

Windows CE for Embedded Networking

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Company Info (1 of 3)

- * SSV SOFTWARE SYSTEMS GMBH (SSV) is a privately held company with corporate headquarters located in Hannover, Germany.
- * SSV was founded in 1982 as a system house for microprocessor software solutions.
- * SSV began in 1983 with the first hardware development - a HandHeld computer with RCA 1802 microprocessor for mobile applications.
- * In 1986 SSV works on the first own 80x86 processor board for mobile applications.
- * In 1988 starts the development of an own industrial BIOS firmware - The EMBEDDED SYSTEM BIOS (SSV ESB) for the Intel 8086/88.



Company Info (2 of 3)

- * In 1989 SSV introduce the first HandHeld computer with MS-DOS 3.3 in ROM.
- * In 1993 SSV changed the internal structures.
- * The SSV operational structure now consists of two business divisions:
1.) **HandHeld Systems** and 2.) **Embedded Systems**.
- * Each division maintains ist own profit and loss accountability, dedicated R & D, sales and product marketing.
- * Each division also works with an own customer support team.
- * The HandHeld division offers more than 16 years experience with microprocessor based systems for industrial computing.



Company Info (3 of 3)

- * There are over 30.000 SSV HandHeld systems installed.
- * The best-seller of the HandHeld division was in 1998 the T420-LS with over 1.500 systems.
- * The Embedded division offers more than 10 years experience with the SSV ESB and over 5 years experience with embedded PC architectures.
- * The Embedded Systems division has sold over 5.000 boards in 1997 and over 9.000 boards (+ 90%) in 1998.
- * The best-seller of this division was in 1998 the CP/486DX1 Single Board Computer with over 2.000 units.



Key Products - Embedded System Division (1 of 4)

* The Embedded System division offers products based on five different embedded PC architectures:

- 1.) 386EX based architecture - SSV code name BETA 1.
- 2.) ALI M6117 based architecture - SSV code name BETA 2.
- 3.) 486DX based architecture with OPTI 82C465 chip set.
SSV code name GAMMA 2.
- 4.) AMD SC400 based architecture - SSV code name DELTA 1.
- 5.) Intel Mobile Pentium II architecture - SSV code name SIGMA 1 (under development).



Key Products - Embedded System Division (2 of 4)

- * For all five architectures, we have a port of the SSV EMBEDDED SYSTEM BIOS (ESB-386EX, ESB-M6117, ESB-486, ESB-SC400...).

- * Based on the 386EX BETA1 architecture we offer two standard boards with PC/104 form factor and over ten full- custom designs.
 - 1.) The CP/386EX with up to 16 Mbyte DRAM and up to 4 Mbyte bootable FLASH Solid State Disk (SSD).

 - 2.) The CP/386LN with an 10BASE-T Ethernet interface.

- * Based on the ALI M6117 BETA 2 architecture we offer only one PC/104 standard board and currently two full- custom designs.
 - 1.) The CP/386AL with up to 16 Mbyte DRAM/4 Mbyte SSD.



Key Products - Embedded System Division (3 of 4)

* Based on the 486DX / OPTI 82C465 GAMMA 2 architecture, we offer currently two PC/104, one half size and some full- custom designs.

1.) The CP/486DX1 with 8 Mbyte DRAM and 4 Mbyte bootable FLASH SSD in PC/104 form factor.

2.) The CP/486DX2 with up to 32 Mbyte DRAM, FLASH SSD and 10BASE-T Ethernet in PC/104 form factor.

3.) The SBC/486DX3 with PS/2 SIMM DRAM, up to 72 MB SSD, Ethernet and CRT/LCD VGA in half size format.

* The SC400 based DELTA 1 architecture is new. Currently we use this architecture, together with a 10 Mbps 10BASE-T Ethernet controller, for Embedded Networking OEM products.



Key Products - Embedded System Division (4 of 4)

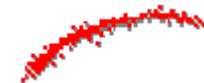
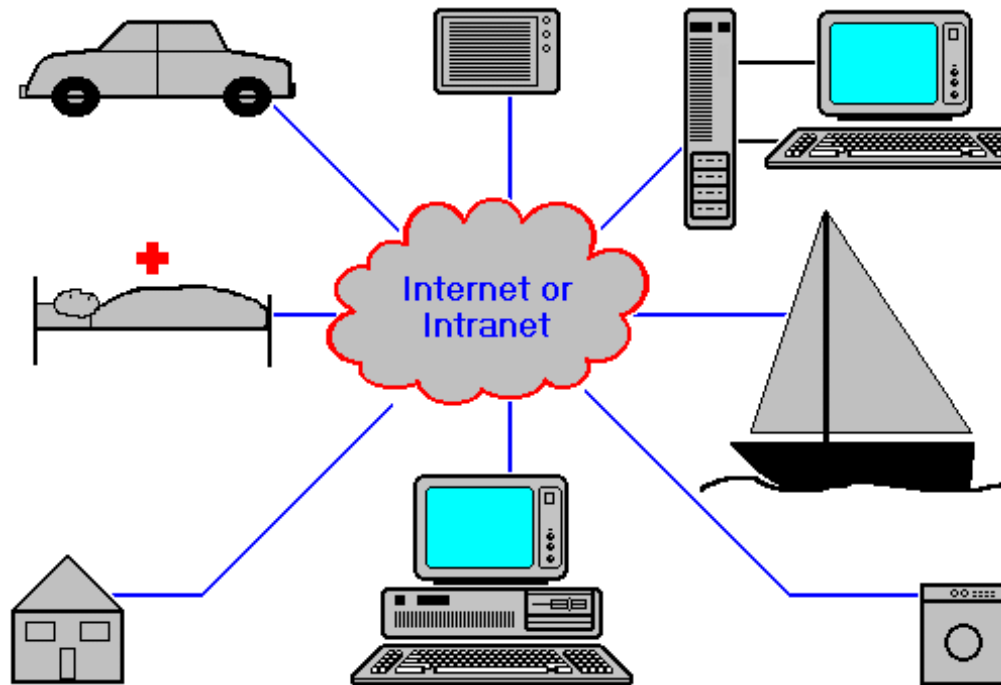
- * For OEM customers we have an SC400 Development Board.
- * We work on two full- custom designs for running MS Windows CE on the SC400 direct from FLASH memory.
- * There is also a LINUX project for using the LINUX operating system together with the SC400 in industrial server applications.
- * The Intel Mobile Pentium II based architecture SIGMA 1 is currently under development.



