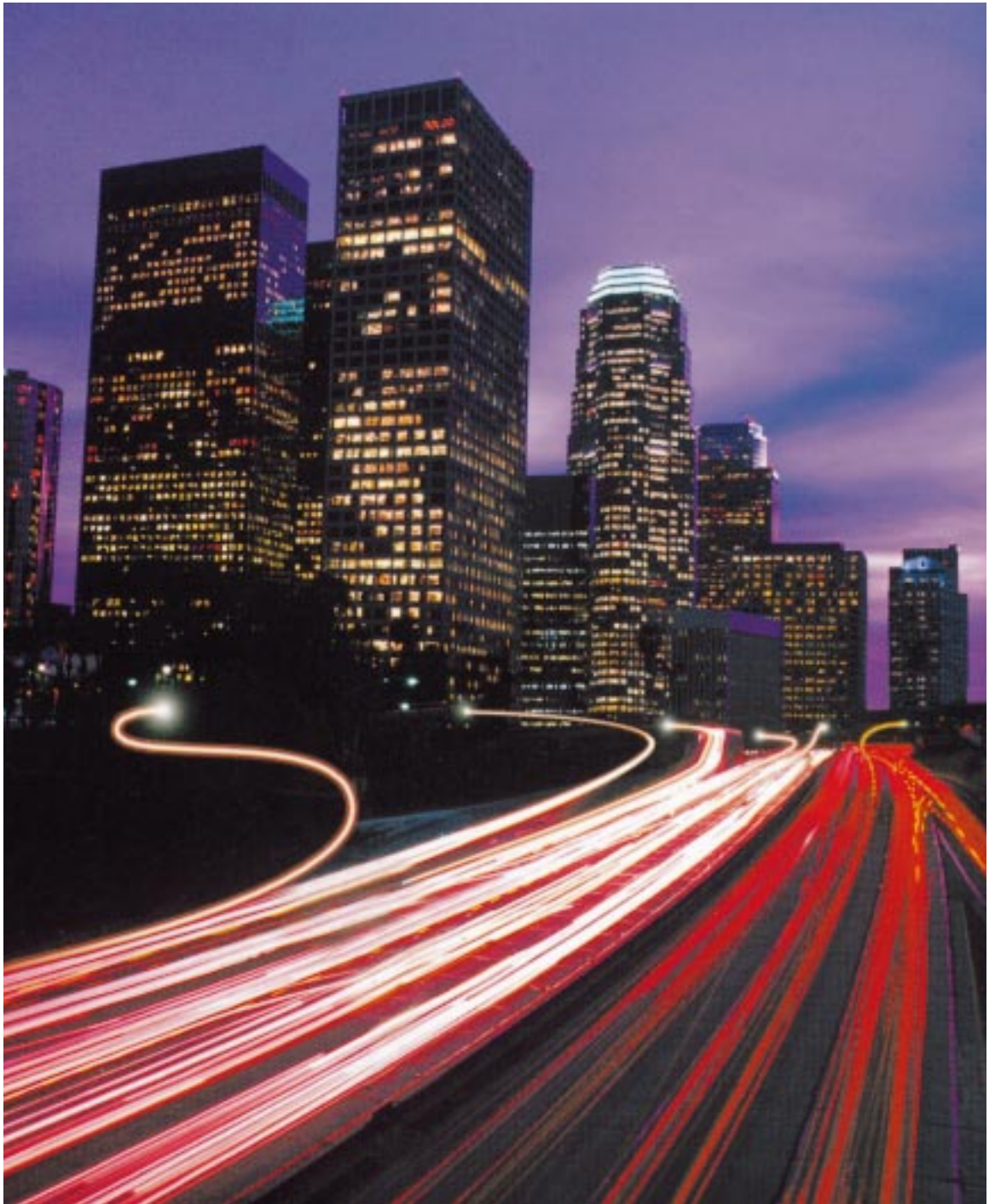


KRONE

KRONE Digital Distribution Frame Solutions



DDF for SDH network

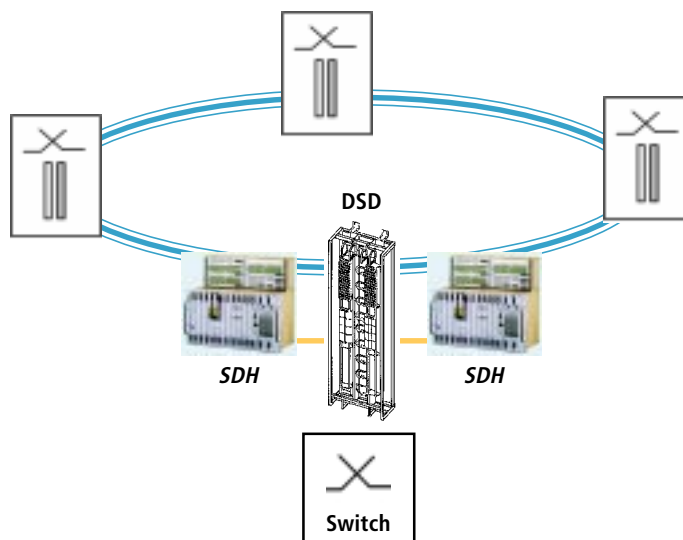
Today, the Telecommunications market finds itself facing a lot of challenges. The economic globalisation and the subsequent intensifying of competition has meant that companies are having to optimise their business processes. These processes can be helped considerably by the introduction of modern information and communications services.

ILEC's (Incumbent Local Exchange Carriers) are seeking to modify and enhance their networks to meet the newest standards and technologies. The liberalisation of the telecommunications markets has seen many new Network Operators (CLEC = Competitive Local Exchange Carriers) competing in the areas of national and regional fixed and mobile networks. CLEC's are not tied to the network technology and infrastructure of the previous monopolistic operators but are concentrating on using standardised technology in their own or collocated premises and, providing detailed and cost effective connection planning.

In technological trends, there is a universal demand for extra bandwidth coupled with high quality and reliability with the pressure to optimise costs wherever possible. Over a period of time there has been a gradual merging of technologies in the public WAN (Wide Area Network) and the private LAN (Local Area Network) infrastructures which will eventually lead to a common telecommunications network with internationally recognised standards.

SDH (Synchronous Digital Hierarchy) and SONET (Synchronous Optical Network) will become the world-wide standard technologies for national and international traffic. They can carry data at up to 10 Gbit/s and therefore provide the most suitable technology for high bandwidth backbone systems thus providing the Data highway for modern telecommunications networks.

