



**GATEWAY CONTROL SOFTWARE**

# **RS-RP2C**

**Set Up Instructions**

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# IMPORTANT

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**READ THIS INSTRUCTION MANUAL CAREFULLY** before attempting to operate the repeater.

**SAVE THIS INSTRUCTION MANUAL.** This manual contains important safety and operating instructions for the RS-RP2C.

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## ■ System requirements

The following units and/or environments are required to build D-STAR gateway server.

<p>◇ <b>PC</b></p> <ul style="list-style-type: none"><li>•OS : Linux® (updated) Compatible distribution: Fedora Core 2 or RedHat® Linux® 9 Compatible software version Linux® Kernel 2.4.20 or later glibc 2.3.2 or later BIND 9.2.1 or later</li><li>•CPU : Pentium® grade 2.4 GHz or faster</li><li>•Memory : At least 512 MB</li><li>•LAN board : 2 (NIC from Intel® is recommended)</li><li>•HDD : At least 10 GB of free space (incl. OS installation)</li></ul> <p>◇ <b>Internet line</b></p> <ul style="list-style-type: none"><li>•Line speed : 750 kbps or more (recommended effective speed*) for both uplink/downlink *Ask the ISP for effective speed.</li></ul>	<p>◇ <b>Fixed IP address</b></p> <ul style="list-style-type: none"><li>•Apply to the ISP to acquire a fixed global IP address.</li></ul> <p>◇ <b>Router</b></p> <p>Following functions are required for the router.</p> <ul style="list-style-type: none"><li>•Remote access function (the port forward, DMZ etc.)</li><li>•Capability of setting a fixed IP address, such as PPPoE for WAN</li><li>•NAT/IP masquerade</li><li>•Static IP masquerade/DMZ</li><li>•IP filtering function</li><li>•DNS answering function</li><li>•Static DHCP server setting for LAN</li><li>•Class A subnet mask (255.0.0.0) can be set for LAN (For your information: The router, WRV54G from LINKSYS, covers all the requirements as above.) *Ask the ISP for recommended router model.</li></ul>
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## ■ Linux® down loading

/// **NOTE:** If you have Linux OS CD (specified distribution and software version), skip this instruction and refer to “■ Linux® OS installation” (p. 2).

The following hardware and software are required for Linux® OS down loading.

- **Another PC**  
The PC must be connected to internet.
- **CD-R drive**
- **CD writing software**  
The software have capability to burning a CD with an ISO image.

<p>◇ <b>Down loading the OS</b></p> <p>Down load the Linux® OS ISO images from the appropriate distributor's site. See p. 2 for the address.</p>	<p>◇ <b>Recording the CD</b></p> <p>Records the down loaded ISO image into the CD. The ISO image is the same format as the recorded in a CD. When this ISO image is recorded in CD as a file, OS cannot be installed with the CD.</p> <p>/// <b>NOTE:</b> See the instruction manual of the CD writing software about a detailed operation, the ISO image recording procedures, etc.</p>
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## Linux® OS installation

Refer to the appropriate distributor’s home page about the details of the OS installation.  
See the addresses listed below for your information.

After the installation, update the OS.  
Any support from RedHat has already been finished, however, the update package is supplied from Fedora legacy Project.

✓ **For your information**

(\*The following addresses may delete or change without notice.)

• **Fedora Core 2**

- http://fedoraproject.org/
- http://fedora.redhat.com/

• **RedHat® Linux® 9**

- OS download site  
http://ftp.redhat.com/pub/redhat/linux/9/en/iso/i386/
- ISO images necessary  
shrike-i386-disc1.iso, shrike-i386-disc2.iso, shrike-i386-disc3.iso
- Installation description  
http://www.redhat.com/docs/manuals/linux/RHL-9-Manual

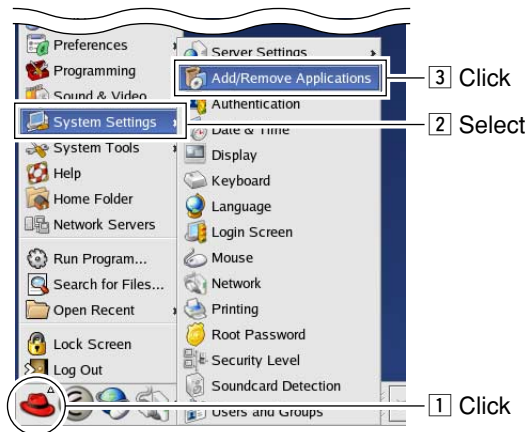
• **Fedora Legacy Project**

- http://www.fedoralegacy.org/

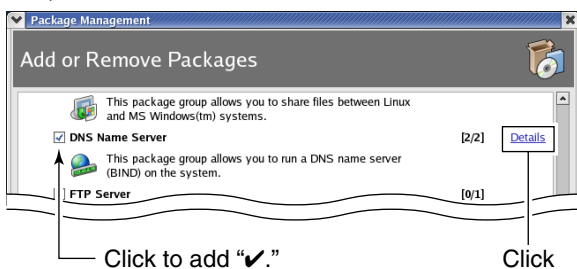
## DNS name server installation

Install the DNS name server if not installed.

