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# Computer Hardware, Networking and Security WorkBench

## Scientech 827DB


**Scientech 827DB Computer Hardware, Networking and Security WorkBench** is a comprehensive setup provides the understanding of all the fundamentals of computer, Hardware, networking and its security. It helps the users to gain knowledge on all networking devices like Managed Layer 2 Ethernet Switch, Managed Layer 3 Ethernet Switch, Media Convertor, Power Over Ethernet Switch, UTP Jack Panel, Wi-Fi LAN card, IP Camera, Network Layers, cable designing a and building of complete network of computers.

This WorkBench includes software by which student can study Star, Bus (compatible on Windows XP) & Ring selection, Protocols: CSMA /CD, CSMA /CA, Stop N Wait, Go back to N, Selective repeat, Sliding Window, Token Bus, Token Ring, Packet delay: 1000 – 5000 ms, Error generation: Acknowledgment lost, bad packet, Auto Error Generation, Complete analysis of Network & Protocols, Real time, Graphic representation of data on software screen with packet details, Network details like, Indication of computer name, IP address, MAC address, Port number, status of network, Network & protocol analysis like Indication of packet serial number, file name, file size, file number, receiver name, receiver IP address, total packets, packet length, time out, protocol, topology, receiver, MAC address, port number, file send start time, file sent completion time, transmission time data rate (Mbps),percentage error.

**Note :** In Windows 7 and above bus topology is not supported as Microsoft has remove protocol from the Operating System. Rest of the experiments are supported in Windows XP and Windows 7 onwards.

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## Features

- Heavy duty WorkBench
- Peer to Peer network, Client - server network
- Networking devices like Managed Layer 2 Ethernet Switch, Managed Layer 3 Ethernet Switch, Media Convertor, Power Over Ethernet Switch, UTP Jack Panel, Wi-Fi LAN card, IP Camera, Network Layers
- Design of Star topology using 100Base-Tx, Design of Bus topology using 10Base-2 (compatible on Windows XP), Design of Ring topology using DB9
- Detailed introduction to TCP/IP model (4 Layer Model)
- Socket programming and processing
  - Wireless LAN with 803.11b/g
- Network monitoring
- Various LAN Protocols
- Error generation (manual and auto)
- Color coded real time graphical representation of entire transmission & reception
- Graphical Analysis of LAN performance with various parameters and protocols
- Encryption/Decryption technique
- User friendly software
- UPS and Antivirus
- Easy identification of different parts of computer
  - Enhanced electrical safety considerations
  - Caster wheel (with locking mechanism) at the legs of WorkBench for easy movement
  - MCB provided with AC supply for safety purpose
  - Licensed windows 10 Operating Software (64 bit)
  - Learning Software NetSys

## Scope of Learning

**Practical**

**Study of:**

- Addressing in TCP/IP
- Ping command
- Socket programming
- Managed layer 2 ethernet switch
- Managed layer 3 ethernet switch
- Media convertor
- Power over switch (POE)
- PoE Adaptor
- UTP Jack Panel
- IP Camera
- Identification of different parts of computer like motherboard, SMPS, Hard disk, RAM, CD Drive, Web Cam

**Practical**

**Study and implementation:**

- Cable designs in Networking
- PC to PC with IEEE 802.3
- Peer to Peer Network
- Client- Server Network
- Star topology using 100base Tx
- Ethernet LAN protocol to create scenario and Study the performance of CSMA/CD (carrier sense multiple access with collision detection) Protocol through simulation
- Wireless LAN Protocol to create scenario and study the performance network with CSMA/CA protocol and compare with CSAMA/CD protocol
- Go back N and Selective repeat protocols
- Bus topology using 10base2 (compatible on Windows XP)
- To create the scenario and study the performance of token bus protocols through simulation
- Ring topology using DB9
- To create the scenario and study the performance of token ring protocols through simulation
- Distance vector routing algorithm
- Link state routing/Dijkistra's algorithm
- Data Encryption and decryption
- Subnet calculation using software
- CRC Technique using software

Software window

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## Technical Specifications

**Smart Managed 3 Layer Switch-1 no.**

Number of Ports:

| | | |
|---|---|---|
| 10/100/1000 Mbps | : | 24 nos. |
| Gigabit SFP | : | 2 nos. |
| 10G SFP+ | : | 2 nos. |
| Full/Half Duplex | : | Full/half duplex for 10/100 Mbps and Gigabit speed |

**Smart Managed 2 Layer Switch-1 no.**

Number of Ports

| | | |
|---|---|---|
| 10/100/1000 Ports | : | 8 nos. |
| 100/1000 SFP Ports | : | 2 nos. |
| Duplex Mode | : | Full/half-duplex for 10/100 Mbps Full-duplex for 1000 Mbps |
| Switching Capacity | : | 20 Gbps |

**Media Convertor-2nos.**

| | | |
|---|---|---|
| Transmission Type | : | 10/100M/FDX/HDX |
| Wavelength | : | 1310nm |
| Fiber Distance | : | Multimode 2km |

