File	Backup	Restore	Verify	Admin	Setup	Schedule

Backup menu:
- Unscheduled Full Backup
- Backup Single Dir
- Backup Multiple Files
- Expert Backup
- Run Scheduled

RecoverEDGE
Reference Guide

SCO OpenServer 5.0.5 - 5.0.7,
SCO OpenServer 5.0.7v,
Xinuos OpenServer 5 Definitive Series

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RecoverEDGE Bare Metal Recovery (3.02.0x Products) Reference Guide - OSR5 - Revision 03.02.01 Build 7 - updated January 1, 2019.

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1.1 - INTRODUCTION TO RecoverEDGE

The *Recover**EDGE*** **Bare Metal Disaster Recovery System** is designed to allow quick and easy recovery of your supported SCO / Xinuos OpenServer 5.0.x System in the event of a catastrophic failure. Supported operating systems include:

- SCO OpenServer 5 (5.0.5 - 5.0.7)
- SCO OpenServer 5 release 5.0.7V
- Xinuos SCO OpenServer 5 Definitive D2M0 and D2M1.

> **NOTE:** Please note that *Recover**EDGE*** for OpenServer 6, UnixWare 7.1.4 and Linux are described in separate reference guides.

*Recover**EDGE*** can also be used as an efficient method for performing the following system maintenance chores...

- Adding, deleting, or resizing hard disk partitions.
- Adding, deleting, or resizing filesystems.
- Changing swap space allocation.
- Adding hard drive flaws to the bad track table.
- Re-organizing files into contiguous blocks for increased performance and decreased disk head movement (optimization).
- Quickly moving your complete filesystem(s) to a new physical or virtual computer system or to a new hard drive in the event of a hardware failure or an upgrade to new equipment.
- Replacing damaged Masterboot file or boot tracks on a hard disk without loss of data.

*Recover**EDGE*** bypasses the normal tedious process of installing or configuring a system using the standard SCO boot media. This process typically involves...

- Installing a base operating system using the standard SCO distribution media.
- Adding additional hard disks.
- Creating and mounting additional filesystems.
- Installing device drivers for the tape drive and all third party devices.
- Restoring from your last good backup set.

*Recover**EDGE*** reduces this process to...

- Boot from the *RecoverEDGE* ISO image, optical disc (CD, DVD or Blu-Ray Disc™ BD-RE), floppy disks, or from an HP-OBDR™ tape[1].
- Make sure a recent backup is available locally, from over the network, or from the internet.
- Choose "Automatic" from the main menu. Wait for everything to happen.
- Re-boot and resume normal operations.

You may also choose a slightly more involved method, involving...

- Boot from the *RecoverEDGE* ISO image, optical disc (CD, DVD or Blu-Ray Disc™ BD-RE), floppy disks, or from an HP-OBDR™ tape.

1.HP OBDR support is deprecated and not recommended.

- Make sure a recent backup is available locally, from over the network, or from the internet.

- Follow the menu-driven utilities to prepare all hard drives and filesystems.

- Optionally load decryption keys from a separate Decryption Key Backup, if your backups are encrypted by the optional Encryption Module.

- Push a button to mount all filesystems and restore from your *Backup**EDGE*** backups.

- Re-boot and resume normal operations.

Normally, any storage media (*Resource Type*) can be used for the backups from which *Recover**EDGE*** will restore your system. The only exception to this are those media types which store data on the local system, since they are obviously at risk of being damaged in whatever event causes you to need *Recover**EDGE*** in the first place. In particular, FSP resources that do not have an associated AF (i.e., local directory backups) are not supported.

Also, if you are using a NAS, be sure to use FTP via a URL resource or NFS via an FSP/AF combination[1], rather than NFS/CIFS with an FSP/AF combination. CIFS backups will not work with *Recover**EDGE***.

Bare Metal Crecovery from cloud *Resources* such as S3 and AWS are fully supported.

*Recover**EDGE*** works by creating:

- Three (3) or more 3-1/2” floppy diskette filesystems. The first diskette is referred to as the **Boot Diskette** and contains only enough information to boot (start) the system and load the Unix kernel. The second is called the **Filesystem Diskette**. It contains a working filesystem with enough information to completely rebuild your hard disk filesystems (***except decryption keys, if applicable***), either exactly as they were or with modifications you may specify. The third and additional diskette(s) are called the ***Misc Diskette***(s). If you have networking installed and functioning, these diskettes can be used to start TCP/IP and perform a restore from a remote archive device, or allow another system administrator to connect to the system and take over the Bare Metal Recovery process. (For OpenServer 5.0.7 and later, 1.44MB diskettes may be formatted to 1.68MB.)

- A single Bare Metal Recovery CD / DVD / BD-RE, which can be booted in place of the floppy diskettes. Functionally, this is identical to the floppies. In this manual, "CD-Recordable" or “optical media” will be used to mean any of these types unless specifically stated otherwise.

- A Bare Metal Recovery ISO image for optical media, which can be used to create a bootable backup through EDGEMENU or a *Scheduled Job*, in addition to being used in virtual environments.

- An HP-OBDR™ image that can be used by EDGEMENU or a *Scheduled Job* to create a bootable tape backup. This option requires that you have an HP-OBDR-compliant tape drive to boot the tape in the event of a disaster. Any tape drive that uses compatible media may be used to actually make the backup, however.

The *Recover**EDGE*** media contain what is essentially a “snapshot” of all the information needed (***except decryption keys***, if applicable) to rebuild your system when combined with a recent Master Backup, including the current kernel with all of its current device drivers. All media / images should be regenerated any time a significant change is made to your operating system. Such changes include any operation which rebuilds the kernel, and anything which adds, deletes, or modifies hard disks or filesystems.

If you are using floppy diskettes, it is important to make more than one set. Floppies are very easily damaged during storage. If you are using optical media without creating bootable backups, it is likewise a good idea to have more than one copy also.

1.NFS Resources are supported with *Recover**EDGE*** on *Backup**EDGE*** release 03.01.02 build 1 and later.

Be sure that if you are using the optional Encryption Module with *BackupEDGE*, that you also have a good Decryption Key Backup made through EDGEMENU with the keys needed to restore the backup tape. Consult the *BackupEDGE* User's Guide for more information on Decryption Key Backups.

Even a novice can rebuild a crashed hard disk using *RecoverEDGE*, especially in Automatic Recovery Mode. However, users attempting to use this program to make changes in the structure of their filesystems should have a good working knowledge of how the individual Unix programs which perform filesystem manipulation function. For example, those attempting to change the partition table with the SCO `divvy` command or increase a partition size with the SCO `fdisk` command must have a working knowledge of the operation of those programs and understand the consequences of making a mistake.

1.2 - Remote Access To RecoverEDGE

RecoverEDGE has complete remote access functionality. While booted from the boot media, the local user has the ability to enable inbound telnet support or serial modem support. A remote administrator can then connect into the system, reconfigure, and begin a restore. The remote user has complete disconnect / reconnect ability to maximize restore speeds and minimize potential connect fees or long distance charges.

1.3 - Theory of Operation

RecoverEDGE operates by emulating and enhancing the functionality of the SCO/Xinuos boot / installation media for preparing the hard disk drive(s) for receiving data. *RecoverEDGE* then mounts all appropriate filesystems, restores your last *BackupEDGE* **Master Backup** (and optionally last **Differential** and/or **Incremental Backups** if you have them) and then unmounts the filesystems again. Re-boot from the hard disk drive and you are back up and running. This procedure normally takes just a few minutes to prepare the hard drives, plus the time it took to create your actual backup(s).

Assuming you have a correct and up-to-date ***Boot Diskette*** and ***Filesystem Diskette*** or other recovery media, here is an outline of the basic procedure for recovering from a simple failure...

1 Boot the system from the *RecoverEDGE* **Boot Diskette**, optical media, or bootable tape. (To use an OBDR tape, you must generally switch the power to the tape drive ON while holding the eject button. The front panel lights will blink in some repeating pattern, and you may then insert the tape.)

2 Insert the *RecoverEDGE* **Filesystem Diskette** and **Misc Diskette(s)** if prompted.

RecoverEDGE **MAIN MENU PROGRAM**

```
 Configure   Restore  Utilities  Automatic  Monochrome  About  Network  Quit
Configure / Reconfigure Hard Disk(s)

  Drive Type &   CAP.   DKINIT    BADTRK OR              FDISK
  Host Adapter   (Mb)  or DPARAM  SCSIBADBLK    FDISK   PART.(Mb)      DIVVY

   0 SCSI lsil  0      ========   Not Done    Not Done   1 0        Not Done
   1 SCSI lsil  0      ========   Not Done    Not Done   1 0        Not Done
















 F1: HELP     F2: QUIT                                             TCP NET ---

 RecoverEDGE Data Recovery System 03.01.05  (c) 1993-2011 MICROLITE CORPORATION
```

3 If the backup device is located on a remote system or otherwise requires it, select *Network -> Network Support -> Init Network Tape* and insert the *Misc Diskette* (if prompted) to start TCP/IP.

4 From the MAIN PROGRAM MENU, select **Utilities Archive Archive Device *Test Drive*** to verify the integrity of your backup media.

5 Select *Configure* to prepare each existing hard drive.

6 Select *Restore* and restore your *BackupEDGE* backup media. You may be prompted to load decryption keys if you attempt to restore from an encrypted backup. These keys must be obtained from a Decryption Key Backup made via *EDGEMENU*.

7 Select *Quit* to exit from *RecoverEDGE*, which will automatically shut down Unix.

8 Power down, remove any *Boot Media* you were using, power up again and away you go.

Configure prompts the user for a drive to configure (if more than one drive exists), then performs disk preparation steps either sequentially or individually at the direction of the user.

```
 All   Write Boot File(s)  Badtrk  FDisk  Divvy  Previous
```

- *All* Performs each of the following steps sequentially. Otherwise they may be selected individually.

- *Write Boot File(s)* (drive 0 only) allows the user to write a master boot block and boot files to the hard drive, plus stamp the hard drive geometry information.

- *DParam* (displayed only if necessary) allows the user to run a dparam/dkinit utility to set fixed disk parameters.

- *Badtrk* (or *SCSIbadblk* on appropriate systems) allows the user to test the hard drive and map bad blocks if necessary. Should not be used on SCSI/SAS or virtual disk drives.

- *FDisk* runs SCO `fdisk` to place or modify operating system partitions on the hard disk drive. This option may be skipped if the drive is already partitioned correctly.

- **Divvy** runs the SCO `divvy` program, in install or view / update mode, to install or update filesystem partitions. This option may be skipped if the filesystems are already partitioned correctly.

```
 Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit
```

Restore asks the user whether a root file system or a full restore is to be performed. *RecoverEDGE* then mounts the appropriate filesystems, begins a *BackupEDGE* restore, unmounts the filesystems, and returns to the main menu.

A power off reboot is done at this point, to ensure that all adapters are reset. Voila! Back in business.

2 - Making *RecoverEDGE* Media / Images

2.1 - Special Notes

Optical Media and / or ISO images are the preferred method of creating/storing *RecoverEDGE* boot media. Floppy diskette and bootable tape images are supported but tend to be less reliable and slower to boot.

As a legacy operating system, the boot system in OpenServer 5 doesn't technically boot from Optical Media or Bootable Tapes. Optical Media and Tape actually boot by PRETENDING TO BE a floppy diskette drive using a method called **El Torito Floppy Emulation**. This means that the space available for larger kernels is actually limited to the space available on a single 1.44MB floppy drive.