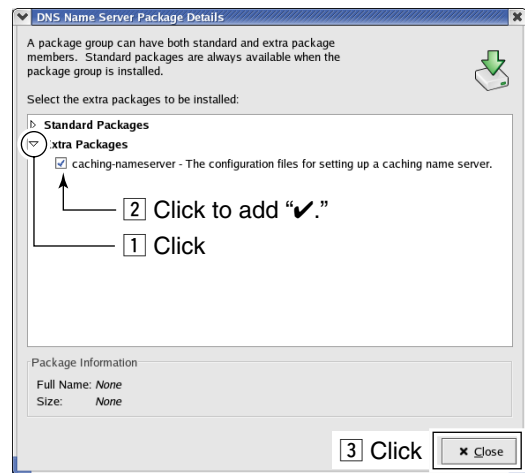
① Open “Add/Remove Applications” with the following mouse operation.



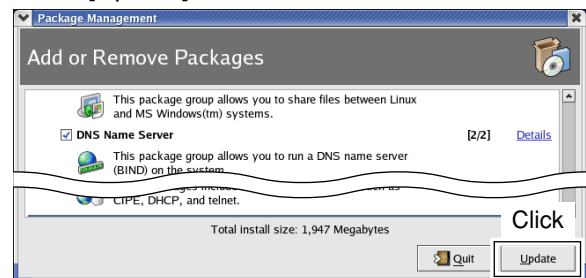
② Click “DNS name Server” to add a check mark, “✓,” and then click “Details.”



③ Click “▶” mark beside “Extra Packages” then click to apply check mark, “✓,” at “caching-nameserver.”  
• Click [X Close] after the setting.

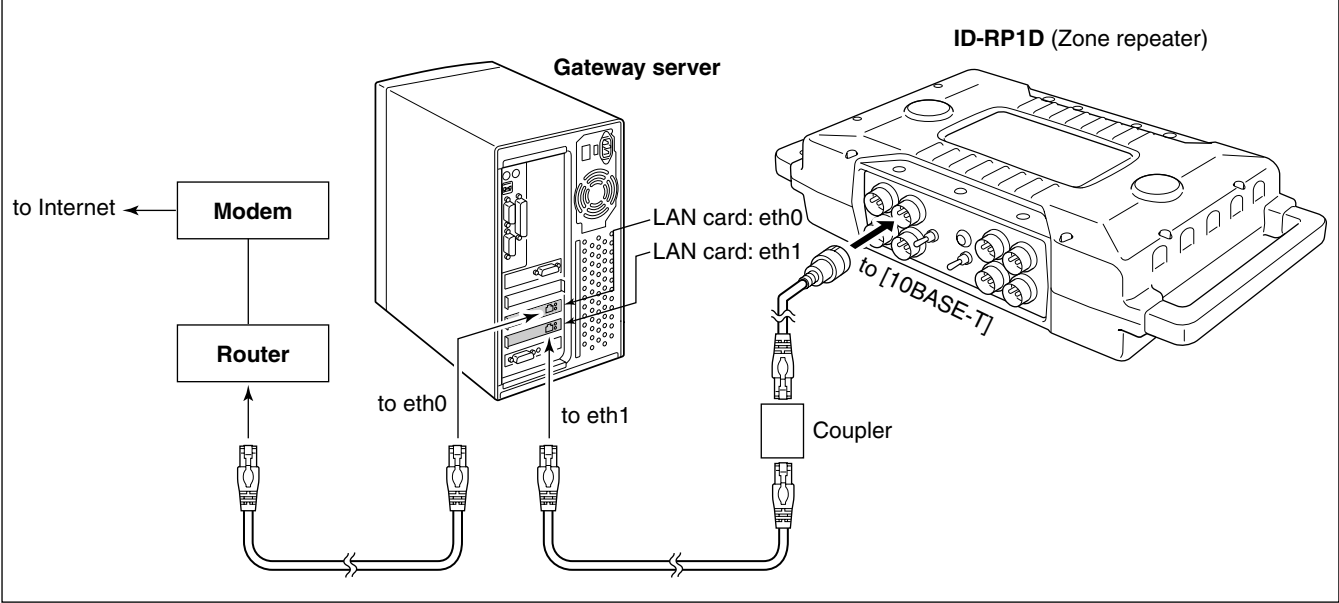


④ Click [Update] to start the installation.

