

## MD110 Networking



*The MD110 Convergence Communication System provides the core infrastructure for a business communications system that is unique in today's market. By incorporating Ericsson's world-leading expertise in switching and networking, the MD110 provides a powerful and scalable platform for a communications network that can be precisely matched to the requirements of your organization, today as well as tomorrow*

Communication is between people, the rest is technology. This phrase summarizes well what networking in an enterprise is about: to create a communication system where employees can exchange information regardless of time, location or medium.

With MD110, employees can work from virtually any location with full access to the corporate network. Thanks to the ubiquity of the IP network it is now feasible to provide the same services to individuals working from home or to small groups located in remote offices as those provided to the work force at the enterprise's main location.

Reorganizations can be implemented by reorganizing the network, not relocating people. In business today, the network is the organization. As departmental walls tumble, networks connect people and provide the infrastructure for workgroups and project groups that are constantly changing in response to new business requirements. Increasingly, companies are also becoming connected with customers, partners and suppliers in networks that mirror their business relationships.

The MD110 is a unique communication system, designed from the core to support the networking requirements of today's distributed organizations.

## **Converged Communication System**

Designed as a truly open system, the MD110 supports virtually every established standard for line signaling and public network interfaces. The MD110 Convergence Communications System is ideally suited for creating a cost-efficient VPN (Virtual Private Network) for large organizations, be it based on the traditional TDM technology or the rapidly growing IP network (IP-VPN). With MD110 these technologies can easily be combined to build robust but cost efficient communication solutions to fit any demand the customer may have.

## **Networking Made Easy**

Regardless of technology, networking means bringing the different system parts together into one communication system. The fully distributed architecture, with up to 124 autonomous Line Interface Modules (LIMs) tied together to form a homogenous system lends the MD110 to solve most needs without additional network services. The LIMs may be scattered over a wide geographical area, linked to the main site over leased E1/T1, a microwave link, an IP or Frame Relay network or any medium capable of carrying a standard G.703 interface.

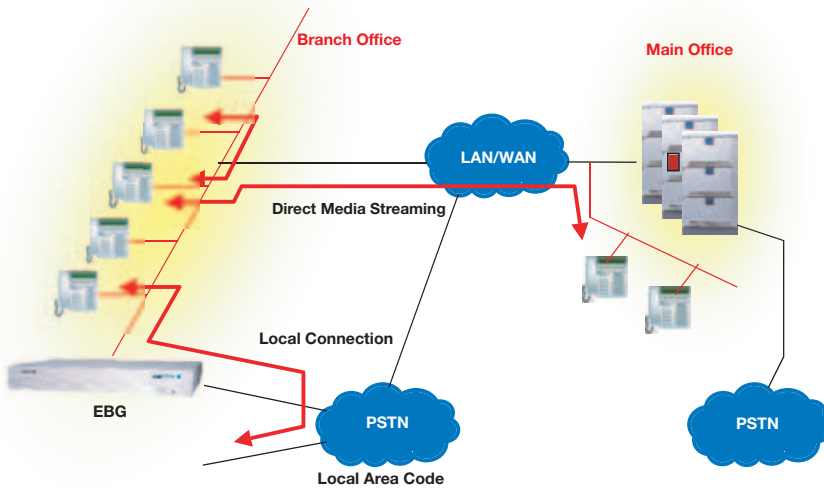
Each LIM comes with its own processor, switch and resources needed to serve its terminals. In case of an error in the communication to the main site it continues to serve its clients locally and has the capability to set up calls across the PSTN network if equipped with a local PSTN trunk.

When building even larger networks it is convenient to form groups of independent system nodes. The network services – according to standard ISO QSIG and enhanced with MD110 proprietary network services – brings the various nodes together, forming a complete communication solution.

The physical distribution of the system unleashes the real potential of MD110 Networking. You can create the optimal balance between cost and functionality and easily adapt to changing needs and tariffs. The flexibility of the LIMs allows distribution over a campus area or on the premises, while maintaining a feature transparency level of 100 percent. With the MD110, you can select the wide-area network that works best for you, regardless of whether you are using IP VPN, ISDN VPN or leased lines.