2.2 - Media / Image Generation Summary

As soon as possible after installing and configuring *BackupEDGE*, you should:

• Make your first set of *RecoverEDGE* media (either directly from *RecoverEDGE* **or** using **EDGEMENU** to create a bootable backup from a *RecoverEDGE* **image)**.

• Print a *RecoverEDGE* **Hard Disk Status Report**.

• If you are using the optional Encryption Module, then you must keep a valid Decryption Key Backup available for recovery as well. Consult the *BackupEDGE* User's Guide for more information on this. Decryption keys are not stored on the *RecoverEDGE* media!

All media / images and the report should be regenerated any time you make a change in your system structure related to the addition or deletion of hard drives, tape drives, and filesystems.

To generate or regenerate a set of *RecoverEDGE* media and create a report...

• Make sure the system is in multi-user mode.

• Log in as *root*.

• Ensure that all filesystems (including NFS mounts, RAMDISKS, and CDROMS) that are typically mounted when backups are performed are currently mounted.

• Type **/usr/bin/edgemenu [Enter]** to start the *BackupEDGE* menu[1]. Select **Setup ->Make RecoverEDGE Media** to run the *RecoverEDGE* media creation program.

• *RecoverEDGE* will examine your system, detect the primary floppy drive type, pre-set some default media creation values, and display popup menu similar to this:

```
┌─What Kind of Recovery Media/Image (F2 to Exit)?─┐
│(Keep Current Settings)                          │
│ 3.5" 1.44MB Floppy Diskette                     │
│ 3.5" 1.68MB Floppy Diskette                     │
│ Boot Media on optical0                          │
│ Image Only for optical0 Bootable Backups        │
│ Bootable Backup Tape Image                      │
└─────────────────────────────────────────────────┘
```

• This example shows floppy, optical, bootable tape options. These will depend on the hardware defined. You may select whether you want to make Floppy Diskettes, Optical Media or an ISO Images or media, or a bootable tape image as appropriate. Under OpenServer 5.0.7, there may be an additional option for 1.68MB floppy diskettes.

1.You may also run *RecoverEDGE* directly from the command line by typing /etc/re2 or "mkdev re2" at the root prompt.

2.3 - Menu: RecoverEDGE Main

RecoverEDGE Media Creation Menu

```
 Generate    Reports    Configure    View    Monochrome    About    Quit
Generate Network-Enabled CD-ROM




















 Configuration For System: def5v      Operating System:    SCO OpenServer 5
 Create Boot Image:        Yes        Format Diskettes:    N/A
 Create Filesys Image:     Yes        Verify Diskettes:    N/A
 Create Misc Image:        Yes        Boot CD-ROM From:    optical0
 BTLD Support Enabled:     Yes        Create CD-ROM On:    optical0

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```

- If the information at the bottom of the screen appears correct, you may simply select **Generate** and follow the prompts to create *RecoverEDGE* CD (in this case). This process is automatic.

- If you want to create different Bare Metal Recovery media, but did not select the correct option when when *RecoverEDGE* started, please **Quit** and restart *RecoverEDGE*, or refer to "Menu: Configure" on page 16 for information on how to configure *RecoverEDGE* **to do this.**

- Select **Reports** then **Print** to print a **Hard Disk Status Report**.

- When finished, select **Quit** to exit *RecoverEDGE*.

Note that by default, *RecoverEDGE* will enable network support on the **Misc Diskette(s)** to support remote devices and Remote Recovery, if it detects network support on your system and you are using floppy diskettes. If you wish to disable this, use the **Configure Menu**.

> **NOTE:** If you are using the optional Encryption Module to create encrypted backups, then you ***must be sure to have the decryption keys available during a recovery***. *These keys are not stored on the RecoverEDGE media for security purposes.* Unless you have a Decryption Key Backup available, then you will have to skip encrypted files during the restore! A Decryption Key Backup can be made via **EDGEMENU** => Setup. Consult the *BackupEDGE* User's Guide for more information.

If you are given the option to use 1.68MB floppy diskettes in addition to 1.44MB ones, you should be aware of the following:

- 1.68MB floppy diskettes are generally slower than 1.44MB floppy diskettes.

- Really old diskette drives may not support 1.68MB floppy diskettes; some might even be damaged by repeated attempts to use them. Modern floppy drives do support them, however.

- 1.68MB floppy diskettes are created from 1.44MB floppy diskettes by formatting them differently. You do not have to have special 1.68MB diskettes in order to use this.

- This feature is not available on all OpenServer platforms.

- Generally, you should use 1.44MB floppy diskettes over 1.68MB floppy diskettes if possible for improved compatibility and reliability.

Other menu options are available to display additional system information and create custom Bare Metal Recovery configurations.

The options available from the *RecoverEDGE* Media Creation Menu are as follows

2.4 - Menu: Generate

```
 Generate    Reports    Configure    View    Monochrome    About    Quit
```

Selecting **Generate** with the Optical Media or Image Only options creates *RecoverEDGE* bootable ISO image, then (if Optical Media is chosen and the optical drive can write on the inserted media) burns the media. You'll see menus similar to the following.

```
                        Filesystem Image Creation

        Format Diskette                    Verify Diskette

     * Generate Device Node List        * Generate Filesystem List

     * Make Image Filesystem            * Mount Image Filesystem

     * Make Directories On Image        * Copy EDGE-Specific Files

     * Copy Device Nodes To Image       * Copy Miscellaneous Files

     * Copy Start-Up Files              * Copy Default Tape Info
```

There is only one Piece of optical media required.

If making floppy diskettes, you'll be prompted, in order to insert and label diskettes as follows...

- **Boot Diskette**
- **Filesystem Diskette**
- **Misc Diskette 1**

and optionally,

- **Misc Diskette 2**

Label and insert as required.

2.5 - Media Images

Media images are stored in `/usr/lib/edge/recover2/images`. The optical image is called `cdrom.iso`. It can be copied elsewhere for burning (in the event the optical drive on the server is read-only), or for use as a bootable image in a virtual server or virtual console environment. f you are making images only, no media is required.

2.6 - Menu: Reports

```
 Generate    Reports    Configure    View    Monochrome    About    Quit
```

Selecting **Reports** allows the user to display and/or print a comprehensive *RecoverEDGE* **Hard Disk Status Report** showing the configuration of each hard disk drive and host adapter

Every time *RecoverEDGE* is started, this report is generated and stored in memory. It may be printed, viewed on-screen, or saved in a user-specified disk file by selecting the appropriate option as displayed above. If a ***Filesystem Diskette*** or any other Bare Metal Recovery media type is generated, this report is automatically saved as **/etc/RE2.REPORT** on both the diskette and the root hard drive.

```
 Print    View    Save    Previous
```

When ***Print*** is selected, the user is prompted for a print spooler string. The default is either "**lp -s**" or whatever has been user specified on the ***Configure*** menu.

When ***View*** is selected, the user can view the report on screen, using the arrow keys to scroll.

When ***Save*** is specified, the user is prompted for a filename in which to write the report.

Whenever media / images are generated, a copy should ALWAYS be printed and kept with the media for reference. A sample page from this report is shown here for reference[1]:

```
Microlite Corporation                    RecoverEDGE HARD DISK STATUS REPORT
_____

REPORT FOR  :  SCO UNIX Release 3.2v5.0.7                          Page:  1
               System Name: def5v   Serial: = 5PLUSTMP0

REPORT DATE :  Mon Feb  8 17:07:27 EST 2016
DEVICE NAME :  /dev/rdsk/0s0   (Primary Hard Drive - Type = SCSI)
DRIVE NUMBER:  0     PARTITION NUMBER:  1

HOST ADAPTER:  lsil   Unknown Adapter Type

  STORAGE CAPACITY   (1MB = 1048576 bytes)
    Megabytes(MB): 70143   Kilobytes(KB): 71826615   Bytes: 73550453760

  PHYSICAL LAYOUT [ /bin/dparam /dev/rdsk/0s0 ]
    Cylinders  :   8942       Heads           :     255
    Write Reduce:             Write Precomp   :
    Ecc        :              Control         :
    Landing Zone:             Sectors Per Track:     63

  PARTITION LAYOUT   (1 Track = 31KB) [ /etc/fdisk -f /dev/rdsk/0s0 ]
    ----- Partition ------     Track     Track     Track
    Num     Type     Status    Start      End      Size
    ___  _____  _____  _____   _____   _____

     1   UNIX      Active          4   2279177   2279174

  FILE SYSTEM LAYOUT   (1 Block = 1KB) [ /etc/divvy /dev/rdsk/0s0 ]
    Name             Type       #  First Block  Last Block  |       Size
    _____  _____  _  _____  _____  |  _____
                                                            |
    boot          EAFS          0            0       30719  |      30720
    swap          NON FS        1        30720      555007  |     524288
    root          HTFS          2       555008    23417636  |   22862629
    u             HTFS          3     23417640    44594536  |   21176897
    docs          HTFS          4     44594540    70795235  |   26200696
    apps          HTFS          5     70795243    71762714  |     967472
    recover       NON FS        6     71762722    71762754  |         33
    re0a          WHOLE DISK    7            0    71793980  |   71793981

  MOUNTED FILESYSTEMS
    Mount Directory              Filesystem              Size (MB)
    _____          _____     _____
    /                            /dev/root                   22326
    /stand                       /dev/boot                      30
    /u                           /dev/u                      20680
    /docs                        /dev/common                 25586
    /apps                        /dev/web                      944
```
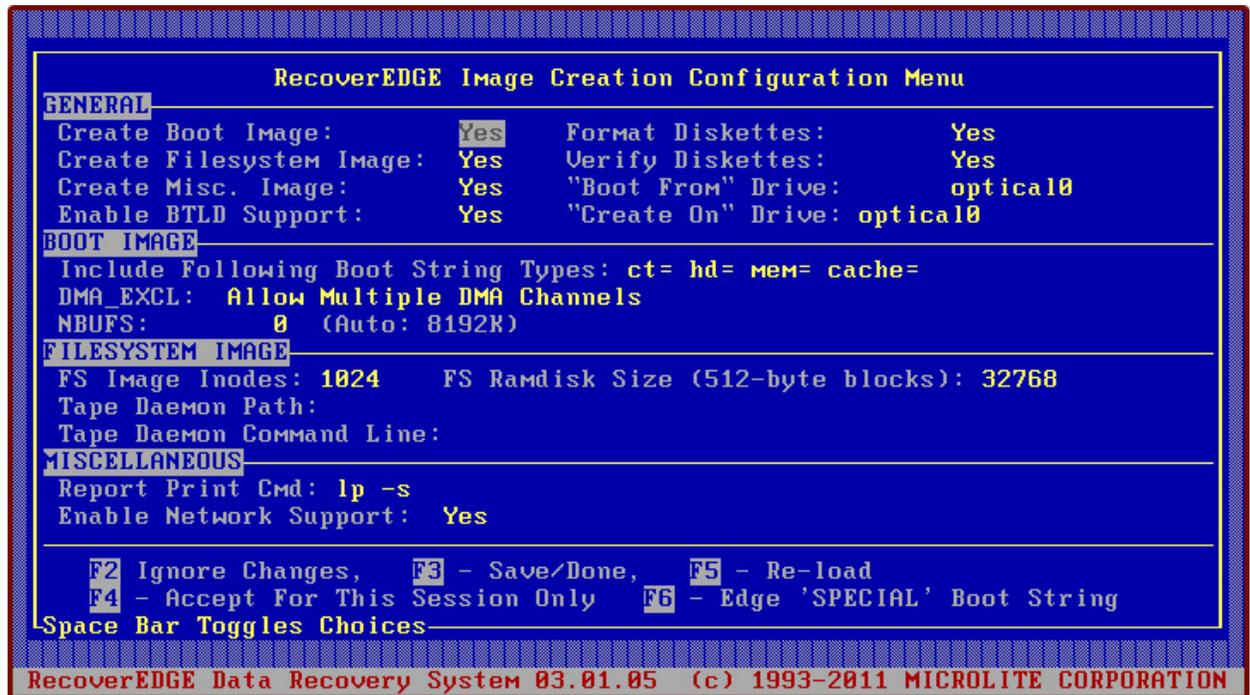
---

1. A second page containing a bad track table will be displayed/printed for each hard drive with a non-blank bad track table.

2.7 - Menu: Configure

Generate	Reports	Configure	View	Monochrome	About	Quit

Selecting **Configure** from the main menu displays the following:

```
         RecoverEDGE Image Creation Configuration Menu
GENERAL
  Create Boot Image:          Yes      Format Diskettes:        Yes
  Create Filesystem Image:    Yes      Verify Diskettes:        Yes
  Create Misc. Image:         Yes      "Boot From" Drive:       optical0
  Enable BTLD Support:        Yes      "Create On" Drive: optical0
BOOT IMAGE
  Include Following Boot String Types: ct= hd= mem= cache=
  DMA_EXCL:   Allow Multiple DMA Channels
  NBUFS:          0   (Auto: 8192K)
FILESYSTEM IMAGE
  FS Image Inodes: 1024     FS Ramdisk Size (512-byte blocks): 32768
  Tape Daemon Path:
  Tape Daemon Command Line:
MISCELLANEOUS
  Report Print Cmd: lp -s
  Enable Network Support:  Yes

    F2 Ignore Changes,    F3 - Save/Done,    F5 - Re-load
    F4 - Accept For This Session Only   F6 - Edge 'SPECIAL' Boot String
Space Bar Toggles Choices
RecoverEDGE Data Recovery System 03.01.05   (c) 1993-2011 MICROLITE CORPORATION
```

To make changes on this screen, use the arrows to place the cursor on the desired field. You may change the data in the field by following the instructions listed at the lower left corner of the display.

- **Space Bar Toggles Choices**
  Pressing the space bar cycles through all possible values for the field (usually **YES** or **NO**).

- **Press Any Key For Choices**
  Pressing any key (except **[Enter]**, a function key, or an arrow key) will display a pop-up list of all available choices. The space bar is the recommended key. Position the cursor over the appropriate choice and press **[Enter]**.

- **Enter [Description of Required Entry Shown]**
  Type the required information and press **[Enter]**.

GENERAL Section

The **GENERAL** section of the screen determines the actions to be taken by the **Generate** menu. For example, the type of recovery media to be used, which diskettes are to be made, whether or not to format and/or verify the diskettes, and which diskette drive to use are all selected here.

- **Create Boot Image**
  Determines whether or not a **Boot Diskette** will be created by **Generate**. For Bare Metal Recovery with optical media or bootable tapes, this option should always be YES.

- **Create Filesystem Image**
  Determines whether or not a **Filesystem Diskette** will be created by **Generate**. For Bare Metal Recovery with optical media or bootable tapes, this option should always be YES.

- **`Create Misc Image`**
  Determines whether or not a ***Misc Diskette*** will be created by ***Generate***. Unlike previous versions of *RecoverEDGE*, this should always be set to `YES`.

- **`Enable BTLD Support`**
  Determines whether or not the recovery media / images being generated should support host bus adapter (HBA) changes by enabling **Boot Time Loadable Device Drivers** (**BTLDs**). Disabling this option can make extra space available on the boot media. If you need this option, Bare Metal Recovery may only be perfomed to a server with the same HBA type as the original.

- **`Format Diskettes`**
  Determines whether or not (if diskette media is selected) the diskettes being generated should be formatted first. This option has no effect for other types of media. Note that even with this option disabled, *RecoverEDGE* will attempt to verify that the floppy diskette is actually the correct format. If it is not, you will be prompted for format it anyway.

- **`Verify Diskettes`**
  Determines whether or not (if diskette media is selected) the diskettes being generated should be verified first.

- This option has no effect for other types of media.

> **NOTE:** It is highly recommended that diskettes should be formatted and verified each time they are generated. This is the best possible test of the functionality of the disk drive and the integrity of the diskette media.

- **`"Boot From" Drive`**
  Determines the type of Bare Metal Recovery media to be created, and which floppy drive or optical drive will be used to boot the Bare Metal Recovery media. Bootable Tape may also be selected to make OBDR images.

> **NOTE:** For floppy diskettes, this also selects the device which will be used to generate the diskettes. Only diskette drives recognized by the system during boot are selectable.

- For other media types, this has no effect on where the media will be made. This only selects where the Bare Metal Recovery media will be **booted during recovery**. For example, if your only CD burner is on a remote system, you could still use CD-Recordables for Bare Metal Recovery of the local system, simply by selecting the local CD-ROM as the Boot From Drive, and later doing a bootable CD-Recordable backup to the remote burner. In this case, you would leave the Create On Drive (see below) blank in order to create images only.

  If *RecoverEDGE* offered a choice of media / image types on startup, it will fill in this field according to your selection.

- `"Create On" Drive`
  For optical media, this field selects what if any device will be used by *RecoverEDGE* to create the Bare Metal Recovery media.

  If this field is left blank, only Bare Metal Recovery images will be created. Images are used to make bootable backups through EDGEMENU or a Scheduled Job.

  For HP-OBDR, *RecoverEDGE* **cannot actually write a tape; you MUST use EDGE-MENU or a Scheduled Job to do so.**

  This field does **NOT** select the type of media; it only select where (and if) *RecoverEDGE* will create the media. The `"Boot From" Drive` (see above) controls both the type of media and where that media will be booted from. Remember: where Bare Metal Recovery media or a bootable backup is created does not have to be related to where it is eventually booted from.

If *RecoverEDGE* offered a choice of media / image types on startup, it will fill in this field according to your selection.

BOOT IMAGE Section

The `BOOT IMAGE` section allows customization of parameters important to the Unix kernel or to the ***Bare Metal Recovery media***.

- **`Include Following Boot String Types`**
  The file **`/etc/default/boot`** may be modified on some systems to force certain actions at boot time. Examples include setting specific cartridge tape driver parameters, loading specific host adapter information, and forcing the kernel to load into a specific section of memory. By default, any parameter in the `DEFBOOTSTR` line of **`/etc/default/boot`** on the host system starting with `ct=`, `hd=`, `mem=`, or `cache=` will be copied to the default boot string on the ***media***. Other entries may be placed in this line as appropriate.

- **`DMA_EXCL`**
  Some very old server motherboards had problems when more than one DMA channel was active at a time. This field can be modified to create a boot kernel that only uses one active DMA channel. Try setting this field to `Use Single Channel DMA Only` if you encounter tape read problems while booted from the *RecoverEDGE* media.

- **`NBUFS`**
  Number of memory buffers configured for the kernel when booted from the Bare Metal Recovery media. `0` means configure for the memory amount shown to the right as the default. This number may be set to any number larger than `100` and less than memory. Useful numbers range from `128` on small (systems with less than 20MB of RAM) to around half of memory, depending upon how the kernel is configured. Lower numbers may result in slower recovery times.

FILESYSTEM IMAGE Section

The `FILESYSTEM IMAGE` section allows customization of parameters important to the ***Filesystem Diskette***, or any of the other media types.

- **`FS Image Inodes`**
  Increases or decreases the number of inodes allocated on the ***Filesystem Diskette*** or its equivalent under other media tytpes (and RAMDISK on appropriate systems). Combined with intelligent stripping of the device directory during copy to the ***Filesystem Diskette***, this feature allows the RAMDISK to be created even on highly complex systems with many device drivers and nodes.

- **`FS Ramdisk Size (512 Byte Blocks)`**
  This option lets you select the number of 512-byte blocks used for the boot RAMDISK, which holds the booted kernel and utilities. Normally, you do not need to change this parameter.

- **`Tape Daemon Path`**
  If the tape drive used requires a specific start-up program, this field is used to specify the path on the hard drive.

- **`Tape Daemon Command Line`**
  If `Tape Daemon Path` above is specified, the command specified here will be used to start the tape daemon when the ***Filesystem Diskette*** is started.

MISCELLANEOUS Section

- **`Report Print Command`**
  Used to pre-configure any special spool command used to print the *RecoverEDGE Hard*

Disk Status Report. Default is "`lp -s`". If not specified and saved here, the spool command may still be changed at print time from the ***Reports*** -> ***Print*** menu.

- **Enable Network Support**
  This field controls whether or not support for network archive devices and network recovery are included on the boot media. This field will not be selectable if TCP/IP is not currently running, or if network restore is not supported on your operating system release. For Bare Metal Recovery from optical media or bootable tapes, this option enables or disables network support, but does not actually require additional media.

2.8 - Menu: View

Generate	Reports	Configure	View	Monochrome	About	Quit

Selecting ***View*** from the main menu displays of summary of the hard disk configuration information as detected when the program started.

```
                          System Information

 Drive  Host   Drive  Drive  Part   Mount        Device            Type Of
 No.    Adapt  Type   Part.  Cap.   Point        Node              Filesystem

   0    lsil   SCSI    1     15838  /            /dev/root          HTFS
   1    lsil   SCSI    1     36862  /u           /dev/u             HTFS
   0    lsil   SCSI    1       30   /stand       /dev/boot          EAFS




 ESC  - Return To Main Menu
 F4   - Save Configuration For This Session     F5   - ReScan System
```

This information may be compared to the system managers' knowledge of the configuration of this system. If discrepancies are noted, please contact Microlite technical support. Simply press **[Esc]** to return to the MAIN MENU.

2.9 - Menu: Monochrome

Generate	Reports	Configure	View	Monochrome	About	Quit

Selecting ***Monochrome*** switches from a color to a black and white display, which may be more readable with some video cards and boot terminals. (If in Monochrome mode, the menu displays a Color entry here to allow switching back to color mode.

2.10 - Menu: About

| Generate | Reports | Configure | View | Monochrome | About | Quit |

Selecting *About* displays version numbers, release dates and expiration dates which may be useful when requesting technical support. Copyright and registration information is also displayed on this screen.

2.11 - Menu: Quit

| Generate | Reports | Configure | View | Monochrome | About | Quit |

Selecting *Quit* terminates the application and returns to either a `root` prompt or the **EDGEMENU** program as appropriate.

2.12 - Write Protecting Your RecoverEDGE Media

Your *Boot Diskette* is read by the diskette drive during a recovery operation, but is never written to. After creation, it may be write protected to protect it from accidental damage.

Your *Filesystem Diskette* actually copies all of its files to a RAMDISK. This diskette may also be write protected.

Your *Misc Diskette(s)* are read-only and may be write protected.

You may similarly write-protect a DVD-RAM if you like.

2.13 - Potential Error Messages

The `re2` program performs a variety of tests before displaying the first menu. The tests ensure that the boot disks will be made properly. `re2`...

- Checks the operating system type and version.
- Ensures that a default archive device has been specified for use during attended backups through **EDGEMENU**.
- Checks to see that all required *RecoverEDGE* programs exist on the hard disk.
- Checks to make sure that all operating system programs used to make the *RecoverEDGE* media are available.
- Checks to make sure that all operating system programs that must be placed on the *RecoverEDGE* media / images are available.
- Checks to see how many floppy disk drives are installed, and which is the primary.
- Checks to see if TCP/IP is running.
- Determines which copy of the kernel will be used on the *Boot Diskette* or other boot media, if an alternate kernel is defined. Otherwise checks to see if the current kernel can be shrunk or compressed to fit on a *Boot Diskette*.

If any errors are encountered during the above phases, `re2` will display an error message indicating the problem found and the course of action required to correct the problem, then terminate.

2.14 - If RecoverEDGE Fails or Hangs

The `re2` program relies upon many SCO operating system commands to make Bare Metal Recovery media, including:

```
badtrk cat chmod copy cp date dd df divvy dparam find grep hwconfig ln
ls mkdir mkfs mknod mv rm scsibadblk sort uname
```

Ensure that no third party product has changed or renamed any of these programs. Otherwise, **re2** may terminate or appear to hang up, or you may end up with boot disks which are not functional.

> **NOTE:** The **SCO Virtual Disk Manager**, third party striping/mirroring software, and non-standard device drivers may also cause problems. See "Compatibility Issues / Limitations" on page 52 for some known compatibility problems.

2.15 - Handling Very Large Kernels

The following discussion applies only to floppy diskettes, since the other media types do not have size constraints that you are likely to encounter.

The principal problem in making a Bare Metal Recovery diskettes is that the boot program and the kernel program (**/unix**) must fit onto the size of a single diskette, even when optical media or bootable tape are used. The kernel can grow to be very large, especially in OpenServer 5 environments where many device drivers have been added. *RecoverEDGE* intelligently determines the largest possible kernel that will fit on the **Boot Diskette** by examining the diskette type, kernel size, and the size of the **/boot** program.

- On SCO OpenServer 5 systems, *RecoverEDGE* can compress the kernel, resulting in a 50%-60% smaller kernel (on average). The original kernel (**/unix**) is not changed; only the copy for the boot diskette is modified.

- On SCO OpenServer 5 systems, BTLD support requires additional space on the **Boot Diskette**. This may cause the kernel not too fit. If this occurs, turn off BTLD support in the **Configure** menu and try again.

- OpenServer 5.0.7 supports 1.68MB floppy diskettes, switching to them may provide enough additional space. You may select these in the initial device selection popup window when *RecoverEDGE* starts, or from the `Configure` screen.

If your kernel is too large too fit on the diskette, **re2** will terminate with an error message.

SPECIAL BOOT KERNEL

The last workaround for this problem is to make a special kernel that contains all of the hard disk and tape (etc.) device drivers necessary to rebuild your system, but is still small enough to fit on a diskette. Alternatively, you can switch to optical media or bootable tape media if you have the appropriate hardware to create and boot from it. Remember that an optical media image may be written by any writable optical drive. It is **not** necessary to have one in the system on which it will boot. It is necessary, of course, to have a physical or virtual bootable optical drive.

When **re2** runs, it looks for a file called **/kernel.edge**. If this file exists it is assumed that this is the file that will be used when new **Boot Media** is generated. It will be copied onto the diskette as **/unix**.

> **NOTE:** If **/kernel.edge** exists, no attempt will be made to shrink or compress the **/unix** kernel. The **/kernel.edge** program will always be used.

Here is one way to make a functional but smaller **/kernel.edge** file.

SHRINKING THE KERNEL BY REMOVING DRIVERS.

- Make sure you have a good system backup, and that all hard disk drives and filesystems you will be using are configured, prepared, and mounted.

- Use SCO CUSTOM to remove enough kernel level products (such as intelligent terminal adapter drivers, network drivers, database servers, etc.) and relink the kernel.

- Ensure that the resulting `/stand/unix` or program is smaller than the size listed in the previous table. (On Unix systems it may be up to 16%-20% larger since *RecoverEDGE* will shrink it.)

- Copy the program to `/kernel.edge` (not `/stand/kernel.edge)`.

- Re-install any of the products you previously removed, re-link the kernel, and re-boot.

Now, when you run *RecoverEDGE*, the `/kernel.edge` program will be copied and used as the boot kernel.

2.16 - Testing Your New RecoverEDGE Media

It is **IMPORTANT** to test the functionality of your *RecoverEDGE* media **BEFORE** you get into a situation where you may need them. If for some reason they do not function, you will have an opportunity to talk to either your dealer or a Microlite customer support representative to attempt to resolve the problem.

To check out the media...

- Shut down your operating system at a convenient time.

- Boot from the **media or images** you've created to reach the MAIN PROGRAM MENU.

- If you wish to test BTLD support, use the procedure described in "RecoverEDGE BTLD Support" on page 46 to test the installation of a Boot Time Loadable Device Driver.

- If you will be using network support or TCP/IP remote recovery, select *Network* from the MAIN PROGRAM MENU to load it and start TCP/IP.

- If you wish to use network remote recovery in the future, be sure to enable remote network recovery and try to telnet into the system from a remote system to make sure that this feature is functioning correctly.

- If you wish to use modem remote recovery in the future, connect a modem to port `tty1A` or `tty2A`, configure and enable modem remote recovery, and dial in to the system to make sure that this feature is functioning correctly.

- If you are using encrypted backups from the optional Encryption Module, then you must make sure that you have a valid Decryption Key Backup. *Decryption keys are not stored on the RecoverEDGE media*! You should test loading them via the **Utilities => Load Keys** option.

- Select *Test Drive* from the **Utilities => Archive Device** menu to verify at least one *BackupEDGE* **Master Backup**[1].

- Select *Quit* to exit and shutdown the *RecoverEDGE* filesystem.

- Power off, remove any boot media or images, and re-boot from the hard drive.

The *RecoverEDGE* media do not change or delete any of the data on the hard disk during this procedure, so there is no need to be squeamish about performing this test.

See "Verifying Operation & Integrity of Backups" in the *BackupEDGE* Operations Guide for a more complete description of the verify procedure.

1.You should write protect the tape to protect it from potential damage.

3 - *RecoverEDGE* Bare Metal Recovery

The key to recovering quickly from a disaster is having an effective backup management policy. If you have good, reliable backups, then *RecoverEDGE* will minimize your down time. To begin the recovery process you need...

- Your last good *BackupEDGE* **Master Backup**.

- Your last *BackupEDGE* **Differential Backup(s) and/or Incremental Backup(s)** (if applicable).

- Your *RecoverEDGE* **Boot Media** or **Bootable Backup**.

- A valid BTLD diskette (only if switching host adapters).

- A copy of your *RecoverEDGE* **Hard Disk Status Report** if available (optional).

- Your Decryption Key Backups, if you are using encrypted backups made with the optional *BackupEDGE* Encryption Module.

- This manual.

It is a good idea to do an archive verification while booted from the *RecoverEDGE* media before performing any procedure which will knowingly erase hard disk data. This allows you to be sure your backup is readable.

3.1 - The Recovery Process

There are really only two steps to performing a system recovery.

- Prepare the hard drive or drives to accept data (partition, create filesystems, install boot tracks).

- Restore the last good copy of the data.

RecoverEDGE greatly simplifies the preparation phase so that *BackupEDGE* can be used for the restoration phase. *RecoverEDGE* can automatically put a hard disk back "just like it was", or it can use the same utilities to prepare hard drives that an operating system installation uses. It executes them in a logical, menu driven fashion. In order, the utilities are...

dparam   sets up the drive parameter tables (heads, cylinders, sectors, etc.). This command is usually run via a menu interface called DKINIT. *RecoverEDGE* uses an equivalent menu.

fdisk   creates / manages operating system partitions. A single hard disk may be divided into up to four separate partitions for MSDOS, OS/2, Unix, Xenix, etc. FDISK is used by *RecoverEDGE*. It can be used to activate and delete any operating system partition, and also to create a Unix partition.

badtrk   creates / manages the bad track, or flawed disk sector, table for the active Unix partition.

scsibadblk   used instead of *badtrk* on systems where appropriate.

divvy   creates / manages the individual filesystems in the active Unix partition.

When these programs have been completed for each hard drive on a system, the data can be restored and the system placed back into service. The DPARAM program does not need to be run when using certain hard disk drives and controllers, and *RecoverEDGE* knows when it is needed and when it is not.

A reasonable working knowledge of the OpenServer operating system installation process is very helpful during a *RecoverEDGE* recovery if the "Automatic" option is not chosen.

3.2 - Booting From The RecoverEDGE Media

With the computer turned off, insert the Boot Diskette, optical media, ISO image, or bootable tape. If you have more than one drive, use the primary drive.

If you are using bootable tape, you will need to apply power to the tape drive with (typically) the eject button depressed. You may release the eject button and insert the tape when the drive begins blinking the front panel lights in repeating sequence. If the tape drive is internal, you will probably have to turn on the computer system with the eject button held down.

NOTE: Be sure to eject the OBDR tape after it is written before trying to boot from it for the first time! Otherwise, it may not be properly recognized.

Turn on your computer system.

The computer will go through a Power On Self Test (POST), load the Unix bootstrap program from the floppy diskette[1] or other media, and display the following...

```
SCO System V
Boot:
```

Standard Boot

Press **[Enter]** at this point to boot from the media or ISO image. The operating system kernel program will load.

If you are booting from floppies, the floppy disk light will go out, and the following message will be displayed...

```
Please Insert Your RecoverEDGE Filesystem Diskette And Press [Enter]
```

When you do as instructed, the operating system will start up, you will see the standard operating system copyright notices and available device information followed by:

```
Press ENTER To Start RecoverEDGE
```

When you do as instructed, the operating system will start up, you will see the standard operating system copyright notices and available device information followed by:

```
Please Insert Your RecoverEDGE Misc Diskette And Press [Enter]
```

Do as instructed to load the rest of the utilities and start the *RecoverEDGE Main Menu Program*.

If you are booting from optical media, ISO image or OBDR tape, you may be prompted to press **ENTER** again but should not have to switch media.

Network Recovery Boot

If you wish to start networking directly, type **network [Enter]** at the Boot: prompt.

If booting from floppies, The operating system kernel program will load, the floppy disk light will go out, and the following message will be displayed...

```
Please Insert Your RecoverEDGE Filesystem Diskette And Press [Enter]
```

When you do as instructed, the operating system will start up, you will see the standard operating system copyright notices and available device information followed by:

1.On Some PCs, the BIOS may be set to allow the system to check the hard drive before the floppy drive when booting. In this instance, the BIOS should be set to check the floppy drive FIRST.

```
    Please Insert Your RecoverEDGE Misc Diskette And Press [Enter]
```

When you do as instructed, the utilities and network files will be transferred and initialized.

Of course, if you are not using floppy diskettes the appropriate steps will be skipped.

After bootup, you will see the following:

```
 Enabling TCP/IP Recovery:  Port: 23
 Press ENTER To Start RecoverEDGE
```

When you do as instructed, the *RecoverEDGE Main Menu Program* will start with remote network support configured for the listed TCP/IP port.

> **NOTE:** You can change the default network port by editing the file **/usr/lib/edge/recover2/RE.DEFAULTS BEFORE** creating your Bare Metal Recovery media / images.

> **NOTE:** If you don't type **network** at the **boot:** prompt, you may still initialize remote network support from the *RecoverEDGE Main Menu Program* through the **Network** sub-menu.

Modem Recovery Boot.

Type **modem [Enter]** at this point to boot from the floppy drive. The operating system kernel program will load, the floppy disk light will go out, and the following message will be displayed...