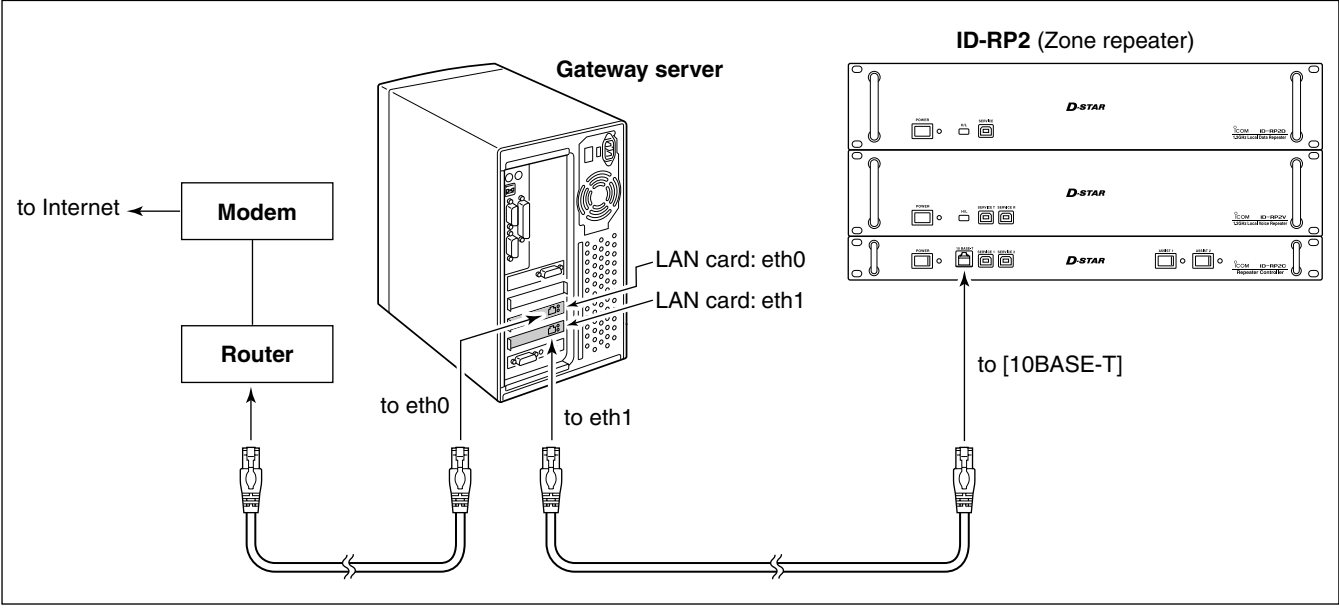


## ■ Gateway server connections

### ◇ Connecting to the ID-RP1 system



### ◇ Connecting to the ID-RP2 system



## Router settings

### IP address setting

Set the specified IP addresses for both WAN and LAN as follows.

IP address (WAN) : Enter the fixed global IP address that is specified from the ISP.

IP address (LAN) : 10.0.0.1

**NOTE:** The same IP address (for LAN; 10.0.0.1) is used for all gateways. **NEVER** use other private IP address.

### Port forwarding setting

Set the following port number with protocol to transferring to the IP address “10.0.0.2.”

Port No./Protocol	Usage	File location
20005/TCP	IP server synchronization	PORT_SYNC (/etc/dsipsvd.conf)
40000/UDP	Voice transfer	GW_VCPOR (/etc/dsgwd.conf)
40001/TCP	Data transfer	GW_DTPORT (/etc/dsgwd.conf)

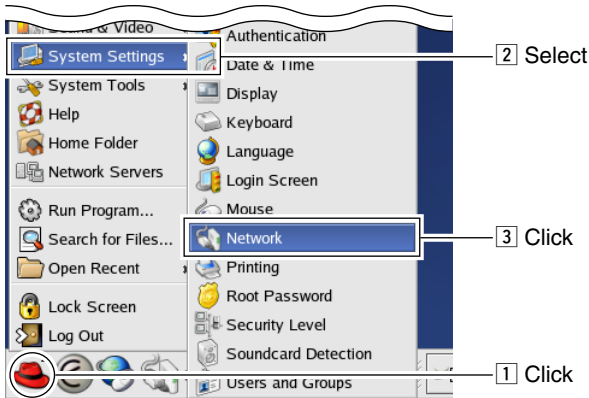
**NOTE:** IP filter must be set to allowing Internet remote access to local IP address “10.0.0.2.” Otherwise the D-STAR gateway will not work due to the firewall.

## Sever settings

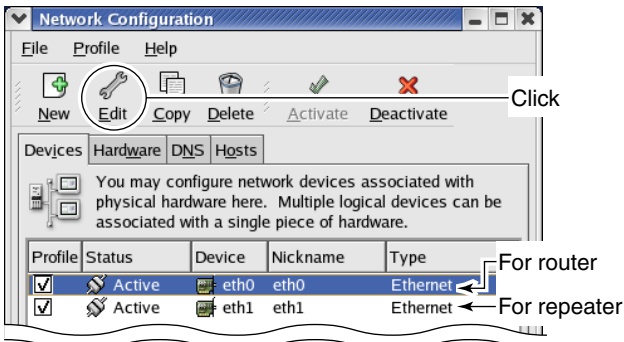
### LAN card settings

**NOTE:** The fixed value for both the IP address and subnet mask must be set to both eth0 and eth1. Otherwise the gateway server cannot communicate to another D-STAR gateway.

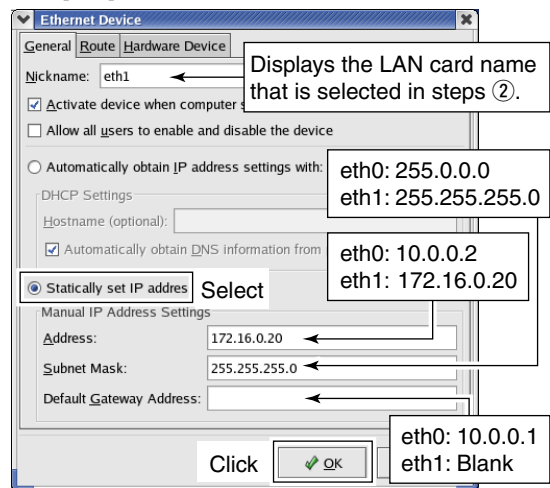
① Open “Network Configuration” screen with the following mouse operation.



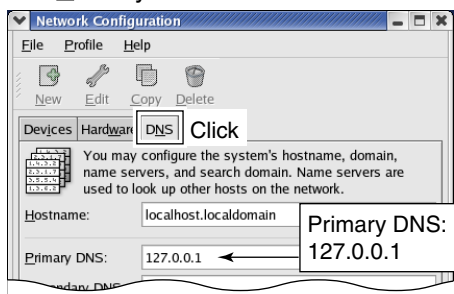
② Select [eth0] or [eth1] to select router or repeater side respectively, then click [Edit].  
 • The “Ethernet Device” screen appears as right above.



③ Select [Statically set IP address], then enter the specified IP address, subnet mask and default gateway (router side; eth0 setting only), as below. Click [OK], then close “Ethernet Device” screen.



④ Click [DNS] tab in “Network Configuration” screen, then enter the address “127.0.0.1” (fixed value) into “Primary DNS” column.