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Stay Connected - The Mission (1 of 2)

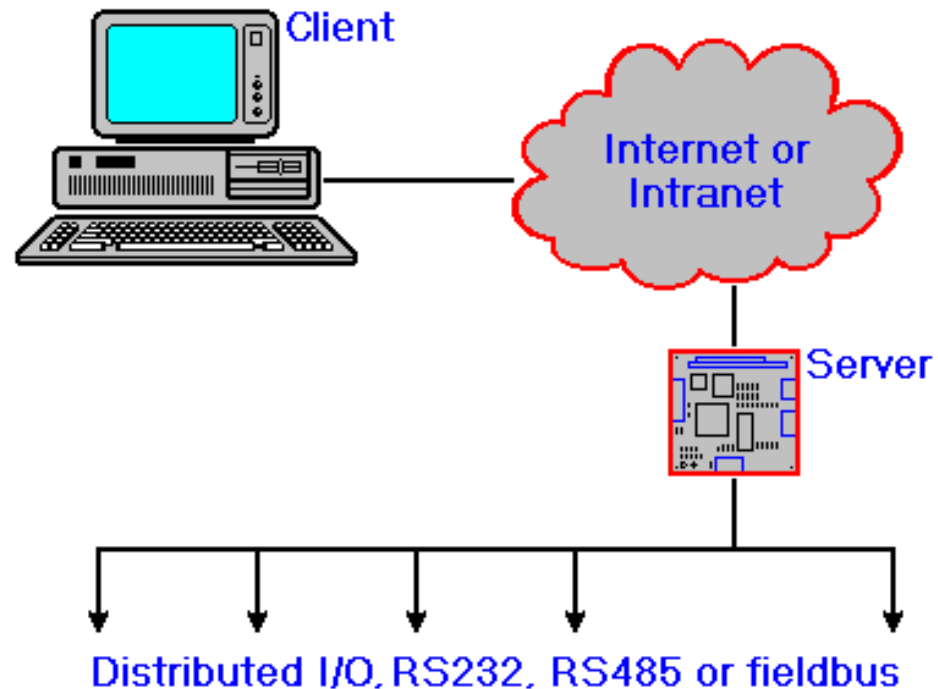
* In the next years, anything to do with information, control or measurement, such as instruments, printers, process control systems, building control equipment, point-of-sale terminals and medical devices will be connected with the Internet or Ethernet based Intranets.



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Stay Connected - The Mission (2 of 2)

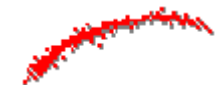
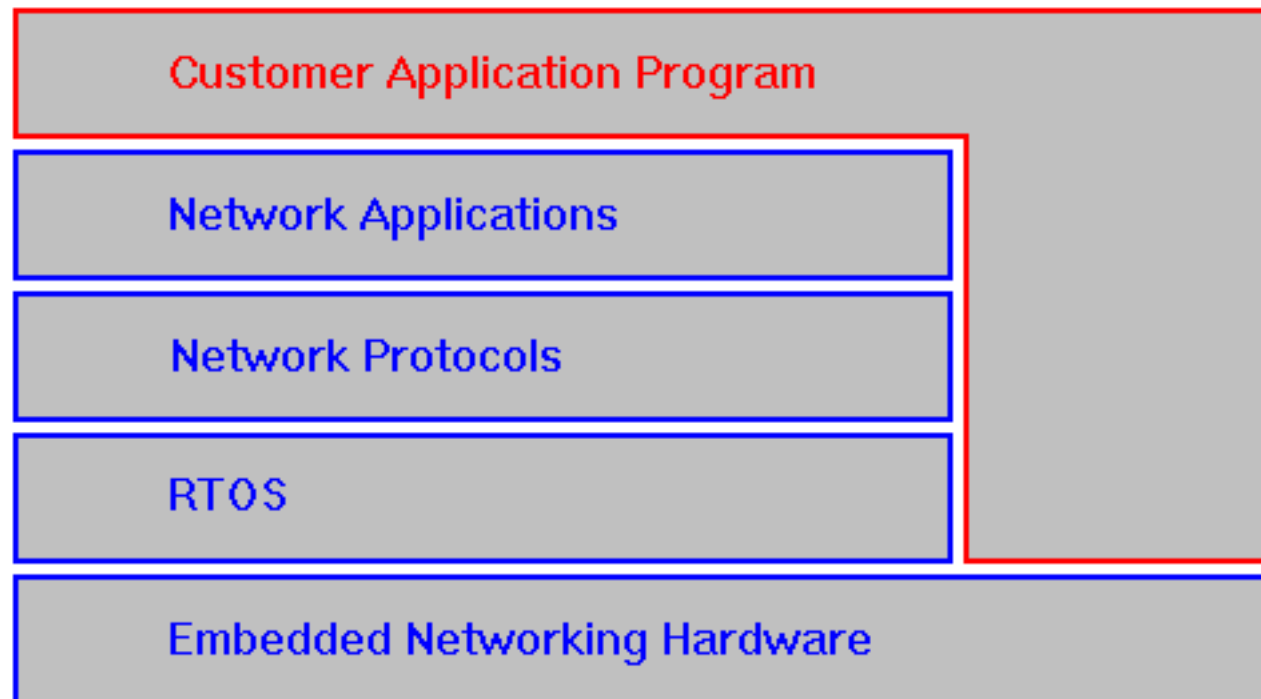
* SSV SOFTWARE SYSTEMS offers complete embedded solutions of all hardware, software and support which enables Internet and/or Intranet connections for a broad range of products.



