



Bridge
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Software Release

SW/1-TCP Version 13000

March 27, 1987

Part Number 86-0018-00
Revision 04

Bridge Communications, Inc.

TO: CS/1 and LS/1 Users
FROM: Bridge Communications, Inc.
SUBJECT: SW/1-TCP Version 13000
DATE: March 27, 1987

Enclosed is the SW/1-TCP Version 13000 diskette. This diskette is your distribution copy of SW/1-TCP Version 13000.

Before updating your system to SW/1-TCP Version 13000, make a backup copy of the distribution diskette using the following procedure:

1. Connect a terminal to the console port.
2. Make a backup copy of the distribution diskette using the following command:

```
> co <n> <CR>
```

where *n* is the number of copies to be made.

The following message appears on the screen:

```
Insert master and hit return key
```

Follow the message instructions by pressing the return key. If the read completes successfully, the following messages appear on the screen:

```
Reading ... OK  
Insert copy #n and hit return key
```

Follow the message instructions by inserting the 48TPI double-sided, double-density blank diskette in the disk drive and pressing the return key. If the message "read error" appears instead of the message "OK", contact Bridge Communications, your local Systems Engineer, or Customer Engineer for assistance.

3. Remove the diskette from the disk drive and label it "SW/1-TCP Version 13000".

To Update Your System to SW/1-TCP Version 13000, Refer to the Following Procedures:

All updated software must be resysgen'd to define the server's Internet address and other sysgen parameters. If your system is currently running SW/1-TCP Version 11000 through 1200x, skip step 5 on page 4. You will have to redefine the global parameters, rotary port assignment, rotary Internet addresses, port Internet addresses, and all the Internet server addresses.

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If your system is currently running SW/1-TCP Version 1300x (where x represents a number from 1 to E), use the following procedure to update your system to SW/1-TCP Version 13000:

1. Connect your terminal to the console port.
2. Make a backup copy of the SW/1-TCP Version 1300x diskette following the above procedure.
3. Insert the SW/1-TCP Version 13000 diskette into the CS/1 disk drive then press the Reset switch.
4. Use the following command to copy the SW/1-TCP Version 13000 software onto the SW/1-TCP Version 1300x diskette:

```
> co p 0 215 <CR>
```
5. The following message appears on the screen:

```
Insert master and hit return key
```
6. Follow the message instructions by inserting the SW/1-TCP Version 13000 diskette into the disk drive. If the read completes successfully, the following messages appear on your screen:

```
Reading ... OK  
Insert copy #n and hit return key
```
7. Follow the message instructions. If the message "read error" appears instead of the message "OK", contact Bridge Communications, your local Systems Engineer, or Customer Engineer for assistance.
8. Remove the SW/1-TCP Version 13000 diskette and insert the SW/1-TCP Version 1300x diskette in the disk drive, then press the return key.
9. If the copy completes successfully, the following messages appear on the screen:

```
writing ... verifying ... OK  
copy completed
```
10. Remove the diskette from the disk drive and label it "SW/1-TCP Version 13000".
11. Repeat steps 4 through 10 for each system being updated.

If your system is currently running SW/1-TCP Version 11000 through 120xx, use the following procedure to update your system to SW/1-TCP Version 13000 without losing port configurations, macros, and names:

1. Connect a terminal to the console port.
2. Insert the SW/1-TCP Version 11000 through 120xx diskette into the CS/1 or LS/1 disk drive, then press the Reset switch.

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3. After the CS/1 or LS/1 is finished booting, enter the following command:

```
> r 20b 3000 c600 <CR>
```

4. Remove the SW/1-TCP Version 11000 through 120xx diskette, insert the SW/1-TCP Version 13000 diskette in the disk drive and enter the following commands. These commands copy the port configurations, macros, and names from the SW/1-TCP Version 11000 through 120xx diskette to the SW/1-TCP Version 13000 diskette.

```
> w 216 3200 400 <CR>
```

```
> w 219 3600 1000 <CR>
```

```
> w 225 4600 2a00 <CR>
```

```
> w 23a 7000 400 <CR>
```

```
> w 23d 7400 4000 <CR>
```

```
> w 26d f400 200 <CR>
```

5. If your current system diskette is SW/1-TCP Version 1201x, you may also copy the global configuration to the SW/1-TCP Version 13000 diskette, using the command:

```
> w 26e 3000 200 <CR>
```