```
 Please Insert Your RecoverEDGE Filesystem Diskette And Press [Enter]
```

When you do as instructed, the operating system will start up, you will see the standard operating system copyright notices and available device information followed by:

```
    Please Insert Your RecoverEDGE Misc Diskette And Press [Enter]
```

When you do as instructed, the utilities will be transferred and initialized.

```
 Enabling Modem Recovery:
 /dev/tty2A  38400  H/W: CTS  S/W: NONE  SH: NO
 Press ENTER To Start RecoverEDGE
```

When you do as instructed, the *RecoverEDGE Main Menu Program* will start with remote modem support enabled per the listed parameters.

> **NOTE:** You can change the default remote modem characteristics by editing the file **/usr/lib/edge/recover2/RE.DEFAULTS BEFORE** creating your media / images.
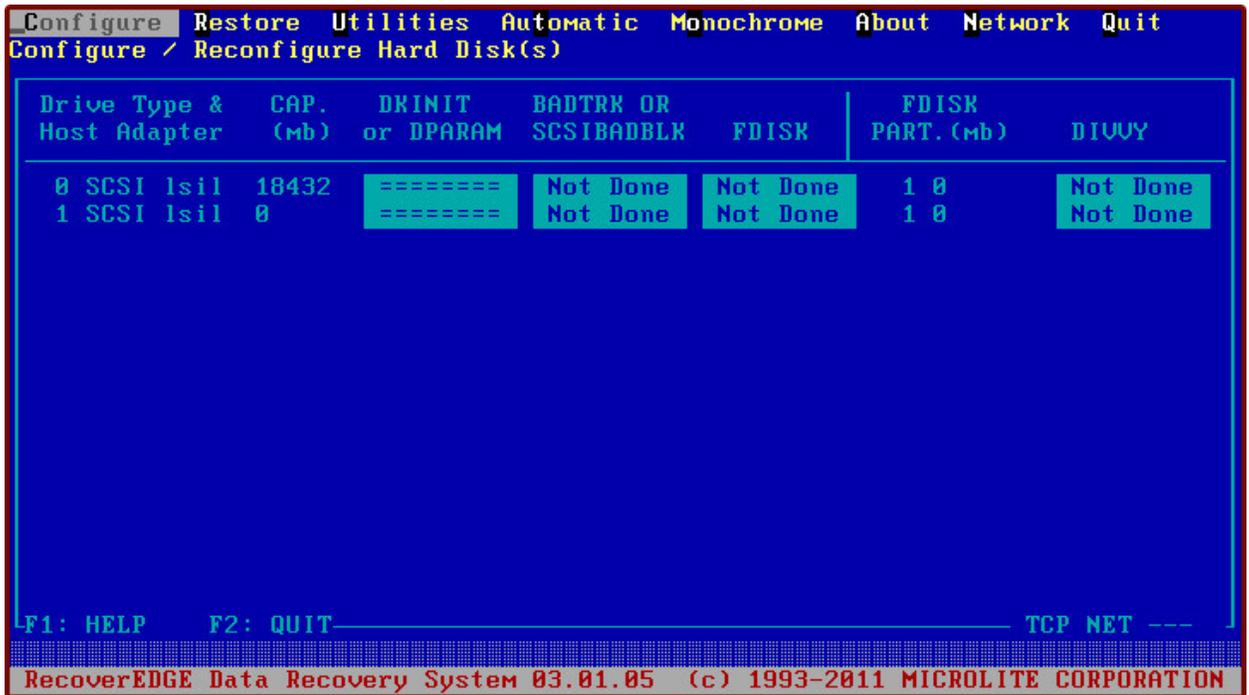
> **NOTE:** If you don't type **modem** at the **boot:** prompt, you may still initialize remote modem support from the *RecoverEDGE Main Menu Program* through the **Network** sub-menu.

BTLD Boot.

You may modify any of the three boot procedures listed above with the appropriate link and device arguments to load a Boot Time Loadable Device Driver. Please read "RecoverEDGE BTLD Support" on page 46 as it thoroughly describes this process.

3.3 - Menu: RecoverEDGE Main Program Menu

Main Program Menu

```
 Configure  Restore  Utilities  Automatic  Monochrome  About  Network  Quit
Configure / Reconfigure Hard Disk(s)

 Drive Type &    CAP.    DKINIT     BADTRK OR              FDISK
 Host Adapter    (mb)  or DPARAM   SCSIBADBLK    FDISK   PART.(mb)    DIVVY

  0 SCSI lsil   18432   ========   Not Done    Not Done    1 0      Not Done
  1 SCSI lsil     0     ========   Not Done    Not Done    1 0      Not Done

 F1: HELP     F2: QUIT                                          TCP NET ---
 RecoverEDGE Data Recovery System 03.01.05   (c) 1993-2011 MICROLITE CORPORATION
```

The MAIN PROGRAM MENU displays a list of each available hard drive and general information about the drive, including which *RecoverEDGE* functions have been performed since the program was last started.

- **Configure**
  prompts the user for a drive to configure (if more than one drive exists), then performs disk preparation steps either sequentially or individually at the direction of the user.

- **Restore**
  asks the user whether a root file system or a full restore is to be performed. *RecoverEDGE* then mounts the appropriate filesystems, begins a *BackupEDGE* restore, unmounts the filesystems, and returns to the main menu.

- **Utilities**
  allows the user to edit system files, write boot files, set tape drive modes, and run disk utility programs.

- **Automatic**
  allows the user to automatically configure all hard drives, or the root hard drive only, and begin a restore with a minimum of user knowledge or intervention.

- **Monochrome**
  switches from a color to a black and white display, which may be more readable with some video cards and boot terminals. (If in Monochrome mode, the menu displays a Color entry here to allow switching back to color mode.

- **About**
  displays version numbers and release dates which may be useful when requesting technical support. Copyright information is also displayed on this screen.

- **Network**
  allows the configuration and initialization of remote Bare Metal Recovery for remote administrators with network or modem access. Also initializes remote tape support.

- ***Quit***
  terminates the application and forces a `Power Down`. You must shut off the power, remove any boot media, and turn the power back on to re-start the system.

3.4 - Alternate Monitor Screens

Up to four system console multi-screens are available while booted from the *RecoverEDGE* media:

Screen 1 `[Alt-F1]` is the normal system console and displays the main menu and all commands.

Screen 2 `[Alt-F2]` is the `FDISK`/`DIVVY Monitor Screen`. Whenever `FDISK` or `DIVVY` are run from the *RecoverEDGE* menus, the table for the correct drive / partition is displayed as the drive or partition was configured at the time the diskettes were made. This screen is also made available through a special TCP port (the remote control port selected during network initialization, plus one) to telnet connected remote administrators.

Screen 3 `[Alt-F3]` is the ***Remote Monitor Screen***. It is used to monitor the status of, and/or disconnect, remote network or modem connections.

Screen 4 `[Alt-F4]` is the ***Modem Terminal Screen***. It is used to establish a standard terminal session with the modem to either configure it, or to dial out from it and in to another computer, in which case it will act just like a serial SCO ANSI configured terminal.

3.5 - Menu: Automatic

```
 Configure  Restore  Utilities  Automatic  Monochrome  About  Network  Quit
```

Of all the things you can do with *RecoverEDGE*, The **Automatic** feature of *RecoverEDGE* is the most often used feature, which is why we will discuss it first. Selecting Automatic will usually put your server operating system and data back just as they were at the completion of the last backup.

It be used configure and restore a system with the original hard drive or drives, or a drive or drives that are each larger than the drives in use at the time the *RecoverEDGE* media / images were created.

If more than one hard drive is present, the **Automatic** feature can be used to configure and restore the root hard drive only, or all drives on the system. You'll see this prompt:
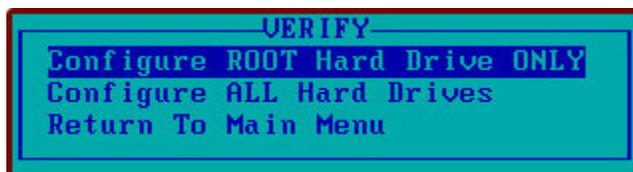
```
┌─────────VERIFY─────────┐
│Configure ROOT Hard Drive ONLY│
│Configure ALL Hard Drives │
│Return To Main Menu       │
└──────────────────────────┘
```

Since the **Automatic** option immediately ***erases*** all information on the hard drive or drives in question, the following message appears when it is selected.
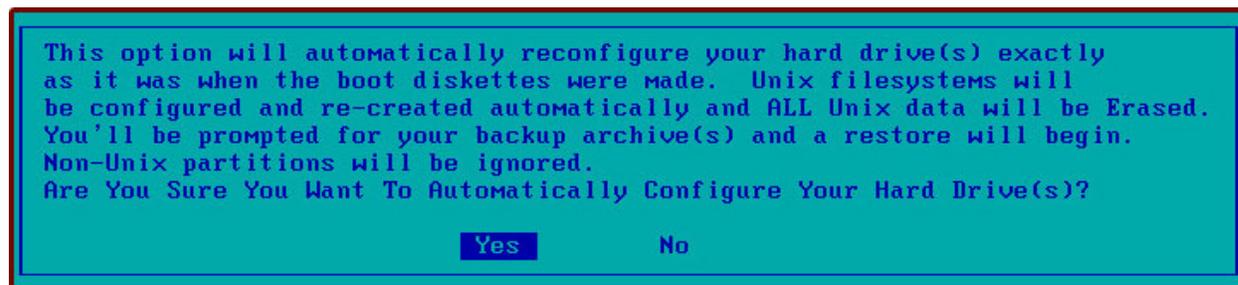
```
This option will automatically reconfigure your hard drive(s) exactly
as it was when the boot diskettes were made.  Unix filesystems will
be configured and re-created automatically and ALL Unix data will be Erased.
You'll be prompted for your backup archive(s) and a restore will begin.
Non-Unix partitions will be ignored.
Are You Sure You Want To Automatically Configure Your Hard Drive(s)?

