Boson Software

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Basic Router Operations	
To get to Priveledge mode	**Enable**
To get to User mode	**Disable**
To Exit router	**Exit or logoff**
Previous Command	**Up arrow or Ctrl-P**
Next Command	**Down arrow or Ctrl-N**
Move forward one character	**Right arrow or Ctrl-F**
Move backward one character	**Left arrow or Ctrl-B**
Break Key	**<shft>+<ctl>+6 'x'**
Auto complete command	**<tab>**

Viewing Router Information	
IOS version info	**Show version**
Current config (RAM)	**Show running-config**
Saved config (NVRAM)	**Show startup-config**
IOS file and free space	**Show flash**
Processor utilization	**Show processes cpu**

Configuring the Router	
From the terminal session (keyboard) to running (RAM)	**Configure terminal**
From tftp (file server) to running (RAM)	**Copy tftp running-config**
From saved config (NVRAM) to running (RAM)	**Copy startup-config running-config**
Upgrade the IOS from file server	**Copy tftp flash**
Save backup copy of IOS to file server	**Copy flash tftp**
Save your configuration (from RAM) to non-volatile (NVRAM)	**Copy running-config startup-config**
Tell the router which IOS file in Flash to boot from	**Boot system flash {filename}**
Tell the router which IOS file to request from TFTP(fallback)	**Boot system tftp {filename}**

Passwords	
Set password for Console port	**Line console 0** **Login** **Password cisco**
Set Password for Telnet	**Line vty 04** **Login** **Password sanjose**
Set password for Priveledge mode	**Enable password cisco**
Set Encrypted password for Priveledge mode	**Enable secret cisco**

Configuring a Serial Interface	
Is it DCE or DTE?	**Show controller serial 1**
From global config	**Interface serial 1**
Set clock rate on DCE	**Clock rate 64000**
Set the bandwidth	**Bandwidth 64**
Enable the interface	**No shutdown**
Check interface status	**Show interface serial 1** **Show ip interface brief**

Cisco Discovery Protocol	
See directly connect neighbors (add 'detail' for more info	**Show cdp neighbor**
See which interface are running CDP	**Show cdp interface**
See one neighbors detail	**Show cdp entry P1R1**
Turn off CDP for whole router (from global config)	**No cdp run**
Turn off CDP on an interface	**No cdp enable**
Change how often you send CDP info	**Cdp timer 120**
Change how long you will till you remove a CDP neighbor	**Cdp holdtime 120**

TCP/IP	
Disable IP routing on the router (enabled by default)	**No ip routing**
To put an IP address on an interface	**Interface serial 0** **IP address 157.89.1.3 255.255.0.0** **Interface Ethernet 0** **IP address 208.1.1.4 255.255.255.0**
Configure RIP	**Router rip** **Network 157.89.0.0** **Network 208.1.1.0**
View IP routing table	**Show ip route**
View RIP debug stuff	**Debug ip rip**
View IGRP debug stuff	**Debug ip igrp events** **Debug ip igrp transactions**

Access-Lists

All Access-List numbered ranges (some not covered in ICRC)	
<1-99>	**IP standard access list**
<100-199>	**Ip extended access list**
<200-299>	**Protocol type-code access list**
<300-399>	**DECnet access list**
<400-499>	**XNS standard access list**
<500-599>	**XNS extended access list**
<600-699>	**Appletalk access list**
<700-799>	**48-bit MAC address access list**
<800-899>	**IPX standard access list**
<900-999>	**IPX extended SAP access list**
<1000-1099>	**IPX SAP access list**
<1100-1199>	**Extended 48-bit MAC address access list**
<1200-1299>	**IPX summary address access list**
<1300-1999>	**IP standard access list (expanded range)**
View Which Access-lists are applied to which interface	**Show ip interface serial 0** **Show ipx interface serial 0** **Show appletalk serial 0**
View the access-lists	**Show access-lists** **Show ip access-list** **Show ipx access-lists** **Show appletalk access-lists**

