APPENDIX A

# Software Recovery

This appendix explains how to re-install LightStream 2020 software onto the hard disk(s) of a LightStream 2020 multiservice ATM switch (LS2020 switch) that has experienced a problem.

**Note** If you are upgrading the software on an operational system, do not use the instructions in this appendix. See the release notes you received with the upgrade.

## Overview

Each LS2020 switch is shipped with all system and application software installed on its hard disk(s). A copy of the software is included on a set of floppy diskettes accompanying the hardware. Installing software from floppies is not part of a routine system installation. It is necessary only when a problem occurs or the installation of new or replacement hardware is necessary. For example, you must install software.

- When the hard disk is blank or its contents are unknown—because you have replaced a failed disk assembly, for example.
- When you are installing a second NP module (NP, NP access card, and disk assembly) in a system that already has an operating NP (See the *LightStream 2020 Installation Guide* for an outline of this task.).
- When a software problem or operator error has corrupted or destroyed files on the hard disk(s).

Each system is shipped with several sets of software diskettes, each set containing one or more diskettes. The diskette sets have three component parts:

- The boot diskette set contains a minimal file system, the Lynx operating system kernel, and a subset of Lynx utilities.
- The system diskette set contains the LynxOS operating system and a larger set of utilities.
- The application diskette set contains LS2020 application software, comprising of executable files, log files, and configuration files.
- The firmware diskette set contains microcode programs that are downloaded to the NP and flash EEPROM images for the NP and line cards.
- The diagnostic diskette set contains standalone diagnostics for LS2020 hardware.

You may also receive

- One or more update diskettes. If present, they contain software released since the last major software revision.

Before installing the software, ensure that the write protection switch on each diskette is set to "protect" or "read only."

## Command Glossary

The following commands are used in the procedures in this appendix:

**‘.** (single open quote, period)—Breaks a terminal connection to an NP and returns the TCS hub prompt.

**reset <slot#>—**TCS command that resets the card in the specified slot.

**connect <slot#>—**TCS command that establishes a connection to the card in the specified slot.

**freshdisk**—Reformats the hard disk, divides it into four partitions, builds file systems, and copies files from the boot diskette to the hard disk.

**reboot -n—**Sends the NP into a boot sequence with instructions to prompt you for information about the device, executable, and options to use for the boot procedure.

**swinstall—**Copies files from software distribution diskettes to the hard disk.

**swchgver—**Activates newly installed application software, reboots the NP, and starts a basic configuration script that prompts you for IP addresses and other information.

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**Note** You are assumed to have already connected a terminal or established a modem connection to the LS2020 switch (as described in the *LightStream 2020 Installation Guide*). A Telnet connection will not work for this purpose.

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# Installing Software on an LS2020 Switch

Follow the procedures in this section to transfer LS2020 software from floppy diskettes to the hard disk(s) in your switch. If your system has two NPs, you must install the software on each NP's hard disk. (It is important for the active and backup NPs in the same node to have the same software.)

During the installation process, the system prompts you for basic configuration information such as the date, IP and Ethernet IP addresses. The information you must enter is described in the *LightStream 2020 Installation Guide*.

The installation takes about 25 minutes per NP.

**Caution** If you are upgrading an operating LS2020 system to a new software release, follow the instructions in the release notes you received with the software. Those instructions will preserve site-specific information on your system, such as configuration files. The procedures in this appendix tell you how to clear the hard disk and perform a full software installation; they are not designed for upgrades.

## Connecting to an NP

To establish a connection to the NP you want to load and reboot it in preparation for loading the software, use these steps:

**Step 1** If your prompt says TCS hub<<A>> or TCS hub<<B>>, or if the system is powered down, skip to Step 2. If your prompt says bash# or single-user$, type **‘.** to get to the TCS hub.

**Step 2** Power up the system or use the **reset <slot#>** command at the TCS hub prompt to reset the NP in a running node. (The NPs reside in slots 1 and 2.) The following example shows that you are resetting the NP in slot 1:

```
TCS hub<<A>> reset 1
```

**Step 3** Quickly use the **connect <slot#>** command to connect to the NP where you want to install the software. This example shows that you are connecting to the NP in slot 1:

```
TCS hub<<A>> connect 1
```

**Step 4** When you connect, the NP may still be running POST. If the following countdown appears on your screen. Press **Return** immediately.

```
System will boot in 5 seconds: hit <RETURN> to interrupt.
System will boot in 4 seconds: hit <RETURN> to interrupt.
System will boot in 3 seconds: hit <RETURN> to interrupt.
System will boot in 2 seconds: hit <RETURN> to interrupt.
System will boot in 1 seconds: hit <RETURN> to interrupt.
```

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**Note** If the system is already booting, type **‘.** to get to the TCS hub again, and then use the reset <slot#> command as described in Step 2. Repeat Step 3 and Step 4.