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The Technology

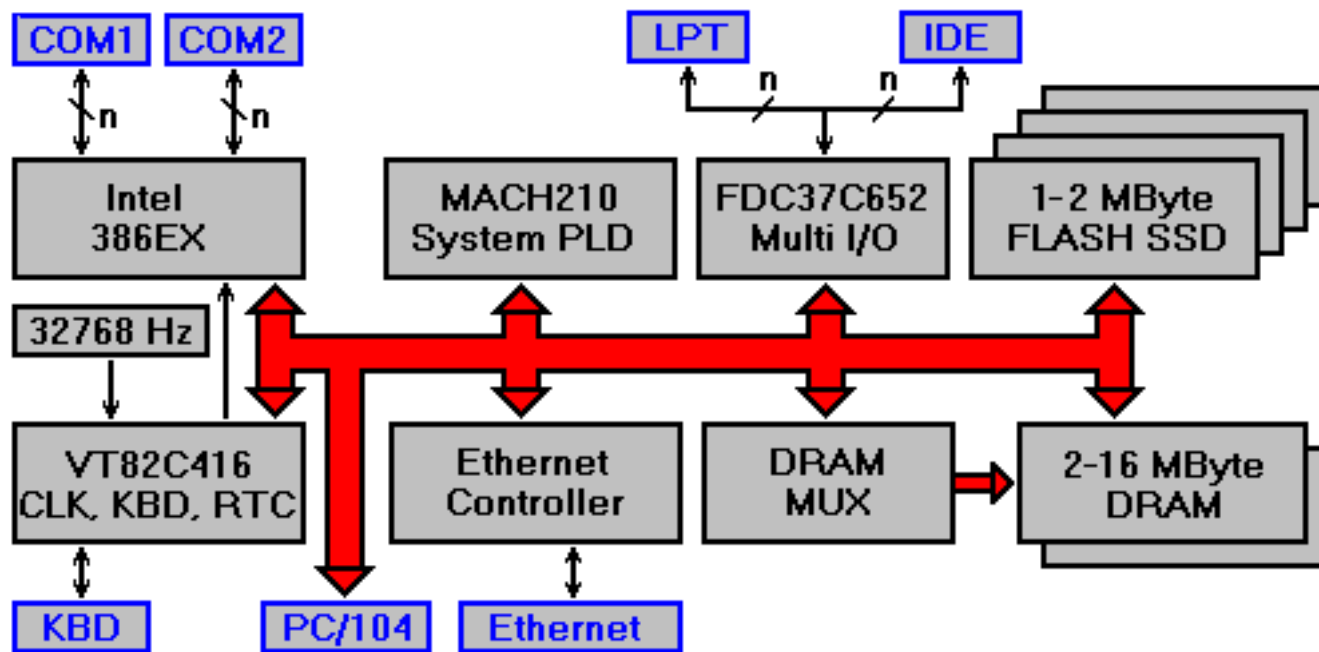
- * For building a Web-enabled or a Intranet-ready device, we need some hardware and software components.



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The Technology - Embedded Networking Hardware

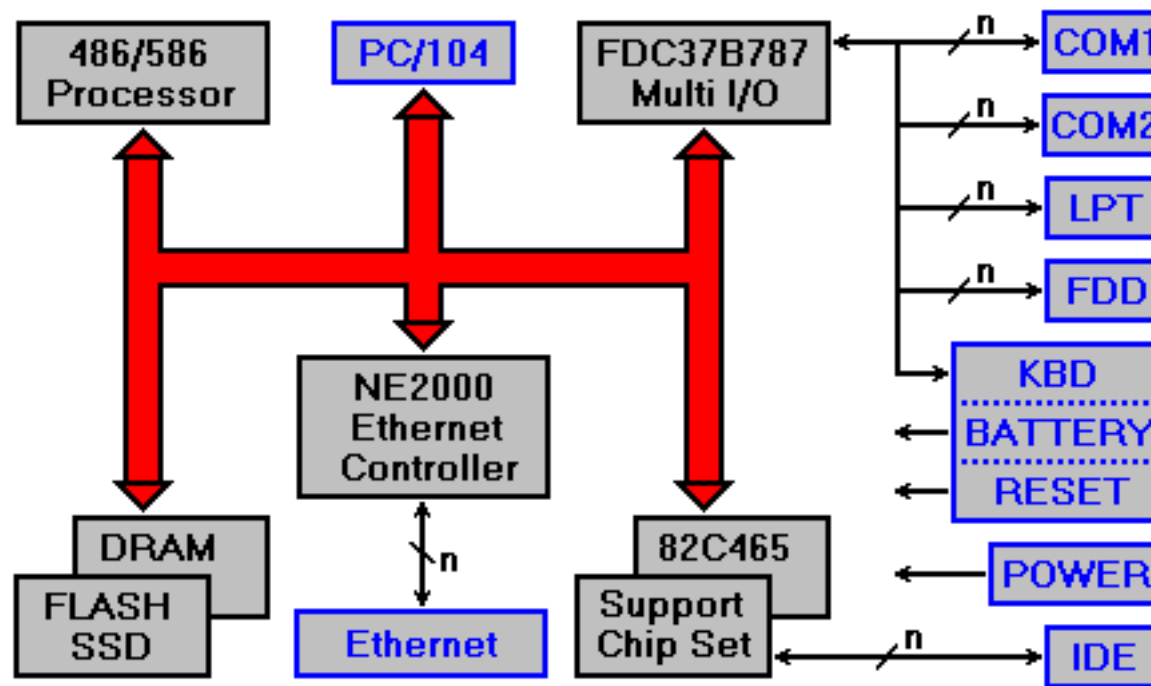
* Example 1 is the *CP/386LN* Single Board Computer with PC/104 form factor.



