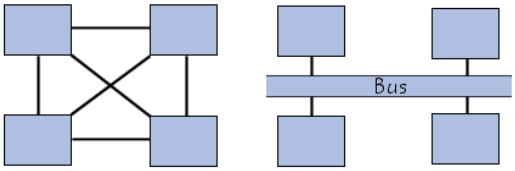
Intech INSTRUMENTS LTD

October 2008

Data Highways & BUS Systems

A 'bus' is simply a group of connections that can be shared by multiple hardware devices.

By employing bus systems, the number of pathways for components to clearly communicate with each other is reduced.



A bus is characterised by the amount of data that can be transmitted at once. This amount, expressed in bits, corresponds to the number of physical 'lines' over which data is sent simultaneously.

A 32-wire ribbon cable can transmit 32 bits in parallel. The term "**width**" is used to refer to the number of bits that a bus can transmit at once.

Additionally, the bus speed is also defined by its **frequency** (expressed in Hz), the number of data packets sent or received per second.

The transfer speed of a bus can be determined by multiplying its width by its frequency.

Example: A bus system with a width of 16 bits and frequency of 133MHz has a maximum transfer speed of:-

$16 \times (133 \times 10^6) = 2128 \times 10^6$ bits / Second

$= 266 \times 10^6$ bytes / second

$= 266 \times 10^3$ kb / second

= 266 Mb / second (Mbps)

The most common field bus systems are summarised below.

	MODbus	PROFIBUS-DP	ETHERNET	CANopen	HART®
Manufacturer	Gould-Modicon /	Siemens, Klöckner Möller, Bosch etc.		Bosch and Intel	Rosemount Inc.
User organization	Modbus-Ida Organization	PROFIBUS-Nutzerorganisation (PNO)	Iaona	Can in Automation (CiA)	HART Communication Foundation (HCF)
Access procedure	Master / slave	Master / slave	CSMA-CD	CSMA-CA	Master / slave
Medium	unrestricted	2-wire cable or optical fiber cable	2-wire cable	2-wire cable	2-wire cable
Stations / segment	247	32	16.777.216 (Class A network)	127	15
Data transmission rate	depending on interface, up to 187.5kbps	9600bps to 12Mbps	100Mbps	50kbps to 1Mbps	1200bps
Bus expansion	depending on interface, up to 1200m / segment	1200m / segment	maximum distance between two points is 100m	up to 5000m	up to 2000m

5th November 1994

George Foreman, aged 45 becomes boxing's oldest heavyweight champion when he defeats 26 year old Michael Moorer in Las Vegas, USA.

19th November 2006

Former Russian spy Aleksander Litvinenko is admitted to hospital after radiation poisoning. He would die just 3 days later amid allegations that he was poisoned by Russian FSB (formerly KGB) agents.

27th November, 1999

Helen Clark becomes the first elected female Prime Minister of New Zealand.

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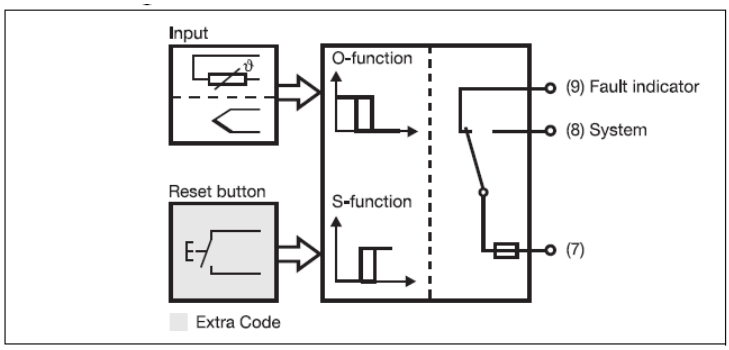

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