ITS-101A

Internet TCP/IP Protocol Training System

HUBOX

The Internet has permeated among our daily life in every aspect, and it provides the fundamental connection with many state-of-the-art technology such as third-generation cell phones, video communication and information appliances.

The core technology of the Internet is TCP/IP protocol suite. Understanding TCP/IP protocol suite is crucial to users of the Internet at all levels, and it facilitates better application of the Internet. Internet TCP/IP Protocol Training System is designed to meet this need.

There are seven layers of TCP/IP protocol, and from the second to the forth of which plays the key role in operating system kernels such as Linux and Windows which are difficult for users to understand. Internet TCP/IP Protocol Training System not only reveals the inner workings of TCP/IP protocol software, but also provides methods to modify the behavior of TCP/IP protocol software for experiment purpose.

▶ System Features

1. Real-time packet monitor
   - Observe TCP segments, IP datagrams, ICMP datagrams, UDP datagrams and Ethernet frames

2. Packet generator
   - Generate actual TCP segments, IP datagrams, ICMP datagrams, UDP datagrams and Ethernet frames
   - Manual or programmable packet generation (packet size up to 1500 bytes)

3. Congestion generator
   - User programmable packet generation speed up to 1.2 Mbps
   - User programmable packet delay, error and lost

4. Programmable router
   - Configurable as a router or host
   - Can emulate as a firewall or NAT
   - Provide a platform to install user-defined network message procedures for experiment

▶ ITS-101A Specification

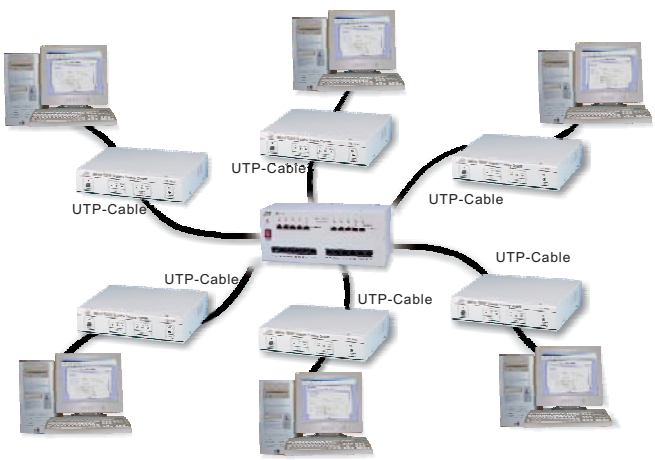
- CPU : ARM9, samsung, 32-bit RISC, 166 MHz
- Flash ROM first level : 512 Kbytes
- Flash ROM second level: 2 Mbytes
- SDRAM : 64 Mbytes(data width 32bits) at 133MHz
- Timer/counter : Six 16-bit multi-function
- Watch dog timer : 8-bit
- USB port
- Upgrade button
- LED : 10/100/active
- Ethernet : 2 ports, 10/100 Mbps, RJ-45
- Power requirements : 100~240V, 50/60Hz, 60VA max
- Environment:
  (1) Humidity : ≤ 70 % relative
  (2) Operation temperature : 0°C~40°C

▶ HUBOX Specification

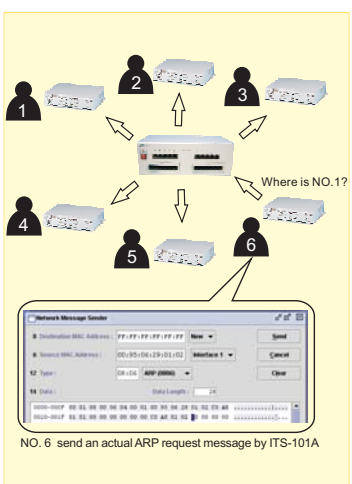
- 6 Port RJ-45 sockets : 2pcs
- 5 Port 10/100 Mbps Ethernet switch : 2pcs
- DC power adapter : 1pce

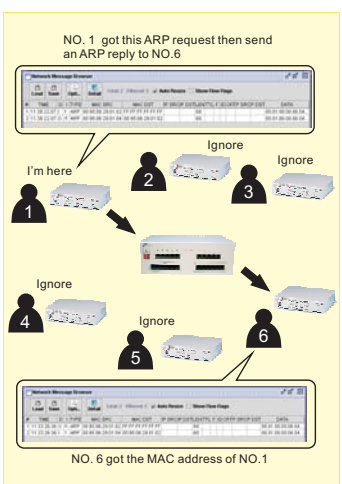
Platform

1. Module: ITS-101A : 6pcs
2. USB cable : 6pcs
3. Power cord : 6pcs
4. HUBOX : 1pce
5. UTP cable : 12pcs
6. Software CD : 6pcs
7. ITS manual : 6pcs
   - Operation manual
   - Laboratory manual
   - Message-driven dataflow language manual
   - MDDL jumpstart



Experiment Example : ARP

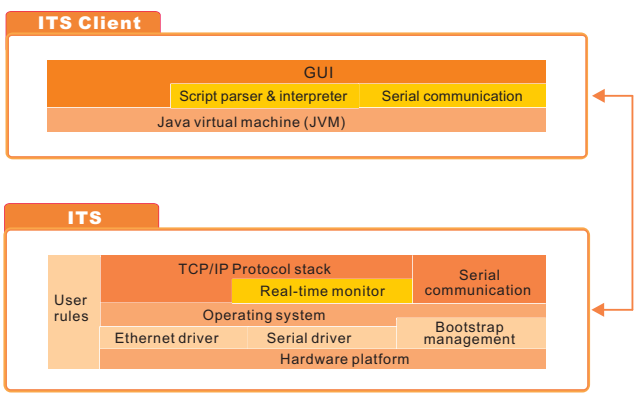




List of Experiments

- ◎ Ethernet messages sending & observing
- ◎ MAC address discovery
- ◎ Address Resolution Protocol (ARP)
- ◎ ICMP ping and checksum
- ◎ IP direct delivery and IP routing using default gateway
- ◎ IP routing using Next-Hop routing
- ◎ TTL in IP routing
- ◎ Trace of IP routing
- ◎ Path MTU discovery
- ◎ Network disturbance for IP
- ◎ Error control
- ◎ Sliding window
- ◎ Congestion avoidance
- ◎ Full TCP implementation
- ◎ TCP vs. UDP
- ◎ The domain name system
- ◎ Echo
- ◎ SMTP client
- ◎ HTTP
- ◎ Telnet
- ◎ FTP
- ◎ NAT
- ◎ Firewall
- ◎ Proxy ARP
- ◎ IP aliasing

Software Modules



1. Embedded multitasking operating system
2. TCP/IP protocol stack
3. TCP/IP protocol stack real-time monitor
4. Bootstrap management
5. Serial communication and console management
6. Java-based graphical user interface client (GUI)
7. Parser and interpreter for protocol behavior specification script
8. Protocol behavior specification scripts for the laboratory sessions

System Requirements

Operating System

- Windows 2000
- Windows XP
- Windows 7 (32/64 bits)

Recommended Hardware

- Pentium 4 or newer processor
- 512MB of RAM
- 200MB of hard drive space