Access-Lists, IP Standard=1-99, filter on Source address

Goal- stop subnet 200.1.1.0 255.255.255.0 from sending packets into Ethernet 0	
A. Deny the subnet	**Access-list 1 deny 200.1.1.0 0.0.0.255**
B. Implicit deny all, so must permit others	**Access-list 1 permit any**
C. Doesn't do anything until we bind it to an interface	**Interface Ethernet 0** **Ip access-group 1 in**

Access-List, IP Extended = 100-199, filter on Source + Dest, Port, etc…

Goal- stop host 1.1.1.1 from telneting out e0 going to host 2.2.2.2 and stop subnet 3.3.3.0 from web surfing anywhere	
A. Remember access-list # source destination options	**Access-list 100 deny tcp host 1.1.1.1 host 2.2.2.2 eq 23**
B. Stop that web surfing	**Access-list 100 deny tcp host 3.3.3.0 0.0.0.255 any eq 80**
C. Implicit deny, allow all other	**Access-list 100 permit ip any any**
D. Doesn't do anything, until you bind it to an interface	**Interface Ethernet 0** **Ip access-group 100 out**

Named IP/IPX Access-Lists

Allows editing of lines instead of deleting entire list	**Ip access-list standard cool_list**
Supports standard and extended	**Deny 1.1.1.1**
(Named IP requires 11.2 or later)	**Permit any**
(Named IPX requires 11.3 or later)	**Interface Ethernet 0** **Ip access-group cool_list in**

Access-Lists, IPX Standard = 800-899, filter Source & Dest	
Stop network 7A from getting to network 8000	**Access-list 800 deny 7a 8000**
Implicit deny all, allow all other networks	**Access-list 800 permit -1**
Doesn't do anything until you bind it to an interface	**Interface Ethernet 0** **Ipx access-group 800 out**

Access-Lists, IPX Extended = 900-999, filter on Source & Dest + Socket, etc…	
Stop SAPs on socket 3378 from all network 8000	**Access-list 800 deny 7a 8000**
Implicit deny all, allow all other SAPs	**Access-list 900 permit sap any all -1**
Doesn't do anything until you bind it to an interface	**Interface Ethernet 0** **Ipx access-group 900 out**

Access-Lists, IPX SAP Filters = 1000-1099, filter on Source, Port, Service Name	
Stop SAPs from server 1 from coming in Ethernet 0	**Access-list 1000 deny 7A.0000.0000.0001 4**
Permit all others	**Access-list 1000 permit -1**
Bind it to an interface	**Interface Ethernet 0**
Stop it coming in	**Ipx input-sap filter 1000**
Or stop it going out	**Ipx output-sap filter 1000**

Access-Lists, AppleTalk = 600-699, filter on Cable-Range & Zone	
Deny cable range 1000-1999	**Access-list 600 deny cable-range 1000-1099**
Permit all other cable ranges	**Access-list 600 permit other-access**
Deny the zone WorkGroup1	**Access-list 600 deny zone Workgroup1**
Permit all other zones	**Access-list 600 permit additional-zones**
Bind it to an interface	**Interface Ethernet 0** **Appletalk access-group 600**

PPP	
Interface Commands	
Enable PPP on the interface	**Encapsulation ppp**
Enable authentication (chap or pap)	**Ppp authentication chap**
Specify chap hostname (defaults to router name)	**Ppp chap hostname MyRouter**
Specify chap password (defaults to enable password)	**Ppp chap password Clearwater**
Specify pap username	**Ppp pap sent-username ArnoldZiffle**
Global Commands	
Create a username and password for logging in	**Username OtherRouter password Skywalker**
Show Commands	
See encapsulation, open LCP's and more	**Show interface serial 0**
Debug Commands	
View the authentication process	**Debug ppp authentication**