6. Repeat steps 2 through 5 for each system being updated.

If your system is currently running SW/1-A/BSC Version 17100 up to SW/1-A/BSC/SDLC Version 20030, use the following procedure to update your system to SW/1-TCP Version 13000:

1. Connect your terminal to the console port.
2. Insert the SW/1-A/BSC Version 17100 up to SW/1-A/BSC/SDLC Version 20030 diskette into the CS/1 or LS/1 disk drive, then press the Reset switch.
3. After the CS/1 or LS/1 is finished booting, enter the following command:

```
> r 20b 3000 c600 <CR>
```

4. Remove the SW/1-A/BSC Version 17100 up to SW/1-A/BSC/SDLC Version 20030 diskette, insert the SW/1-TCP Version 13000 diskette in the disk drive and enter the following commands. These commands only copy the port configurations and macros from the SW/1-A/BSC Version 17100 up to SW/1-A/BSC/SDLC Version 20030 diskette to the SW/1-TCP Version 13000 diskette. Because of the difference between naming conventions in XNS and TCP/IP, clearinghouse names that are defined in the SW/1-A/BSC Version 17100 up to SW/1-A/BSC/SDLC Version 20030 software must be redefined in SW/1-TCP Version 13000. In addition to redefining names in SW/1-TCP Version 13000, the global configuration must also be redefined.

```
> w 216 3200 400 <CR>
```

```
> w 219 3600 1000 <CR>
```

```
> w 23a 7000 400 <CR>
```

```
> w 23d 7400 4000 <CR>
```

```
> w 26d f400 200 <CR>
```

5. Repeat steps 2 through 4 for each system being updated.

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If your system is currently running SW/1-A/BSC/SDLC Version 20050 or later, use the following procedure to update your system to SW/1-TCP Version 13000:

1. Connect your terminal to the console port.
2. Insert the SW/1-A/BSC/SDLC Version 20050 or later diskette into the CS/1 or LS/1 disk drive, then press the Reset switch.
3. After the CS/1 or LS/1 is finished booting, enter the following command:

```
> r 216 3000 b200 <CR>
```

4. Remove the SW/1-A/BSC/SDLC Version 20050 or later diskette, insert the SW/1-TCP Version 13000 diskette in the disk drive and enter the following commands. These commands only copy the port configurations, macros, and global configuration from the SW/1-A/BSC/SDLC Version 20050 or later diskette to the SW/1-TCP Version 13000 diskette. Because of the difference between naming conventions in XNS and TCP/IP, clearinghouse names that are defined in the SW/1-A/BSC/SDLC Version 20050 or later software must be redefined in SW/1-TCP Version 13000.

```
> w 216 3000 1e00 <CR>
```

```
> w 23a 7800 6a00 <CR>
```

5. Repeat steps 2 through 4 for each system being updated.

COMPATIBILITY

SW/1-TCP Version 13000 can only operate with the following products and software releases:

NCS/150 running SW/150-NCS-TCP Version 10000 or later
CS/100 running SW/100-TCP Version 11000 or later
CS/1-SNA running SW/1-SNA3270-T Version 10000 or later
GS/3 running SW/3-IP Version 10000 or later
TCPterm Version 10000 or later
CS/200 running SW/200-TCP Version 13000 or later
IVECS running SW/IVECS-TCP Version 13000 or later
IB/1 and IB/2 running SW/IB Version 10000 or later

The following chart illustrates product, software, and firmware compatibility for SW/1-TCP Version 13000:

FIRMWARE						
PRODUCT	SOFTWARE	SIO	MCPU	ESB	or EC/2	IBCM
CS/1	SW/1-TCP	MOASYN 15A MOASYN 17B or later	M1MMON 01B or later	MOEDL1 4B or later	MOEDL2 00A or later	N/A
LS/1	SW/1-TCP	N/A	M1MMON 01G or later	N/A	MOEDL2 00A or later	N/A
CS/1-B	SW/1-TCP	MOASYN 15A MIASYN 17B or later	M1MMON 01G or later	N/A	N/A	M2IBCM 00E or later
LS/1-B	SW/1-TCP	N/A	M1MMON 01G or later	N/A	N/A	M2IBCM 00E or later

The SIO-16 board is supported in both the LanSwitch/1 and CS/1 products. If you have an SIO-16 in the CS/1, the following configurations must be followed:

1. For a CS/1 with one or more SIO-16s, an EC/2 or IBCM (for the CS/1-B or LS/1-B) must be installed. In addition, the MCU PROMs must have M1MMON Revision 01G or later.
2. For a CS/1 with three or four SIO-16s, the MCU board must be upgraded to 12MHz. One or two SIO-16s can be used with a 10MHz MCU board.