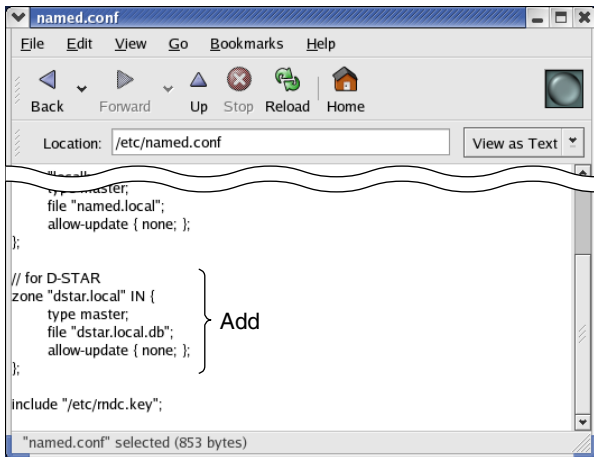


◆ **Named setting**

**IMPORTANT!**: Master the basis of BIND with a reference book of Linux, before starting the named setting.

- ① Add local zone setting file (dstar.local.) to "/etc/named.conf."

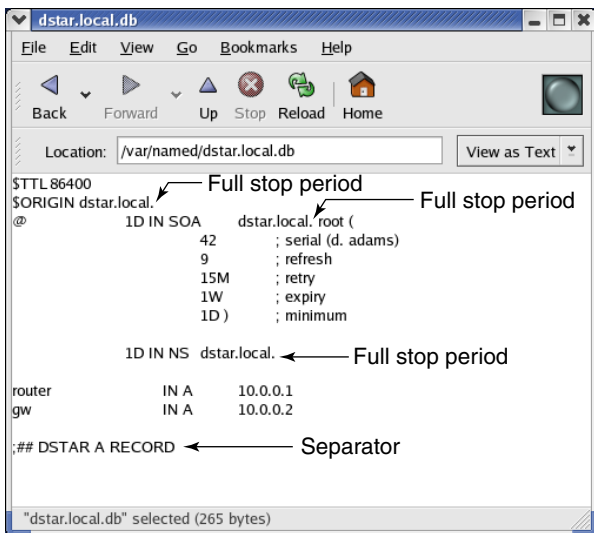
•e.g.; /etc/named.conf



- ② Create database, /var/named/dstar.local.db, for local D-STAR as the following example.

**NOTE:** A full-stop period must be applied into 2nd, 3rd and 10th lines. And set the separator as below at the end of the line.  
;##DSTAR A RECORD

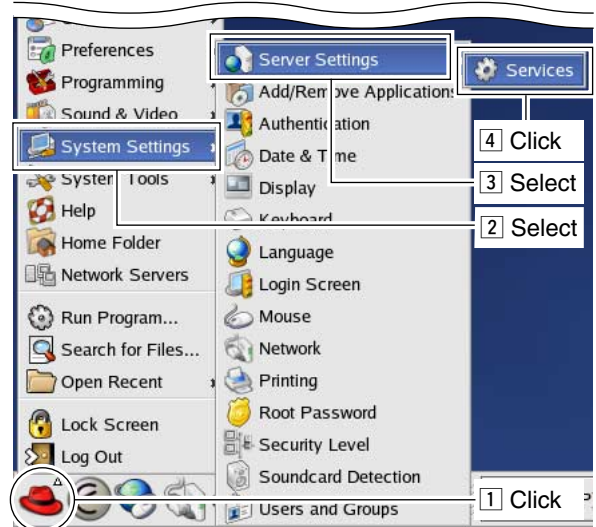
•e.g.; /var/named/dstar.local.db



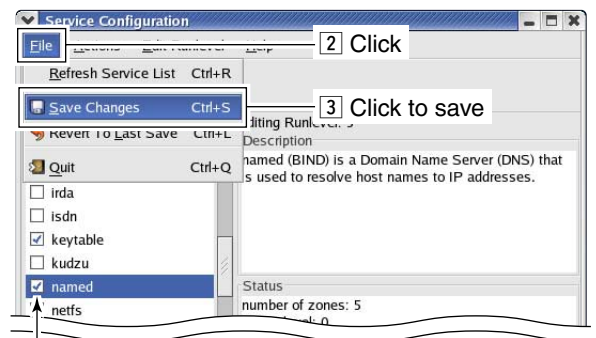
✓ **For your information**

When "Fedora Core 2" is used, the database location is "/var/named/chroot/var/named/dstar.local.db."

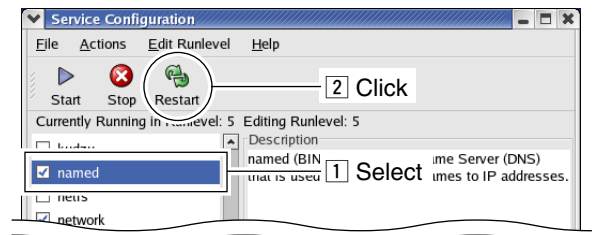
- ③ Open "Service Configuration" screen with the following mouse operation.



- ④ Click the check box beside "named," then save the changed setting if no check mark, "✓," is added.