X.25	
Interface commands	
Enable X.25 on an interface and specify encap type	**Encapsulation x.25 letf**
Specify YOUR Local x121 address	**X25 address 301222333444**
Map the OTHER x121 address (global)	
Enable broadcasts for RIP and such	**X25 map ip 200.1.1.1 301999888777 broadcast**
OPTIONAL interface commands	
Adjust Incoming Packet Size, must match on both sides	**X25 ips 512**
Adjust Outgoing Packet Size, must match on both sides	**X25 ops 512**
Adjust Incoming Windows Size, must match on both sides	**X25 win 7**
Adjust Outgoing Windows Size, must match on both sides	**X25 wout 7**
Show Commands	
View Encapsulation, LAPB Status, & more	**Show interface serial 0**
Back-to-Back x25 routers (for lab testing)	
Note, x25 does not care about which ONE router has DCE cable	
Enable x.25 on interface and specify encap type + ONE side is DCE	**Encapsulation x25 dce ietf**
Set DCE-side to transmit clocking frequency in Kbits/Sec	**Clockrate 9600**

Frame-Relay	
Interface commands	
Enable Frame-Relay on an interface and specify encap type	**Encapsulation frame-relay ietf**
Specify LMI Type (11.2+ will autosense LMI type)	**Frame-relay lmi-type ansi**
If Inverse ARP won't work, Map OTHER IP to YOUR DLCI# (local)	**Frame-relay map ip 3.3.3. 100 broadcast**
Can also allow broadcast and specify encap type	
Define local DLCI (in LMI not working)	**Frame-relay local-dlci 100**
Adjust keepalive period	**Keepalive 10**
Show commands	
View DLCI & LMI Info	**Show interface serial 0**
View PVC traffic statistics	**Show frame-relay pvc**
View route maps (static or dynamic)	**Show frame-relay map**
View LMI info	**Show frame-relay lmi**
Back-to-Back frame-relay routers (for lab testing)	
Note, must match DCE-side router commands with DCE cable	
Enable Frame-Relay switching on DCE-side router	**Frame-relay switching**
Tell DCE-side to support DCE frame-relay functions on what interface	**Frame-relay intf-type dce**
Tell DCE-side which interface & DLCI to switch current interface to	**Frame-relay route {dlci} interface {int} {dlci}**
Set DCE-side to transmit clocking frequency in Kbits/Sec	**Clockrate 64000**

Config-Reg	
RXBOOT (diagnostics mode, use ‘b’ to continue booting	**Config-reg 0x2000**
Boot to ROM, use NVRAM (upgrade flash in run-from flash routers)	**Config-reg 0x2101**
Boot to ROM, skip NVRAM (disaster recovery)	**Config-reg 0x2141**
Boot to Flash, use NVRAM (normal operation)	**Config-reg 0x2102**
Boot to Flash, skip NVRAM (password recovery)	**Config-reg 0x2142**

Auto-Install	
Router broadcasts to get its own TCP/IP address using	**BOOTP**
Router broadcasts again to locate the file server IP address using	**TFTP**
Router attempts TFTP to get the IP-to-Hostname mapping file	**Network-confg**
If above fails, fallback to 8.3 DOS compatible filename convention	**Cisconet.cfg**
Router attempts TFTP to get its specific Hostname running-config	**{Hostname}-confg**
If above fails, fallback to 8.3 DOS compatible filename convention	**{Hostname}-cfg**
Note:{hostname} is determined by parsing network-confg file and checking all Hostnames listed against own IP address	

Password Recovery	
Step 1, halt router bootup on console port (requires physical access)	**CTRL-BREAK**
Step 2, enter RXBOOT command to set config-reg bits & stop NVRAM	**o/r 0x2142**
Step 3, bypassing NVRAM startup allows Enable mode without pwd	**Enable**
Step 4, once in Enable mode, copy NVRAM startup to RAM	**Copy startup-config running-config**
Step 5, change Enable and all other password as desired	**Enable password whatever**
Step 6, save RAM back into NVRAM, but now with new password	**Copy running-config startup-config**
Step 7, change config-reg bits back, so router boots normally	**Config-reg 0x2102**