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**Step 5** Insert the boot diskette into the disk drive of the active NP. (Hold the disk with the label facing up and insert the edge with the metal slider first.)

**Step 6** The following menu appears on the screen:

```
Network Processor bootstrap (version 1.3: Sep 13 1993)
  1-Boot ATM switch application
  2-Begin full installation with boot from floppy disk
  3-List contents of hard disk root directory
  4-List contents of floppy disk root directory
  5-Boot system single-user
  6-Escape to full set of bootstrap options
  7-Extended help
Option>
```

At the Option> prompt, type **2** and press **Return**.

The system takes about 4 minutes to boot, and then displays the single-user$ prompt.

**Caution** Do not remove the boot diskette from the drive until instructed to do so. The NP is now using the boot diskette as its root file system and will not function properly if the diskette is removed before rebooting.

## Reformatting the Disk and Loading the Boot Diskette

Use these steps to reformat the hard disk, run the date and time script, and load the boot diskette:

**Caution** This procedure destroys the contents of the hard disk.

**Step 1** To erase the hard disk and start a script that prompts you for the date and time, use the **freshdisk** command:

```
single-user$ freshdisk
```

**Step 2** The system prompts you to enter time and date information:

```
Starting the Network Processor "/bin/freshdisk" procedure

Step 1: Setting the system date

Set the daylight savings method to one of the following values:
     0 (no daylight savings)
     1 (USA)
     2 (Australia)
     3 (East Europe)
     4 (Central Europe)
     5 (Western Europe)
  Daylight savings method: 1
```

**Note** Indicate the daylight savings method that is followed at your site, regardless of whether daylight savings is actually in effect at the time of installation.

```
Set the timezone by specifying the number of minutes west of Greenwich
  Examples:
     300 (US Eastern Time)
     360 (US Central Time)
     420 (US Mountain Time)
     480 (US Pacific Time)
  Minutes west of Greenwich, England: 300

At the prompt, enter a new date or press <RETURN> to continue.

  The date is set to Tue May 4 16:04:57 EDT 1994
  Enter date (yymmddhhmm[.ss]: 9405041607

At the prompt, enter a new date or press <RETURN> to continue.
  The date is set to Tue May 4 16:07:00 EDT 1994
  Enter date (yymmddhhmm[.ss]: [Return]
```

(The second "Enter date" prompt is for confirmation.)

**Step 3** The system prepares to reformat the hard disk by asking you for confirmation:

```
Step 2: Formatting and partitioning the target disk drive

"/bin/freshdisk" will create new file systems on "/dev/sd0" and then copy to
"/dev/sd0" a minimal set of utilities so that a complete system can be loaded from
a tar-format source. NOTE that any existing data on "/dev/sd0" will be completely
destroyed.

Do you want to continue? Y or N (default is No) Y
```

The system proceeds to reformat the hard disk, divide it into four partitions, build file systems, and copy files from the floppy to the hard disk. The whole process takes about 4 minutes. You see the following on the screen:

```
Starting format and partitioning at Tue May 4 16:07:06 EDT 1994
  Building a file system on /dev/sd0a
  Building a file system on /dev/sd0b
  Building a file system on /dev/sd0c
  Building a file system on /dev/sd0d

Step 3: Making mount points for file systems and mounting them

Step 4: Copying files to the target disk
  Starting file copy at Tue May 4 16:08:51 EDT 1994
  Finished file copy at Tue May 4 16:10:45 EDT 1994

Step 5: Unmount the target file systems
"/bin/freshdisk" finished at Tue May 4 16:10:55 EDT 1994.

To continue installing system and application software, enter "reboot -n" and then
run the "swinstall" utility.
```

**Step 4** At the single-user$ prompt, reboot the NP by entering

```
single-user$ reboot -n
```

**Step 5** The following menu appears on the screen:

```
Network Processor bootstrap (version 1.3: Sep 13 1994)
  1-Boot ATM switch application
  2-Begin full installation with boot from floppy disk
  3-List contents of hard disk root directory
  4-List contents of floppy disk root directory
  5-Boot system single-user
  6-Escape to full set of bootstrap options
  7-Extended help
Option>
```

At the `Option>` prompt, type **`5`** and press **[Return]**.

**Step 6** The system boots from the hard disk in about 10 seconds, and then displays the single-user$ prompt.

**Step 7** If you are using the boot diskette, press the button on the floppy drive to eject it.

Continue to the next section.