NEW FEATURES

The following new features have been implemented in SW/1-TCP Version 13000:

1. SW/1-TCP Version 13000 now supports the SIO-16 for the LanSwitch/1 product. In addition, this software can also support any combination of SIO-A, SIO-16, and SIO-3270 boards.
2. SW/1-TCP Version 13000 now supports the CS/1 and LS/1 for Broadband networks.
3. A sysgen parameter "Number of macro buffers" has been added. This parameter is useful

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when the macro service is used extensively. The default value for this parameter is 12 and the maximum value is 64. This parameter value determines the number of macros that can be executed simultaneously without seeing the "Can't - no memory" message. For example, if this parameter is set to 64, then 64 users can execute macros simultaneously.

Note that the higher the number of macro buffers, the lower the number of sessions in the systems, especially in a CS/1 with an EC/1 set.

4. The NoMacroBreak or MacroBreak field has been added to the InterAction parameter. The NoMacroBreak option prevents users from breaking out of a macro while the macro is in the process of execution. When a NoMacroBreak option is set, the BREAK key is ignored. This feature can be used to prevent a user from breaking out of a macro in Global Network Manager privilege.
5. The BUffersize parameter in the port configuration can be set to a value smaller than the system buffer size. This feature is useful for PC-to-host file transfer applications that require smaller buffer sizes.
6. Whenever a disconnection from a host port is requested, either by a user typing the DisConnect command on the terminal or by the AutoDisconnect timer, the LogoffString will be transmitted to the host port before it closes down the circuit.

LogoffString transmission is controlled by the string defined in the LogoffString parameter of the host-end server. The LogoffString can be up to 24 characters long.

In order for the LogoffString to be transmitted, the AUtoLogoff parameter should be set to ON. This parameter can be set on a per-port basis.

The LogoffString will not be transmitted if the disconnection is caused by the following conditions:

- a) A network manager uses the Listen command to listen out the host or terminal port.
- b) Traffic to the host port is totally flow controlled, and transmission of the LogoffString is not possible within a reasonable amount of time (currently 6 seconds).
- c) A user powers off the terminal before disconnecting the session and the UseDTRin parameter is set to AsDTR on the terminal port.

The LogoffString and AUtoLogoff have the following syntax:

- a) To set the LogoffString, enter:

```
SETDefault LogoffString = "string"
```

The "*string*" can contain any control characters. For example, "^M" for control-M, "^J" for control-J, etc.

- b) To enable/disable AUtoLogoff on a particular port, enter:

```
SETDefault (!portid) AUtoLogoff = [ON | OFF]
```

Note that the AUtoLogoff parameter is only available on a host port.

- c) To display the AUtoLogoff parameter for a particular port, enter:

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`SHow (!portid) AUtoLogoff`

- d) To display the LogoffString, enter:

`SHow LogoffString`

7. Permanent Virtual Circuits (PVCs) support is implemented in this release. Permanent Virtual Circuits allow automatic circuit reestablishment upon disconnection.

Once a permanent virtual circuit is defined, it will be reestablished whenever the server is rebooted. After the PermanentVC parameter is set, the first connection attempt will begin in approximately 30 seconds. If the connection attempt fails or if the permanent virtual circuit is disconnected for any reason, the system will attempt to reestablish the circuit every 60 seconds. PVCs can only be defined on a host port. The destination end of the connection can be either a terminal or host port. The PVC may be defined on both ends of the circuit.

In addition, PVCs may accept names.

PermanentVC commands have the following syntax:

- `SETDefault (!portid) PermanentVC = "<address>"`

Defines a permanent virtual circuit between a local host port and any port on the network. *<address>* can be either a physical address or a name. The name can be up to 12 characters long.

- `SETDefault (!portid) PermanentVC = ""`

Removes any previous PVC definition, but does not disconnect any existing connection. The existing circuits can be disconnected using the Disconnect or Listen command.

- `SHow (!portid) DefaultParameter PermanentVC`

Displays the current permanent virtual circuits.