**Power over Ethernet (PoE) Switch- 2 nos.**

| | | |
|---|---|---|
| No. of Ports | : | 8 (10/100BASE-TX PoE) |
| PoE Standard | : | 802.3af |
| PoE Capable Ports | : | Port 1-8 up to 15.4 watts per port |
| PoE Power Budget | : | 72 watts |

**Power over Ethernet (POE) Adaptor-2 nos.**

| | | |
|---|---|---|
| Power Supply | : | 230V |
| **UTP Jack Panel** | **:** | **2 nos.** |
| No. of Ports | : | 12 nos. |
| **LAN Cable Tester** | **:** | **1 no.** |
| **IP Camera** | **:** | **1 no.** |
| Type | : | Dome |
| Camera | : | 4 megapixel |

**Digital Storage Oscilloscope (DSO)-1 no.**

| | | |
|---|---|---|
| Analog Bandwidth | : | DC to 50 MHz |
| Channel | : | 04 nos. |
| Memory | : | Minimum 12 Mpoints |
| Display | : | 7 Inch color |

**Digital Multimeter (Bench Top)-1 no.**

| | | |
|---|---|---|
| Display | : | 4 ½- digit large LCD displays with back light max. |
| Reading | : | 1.9999, |

Voltage measurement range:up to 1000 VDC and 750VAC,DC

| | | |
|---|---|---|
| AC Current | : | up to 20A,ACV |
| frequency Response | : | 50KHz,Frequency, |
| Included Function | : | Resistance, Capacitance measurement, Diode check and Continuity test. |

**LAN Training System-1 no.**

Hardware:

- PC to PC using RJ-45 Connector
- Star topology using RJ45 Connector
- Bus topology by using end terminator (compatible on Windows XP)
- Ring topology using DB9 Connector
- Data transmission speed: 10/100 Mbps 4 Nodes

Software:

- Star, Bus & Ring selection
- Protocols: CSMA/CD, CSMA/CA, Stop N Wait, Go back to N, Selective repeat, Sliding
- Window, Token Bus, Token Ring
- Packet size: 128, 256, 512, 1024, 2048, 4096, 8192, 16384
- Inter Packet delay: 1000 – 5000 ms
- Error generation: Acknowledgment lost, bad packet, auto error generation
- Complete analysis of Network & Protocols

**Network & protocol analysis:**

Indication of packet serial number, file name, file size, file number, receiver name, receiver IP address, total packets, packet length, time out, protocol, topology, receiver, MAC address, port number, file send start time, file sent completion time, transmission time data rate(Mbps), percentage error.

**NetSys (Optional)**

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**Computer Hardware Training System -2 nos.**

| | | |
|---|---|---|
| CPU with fan | : | Core i3 Processor with Licensed window7/8/10 OS |
| Mother board | : | With Intel Chipset |
| Memory (RAM) | : | 4GB |
| Display adaptor card | : | Built in mother board |
| Hard disk | : | 1TB (SATA) |
| Monitor | : | 15" TFT colour SVGA |
| Key board | : | Multimedia key board |
| Mouse | : | Scroll mouse (optical) |
| SMPS | : | 450 watts |
| Drive | : | DVD R/W drive (SATA) |
| Sound cord | : | Built in mother board |
| Speakers & Mike | : | Stereo speakers |
| Video camera | : | Web CAM |
| UPS | : | 2 nos. |
| Windows Professional OS | : | 2 nos. (Licensed) |
| Anti Virus | : | 2 nos. (1 year) |

**Digital multimeter-1 no.**

| | | |
|---|---|---|
| **AC Voltmeter** | : | 1 no. |
| **Voltage** | : | 10 - 450Vrms |
| **Accuracy** | : | ± (1% reading + 2 digits) |
| **AC Ammeter** | : | 1 no. |
| **Current** | : | 0.2 - 10Arms |
| **Accuracy** | : | ±(1% reading + 2 digits) |
| **Energy meter** | : | 1 no. |
| **LED Tubelight** | : | 1 no. |
| **Dimension in mm** | : | H1785 x W1775 x D935 |

**Included Accessories**

| | | |
|---|---|---|
| RJ45 connector | : | 20 nos. |
| Crimping tool | : | 2 nos. |
| LAN cable tester | : | 2 nos. |
| **Rj45–RJ45 connector cable** | : | **4 nos.** |
| USB dongles | : | 2 nos. |
| DB9 connector cable | : | 4 nos. |
| END terminators | : | 2 nos. |
| Patch cords 16" (2mm) | : | 8 nos. |
| Mike | : | 2 nos. |
| Cat5 cable | : | 20 meter. |
| A to B USB cable | : | 1 no. |
| Fiber optic cable (SC-SC) | : | 2 nos. |
| Mouse | : | 2 nos. |
| Key board | : | 2 nos. |
| Head Phone | : | 2 nos. |
| UPS | : | 2 nos. |
| Windows Professional OS | : | 2 nos. |
| Anti Virus | : | 2 nos. (1 year) |

Subject to Change

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