In order to meet the above technology requirements, SDH and SONET systems allow, via the installation of ADM (Add/Drop Multiplexers), the construction of a ring topology with the advantage of automatic reserve switching. ADM's are particularly suitable for extracting a low bitrate signal from a high bitrate signal stream. Depending on the transmission rate (from 64 kbit/s up to 2.5 (10) Gbit/s), different cable types are used (e.g. symmetrical, coaxial or fibre-optic). The connection and jumpering (patching) of these different cable types with their differing transmission rates should, ideally, be possible in one composite frame. Replacement of the current 2 Mbit/s wire-wrap termination system with KRONE LSA-PLUS Quick Connection System gives the best reliable warranty to the users.



Benefits of KRONE Digital Signal Distributor :

Using the Profil Rod mounting system, the system integrates all types of analogue or digital signalling based on shielded or unshielded symmetrical cable with higher bitrate signalling based on Coaxial or Fibre-optic in one composite frame.

When compared to current systems, the Digital Signal Distributor offers considerable and measurable improvements in the areas of Functionality, Handling and Economics.

Functionality

- long-term reliability through the use of patented LSA-PLUS Contact technology.
- use of standardised connection components in the coax and fibre-optic connection fields.
- full accessories program for measurement and testing (Monitoring).

Handling

- simple and quick termination of distributors using the LSA-PLUS Insertion tool.
- construction of mixed distributors by the use of the flexible LSA-PROFIL mounting system for all elements.
- faster on-site assembly through pre-assembled frames and racks.

Economics

- modular components allow the construction of cost-effective distributors.
- training costs are reduced by using the well-known LSA-PLUS System.
- the full availability of KRONE Products offers simple planning and forecasting.