8. The SHow AllSessions command has an option allowing the display of this command to show specified physical addresses or logical names of destination devices when a connection is established.

For example, to display physical addresses of destination devices, use the following command:

```
SHow AllSessions p
```

To display logical names of destination devices, use the following command:

```
SHow AllSessions
```

9. The ARP-based routing has been improved. When a packet is transmitted to a destination with a different network number in its address, an initial route is set up using the default gateway. If the default gateway is zero when such an initial transmission is made, SW/1-TCP Version 13000 will attempt to resolve the address on the local segment via an ARP request.
10. User Telnet has been enhanced. During setup negotiation, User Telnet now agrees to DO

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ECHO if instructed by the host. This feature is useful in offloading processing from some hosts whose TELNET implementations might not echo keyboard input (e.g., a TELNET that is aware of entry/exit from a screen-based editor).

11. If the **BR**eaKAction parameter includes InBand or OutofBand or both, then a TELNET Interrupt Process command will be sent. If the **BR**eaKAction parameter includes FlushVC, then a TELNET DO-TIMING-MARK will be sent and all incoming data will be flushed until the mark is echoed.

******* WARNING *******

FlushVC is useful in preventing long displays from a dead host process. The FlushVC, however, depends on the TELNET timing mark being returned. Some systems may not return this mark reliably. In particular, Bridge has experienced this problem with a VAX™ running 4.2 BSD UNIX™. In a VAX running 4.2 BSD UNIX, we found that a second timing mark sent by a second BREAK was usually returned.

12. The **Connect** and **REMOTE** commands reject invalid Internet addresses. The SW/1-TCP Version 13000 checks the legality of Internet address assignments (i.e., any of the InternetServer addresses and the InternetPort addresses) as follows:
 - Any address may be assigned 0.0.0.0, indicating no assignment (all addresses start out with this value).
 - No address may be assigned a broadcast or loopback address (host portion all 0s or all 1s).
 - The DefaultGateway may not be the local address.
 - If the server is booted from the Network Control Server, neither the PrimaryNameServer nor SecondaryNameServer may be the local address.
 - A same IP address may not be assigned to more than one port.
13. If the PrimaryNameServer parameter is undefined (i.e., 0.0.0.0), name lookups refer to the boot source (local floppy or Network Control Server) as the PrimaryNameServer.
14. The **NAME** and **UNNAME** commands require the local server to be a NameServer (i.e., one of the NameServer parameters must be set to the local address or the PrimaryNameServer must be undefined). If one of these commands uses the local server as the SecondaryNameServer, the user will be notified.
15. The **sysgen** program now forces the synchronization of the Internet Address and the Subnet Mask assignments. Refer to step 7 of the sysgen instructions on page 15.
16. A new port configuration parameter "NetAScii" has been added. Its values are UseLF and UseNUL. This parameter allows the user to choose the character sequence transmitted by the server when a <CR> is entered. If the "NetAScii" parameter is set to UseLF, a <CR><LF> will be transmitted. If the "NetAScii" parameter is set to UseNUL, a <CR><NUL> will be transmitted.

The "NetAScii" parameter is only used by a terminal (active) port; it has no effect on the host (passive) side of a connection.

The "NetAScii" parameter has been implemented to provide for the variety of TELNET

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implementations that interpret the TELNET data stream differently. For hosts that correctly view <CR><LF> and <CR><NUL> as encoded Network Virtual Terminal functions (e.g., 4.3 BSD UNIX), Bridge recommends that the "NetAScii" parameter should be set to UseNUL. When the "NetAScii" parameter is set to UseNUL, it allows <CR><NUL> as a <CR>. For hosts that neglect to strip a <NUL> following a <CR>, Bridge recommends that the "NetAScii" parameter should be set to UseLF.

As a consequence of this new parameter addition, the EOM parameter has been deleted.

17. When resolving a single name, the server now performs six tries at three-second intervals before timeout (instead of four tries at two-second intervals). This allows for Name Servers with larger, slower databases. When resolving a request for multiple names (e.g. "show name *"), the server performs two tries at ten-second intervals, because it is assumed that this type of lookup will take longer.
18. An additional Internet server parameter, FileServerAddress, has been added. It indicates which NCS is being used by this server for its files such as configuration files and macro files, and is being used as the default Audit Server when the AuditServerAddress is not set.