## Loading the Software

This section tells you how to install software from floppy diskettes to the hard disk, and what to do afterwards.

**Note** If you are upgrading the software in an operating node, use the installation procedure in the release notes. Do not use the procedure given here.

### NP States

There are three possible states for an NP whose power is on:

- Active—Application software is up and providing network management services for the system; that is, handling network management requests and circuit setup. This state can occur in any system.
- Standby—Application software is up, but only monitors the active NP unless the active NP fails and this standby NP must take over. This state occurs only in a redundant system.
- Inert—Application software is not running or is inactive (disabled). Diagnostics or LynxOS may be running, or the card may be waiting for input at a boot prompt. This state can occur in any system.

The NP on which you perform the loading procedure, described in the next section, must be in the inert state. If you have followed the previous procedures in this appendix, which leave the NP in single-user mode, the NP will be inert. (If there is a second NP in the chassis, it can be in any state.)

### Loading Procedure

This procedure loads the software onto the hard disk, starting with the set of system diskettes.

**Note** The software diskettes must be installed in the correct order. Always insert diskette number 1 first (system disk 1), followed by applications, firmware, and diagnostics. The diskettes in each series are numbered.

**Step 1** Put *System Disk 1* into the floppy disk drive and type

```
single-user$ swinstall
```

The system responds:

```
Insert the first installation diskette and press <RETURN>
```

When you press **Return**, the swinstall script copies the system distribution files onto the hard disk. The script prompts you to insert the remaining system diskettes and displays progress messages. When the single-user$ prompt reappears, you can remove the last system diskette from the drive.

**Step 2** Use the **swinstall** command to install the following software from the remaining diskette sets. You must re-enter the command for each set.

**Step 3** Use the **ln** command to create the following symbolic links:

```
ln -s /usr/app/dist/base-2.1.1/config/mma.communities /usr/app/base-2.1.1/config/mma.communities
ln -s /usr/app/dist/base-2.1.1/config/mma.trap_communities /usr/app/base-2.1.1/config/mma.trap_communities
```

**Step 4** If update diskettes are provided, check for additional installation instructions or release notes provided with updates.

**Step 5** At the prompt, type the **swchgver** command, which activates the newly installed software, copies new images to the flash EEPROMs on the function cards if needed, resets the line cards, and reboots the NP. If there is another NP in this chassis, and it is active (so that the chassis is operational), use the switches **-nolinecardreset** and **-noflashupdate.** The switches prevent the execution of **swchgver** on this inert NP from disrupting the rest of your system.

The commands and their output are as follows:

For the case of a second NP in a system that is operating:

```
single-user$ swchgver -nolinecardreset -noflashupdate

Rebooting the network processor.
```

For the first of two inert NPs being installed or for a system with a single NP:

```
single-user$ swchgver

Forcing reset of line cards.

Checking and downloading files for standby network processor.

Checking and downloading FLASH memory for all function cards.

Rebooting the network processor.
```

---

**Note** **swchgver** usually takes about a minute to run, but may take up to 75 minutes if flash images need to be loaded into all 10 function cards in a fully loaded system. (Flash loading takes about 7.5 minutes per card.) While a flash image is being loaded into a card, the card's yellow FLT LED is lit.

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**Step 6** The bootstrap sequence and basic configuration procedure are described in the *LightStream 2020 Installation Guide*. When you complete basic configuration, return to Step 7 for instructions on how to proceed.

**Step 7** Find the best description of your situation in Table A-1 and proceed as indicated.

**Table A-1 Basic Configuration Scenarios**

| Number of NPs | What You Have Already Done | What to Do Now |
|---|---|---|
| 1 | Installed software and performed basic configuration | Use the LS2020 configurator to download a full configuration to this node. Refer to the *LightStream 2020 Configuration Guide* for instructions on using the configurator. |
| 2, both need software | Installed software and performed basic configuration on the first NP | Return to the procedure "Connecting to an NP" earlier in this appendix. For the second NP, repeat all steps from "Connecting to an NP" to the end of the appendix. |
| 2, both need software | Installed software and performed basic configuration on both NPs | Use the LS2020 configurator to load a full configuration into this node. Refer to the *LightStream 2020 Configuration Guide* for instructions on using the configurator. |
| 2, only one needs software | Installed software and performed basic configuration | Stop here—your installation is complete. |
| 1 upgrading to 2 | Installed software on the second (new) NP and performed basic configuration | Use the LS2020 configurator to add the new NP to the configuration, and then load the updated configuration into this node. Refer to the *LightStream 2020 Configuration Guide* for instructions on using the configurator. |