                    Yes            No
```

If you acknowledge that you want to continue, and have one hard drive, *RecoverEDGE* will proceed to erase and configure your drive exactly as it was when the *RecoverEDGE* media / images were created.
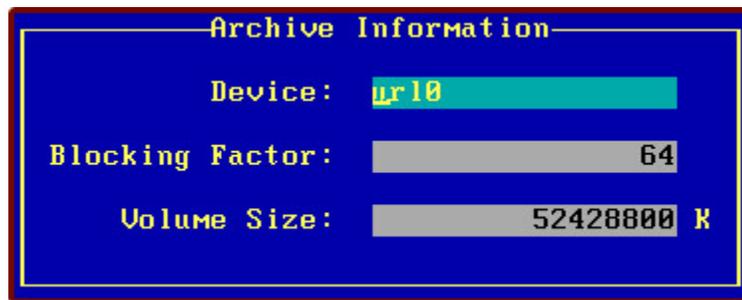
If you have more than one hard drive, you will be asked whether you wish to erase, configure and restore your root hard drive only, or erase, configure and restore all available hard drives.

If a hard drive is larger than the original drive, you will be prompted whether configure the new drive on a **SIZE** or **PERCENTAGE** basis.

SIZE means to make all the divisions and partitions the same size as the original and leave the balance of the hard drive unused.
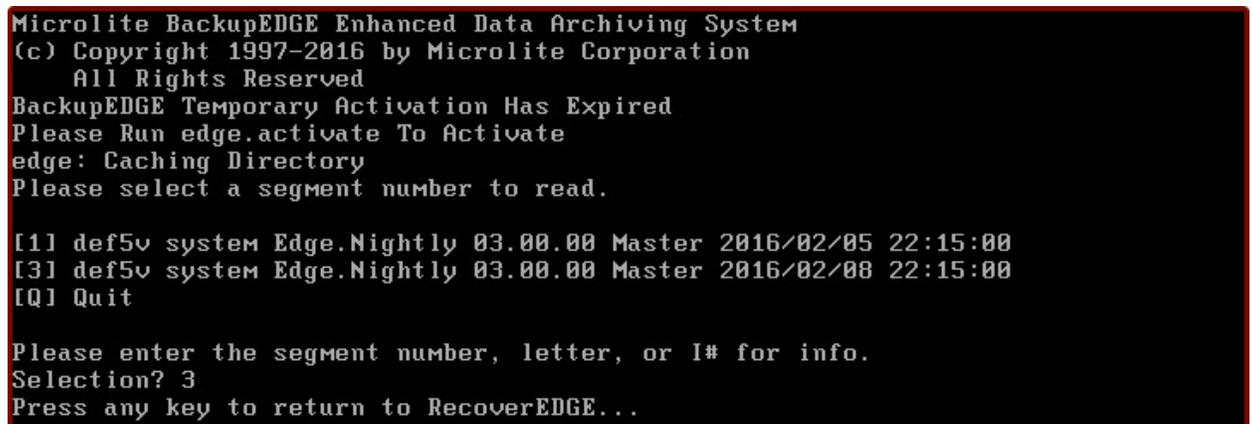
PERCENTAGE means to scale the divisions and partitions by an equal proportion to use the entire drive.

When filesystem creation is complete, drives will be configured, partitions mounted, and the normal archive device prompts will appear.
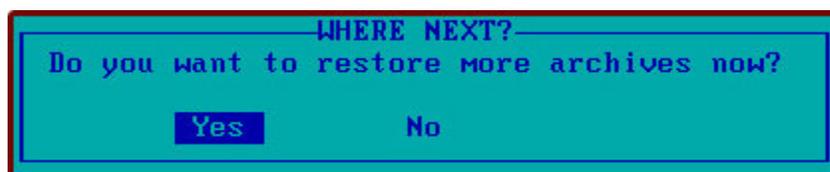
```
┌─────────Archive Information─────────┐
│                                     │
│        Device:  ur10                │
│                                     │
│   Blocking Factor:            64    │
│                                     │
│      Volume Size:       52428800 K  │
│                                     │
└─────────────────────────────────────┘
```

If the correct storage *Resource* is shown, Simply default (press [Enter] through the prompts. Otherwise, type the proper *Resource Name* (preferred) or Device Name (only if requested by Microlite Support, and continue.

Select the archive number of the last **Master Backup** if needed (see the example here), and begin restoring your files.

```
Microlite BackupEDGE Enhanced Data Archiving System
(c) Copyright 1997-2016 by Microlite Corporation
    All Rights Reserved
BackupEDGE Temporary Activation Has Expired
Please Run edge.activate To Activate
edge: Caching Directory
Please select a segment number to read.

[1] def5v system Edge.Nightly 03.00.00 Master 2016/02/05 22:15:00
[3] def5v system Edge.Nightly 03.00.00 Master 2016/02/08 22:15:00
[Q] Quit

Please enter the segment number, letter, or I# for info.
Selection? 3
Press any key to return to RecoverEDGE...
```

When the Master Backup has been restored, you'll get this message:

```
┌────────WHERE NEXT?────────┐
│ Do you want to restore more archives now? │
│                                           │
│        Yes            No                  │
└───────────────────────────┘
```

If you have any *Differential Backups* or *Incremental Backups*, choose YES to return to the archive selection screen and restore the additional archives. Otherwise, choose NO.

*Recover**EDGE*** will complete the recovery, unmount all filesystems, install the boot track, and return to the main menu.

Choose QUIT to shut down. Power off, remove any boot media, power up and boot from the hard drive. Your **Bare Metal Recovery** is complete!

> **NOTE:** As with any recovery, you should verify the integrity of your archive before deliberately erasing hard disk data.

> **NOTE:** Remember that if you plan to restore from an encrypted backup, then you must load decryption keys first. Otherwise, encrypted files will be skipped.

> **NOTE:** All tapes (or other archive media) used with *Recover**EDGE*** should be write protected before being inserted, if applicable.

3.6 - Menu: Configure

| Configure | Restore | Utilities | Automatic | Monochrome | About | Network | Quit |

Selecting ***Configure*** starts the disk drive preparation process.

> **NOTE:** **NOTE:** If more than one hard drive is installed, ***Configure*** will display a menu similar to the one below allowing the user to select the appropriate drive. Always configure Drive 0 first.
>
> | Drive 0 | Drive 1 | Previous |

*Recover**EDGE*** will query the selected (or only) drive for heads, cylinders, sectors, and current file systems and update the display as appropriate, then display configuration options ***Configure*** prompts the user for a drive to configure (if more than one drive exists), then performs disk preparation steps either sequentially or individually at the direction of the user.

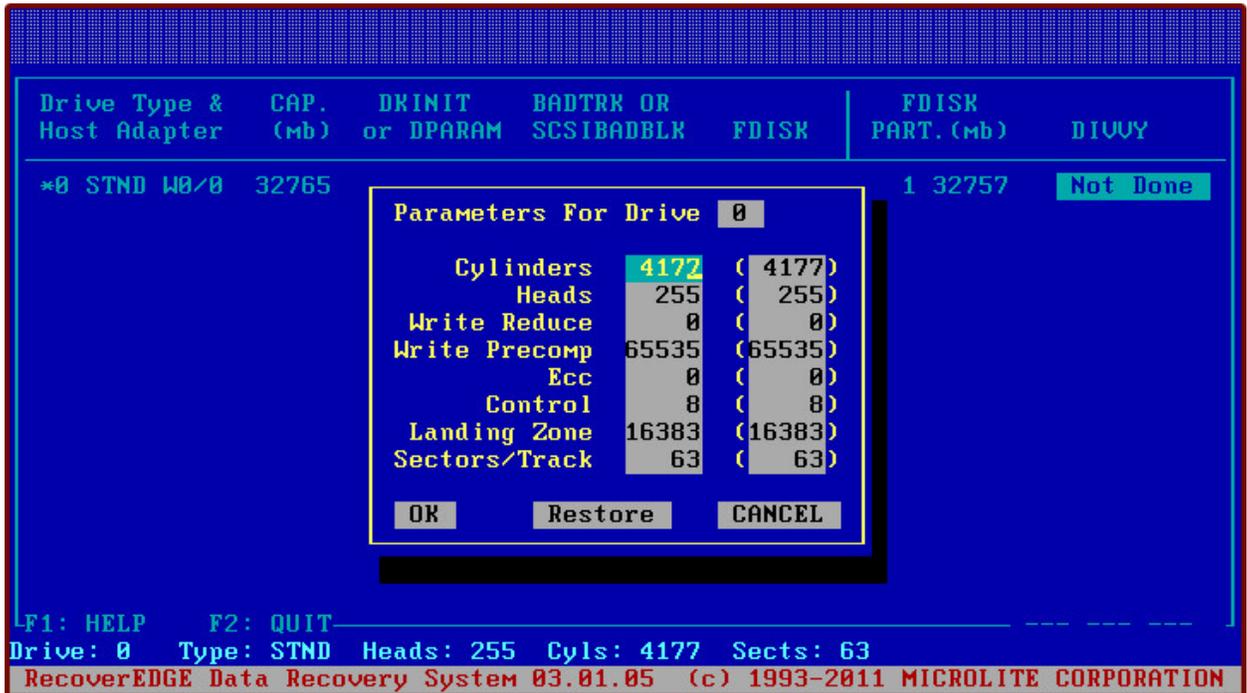| All | Write Boot File(s) | DParam | Badtrk | FDisk | Divvy | Previous |

Menu: Configure - All

Performs each of the following steps sequentially. They are run as if each was selected individually. Advanced users may skip this option and select configuration options individually.

Menu: Configure - Write Boot File(s)

(Drive 0 only.) Allows the user to write a master boot block to the hard drive, permanently stamp the hard drive geometry, and write the boot tracks on to an active Unix root partition. See "Menu: Utilities - Write Boot Files" on page 33.

Menu: Configure - DParam

This is displayed only if necessary for your hard drive type. This option allows the user to manually change fixed disk parameters through the following menu:

```
 Drive Type &    CAP.   DKINIT     BADTRK OR              FDISK
 Host Adapter    (mb)  or DPARAM  SCSIBADBLK    FDISK   PART.(mb)    DIVVY

*0 STND W0/0    32765                                   1 32757     Not Done
                     ┌──────────────────────────────┐
                     │ Parameters For Drive  0        │
                     │                                │
                     │    Cylinders   4172  (  4177)  │
                     │        Heads    255  (   255)  │
                     │  Write Reduce     0  (     0)  │
                     │  Write Precomp 65535 (65535)   │
                     │          Ecc      0  (     0)  │
                     │      Control      8  (     8)  │
                     │  Landing Zone 16383  (16383)   │
                     │  Sectors/Track   63  (    63)  │
                     │                                │
                     │   OK      Restore     CANCEL   │
                     └──────────────────────────────┘

F1: HELP     F2: QUIT                                       --- --- ---
Drive: 0    Type: STND   Heads: 255   Cyls: 4177   Sects: 63
RecoverEDGE Data Recovery System 03.01.05  (c) 1993-2011 MICROLITE CORPORATION
```

Enter the appropriate fixed disk parameters and select *OK* to apply them. Select *Restore* to restore the default parameters (shown in parenthesis) or *Cancel* to quit without modifying the fixed disk parameters.

> **NOTE:** Changing hard drive parameters may overwrite the drive's current `fdisk`, `badtrk` (if applicable) and `divvy` tables.

This menu option will not appear unless it is required for your hard disk type.

Menu: Configure - Badtrk

(Or *SCSIbadblk* on appropriate systems).
This allows the user to test the hard drive and map bad blocks if necessary. This option can be used to test the integrity of disk drives, map out bad spots, or increase the space allocated on the hard drive for bad sector re-mapping. When prompted, the user may run the `badtrk`/`scsibadblk` program, or skip it. Changing the size of the `badtrk` table with the add space option will destroy the drive's current `divvy` table. For more information on running SCO *badtrk*/*scsibadblk*, please refer to your SCO operating system manuals.

Menu: Configure - FDisk

This runs `fdisk` to place or modify operating system partitions on the hard disk drive. This option may be skipped if the drive is already partitioned correctly.

Your *RecoverEDGE Hard Disk Status Report* shows how the `fdisk` partitions were set up when your *Filesystem Diskette* or other media / image was made. If you are performing a

recovery, use **fdisk** to make the Unix partition the same size as shown on the report. Otherwise, make the Unix partition larger or smaller as desired.

> **NOTE:** While **fdisk** is running from the *RecoverEDGE* menus, the user may press **ALT-F2** to display a table of the **fdisk** parameters that were current at the time the Bare Metal Recovery media were made. This is the same information printed on the report. Press **ALT-F1** to return to the **fdisk** program.

> **NOTE:** Changing the **fdisk** partition may destroy the drive's current **badtrk** (if applicable) and **divvy** tables.

> **NOTE:** You *must* make sure that the Unix partition is active before leaving **fdisk**.

For more information on running SCO **fdisk**, please refer to your SCO operating system manuals.

Menu: Configure - Divvy

This runs the **divvy** program, in install or in view / update mode. This option may be skipped if the filesystems are already partitioned correctly.

The **divvy** program divides the active Unix partition into individual filesystems. A primary hard drive would consist of (at minimum) **root** and **swap** filesystems and maintenance filesystems such as scratch and recover.

Your *RecoverEDGE Hard Disk Status Report* shows how the filesystems were laid out when your *Filesystem Diskette* (etc.) was made. If you are performing a recovery, use **divvy** in *Inquire/Update* mode to set up the filesystems exactly as shown on the report. Otherwise, run **divvy** in *Installation* mode and make the filesystems larger or smaller as desired.

> **NOTE:** While **divvy** is running from the *RecoverEDGE* menus, the user may press **ALT-F2** to display a table of the **divvy** parameters that were current at the time the diskettes were made. This is the same information printed on the report. Press **ALT-F1** to return to the **divvy** program.

If you attempt to run **divvy** on a partition with no current filesystems, the following message will appear.