This parameter is initially equal to the BootServerAddress, but on servers booted from the network, it may be set by the SET command. This parameter is useful when a primary Network Control Server fails and a secondary Network Control Server must be used as a file source.

BUGS FIXED

The following problems have been corrected in SW/1-TCP Version 13000.

1. If a question mark is entered at the end of a SETDefault InternetPort (setd <!portid> ip = ?) command, the syntax for this command will be displayed.
2. Internet address assignments to physical ports now operate properly. In Version 13008, an Internet address can only be assigned to port 0 if the CS/1's boot source has no global information.
3. <BREAK> is now transmitted across connections between two ports on the same server.
4. When creating a macro to establish a session with ECM and RESume after transmitting a string, the macro buffer is no longer lost if the connection fails due to a busy or disabled destination port.
5. In a heavy traffic environment, the CS/1-B (broadband) no longer isolates from the network.
6. When the DTR toggles down, the SIO-16 no longer fails under certain circumstances.

LIMITATIONS

SW/1-TCP Version 13000 has the following limitations:

1. SW/1-TCP Version 13000 supports up to 64 sessions. For the LanSwitch/1 product with 64 ports, one session is reserved for every existing port on the server. Therefore, in this configuration each port is capable of making a maximum of one connection. Note that the number of physical ports on a server depends on the SIO boards it contains, not on the number

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of connected or active terminals.

2. The number of directly assignable IP addresses is 32. For the LanSwitch/1 product with 64 ports, IP address assignments can only be made to any 32 ports on the server. However, the ability to assign IP addresses to rotary ports still remains the same. Note that only ports that are used for the passive end of a connection (host or dial-out modem) need to be assigned Internet addresses.
3. The Internet address checks do not include a check of the subnet field (for all 0s or all 1s).

USER INTERFACE

SW/1-TCP Version 13000 has the following user interface commands:

- SETDefault (!<port-id>) InternetPort = <Internet address>
Assigns Internet addresses to individual physical or rotary ports.
- SETDefault (!<port-id>) InternetPort = 0.0.0.0
Removes the Internet address of an individual physical or rotary port.
- SETDefault DefaultGateway = <Internet address>
Allows all remote net packets to be sent to the gateway.
- SETDefault PrimaryNameServer = <Internet address>
Assigns an Internet address for the primary Name Server. The primary Name Server will be queried first for name resolution. The primary Name Server's Internet address can be defined to be on a remote network.
- SETDefault SecondaryNameServer = <Internet address>
Assigns an Internet address for the secondary Name Server. The secondary Name Server will be queried if the primary Name Server does not yield a name to address resolution.
- SHow InternetPorts
Replaces the SHow InternetMap command. It displays the Internet address of the Communications Server itself and all other Internet addresses associated with the Communications Server (physical and rotary ports).
- SHow InternetServers
Displays Internet addresses of the Name Servers and Default Gateway.
- SHow VirtualPorts
Displays the connection state (passive or active) of the physical port to which these virtual ports are connected.

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- Show ARptable

Displays the mapping between Internet addresses and Ethernet addresses of devices that communicate with the CS/1 or LS/1. Note that the ARP table always contains the unit's Internet address and the broadcast address.

- ZeroArp

Cleans up the contents of the ARP table. Normally, the software automatically removes an ARP entry if it cannot communicate with the device for more than 15 minutes. However, if the device has moved to a different location, this command serves the purpose of updating the information in the ARP table faster.

KNOWN PROBLEMS

The following is a list of current problems in SW/1-TCP Version 13000:

1. The message "Remote is Busy" appears when the remote system is out of memory.
2. If the host crashes and the user continues to enter characters on the terminal, the terminal port will hang. After a few minutes, the terminal port will be reactivated automatically. However, this terminal port can also be reactivated by putting it in listen mode from another terminal.
3. IP addresses assigned to ports may be dropped from the ARP table if the addresses remain unused for an extended period of time (more than one day). This problem has been reported at one site. If you suspect that your system has this problem, please contact Bridge Communications, your local Systems Engineer or Customer Engineer for assistance.
4. If the remote-end of an inactive session is disconnected, the SHow SESSions and SHow AllSessions commands still show that the local-end is connected. The disconnection message only appears if a user resumes that session. This problem does not occur on an active session.
5. If a wrong password is entered in a SET PRIVilege command, this information is not forwarded to the NCS/150 Audit Trail.
6. At the time when a connection is made, the routes are established using the default gateway. Changing the default gateway after connection will not affect the already established routes.