DDF for Cellular networks

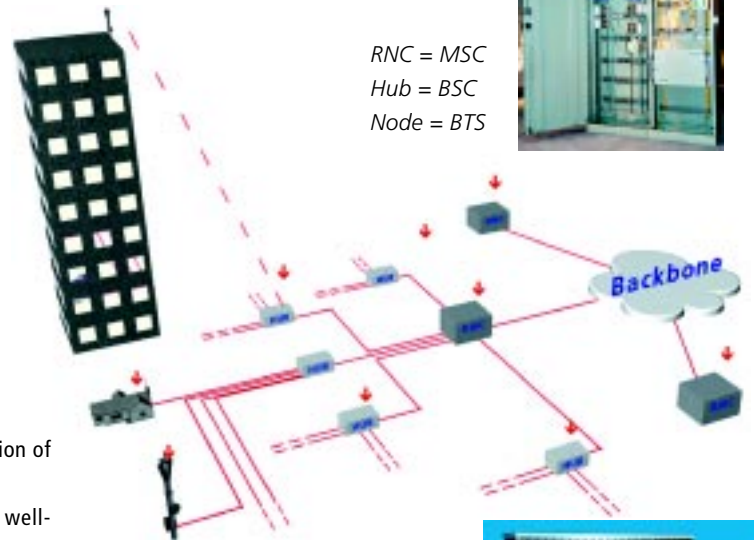
KRONE offers a complete, flexible distribution system for the cellular backbone.

1. A high degree of planning reliability
2. Smooth rollout
3. Fibre, copper and coax
4. BTS (Node-B), BSC (HUB), MSC (RNC & Backbone)

A clearly thought-out distribution solution can be adapted optimally to changed requirements.

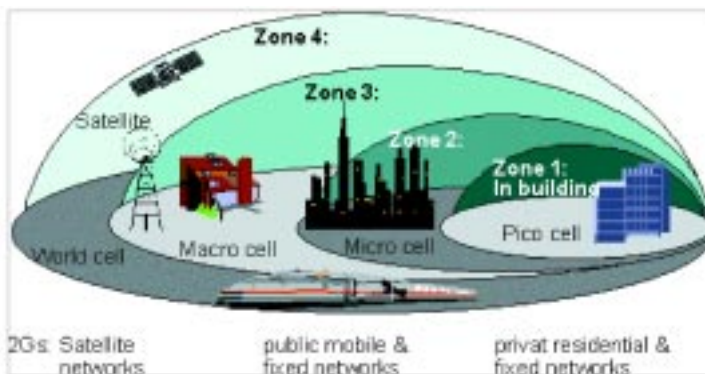
KRONE has different solutions for different applications in the Cellular network :

- CCC UniCab Solution
- Indoor Cabinet solution
- Digital Signal Distributor solution
- Interconnection DP
- Tracer System
- Optical Distribution
- Accessories



Economics -

- Modular components allow the construction of cost effective distributors
- Training costs are reduced by using the well-known LSA-PLUS System
- The full availability of KRONE products offers simple planning and forecasting



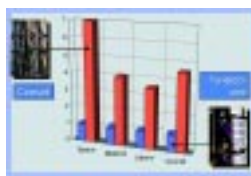
KRONE DSD system supports the Migration to 3G network

KRONE DDF solutions - HighBand DDF



For years KRONE has been leading the world in the provision of innovative connectivity solutions. One such innovation was the revolutionising of Telstra's Australian Inter-Exchange Network, allowing for better service to its clients, and saving the company millions of dollars every year.

The secret to Telstra's success within its Inter-Exchange Network has been the introduction of balanced twisted pair technology through the use of KRONE's LSA PLUS solution. This has replaced coaxial cable at the bit rates of 2 and 8 Mbit/s.



Telstra introduced balanced twisted pair technology at 2 Mbit/s in early 1992 as an alternative to the traditionally used coaxial cable. The balanced twisted pair introduction was driven by coaxial problems in the termination quality, material cost, installation/response times and the restricted confines for expansion of their digital distribution frames (DDF).

"The reason we considered and introduced this technology was the need to be competitive and to ensure the timely provision of the best possible service to our customers", said Bill Kotsakidis, Principal Engineer, Platform Technologies.

Telstra's conversion to balanced twisted pair from coaxial cable has indeed allowed Telstra to become more competitive, with material savings measured at 4.5: 1, space savings at 7:1, and labour savings at 3.5: 1, for an overall cost saving of 4.5: 1.