```
No valid division table.
Run divvy with either the -i flag if this device is
to be initialized with a new root file system, or the -m
flag if it is to be initialized with a number of mountable
file systems.
```

In this event, you *must* run **divvy** in the installation mode. On primary hard drives, installation mode will prompt you for the swap device size (use the number for swap in the **Size** column of the *RecoverEDGE Hard Disk Status Report*), whether you want a **/u** filesystem if applicable (answer Yes if the report indicates you have one), and whether you want to make manual adjustments to the filesystems (answer Yes). On secondary hard drives, installation mode will prompt for a number of default filesystems to create.

> **NOTE:** When you are on the **divvy** screen, you should use the **[c]** create option to force the word YES into the **New FS** column for each of your filesystems. When you exit **divvy** by typing **Q [Enter] I [Enter]**, new, empty, fully optimized filesystems will be created and ready to receive your *BackupEDGE* backups.

If you intend to do a "ROOT ONLY" restore, do not create a new filesystem on any filesystem other than **root** (or **root** and **stand** on OpenServer 5).

When each of the steps listed above has been performed for each hard drive, you are ready to return to the menu and select ***Restore*** to begin restoring your data.

3.7 - Menu: Restore

```
_Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit
```
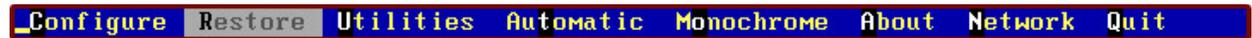
Selecting ***Restore*** from the main menu will provide you with options for mounting filesystems and restoring data files.

```
_All Filesystems   Root Filesystem  Previous
```

Menu: Restore - All Filesystems

Selecting ***All Filesystems*** will cause *RecoverEDGE* to attempt to mount each local filesystem that was detected at the time the ***Filesystem Diskette*** / CD-Recordable / etc. was created. NFS mounted filesystem, RAMDISK filesystems, and CD-ROM filesystems will not be mounted. The pathnames to these filesystems will be excluded from the data restore.

Menu: Restore - Root Filesystem

Selecting ***Root Filesystem*** will cause *RecoverEDGE* to mount the root and `/stand` filesystems only. All other filesystems that were in place at the time the ***Filesystem Diskette*** (etc.) was created will be ignored, and their pathnames will be excluded from the data restore.

Each filesystem will have a large, empty `lost+found` directory created on it to facilitate future filesystem checks. In addition, when the root filesystem is mounted, space will be reserved at the top of the filesystem for the `/stand/boot` and `/stand/unix` programs.

If a filesystem fails to mount properly, you will be given the option of attempting to clean and remount the filesystem, or returning to the MAIN PROGRAM MENU. If an attempt to clean fails more than twice, the filesystem has probably not been configured or has been reconfigured improperly. Return to the MAIN PROGRAM MENU[1] and check to make sure all necessary hard drives and filesystems have been prepared.

Assuming all filesystems mounted properly, *RecoverEDGE* will begin prompting for the archive device information necessary to restore your files. You may enter either a resource name (e.g., `tape0`) or a device node name (e.g., `/dev/rStp0`).

The default system name, device name, block factor, and volume size will be the values detected for **EDGEMENU** attended backups at the time the ***Filesystem Diskette*** was created. The normal response is just to press `[Enter]` to acknowledge each value,

At this point you are ready to begin your *BackupEDGE* restore. Write protect your first backup medium (if applicable), insert it into the drive (if applicable), and press `[Enter]` to begin or hit the `[Esc]` key to terminate the restore operation, unmount all mounted filesystems, and return to the MAIN PROGRAM MENU.

If the backup medium you are using has multiple archvies on it, then *RecoverEDGE* will list them. You may select the one you want by typing its number and pressing `[Enter]`. You may also get more information about it by type `I# [Enter]`, where `#` is the archive number. If the media contains only one archive, you will not be prompted.

If you are reading an encrypted backup made with the optional *BackupEDGE* Encryption Module, you will be prompted to load the Decryption Keys for it from a Decryption Key Backup. If you do not do so, then encrypted files must be skipped.

1.This will automatically cause any successfully mounted filesystems to be unmounted.

At this time, *BackupEDGE* will start up and restore all the data on the first (or only) *BackupEDGE Master Backup*. If *BackupEDGE* encounters an end of volume with a file split across volumes, you will be prompted for additional volumes.

Select *No* at the volume prompt after all volumes have been restored. All filesystems will be unmounted and you will be returned to the MAIN PROGRAM MENU.

Select *Quit* from the MAIN MENU PROGRAM to shut down the *RecoverEDGE* filesystem. Wait for the **Power Down** prompt to appear, then **TURN THE SYSTEM OFF**. Remove any diskettes still in the primary floppy diskette drive, wait at least 30 seconds, and turn the power back on to re-boot the system from the hard drive.

3.8 - Menu: Utilities

```
Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit
```

Selecting *Utilities* from the MAIN MENU PROGRAM will provide you with a variety of useful additional programs and options.

```
Shell   Editor   Write Boot Files   Disk Util   Archive Util   Read Keys   Previous
```

Menu: Utilities - Shell

Selecting *Shell* will cause *RecoverEDGE* to start a Unix command line (Bourne) shell. You can perform operations not covered by the menus, including scanning disk preparation tables, performing manual filesystem integrity checks, etc. To return to the MAIN MENU PROGRAM, type **exit [Enter]** at the **RecoverEDGE=>** prompt[1].

Menu: Utilities - Editor

Selecting *Editor* will cause *RecoverEDGE* to start a menu driven ASCII text editor. The default files that will appear are the *RecoverEDGE* configuration files. You may also select any other ASCII file. *Editor* may be used as a viewer or as an editor. Function keys controlling *Editor* options are shown on the display, or by pressing F1 for help.

Menu: Utilities - Write Boot Files

Selecting *Write Boot Files* will allow you to force the masterboot file (which stores the hard disk parameter table) onto the hard drive. It does this by issuing the following command...

```
dparam -w
```

On many systems the drive parameters need to be stamped on the boot track of the hard drive. When necessary, *RecoverEDGE* performs the following command:

```
dparam /dev/rhd00 `dparam /dev/rhd00`
```

> **NOTE:** In the line above, the quotes are back quotes.

NOTE: In the line above, the quotes are back quotes.

Additionally, if the current active fdisk partition is the primary Unix partition, this option forces the SCO boot tracks onto the partition by issuing the following commands...

```
dd if=/etc/hdboot0 of=/dev/hd0a
dd if=/etc/hdboot1 of=/dev/hd0a bs=1k seek=1
```

1.You may also press [Ctrl]D.

If your hard drive has merely lost this information, it is possible to simply restore this information from here and not lose any of the data on the hard drive.

Menu: Utilities - Disk Util

Selecting *Disk Utilities* runs the disk utilities menu. See "Menu: Utilities - Disk Util" on page 38.

Menu: Utilities - Archive Util

Selecting *Archive Utilities* runs the archive utilities menu described elsewhere in this manual. See "Menu: Utilities - Archive Util" on page 40.

Menu: Utilities - Read Keys

This enables you to load decryption keys from a Decryption Key Backup made through *EDGEMENU* onto the *RecoverEDGE* RAMDISK. Normally, you will be prompted to do this automatically before a restore if needed, but you may also use this option to load keys manually at any time. You may use this option multiple times with different key backups if needed.

It is a good idea to do this before testing the media from the *Archive Utilities* menu.

3.9 - Menu: Automatic

```
_Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit
```

This is the most often used *RecoverEDGE* option. It is discussed in "Menu: Automatic" on page 27.

3.10 - Menu: Monochrome

```
_Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit
```

Selecting *Monochrome* switches from a color to a black and white display, which may be more readable with some video cards and boot terminals. (If in *Monochrome* mode, the menu displays a *Color* entry here to allow switching back to color mode.

3.11 - Menu: About

```
_Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit
```

Selecting *About* displays version numbers and release dates which may be useful when requesting technical support. Copyright information is also displayed on this screen.

3.12 - Menu: Network

```
_Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit
```

The Network menu controls the support and initialization of remote tape drives, remote telnet administration, and remote modem administration. When *Network* is selected the following submenu is displayed:

```
_Network Support   Modem Support   Disable Remote   Previous
```

Menu: Network - Network Support

Selecting **Network Suppor**t displays the Network Support Submenu:

```
 Init Network   Init Network Recovery   Gateway   Previous
```
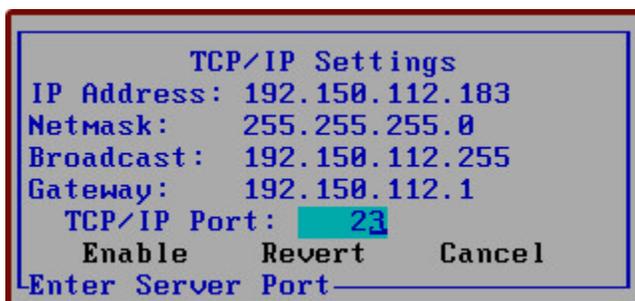
Menu: Network Support - Init Network

This menu prompts for the **Misc Diskette** (if needed - usually it is loaded when *RecoverEDGE* starts), loads it, and starts TCP/IP networking for remote restore of data files. This option is required for any remote **Resource**.

Menu: Network Support - Init Network Recovery

This menu selection allows a remote computer system with SCOANSI console emulation to connect into and take over the console for remote recovery.