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The Technology - Embedded Networking Hardware

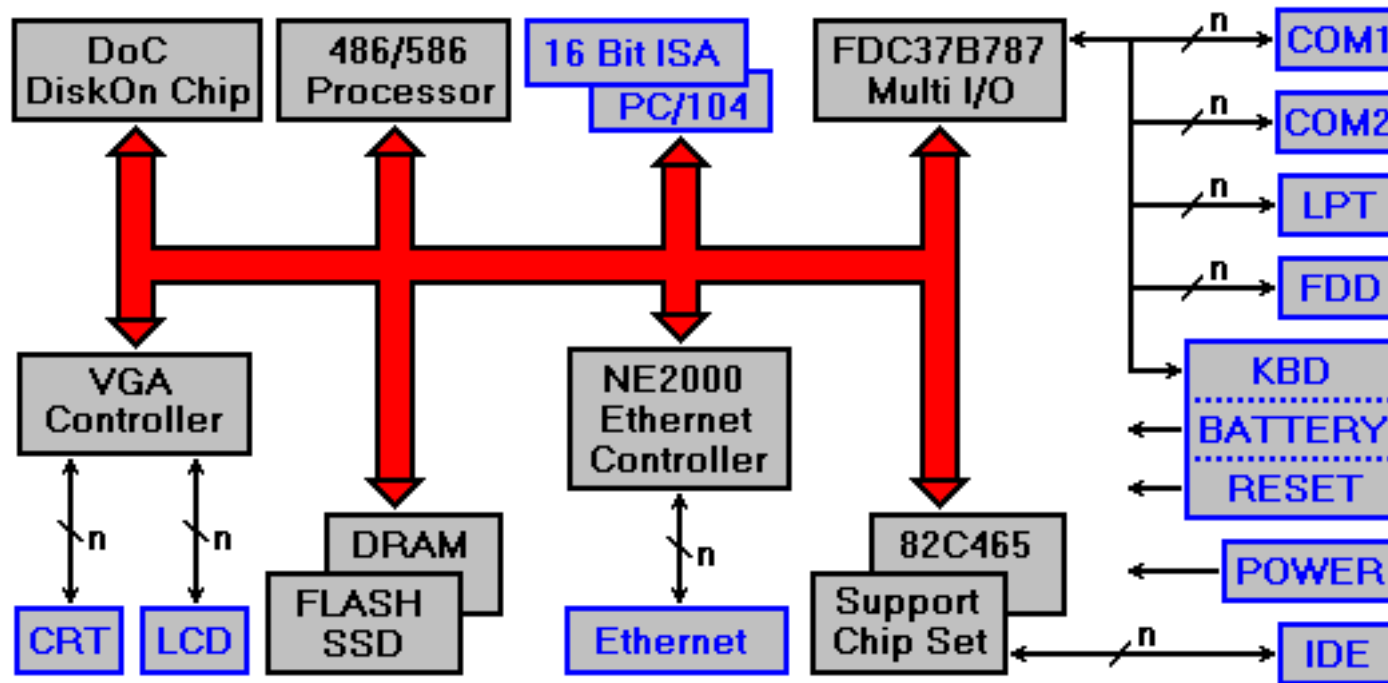
* Example 2 is the *CP/486DX2* Single Board Computer with PC/104 form factor.



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The Technology - Embedded Networking Hardware