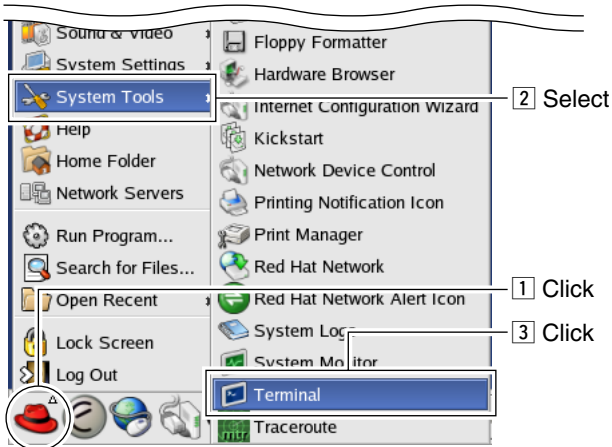


- ⑤ Select "named" item, then click [Restart] to restart the named setting.



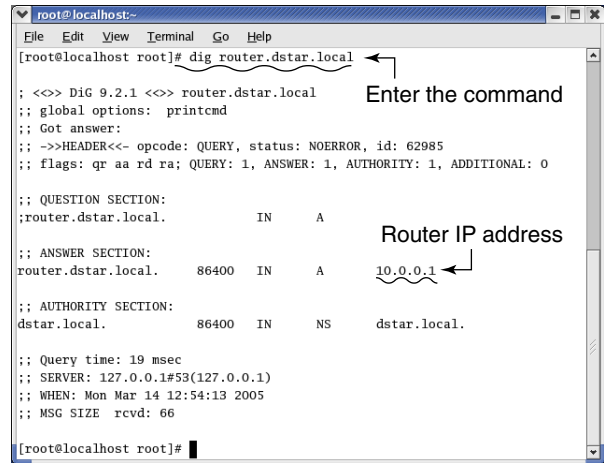
◆ DNS function verification

- ① Start up “Terminal” with the following mouse operation.



- ② The local DNS operation can be verified by entering the following command.  
# dig router.dstar.local

- ③ When the correct router IP address “10.0.0.1” is displayed in the answer section as below, the GW setup is succeeded.



■ Gateway control software

◆ Installation

- ① Insert the RS-RP2C CD into the drive.
- ② Expands the file into the “/dstar” directory using with the following command, or double-click the file during the CD content is displayed.  
Command: # tar zxvf dstar-xxxx.tar.gz  
(XXXX=revision number)

- ③ Copy the both “dsgwd.conf” and “dsipsvd.conf” files, expanded in the “/dstar/conf” directory, into the “/etc” directory.
- ④ Open the copied files, then edit the contents to suits the network.  
•See page 8 and 9 for details.

◆ Syslog setting

/// **For your convenience:**  
 /// Set the syslog if desired.  
 /// By setting the syslog, easy log management is provided because of the independent log.

➔ Add the following contents in “etc/syslog.conf.”  
 # for D-STAR  
 local0.\* /var/log/dsgwd.log  
 local2.\* /var/log/dsipsvd.log

◆ Starting up the control software

Execute script “/dstar/exec-mgsv” when starting up the gateway control software.

When starting up the control software and the system at the same time, add the command as above in the “/etc/rc.d/rc.local.”

And we recommend to set the server condition as described at right above to improve the gateway server performance.

- Deactivate all the services except below**  
 anacron, apmd, atd, crond, keytable, named, network, ntpd, random, sshd, syslog, xinetd
- Do not start up the X-Window System when starting up the gateway server**  
 Change the “Default runlevel” in “/etc/inittab” from 5 to 3.  
 \*The X-Window System start up manually with the “startx” command.

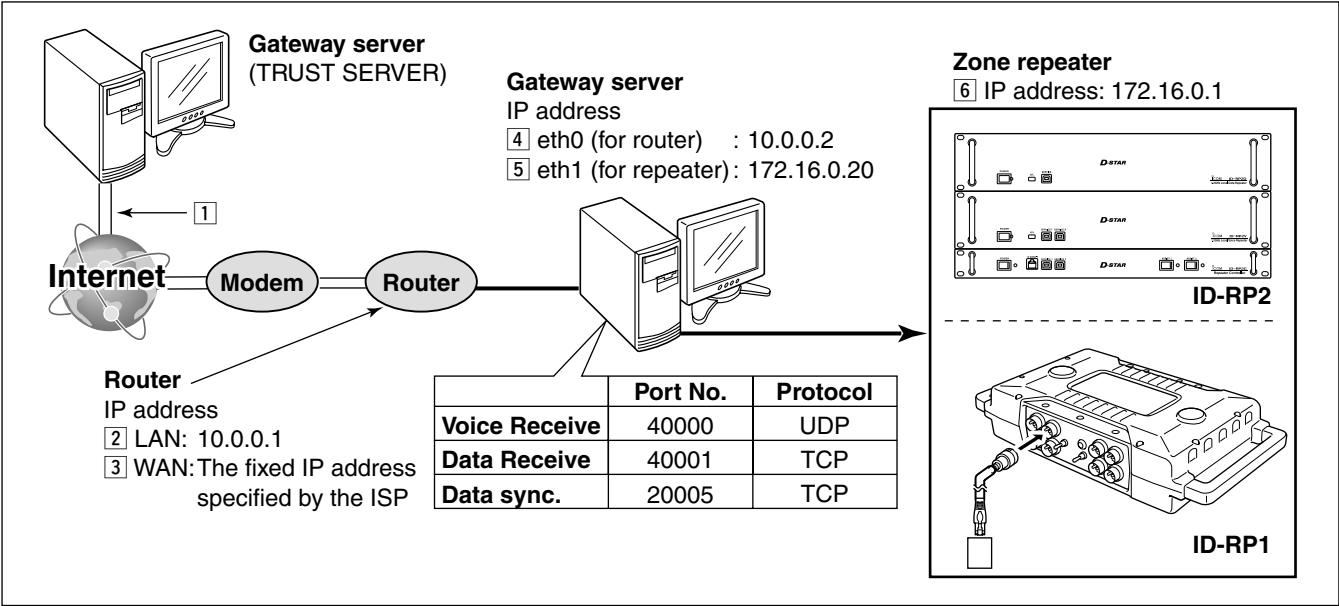


◆ Data base directory

Make the directory for data base backup in the "/var."  
 "/var/dsipsvd" is specified as the default setting.  
 •Refer to ⑥ BACKUPDIR\_PATH (p. 9)