Since its implementation in early 1992, the use of balanced twisted pair technology in place of coaxial cable has already saved Telstra a staggering AUD \$85 million. These cost reductions were achieved mainly through huge savings in labour and equipment costs. The technology is now well and soundly proven.



COAXIAL VERSES TWISTED PAIR

Telstra was not just concerned about saving money, the increased demand for capacity in data transmission meant Telstra could not keep up with customer demand. Network Design and

Construction (Telstra's construction arm) could not install the systems fast enough. This problem has been overcome by using shielded twisted pair cables, which easily and quickly terminate with a high degree of quality on KRONE LSA PLUS Insulation Displacement Terminals instead of the previous use of coaxial cable and connectors which were very labour intensive and less reliable. Unshielded twisted pair is utilised for the cross connects.

The balanced twisted pair technology at 2 and 8 Mbit/s operates through an impedance of 120 ohms, whereas the unbalanced coaxial operates at 75 ohms. With the use of 0.50mm copper the 6dB loss distance is in excess of 300 meters at 2 Mbit/s, and 160 meters at 8 Mbit/s. These results are comparable to coaxial cable.



Not only has the productivity, quality and performance of the KRONE connectors, cabling and baluns been verified at 2 and 8 Mbit/s, but they have been shown to excel in comparison with coaxial installations. In particular, the KRONE IDC termination has proven to be very reliable, which is in contrast to the termination problems (tolerances and man made), and poor consistency, experienced when using coaxial cable. Furthermore, the KRONE IDC system has shown to be flexible, all owing for ease of use, including network monitoring and rearrangements.

The coaxial installations on the other hand display poor flexibility arrangements in maintenance, such as patching, monitoring and testing practices, and therefore require very involved staff training and are often extremely labour intensive.

The twisted pair solution offers physical interfaces to all variations of 2 and 8 Mbit/s equipment, including switches. This will eliminate the inherent problems of coaxial cabling and associated practices at these bit rates.

The solution allows for full and immediate introduction of twisted pair cabling while migration of older coaxial equipment can still be achieved with the KRONE twisted pair solution. There is no requirement to modify or alter existing orders with equipment manufacturers. Introduction of 120 ohm equipment interfaces can be realised when practical.

With such extensive benefits, it is easy to understand why the use of balanced twisted pair technology at 2 and 8 Mbit/s has all but made coaxial cable and connectors obsolete at these bit rates within Australia. The increasing pressure being experienced by carriers internationally to remain competitive, profitable and responsive to customer needs, means it will not be long before the KRONE LSA solution is employed by carriers around the globe

Telstra believes the installation of 8 Mbit/s balanced twisted pair technology was a first, Internationally. As a result Telstra has submitted to ITU-T Study Group 15 a proposal to modify Recommendation G. 703 for balanced twisted pair connection at 8448 Kbit/s using IDT and baluns to serviced both 75 and 120 ohm options.

The Australian AUSTEL Working Group 9/1 met and gave this submission their full support. Furthermore, following the success of balanced twisted pair at 2 and 8 Mbit/s investigations and trials were in operation to determine the feasibility of using the twisted pair solution in the 34 Mbit/s to 155 Mbit/s range. There is a genuine requirement to eliminate coaxial termination from the network.

KRONE DDF solutions - Digital Signal Distributor

The KRONE Digital Signal Distributor is a **universal distribution system** designed for installation throughout the WAN area. The introduction of transmission services such as ATM and xDSL had led to a merging of distribution and transmission functions. Transmission paths with data rates of 64 kbit/s to 2.5Gbit/s have to be multiplexed and distributed. KRONE has developed universal distribution system to meet these requirements. These solutions are designed to accommodate different types of cable such as **symmetric copper cable (both shielded and unshielded), coaxial cable and fibre cable**.

Open Distributors - The advantage here lies in the freestanding, open design which allows for easy access from all sides for wiring. The distributor can be expanded by installing the frames side-by-side to form a bank.