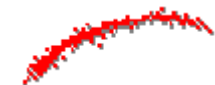
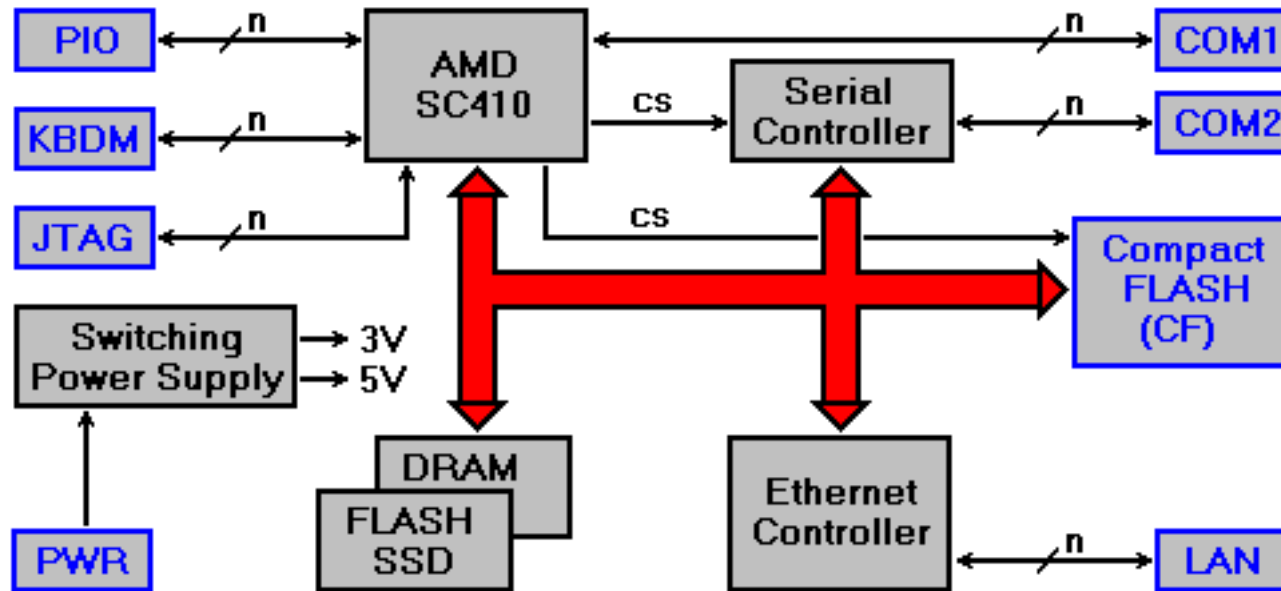
* Example 3 is the *SBC/486DX3* Single Board Computer with Half Size ISA form factor.



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The Technology - Embedded Networking Hardware

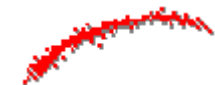
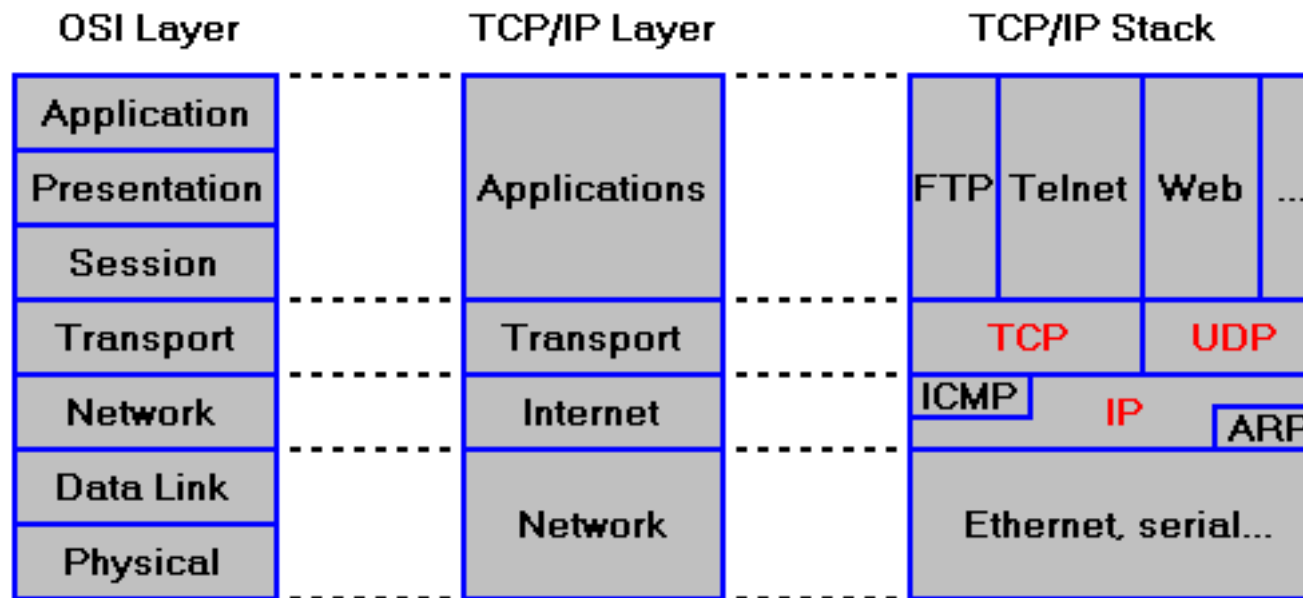
* Example 4 is the *SC400 EmNet SIB/1* OEM Embedded Networking Systems Integrator Board.



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The Technology - Network Protocols (1 of 4)