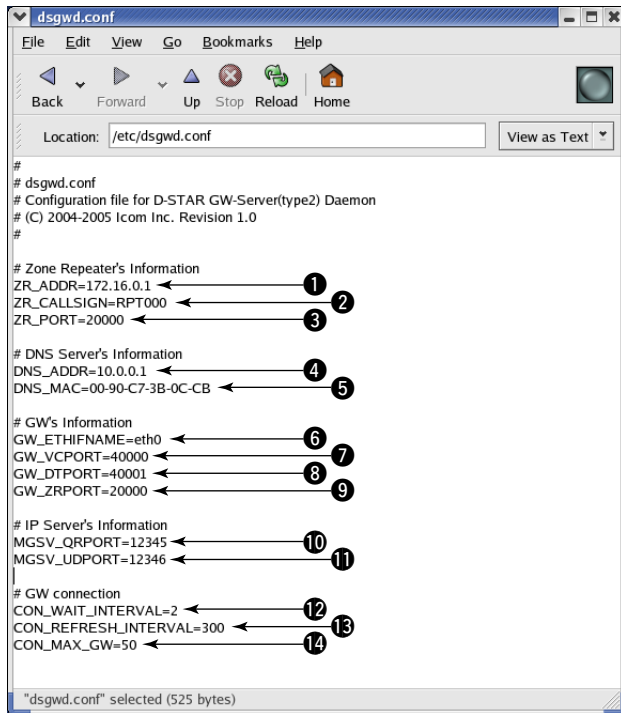
■ System setup

◆ Setup example



## ■ Control software settings

### ◇ dsgwd.conf screen description



#### — Zone Repeater's Information —

##### ① ZR\_ADDR

Sets the zone repeater's IP address (the IP address [6] in ◇ Setup Example).

The same IP address that is programmed in "IP" (for the ID-RP1D maintenance) or "IP Address" (for the utility for ID-RP2C) cell in "Communication Settings" should be set.

##### ② ZR\_CALLSIGN

Sets the zone repeater's call sign.

The same call sign that is programmed in "Callsign" cell in "General" of the ID-RP1D maintenance or the utility for ID-RP2C should be set.

##### ③ ZR\_PORT

Sets the zone repeater's transmit/receive port number (the port number [6] in ◇ Setup Example).

The same port number that is programmed in "Port" cell in "Communication Settings" of the ID-RP1D maintenance or the utility for ID-RP2C should be set.

#### — DNS Server's Information —

##### ④ DNS\_ADDR

Sets the zone DNS server's IP address (the IP address [3] in ◇ Setup Example).

##### ⑤ DNS\_MAC

Sets the zone DNS server's MAC address (the MAC address [3] in ◇ Setup Example).

Set the MAC address of the connected router with dividing by hyphen (-).

#### — GW's Information —

##### ⑥ GW\_ETHIFNAME

Sets the interface name of the LAN card (the interface name [4] in ◇ Setup Example).

The interface name can be confirmed with the "ifconfig" command.

##### ⑦ GW\_VCPOR

Sets the port number for voice operation (UDP). Use the default setting.

##### ⑧ GW\_DTPOR

Sets the port number for data operation (TCP). Use the default setting.

##### ⑨ GW\_ZRPORT

Sets the port number of the gateway server self for the communication with the zone repeater (UDP). Use the default setting.

#### — IP Server's Information —

##### ⑩ MGSV\_QRPORT

Sets the port number of the IP address managing server for call sign inquiry (UDP). Use the default setting.

##### ⑪ MGSV\_UDPORT

Sets the port number of the IP address managing server for updated location information request (UDP). Use the default setting.

#### — GW connection —

##### ⑫ CON\_WAIT\_INTERVAL

Sets the application timer.

The application timer is the waiting timer (unit: second) until the connection is succeeded when making a new connection to another gateway in data mode operation.

Use the default setting.

##### ⑬ CON\_REFRESH\_INTERVAL

Sets the decide timer (unit: second) to impossible to connect to the gateway which is failed in connection once in data mode operation.

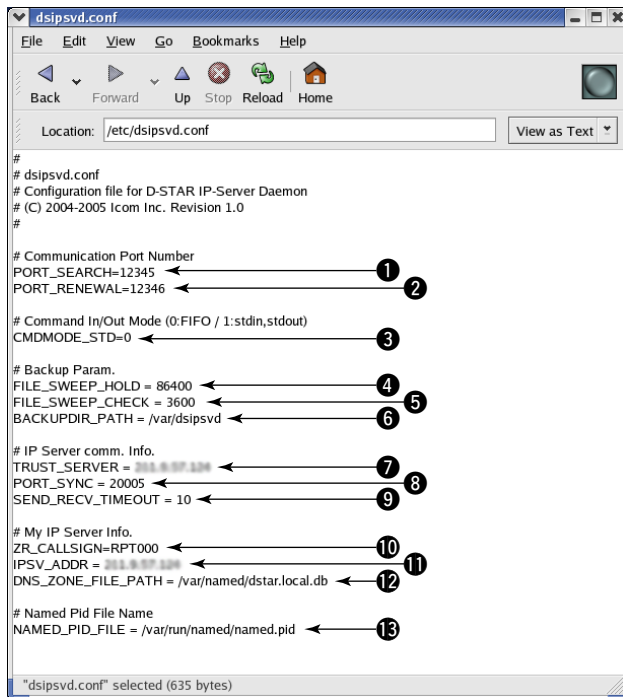
Use the default setting.