PROCEDURE TO SYSGEN A CS/1 RUNNING SW/1-TCP VERSION 13000

Following is the procedure for running the sysgen program on a CS/1 or LS/1 running SW/1-TCP:

1. Connect a terminal to the console port.
2. Insert the SW/1-TCP Version 13000 diskette in the CS/1 or LS/1 disk drive, then press the Reset switch. The CS/1 or LS/1 displays the following messages:

```
Power-up V1.0  
MCPU - passed  
EC - passed
```

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SIO # 1 - passed
SIO # 2 - passed (or not present)
SIO # 3 - passed (or not present)
SIO # 4 - passed (or not present)
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3. After the above message, the system displays a ">" prompt. Enter "gn", then press the return key.
4. The CS/1 displays the "Sysgen Utility V2.0" menu and a message at the bottom of the screen asking you to make a selection.

Sysgen Utility V2.0

1. View/Alter Module Parameters
2. Save Parameters
3. Exit to Monitor

Enter selection:

5. Enter 1 to select "View/Alter Module Parameters", then press the return key.

The CS/1 then displays the "Module Select Menu" and a message at the bottom of the screen asking you to make a selection.

Module Select Menu

1. Kernel Parameters
2. Data Link Parameters
3. IP Parameters
4. TCP Parameters
5. User Interface Parameters
6. Virtual Terminal Parameters
7. Statistics Monitoring Parameters
8. Service Listener Port List

(ESC to return to main menu)
Select module:

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6. Enter 1 to select "Kernel Parameters". The "Kernel Parameters" display is as follows:

Kernel Parameters

Parameters	Current Value
1. Max. no. of ports	0x40
2. Buffer size	0x52
3. Buffer load factor	0x40
4. Number of macro buffers	0xC

Kernel Submenu

5. View/Modify SYSINIT Table

- A) Enter 1 to specify the maximum number of physical ports that you would like to use on the Communications Server. This number will be used by software as an upper limit on the number of ports to be enabled.

This feature is useful only when the number of physical ports exceeds the number of actual users on the server. The lower the value of this parameter, the more sessions will be created for the system.

- B) Enter 3 to specify the buffer size. This parameter should not be changed unless you have an application that requires a specific system buffer size.
- C) Enter 4 to specify the buffer load factor. The minimum value for this parameter is 10 and the maximum value is 100.

Note that this parameter allows you to control the use of shared memory. The higher the number, the more buffer will be allocated to each port and session. As a result, fewer sessions will be available. The lower the number, the greater the number of sessions; also the greater the likelihood the system will run out of memory.

- D) Enter 4 to specify the number of macro buffers. The higher the number of this parameter, the lower the number of sessions in the system.
- E) Press <ESC> to return to the "Module Select Menu".

7. Enter 3 to select "IP Parameters". The "IP Parameters" display is as follows:

IP Parameters

Parameter	Current Value
1. Network to IP mailbox	0x20
2. Client to IP mailbox	0xC
3. Server Internet address	000.000.000.000
4. Server subnet mask	not a subnet

- A) If the CS/1 or LS/1 is booted from an NCS/150, do not select option 3 to define the server's Internet address. This function is performed in the BIND command of the NCS/150.

If you select option 3 to define the Server Internet address, the Server subnet mask will

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also be prompted. If your network topology requires the definition of subnetworks, enter the subnet mask. The subnet mask is in decimal format. Refer to SUBNETS in the Appendix for a more detailed description of subnets.

In order to avoid a system malfunction, do not define a subnet mask if subnetting is not in use.

- B) Press <ESC> to return to the "Module Select Menu".
- 8. Enter 8 to select "Service Listener Port List". The "Service Listener Well Known Ports" menu display is as follows:

Service Listener Well Known Ports

- 1. 23 (17)
- 2. 513 (201)
- 3. (Add new service here)

- A) 23 is a number assigned to the Telnet Service Listener Port.
- B) 513 is a number assigned to the Rlogin Service Listener Port.
- C) The assigned Service Listener Ports can be found in the RFC (Request for Comment) 943 document.