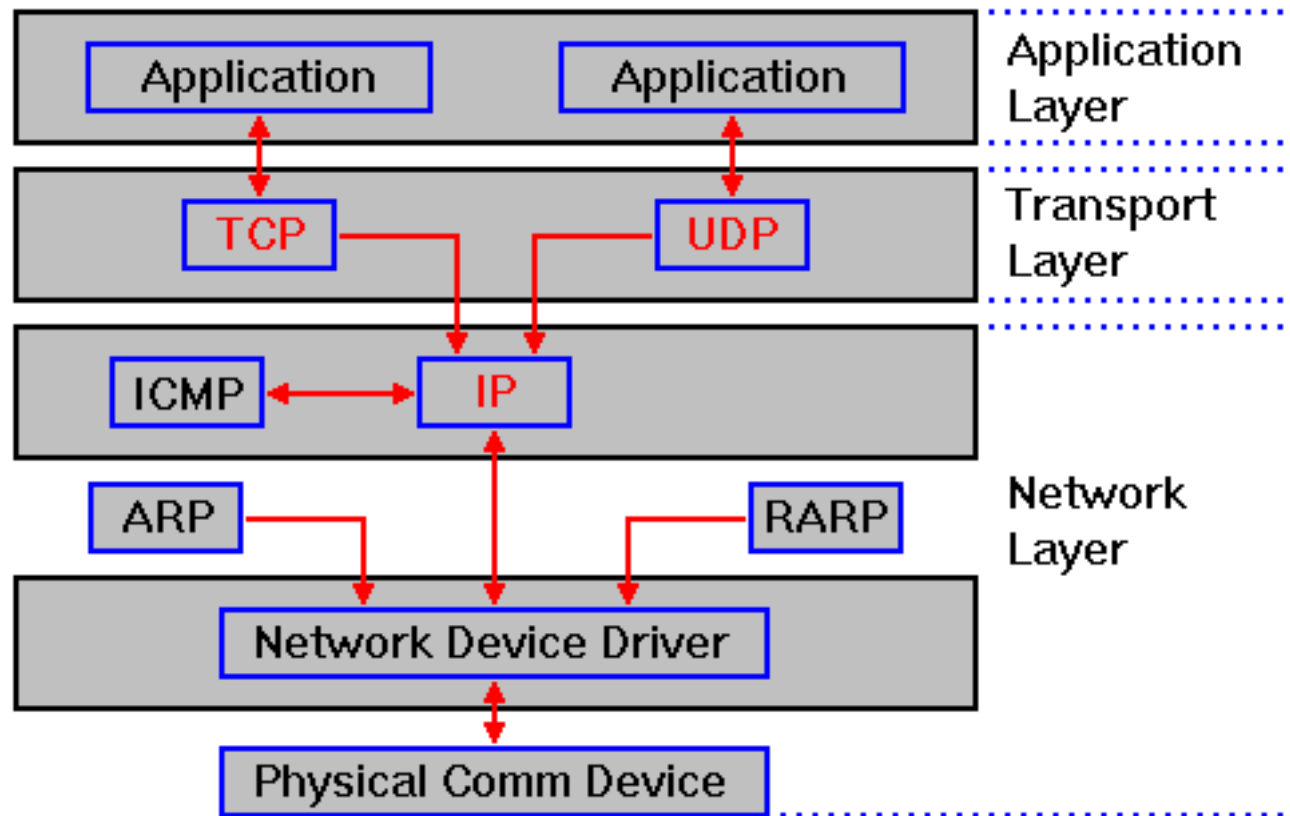
* The protocol stack for embedded networking is TCP/IP. Please note: TCP/IP is not the Internet. TCP/IP is nothing more than a part of a suite of communications protocols.



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The Technology - Network Protocols (2 of 4)

* In the Network Layer we are using the IP protocol. Over this layer, in the Transport Layer, we use TCP and UPD.



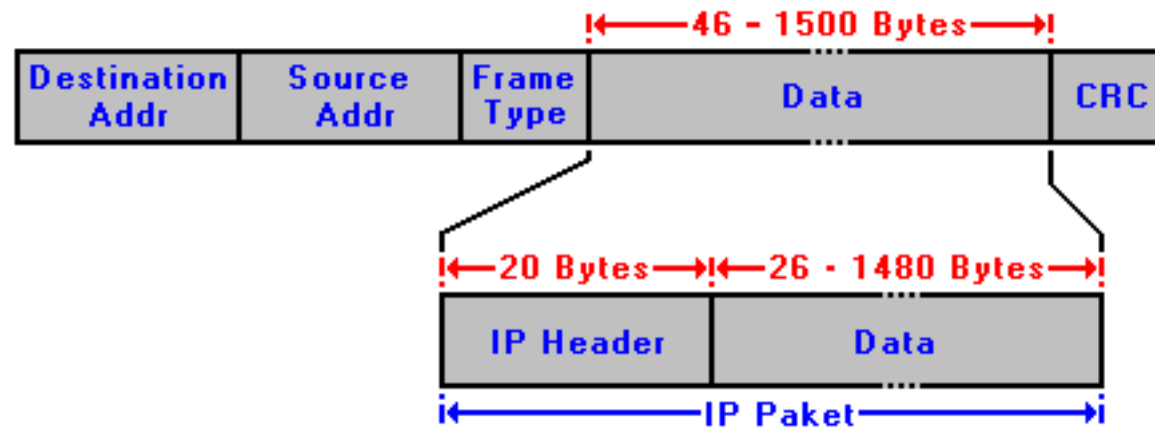
The Technology - Network Protocols (3 of 4)

- * **UDP** (User Datagram Protocol) is used to transmit packets that do not require guaranteed delivery. UDP is specifically used for network broadcasts and to support other protocols (SNMP, DHCP, BOOTP). It is one of the two main protocols to reside on top of IP.
- * **TCP** (Transmission Control Protocol) is the workhorse of the TCP/IP protocol stack. TCP is used to transfer data and control information in a manner that guarantees delivery. Its entire design is centered on ensuring each packet gets to its correct destination. TCP is the other main protocols to reside on top of IP.
- * **IP** (Internet Protocol) is the data pump of a TCP/IP protocol stack. IP supports the routing and delivery of packets. It uses a unique address (the IP address) to transfer packets to the proper destination. The IP protocol provides fragmentation and reassembly of datagrams.

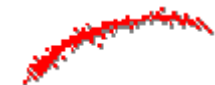


The Technology - Network Protocols (4 of 4)

- * The IP protocol works direct over the hardware layer. The interface to the hardware is the network interface device driver. Over this driver, a IP packet is transfered over Ethernet LANs or modem lines.