The concept of distribution fits perfectly when the IP technology is further explored. IP based terminals such as the Dialog 4000 IP telephones, or the SoftPhone, the Ericsson Communication Client, connects directly to the LAN and no longer needs to route calls through a switch. Peer-to-peer switching (or Direct Media Routing) ensures that the voice signal finds its way through the IP network maintaining optimal speech quality, still controlled by the involved LIMs and with the full support of services. The terminal user is assured the same service availability whether logged on at the main site, at the branch office or at in the home office. Resilience for IP telephony is guaranteed through the unique distributed architecture of the MD110.

Branch Office with Local Presence



Branch Office with Local Presence

## Networking the Dispersed Workforce over IP

Bringing all employees into the same communication system also implies giving a high level of services and availability to the teams at small to medium sized remote locations. MD110 Convergence Communication System is specifically designed to solve this need to link all parts of an organization together: the very small to medium size branch offices with 1 to approximately 100 employees and, naturally, any larger unit of the organization. These solutions are mainly built upon the MD110 and the Ericsson Enterprise Branch Gateway (EBG).

In the small and medium sized branch offices where the cost of a separate LIM or even a MD110 node is hard to justify, the MD110 system provides a powerful, cost effective and reliable solution with its IP telephony solution. The EBG is further enhancing this solution at branch offices. The EBG is designed to guarantee the branch office telephony functionality in the event of a network failure and to give local presence by access to the local PSTN/ISDN.

When the network is fully intact, the MD110 at the main office keeps the IP terminals under its control. In the event of a network failure, the IP terminals at the branch office will automatically connect to the EBG, enabling the branch office employees to resume the traffic locally and through the local PSTN connection. Once the failure in the network is corrected, the IP terminals automatically reconnect to the MD110.

Under normal circumstances with a fully operational network, the EBG, with its local PSTN connection offers cost-optimized routing for both incoming and outgoing calls to/from both the branch office and the main office. Supporting the peer-to-peer switching, the EBG together with the MD110 system enables considerable cost saves in case of local clients calling a branch office employee and in case of employees calling out to the local area. Also, employees at the main office may save tariff costs when calling through tail-end hop-off at the branch office EBG. Further information can be found in the datasheet for the Ericsson Enterprise Branch Gateway (EN/LZT 102 3691)

## IP Networking

For larger sized branch offices using a separate MD110 system, the MD110 Convergence Communication System offers integrated IP networking, enabling purely IP WAN connections between MD110 nodes - and this with MD110 networking services intact. Also supporting peer-to-peer switching (Direct Media Routing), this solution ensures that the speech connection of IP terminals is routed directly over the IP WAN with the optimal speech quality and controlled by the nodes.

Fully integrated on one board, the IP networking solution is a cost effective alternative to any IP trunking solution offering IP gateway facilities to traditional tie line ports only. Utilizing IP Networking to replace dedicated leased lines that enable voice networking of several large sites and utilizing the possibility of tail-end hop off when calling long distance may drastically reduce the company communication costs.

## IP networking BusinessPhone – MD110

The Ericsson communication system Business Phone – frequently used for small-medium sized enterprise locations and branch offices - can be connected to larger site offices equipped with MD110 using IP networking. Such IP networking connections also offer network services – according to standard ISO QSIG and enhanced with MD110-BP proprietary network services – and thereby enabling usage of centralized resources such as operators services.

Replacing the existing QSIG based leased lines between Business Phone systems and MD110 in the company network with IP Networking will generate further cost savings.

## Dynamic Route Allocation

Dynamic Route Allocation (DRA) provides switched interconnections between MD110 nodes over public ISDN or IDN (digital CAS) with the full MD110 networking functionality. DRA offers to replace leased lines, without placing requirements on or having an impact on intervening networks. DRA can also work as a back-up solution for MD110 nodes networked over IP, providing the full networking functionality even in case of problems in the IP network. DRA uses voice compression to support up to four calls on one 64kbps channel, resulting in substantial savings on traffic costs.