Up to eight Service Ports are allowed in this menu. These Service Ports can be used in a variety of ways. They can be used to "export" the TCP interface to the serial line. In this case, a host could bind a process to that line which could accept incoming data units from the active side of the particular service and generate whatever responses would be appropriate for that service protocol.

Note that the Service Ports are only available on the passive end of a connection. There is no way to select the remote service when connecting from a terminal on the CS/1 or LS/1 running SW/1-TCP. You will always get a Telnet service.

- 9. Press <ESC> to return to the "Module Select Menu".
- 10. Press <ESC> to return to the "Sysgen Utility V2.0" menu.
- 11. Enter 2 to save all the parameters.
- 12. Enter 3, then press the return key to exit to the monitor.

Appendix

SUBNETS

Overview

If a private network wishes to establish communications to a public TCP/IP network (e.g., ARPANET), the public network first assigns a unique network number to the private network. In this case, all stations on this private network will have this unique network number. Gateways internal to this network may be used to further subdivide the network into segments by incorporating subnetting as described below.

Definition of Subnets and the Subnet Mask

An Internet address consists of 32 bits divided into four 8-bit subfields.

Normally, these subfields are divided between the *<net>* and *<host>* fields. Some TCP/IP networks, however, have inserted an additional field between the *<net>* and *<host>* fields called *<subnet>*. The subnet field is used to indicate the particular physical segment. The *<subnet>* field is formed by taking the leading bits from the *<host>* field.

The *<subnet>* field is assigned in the sysgen program under the "Server subnet mask" option in the "IP Parameters" menu. However, if your network does not use subnets, do not assign a subnet mask. When entering the subnet mask, enter the decimal instead of binary representation.

The subnet mask is then defined as follows:

It is a 32-bit number divided into four equal subfields. Each bit that coincides with the network field (the 8, 16, and 24 most significant bits for a class A, B, and C Internet address, respectively) is always set to 1. The remaining bits in the host field that are set to 1 define the subnet field to be incorporated. The subnetwork address is then obtained by performing the logical AND operation of the Internet address with the selected subnet mask field.

For the subnet addressing to be meaningful, all the servers on this private network must be sysgen'ed with identical subnet masks.

A subnet field consisting of all 0s is to be interpreted as meaning "this subnet", while all 1s means "all subnets". These values are intended for inter-subnet uses (e.g., forwarding through gateways). While Bridge servers perform no special processing in addresses containing these subnet values, they are reserved.

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Example 1:

The subnets of a class A Internet address might be defined as follows:

126.(11110000) (00000000) (00000000)

In this example, the number of subnets defined on this network is 14 and the subnet mask is (11111111) (11110000) (00000000) (00000000), which is the binary equivalent of 255.240.000.000 decimal. The possible subnetwork addresses for this network would then be:

126.16.0.0	126.128.0.0
126.32.0.0	126.144.0.0
126.48.0.0	126.160.0.0
126.64.0.0	126.176.0.0
126.80.0.0	126.192.0.0
126.96.0.0	126.208.0.0
126.112.0.0	126.224.0.0

Example 2:

The subnets of a class B Internet address might be defined as follows:

129.000.(11100000) (00000000)

In this example, the number of subnets is 6 and the subnet mask is (11111111) (11111111) (11100000) (00000000), which is the binary equivalent of 255.255.224.000 decimal. The possible subnetwork addresses for this network would then be:

129.0.32.0	129.0.128.0
129.0.64.0	129.0.160.0
129.0.96.0	129.0.192.0

Example 3:

The subnets of a class C Internet address might be defined as follows:

193.129.130.(11000000)

In this example, the number of subnets is 2 and the subnet mask is (11111111) (11111111) (11111111) (11000000), which is the binary equivalent of 255.255.255.192 decimal. The possible subnetwork addresses for this network would then be:

193.129.130.64	193.129.130.128
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Note that in the three examples above, the numbers in parentheses are in binary format.

DOCUMENTATION

The manuals shipping with CS/1 or LS/1 running SW/1-TCP are listed below:

1. *Series/1 Installation Guide (11/86)*
2. *Connection Service User's Quick Reference Guide (12/85)*
3. *Connection Service User's Guide (8/86)*
4. *Configuration Guide (1/87)*
5. *Network Management Guide (1/87)*
6. *Getting Started Guide (1/87)*

If you have any questions, please contact Bridge Communications, your local Systems Engineer, or Customer Engineer for assistance.

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