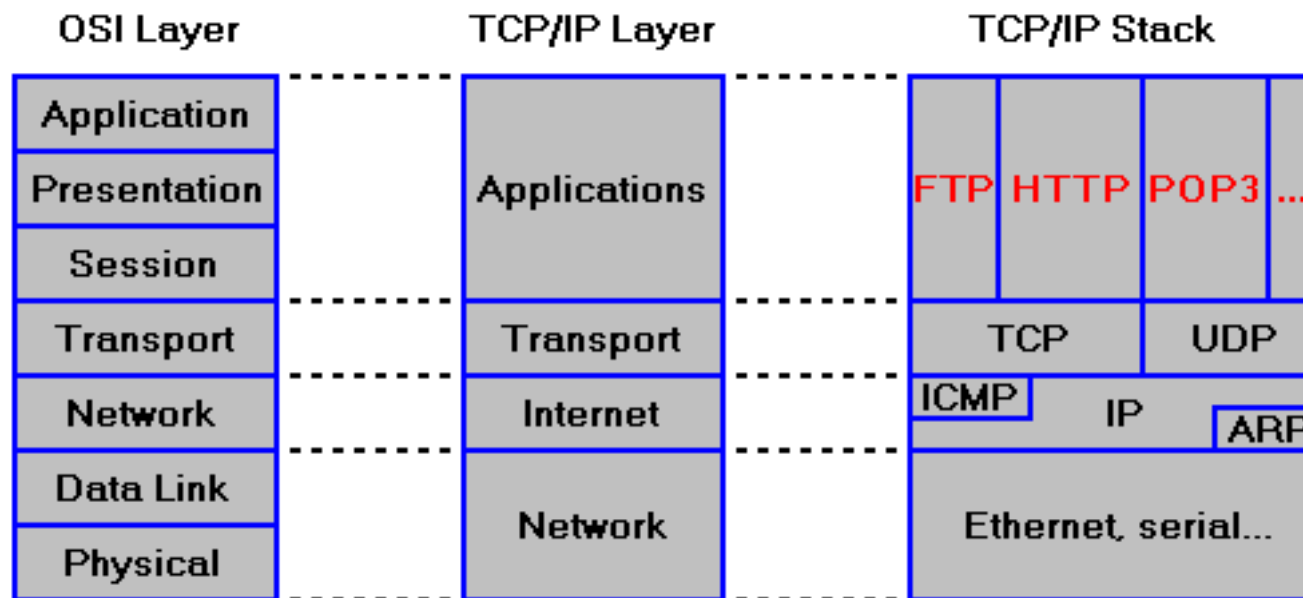
- * The IP packet consists of the IP header and the IP data. TCP and UDP packets are transfered in the IP data area.



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The Technology - Network Applications (1 of 2)

* In the application layer we find the high-level Internet protocols. The protocols in this layer are very powerful.



* **FTP** (File Transfer Protocol) is used for file transfer from and to other computers.



The Technology - Network Applications (1 of 2)

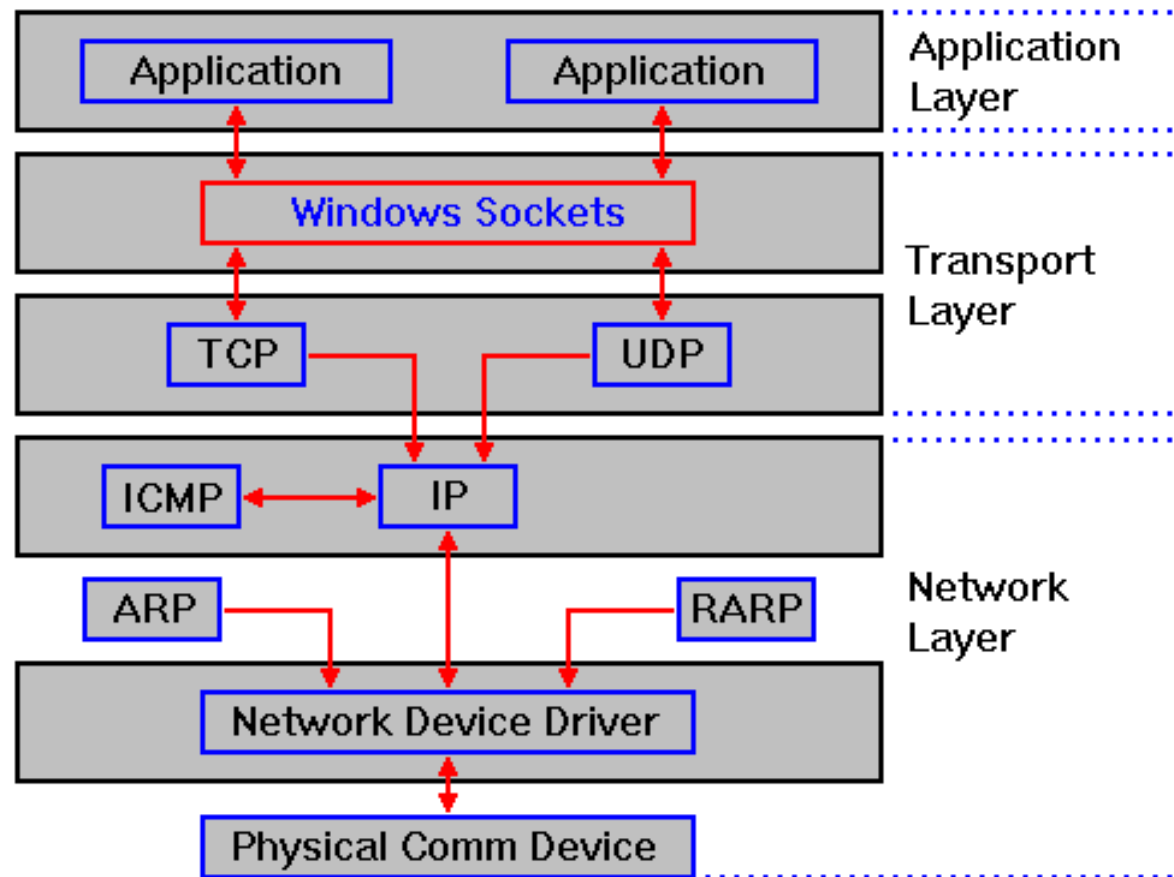
- * **HTTP** (Hypertext Transfer Protocol) is used by Web browsers to communicate with Web servers.
- * **POP3** (Post Office Protocol Version 3) is the protocol used to receive an e-mail message.
- * **SMTP** (Simple Mail Transfer Protocol) is the high- level Internet protocol used to send e-mail messages.
- * **SNMP** (Simple Network Management Protocol) is used to transfer network management and diagnostic informations.
- * **DHCP** (Dynamic Host Configuration Protocol) is used to acquire an IP address upon system start up time. **BOOTP** is another way to acquire IP addresses at start up time.