## Advanced Call-handling Functions over a Network

The MD110 offers advanced call handling functions over a network that include:

- *Calling line identification*  
The calling party's extension number is displayed on the telephone. For calls made from public ISDN-type networks, the public subscriber number is displayed.
- *Connected number identification*  
The other party's number is displayed on the telephone, even if diversion is activated for the called extension or if the call is transferred or answered by another extension.
- *Call back*  
Calls to busy or unanswering extensions are automatically re-established across the network when the extension becomes free or is next used.
- *Call waiting*  
A caller to a busy extension can use a suffix digit to produce a "call waiting" indication at the dialed extension.
- *Transfer*  
Calls may be transferred to any extension on the network.
- *Follow-me*  
Incoming calls can be temporarily directed to another extension on the network.
- *Diversion*  
Calls may be more permanently redirected immediately, on no answer, or on busy.
- *External follow-me*  
Calls may be directed to an external number when the extension user is out of the office.

- *Centralized operator functionality*  
Operators can be centrally located as a networked resource, which can be more efficient than having several switchboards.
- *Centralized messaging systems*  
Voice mail or Unified messaging systems can be centrally located as a network resource
- *Virtual call centers*  
With the ANCD, call center agents can be distributed across an MD110 network.
- *Call Offer*  
A call may be offered to a busy user with the choice to accept, reject or ignore it.

## Open Standards and Interfaces

As a company, Ericsson is committed to open standards and interfaces and to implementing new standards as soon as they are defined. This commitment, which protects your investment for the future, is evident in the design of the MD110 Business Communications System.

The MD110 is unique in that it successfully integrates all common PBX signaling systems, allowing it to act as a gateway between a range of new and existing systems and public network resources. The MD110 handles more than 50 variants of digital and analog signaling systems and some 20 variants of register signaling protocols, including Loop Disconnect, E&M signaling, MFC signaling, CEPT L1, AC15, CAS Digital (MFC R2), DPNSS, ECMA/ISO QSIG (ISDN) and H.323 (IP).

## Powerful Management Functions

A state-of-the-art business communications system by itself is not enough to ensure effective communications. As networks grow in complexity, system and network management become crucial for effective use of communications resources. Network management is an area in which Ericsson excels and that sets the MD110 apart from other business communications systems. The MD110's already superb network management functions are constantly being improved. It has a management system for the entire network that supports industry standards such as SNMP (simple network management protocol) using TCP/IP and PPP (over the LAN or via modem). The Dynamic Network Administration family of management tools includes Directory Manager, Extension Manager, Performance Manager, Node Manager and Event Manager.

The Dynamic Network Administration applications deliver a set of network management tools for all aspects of operating and administering a unified voice and data network. Together, these tools comprise a suite of applications running under Microsoft Windows NT on standard PCs. All network management tasks can thus be performed from a single location using a familiar interface. The result is a truly integrated network management system with a full range of powerful tools for managing and controlling all aspects of network operations and services.

## Key Benefits of MD110 Networking

- Increases efficiency by enabling people throughout the organization to communicate with each other as if they were in the same building.
- Reduces communication costs by eliminating or reducing the need for remote (e.g. branch office) switching equipment and by carrying as much traffic as possible over a private network.
- Reduces staff overhead by optimizing operator and support functions.
- Enhances customer service and corporate image by ensuring fast, efficient response at all times.
- Allows the organization to take advantage of the latest telecommunications service offerings.
- Simplifies management by integrating all communications resources into a single, centrally managed system.
- Makes maximum use of existing communications resources, while providing a sound platform for future investments.
- Allows telephones, computers and video-conferencing systems to be joined over the same high-capacity links, providing maximum value from leased lines.

## MD110 Signaling

Public ISDN connectivity

Europe – DSS1

2B+D, 30B+D, I.430/I.431, Q920/Q921, Q930/Q931, ETS300 011, ETS300 012, ETS300 125, ETS300 102, ETS300 402, ETS300 403 and supplementary services:

CLIP ETS 300 092

CLIR ETS 300 093

COLP ETS 300 097

COLR ETS 300 098

DDI ETS 300 064

AOC-D and E ETS 300 182

SUB ETS 300 061

UUS ETS 300 268

MCID ETS 300 130

GF ETS 300 196

USA – Bellcore

23B+D TR268

N.T. DMS 100/250

AT&T 4ESS/5ESS

US National ISDN 1 and 2

*Germany* – 1TR6 2B+D, 30B+D

*France* – VN3/VN4 2B+D, 30B+D

*Australia* – TS013/TS014 2B+D, 30B+D

Public Networking

IP

H.323 V2

Private networking ISDN

QSIG

2B+D, 30B+D, I430/I.430

Private networking

DPNSS/APNSS

30B+D, 23B+D and analog tie lines BTNR 188 issue 5

Private Networking

IP

H.323 V2

<b>QSIG, Service Name,</b>	<b>ECMA Standard, ETSI Standard, ISO/IEC Standard</b>		
Basic call stage 1 & 2 BCSD	ECMA 142	ETS 300 171	IS 15574
Basic call stage 3, QSIG-BC	ECMA 143	ETS 300 102	IS 11572
64 kbit/s unrestricted, 3.1 kHz audio, Speech	ECMA 143	ETS 300 172	IS 11572
64 kbit/s restricted	ECMA 143	ETS 300 172 4:th edition	IS 11572
Calling Line Identification Presentation	ECMA 148	ETS 300 173	IS 14136
Calling Line Identification Restriction	ECMA 148	ETS 300 173	IS 14136
Connected Line Identification Presentation	ECMA 148	ETS 300 173	IS 14136
Connected Line Identification Restriction	ECMA 148	ETS 300 173	IS 14136
Generic functional Protocol	ECMA 165	ETS 300 239	IS 11582
Calling Name Identification Presentation	ECMA 163 ECMA 164	ETS 300 237 ETS 300 238	IS 13864 IS 13868
Calling Name Identification Restriction	ECMA 163 ECMA 164	ETS 300 237 ETS 300 238	IS 13864 IS 13868
Connected Name Identification Presentation	ECMA 163 ECMA 164	ETS 300 237 ETS 300 238	IS 13864 IS 13868
Connected Name Identification Restriction	ECMA 163 ECMA 164	ETS 300 237 ETS 300 238	IS 13864 IS 13868
Advice of Charge AOC-D			IS 15049 IS 15050
Advice of Charge AOC-E			IS 15049 IS 15050
Call Completion on busy			IS 13866 IS 13870
Call Completion on no reply			IS 13866 IS 13870
Call Forwarding on busy			IS 13872 IS 13873
Call Forwarding on no reply			IS 13872 IS 13873
Call Forwarding unconditional			IS 13872 IS 13873
Path Replacement			IS 13863 IS 13874
Call Transfer			IS 13865 IS 13869
Transit Counter			IS 14841 IS 14843
Transit Counter			IS 15055 IS 15056
Common Information			IS 15771 IS 15772

Channel Associated signaling (CAS) with various country dependent schemes and interfaces

<i>Line signaling</i>	CCITT R2 E&M
<i>Register signaling</i>	Decadic DTMF MFC
<i>Line signaling</i>	E&M CEPT L1 Loop
<i>Register signaling</i>	Decadic DTMF MFC

Analog tie lines with various country dependent schemes and interfaces

## IP Networking services

MD110 IP Networking services	Between MD110-MD110	Between MD110-BP
Account Code	•	•
Advice of charge	•	•
Authority Code	•	-
Basic Call	•	•
By-pass call forwarding	•	•
Direct media for IP terminals	•	-
Number Transfer (Calling/connected Line Identity)	•	•
Name Transfer (Calling/connected Name Identity)	•	•
Call back on no reply/busy (Network Call Back)	•	•
Call Deflect	•	-
Call Diversion and follow-me	•	•
Calling line category (Calling party info)	•	•
Call Offer, Call Waiting Indication	•	•
Call Transfer	•	•
Camp on	•	•
Centralized operator	•	•
Customer Identity	•	-
DNIS	•	-
Intrusion	•	•
Centralized messaging (includes Message waiting indication)	•	•
Night Service Diversion	•	•
Night Service Indication	•	•
Priority Routing	•	-
Rerouting	•	•
Transit Counter	•	•
Transfer of Party Type Info	•	-
Traveling Class Mark	•	•

See also the BusinessPhone Networking datasheet (EN/LZT 102 3656)

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