##### ⑭ CON\_MAX\_GW

Sets the maximum number of simultaneous connections to another gateway in data mode operation.

Use the default setting.

## ◇ dsipsvd.conf screen description



### — Communication Port Number —

#### ① PORT\_SEARCH

Sets the port number of the IP address managing server for call sign inquiry (UDP).  
Use the default setting.

#### ② PORT\_RENEWAL

Sets the port number of the IP address managing server for updated location information request (UDP).  
Use the default setting.

### — Command In/Out Mode —

#### ③ CMDMODE\_STD

Sets the command processing mode.  
Use the default setting.

### — Backup Param. —

#### ④ FILE\_SWEEP\_HOLD

Sets the backup file preservation period (unit: second).  
(default: 86400 sec.)

#### ⑤ FILE\_SWEEP\_CHECK

Sets the backup file check interval for the file deleting (unit: second).  
(default: 3600 sec.)

#### ⑥ BACKUPDIR\_PATH

Sets the directory for saving the backup file.  
The directory “/var/dsipsvd” is the default.

### — IP Server comm. Info.—

#### ⑦ TRUST\_SERVER

Sets the IP address of the “TRUST SERVER” to acquire the user information in MNG, GIP and RIP table when starting up the repeater first time.

#### ⑧ PORT\_SYNC

Sets the port number for the user information in MNG, GIP and RIP table synchronization. (TCP)  
Use the default setting.

#### ⑨ SEND\_RECV\_TIMEOUT

Sets the time-out period for the user information in MNG, GIP and RIP table synchronization.  
Use the default setting.

### — My IP Server Info. —

#### ⑩ ZR\_CALLSIGN

Sets the call sign of the zone repeater.  
The same call sign that is programmed in “ZR\_CALLSIGN” in “dsgwd.conf” file should be set.

#### ⑪ IPSV\_ADDR

Sets the fixed IP address (global address) of the IP server (the IP address ② in ◇ Setup example).

#### ⑫ DNS\_ZONE\_FILE\_PATH

Specifies the DNS zone file for D-STAR.

### — Named Pid File Name —

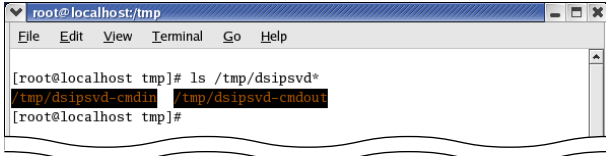
#### ⑬ NAMED\_PID\_FILE

Sets the PID (Process ID) of the named setting.

## ■ IP server operation

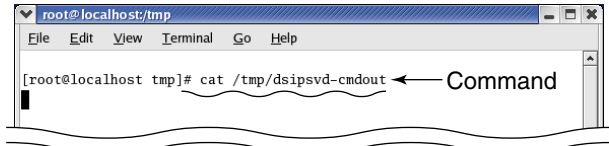
### ◆ Command operation

Sets the command input and output using with the "FIFO" (/tmp/dsipsvd-cmdin, /tmp/dsipsvd-cmdout).

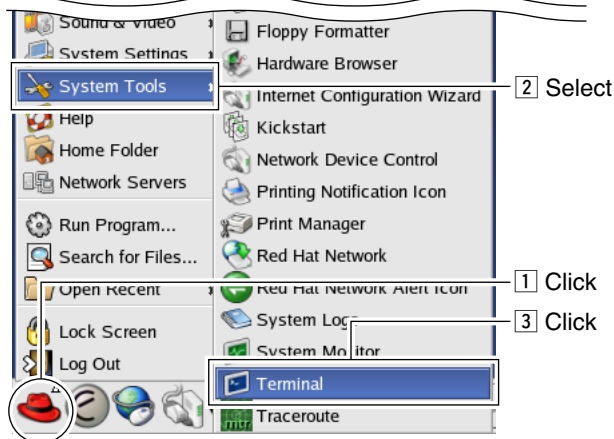


② Enter the following command in the Terminal-1 to make an output terminal of the "FIFO."

```
#cat /tmp/dsipsvd-cmdout
```



① Start up 2 Terminals, Terminal-1 and Terminal-2 with the following mouse operation.



### •Format

Mark	Description
△	Space (ASCII code: 0x20)
	Vertical line (ASCII code: 0x7c)
[CS(T/A/Z)]	8-character call sign (T: Target, A: Area repeater, Z: Zone repeater) When the entered call sign does not fulfil 8-character, fill using a space. (ASCII code: 0x20)
[DB]	Enter one of "GIP," "RIP" or "MNG." (Capital letters only)
[GWIP]	Enter the global IP address of the gateway divided by full stop (.).
[TIP]	Enter the local IP address of the target server divided by full stop (.).
[HNAME]	Enter the target HOST name that is used for DNS. Usable characters: A-Z, a-z, 0-9, -, /, [, ], +
[FNAME]	Enter the file name that is specified by the absolute path.