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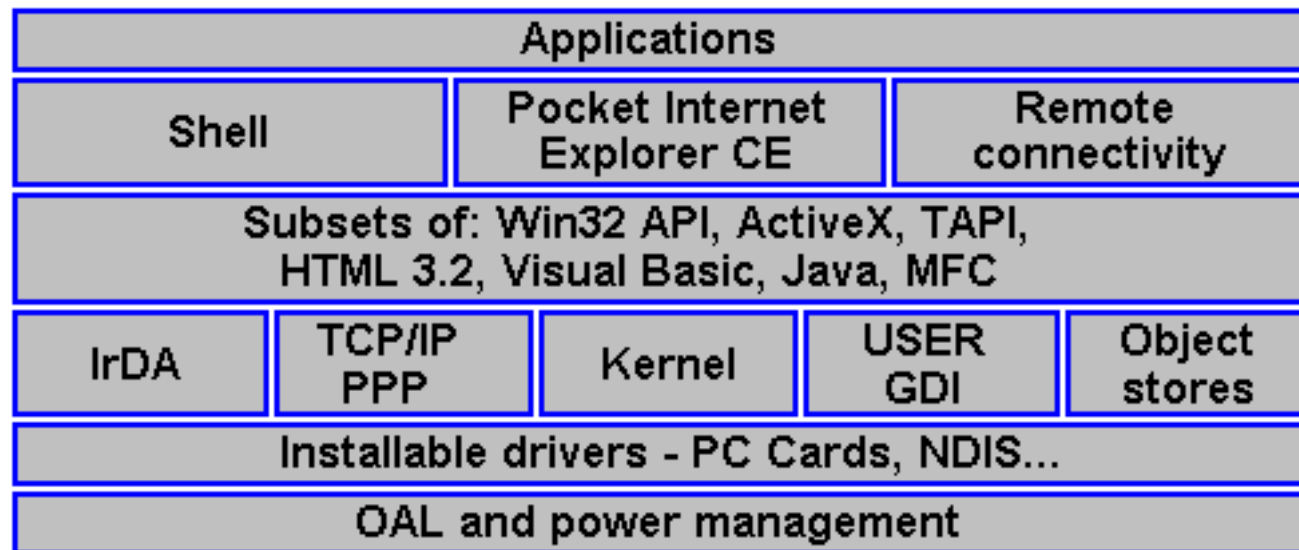
Application Programming Interfaces (APIs)

* For using a TCP/IP stack we need an application programming interface.



Application Programming Interfaces (APIs)

- * The Windows CE operating system contains the Windows Socket (WinSock) API.

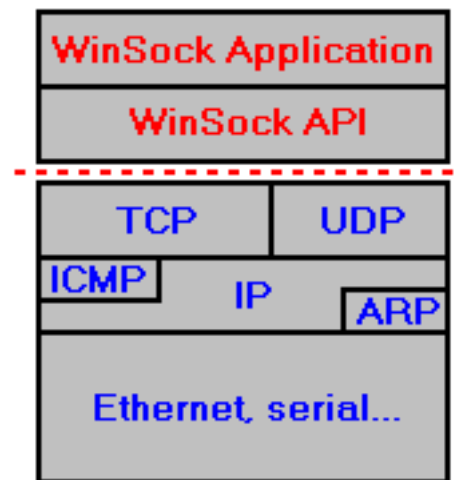


- * The WinSock API offers direct access to the TCP and UDP protocols within a TCP/IP protocol stack.



Application Programming Interfaces (APIs)

- * With Windows CE and the WinSock API the application layer protocols FTP, HTTP, POP3, SMTP, SNMP, DHCP and others will be WinSock applications.



- * The customer application program for a Web-enabled device is using the WinSock API within Windows CE for all Internet communication tasks.



Conclusion

- * Microsoft Windows CE offers communications components and APIs for using in embedded networking application programs.
- * For Internet or Intranet embedded networking applications the TCP/IP protocol stack and the WinSock API of Windows CE is very important.



- * Microsoft Windows CE can be the operating system for Web-enabled or Intranet-ready devices.



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