Vt COM-2Mbit/Coax/FO-600

- The hybrid distributor for the WAN and the subscriber access network.
- For single-sided jumpering to the middle
- Short jumper paths
- Separate cable and jumper space
- Vertical and horizontal jumper elements



2Mbit/s distribution field

Requirements/Advantages/Benefits

- Different cable types can be used (1-pair, 2-pair, 8-pair, 16-pair)
- Patching with patchcords without interruption of the fixed connection
- Interruption-free measurement and testing



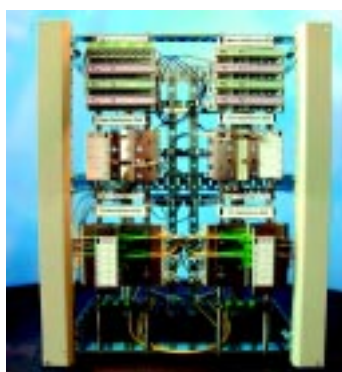
Tracer Lamp Unit

Product Features :

- Display unit to mount on a variant of 2/8 x abs-module
- Visualizing the end of a jumper wire
- Two LED per Quad (two pairs). Allows also the marking of circuits
- Inserted plugs do not interrupt the signal



2.2m free-stand rack



15U 19" rack mounted



3 or 4U 19" rack mounted

Customer Benefits :

- The distributor becomes its own connection reference card.
- Considerable reduction of documentation efforts.
- Fast identifying of connection points
- Vast reduction of breakdown periods



Coax distribution field

with connection components for coaxial cable (75 Ohm)

Requirements/Advantages/Benefits

- Routing of the IN/OUT signals in separate cables or in a single cable.
- Coax Adapter , e.g. type 1.6/5.6 DIN 47 295 for different coaxial cables.
- Connections in the coax distribution fields are by means patchcords of different lengths.

KRONE offers various coax-assemblies for the accommodation of 4 to 16 coax.



Fibre-optic distribution field

- Accommodates up to 12 splice and plug connections per module.
- Pre-assembled with FO throughadapters and terminated buffered fibre pigtails.
- The plug connections are arranged at an angle, which saves space and increases the protection against laser radiation.

Wire-Wrapping Disadvantages

Summary :

Contact features	Wire-stripping necessary in Wire-wrap technique
Contact reliability	The wire is wound several times around a sharp-edged four-sided pin e.g. three windings without insulation, and three windings with insulation. The contact reliability derives from the statistical probability that from a large number of contact points (e.g., for 6 windings 24 contact points) there will always be several that will remain in contact. The pins can become bent, which represents a danger of short circuit and injury.
Types of contacts	The wire-wrap contact is only available as a connection model. Disconnection is only possible by means of plug connectors which are set onto the wrap pins (7R design) or through expensive and time-consuming system solutions making use of latch connectors and an additional LED display for wiring guides.
Connection Modules	In the telecommunications area the wire-wrap points are usually in groups of 8 x 8 pairs (octets).
Protection against	The wire-wrap pins are very close to each other and are, therefore, not secure against accidental contact. Therefore risk of data transmission errors
Ease of installation	Wiring requires skill at working with one's hands and a special, expensive tool or an electrical tool (wiring gun), which requires a power connection.
Jumpering	Time-consuming because the old winding has to be unwound and the new one made in dependence upon the thickness of the conductor and the insulation.
Applications	Wrap pins can be inserted into printed circuit boards at a great density. The main application is for backplane wiring systems for process control. Here the wiring is done industrially, using an automatic process. Changes in the jumpering are extremely rare.
System solutions	Special wrap modules for 2 Mbit/s distributor systems in 7R design or in 19 or 23 inch especially for 2 Mbit/s design.
Cable types	The wires have to be of wrapping quality if contact difficulties are to be avoided. The cable design also has to be suitable for the particular wrap solution.
Transmission bandwidth	In general, wire-wrap distributors are only used for transmission rates up to 2 Mbit/s.
Near-end crosstalk	The high requirements are satisfied by the fixed geometric system structure of the wire-wrap distributors. However, this requires special types of cable which not all suppliers can offer.
Overvoltage protection	Not available, not possible!
Accessories	Special for 2 Mbit wire-wrap distributors.
Costs	The products are considerably more expensive. Wire-wrap distributors are only a partial solution; that is, outside the network nodes one has to use existing technology (for example, LSA-PLUS). Furthermore, for coaxial cable and fibre-optic cables special solutions have to be used which means higher planning and project engineering costs.

KRONE Asia Offices - For Your Local Contact

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