### ◇ Local IP address reservation

- ① Enter the following command in the Terminal-2.  
`#echo "reserve" > /tmp/dsipsvd-cmdin`  
 • The command processing result outputs to Terminal-1.

```
root@localhost/tmp
File Edit View Terminal Go Help

[root@localhost tmp]# echo "reserve" > /tmp/dsipsvd-cmdin
[root@localhost tmp]#
```

- ② The reserved IP addresses are displayed when the "reserve" command operation is succeeded.  
 • 32 of local IP addresses are reserved in consecutive numbers.

```
root@localhost/tmp
File Edit View Terminal Go Help

[root@localhost tmp]# cat /tmp/dsipsvd-cmdout
ADDRESS=10.22.179.96 - 10.22.179.127
BEGIN
END
200 Command OK
```

### ◇ Station registration

- ➔ Enter the following command in the Terminal-2.  
`#echo "add ID1000|RPT000|RPT000|XXX.XXX.XXX.XXX|10.22.179.96|id1000" > /tmp/dsipsvd-cmdin`  
 \*XXX.XXX.XXX.XXX=global IP address

#### Format:

`add△[CS(T)]△[CS(A)]△[CS(Z)]△[GWIP]△[TIP]△[HNAME]`

- Local IP addresses must be reserved using with "reserve" command in advance.
- The command processing result outputs to Terminal-1.

```
root@localhost/tmp
File Edit View Terminal Go Help

[root@localhost tmp]# echo "reserve" > /tmp/dsipsvd-cmdin
[root@localhost tmp]# echo "add ID1000 |RPT000 |RPT000 |10.22.179.96|id1000" > /tmp/dsipsvd-cmdin
[root@localhost tmp]#
```

#### <The station registration confirmation>

- ➔ Enter the following command in the Terminal-2.  
`#dig id1000.dstar.local`  
 • The registration is succeeded when the registered local IP address is displayed in answer section.

```
root@localhost/tmp
File Edit View Terminal Go Help

[root@localhost tmp]# dig id1000.dstar.local
<-- Command

;; <<> DiG 9.2.1 <<> id1000.dstar.local
;; global options: printcmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 27891
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 0

;; QUESTION SECTION:
;id1000.dstar.local.      IN      A

;; ANSWER SECTION:
id1000.dstar.local.    86400  IN      A      10.22.179.96

;; AUTHORITY SECTION:
id1000.dstar.local.    86400  IN      NS      id1000.dstar.local.
```

### ◇ Station data synchronization

- ➔ Enter the following command in the Terminal-2.  
`#echo "push_mng" > /tmp/dsipsvd-cmdin`  
 • The registered station information will be registered to another gateway's IP server when this command is performed.

### ◇ Data output

- ➔ Enter the following command in the Terminal-2.  
`#echo "write MNG /tmp/mng.txt" > /tmp/dsipsvd-cmdin`

#### Format:

`write△[DB]△[FNAME]`

- The functioning data in the memory is output into the specified file.

◆ **Deleting a station registration**

➔ Enter the following command in the Terminal-2.

```
#echo "del ID1000"> /tmp/dsipsvd-  
cmdin
```

**Format:**

```
del△[CS(T)]
```

**NOTE:** A delete flag is applied to the deleted station data in the MNG. (The record is not deleted, the delete flag "1" is added only.)

The deleted call sign is usable when "add" command is used.

◆ **Backup file**

A backup file is made with the following file name and contents into the directory that is specified in "BACKUPDIR\_PATH" in IP server's parameter.

The latest file is re-loaded when re-starting the program.

(YYYY: Year), (MM: Month), (DD: Day),  
(HH: Hour), (mm: Minutes), (ss: Second),  
(uuuuuu: micro second)

• **Global IP address table**

(gip\_YYYYMMDD\_HHmms\_uuuuuu.dat)

*File contents:*

```
[GWIP][tab]Registered time[tab]Communication  
permission[tab]Effective flag
```

• **Reserved IP address table**

(rip\_YYYYMMDD\_HHmms\_uuuuuu.dat)

*File contents:*

```
[Reserved head IP address][tab][GWIP][tab]Reg-  
istered time[tab]Effective flag
```

• **Target information table**

(mng\_YYYYMMDD\_HHmms\_uuuuuu.dat)

*File contents:*

```
[GWIP][tab][CS(Z)][CS(A)][tab][CS(T)][tab]  
[HNAME][tab][TIP][tab]Registered time[tab]Delete  
flag[tab]CommandExec.Time
```

◆ **Data base maintenance**

The maintained data will be restored when the gateway server synchronized with another gateway even if the data has been deleted because of the IP servers are synchronized each other.

Follow the maintenance instructions as at right.

- ① Read out the "TRUST SERVER" data with the "write" command.
  - Used the same format for the file name as the "Backup file" as described above.
- ② Deactivate the all programs that are connected to the gateway server.
- ③ Evacuate the all files in the backup directory in the connected gateway server into the desired location.
- ④ Move the file that is read out at step ① into the backup directory.
- ⑤ Edit the file using a editor application.
- ⑥ Start up the "TRUST\_SERVER."
- ⑦ Start up another gateway servers one by one to read the "TRUST\_SERVER" data.

/// **NOTE:** When starting up the server with brand-new condition, start up the server with the condition that the backup directory is emptied.

## ■ Uninstallation

Refer to the following instructions when uninstalling the software.

- ① Delete the following directories.
  - /dstar
  - /var/dsipsvd
- ② Delete the following files.
  - /etc/dsgwd.conf
  - /etc/dsipsvd.conf
  - /var/named/dstar.local.db
  - /var/log/dsgwd.log
  - /var/log/dsipsvd.log
  - /tmp/dsipsvd-cmdin
  - /tmp/dsipsvd-cmdout
- ③ Restore the following files.
  - /etc/named.conf
  - /etc/syslog.conf
  - /etc/rc.d/rc.local

**Count on us!**