```
            TCP/IP Settings
IP Address: 192.150.112.183
Netmask:    255.255.255.0
Broadcast:  192.150.112.255
Gateway:    192.150.112.1
   TCP/IP Port:    23
   Enable     Revert      Cancel
-Enter Server Port-
```

It displays the network settings, prompts for a TCP/IP port to use for inbound connections, then enables inbound TCP/IP access on the selected port. The default port is 23, the normal Unix TCP/IP port. This can be changed if desired when initializing TCP/IP, to get around problems with firewalls, etc. as necessary. If the **Misc Diskette** has not yet been loaded and initialized, the user is prompted to insert it. Note that usually, it is loaded immediately upon startup.

The default TCP/IP port stored on the network diskette is read from the file **/usr/lib/edge/recover2/RE.DEFAULTS**. This file can be changed on the hard drive before the **Boot Media** is created if it is necessary to permanently change the default TCP/IP port.

Selecting **ENABLE** on the bottom line enables inbound telnet connections. When an inbound connection is made, the remote administrator take command of the *RecoverEDGE* menu system.

For additional information on network recovery, see "Telnet Connection and Recovery" on page 42.

Menu: Network Support - Prevent Remote Access

fter Network Recovery has been initialized, the
Network -> Network Support -> Init Network Recovery prompt toggles between "**Prevent Remote Access**" and "**Allow Remote Access**".

This selection may be used to disable remote access when necessary. It only disables the telnet port listener, not the network stack for restoring from a remote **Resource**.
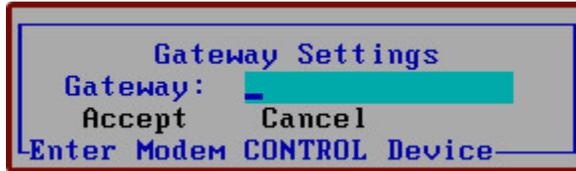
Menu: Network Support - Allow Remote Access

After Network Recovery has been initialized, the
Network -> Network Support -> Init Network Recovery prompt toggles between

"*Prevent Remote Access*" and "*Allow Remote Access*". This can be used to temporarily disable and re-enable incoming connections.

If for any reason it becomes necessary to switch TCP/IP ports, or to switch over to an incoming modem connection, use the *Network -> Disable Remote* command. See "Menu: Network - Disable Remote" on page 37.
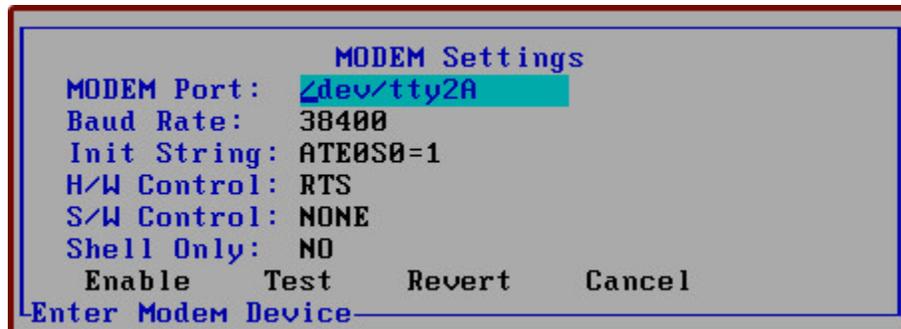
Menu: Network Support - Gateway

```
              Gateway Settings
        Gateway:    _
           Accept      Cancel
    Enter Modem CONTROL Device
```

This option allows the user to add a gateway route to the TCP/IP connection. It works only after TCP/IP has been initialized.

Any gateways that were operational at the time the *Misc Diskette* was created are automatically added to the TCP/IP setup and opened when TCP/IP is initialized.

Menu: Modem Support - Init Modem Support

```
 Init MODEM Support  Previous
```

This menu prompts for modem port characteristics to use for inbound connections, then enables inbound modem access on the selected `tty` port. The default port and characteristics are shown below. These can be changed if desired, prior to the creation of the *Boot Media*.

```
                MODEM Settings
     MODEM Port:  /dev/tty2A
     Baud Rate:   38400
     Init String: ATE0S0=1
     H/W Control: RTS
     S/W Control: NONE
     Shell Only:  NO
       Enable      Test     Revert     Cancel
    Enter Modem Device
```

Modem Port

MUST be `/dev/tty1A` or `/dev/tty2A`. No other options are supported. Support for the appropriate port MUST be linked into the kernel before creating the *Filesystem Diskette*.

Baud Rate

Choose From `38400`, `19200`, `9600`, or `4800` baud.

Init String

At minimum, must turn `echo off` and allow modem to auto-answer. In addition, the default modem characteristics for `DCD` and `DTR` should be set for intelligent answering. This is normally `&C1&D2`.

H/W Control

Hardware handshaking may be set to **RTS**, **CTS**, **RTS+CTS**, **ORTSFL**, or **NONE**, depending on your cabling. In house tests at Microlite have shown that **RTS** works best with our systems. **NONE** should only be used if software handshaking is enabled both in software and on the modem.

S/W Control

Software handshaking defaults to **OFF**. It may also be set to **XON**, **XOFF**, or **XON+XOFF** if your modem is configured appropriately.

Shell Only

When this option is set to its default of **NO**, inbound modem connections attach to the menu system and take over *RecoverEDGE* operations. When set to **YES**, inbound connections are given a simple Unix Bourne Shell prompt.

Selecting **TEST** on the bottom line sends a series of **ATI** commands to the modem and reports the results as a simple modem connectivity test.

Selecting **ENABLE** on the bottom line enables inbound modem connections. When an inbound connection is made, the remote administrator take command of the *RecoverEDGE* menu system.

The port information used by *RecoverEDGE* is read from the file **/usr/lib/edge/recover2/RE.DEFAULTS**. This file can be changed on the hard drive before the ***Filesystem Diskette*** is created if it is necessary to change the default modem support characteristics.

For additional information on modem recovery, see "Modem Connection and Recovery" on page 44.

Menu: Modem Support - Prevent Remote Access

Menu: Modem Support - Allow Remote Access

After Modem Recovery has been initialized, the ***Network -> Modem Support -> Init Modem Recovery*** prompt toggles between "***Prevent Remote Access***" and "***Allow Remote Access***". This can be used to temporarily disable and re-enable incoming connections.

If for any reason it becomes necessary to switch modem port characteristics, or to switch over to an incoming network connection, use the ***Network -> Disable Remote*** command. See "Menu: Network - Disable Remote" on page 37.

Menu: Network - Disable Remote

Disables any inbound connectivity and shuts down remote daemons. Prevents remote connections. Also allows remote connections to be reconfigured, or switched from network to modem or from modem to network.

3.13 - Menu: Quit

`_Configure   Restore   Utilities   Automatic   Monochrome   About   Network   Quit`

Quit prompts for confirmation, terminates the application and forces a `Power Down`. You must shut off the power, remove any floppy diskettes, and turn the power back on to re-start the system.

> **NOTE:** If a remote user is logged in, the *Quit* option displays an additional *Disconnect Only* selection which will allow the user to terminate the remote connection and return the local user to the main menu on the system console. Remote users may use this instead of their local telnet disconnect command.
>
> ```
> ┌─────VERIFY─────┐
> │ Shut Down      │
> │ Disconnect Only│
> │ CANCEL         │
> └────────────────┘
> ```
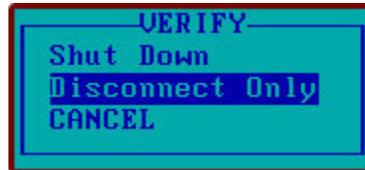
> **NOTE:** If a remote user issues the *Quit -> Shut Down* command, the remote user will be logged off and the local system will be shut down.

3.14 - Menu: Utilities - Disk Util

`_Shell   Editor   Write Boot Files   Disk Util   Archive Util   Read Keys   Previous`
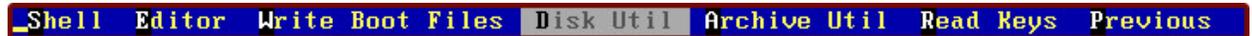
Allows individual selection and execution of hard disk drive management / preparation utilities.

`_Drive   Check Filesystem   DParam   Badtrk   FDisk   Divvy   Previous`

Menu: Utilities - Disk Util - Drive

If more than one hard disk drive is available, selecting *Drive* will allow the user to select which drive the following utilities act upon.

Menu: Utilities - Disk Util - Check Filesystem

Selecting *Check Filesystem* allows the user to perform an `FSCK` check on the selected drive. The user may choose to perform a standard `FSCK`, or an `FSCK` with the "`-y`" flag to eliminate having to answer questions. A third selection is provided to terminate the operation without performing an `FSCK`.

Menu: Utilities - Disk Util - DParam

DParam is displayed only if necessary for your hard drive type. This option allows the user to manually change fixed disk parameters through the following menu:
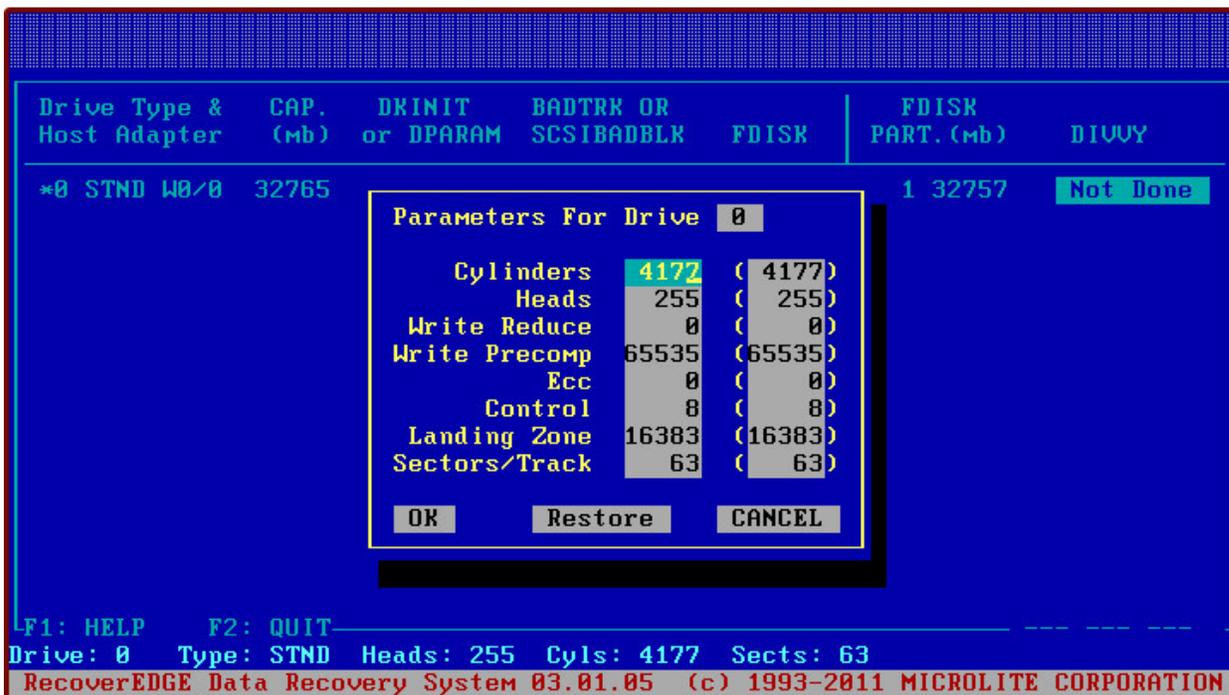
Enter the appropriate fixed disk parameters and select *OK* to apply them. Select *Restore* to restore the default parameters (shown in parenthesis) or *Cancel* to quit without modifying the fixed disk parameters.

> **NOTE:** Changing hard drive parameters may overwrite the drive's current `fdisk`, `badtrk` (if applicable) and `divvy` tables.

Menu: Utilities - Disk Util - Badtrk/SCSIbadblk

Badtrk (or *SCSIbadblk* on appropriate systems)
allows the user to test the hard drive and map bad blocks if necessary. This option can be used to test the integrity of disk drives, map out bad spots, or increase the space allocated on the hard drive for bad sector re-mapping. When prompted, the user may run the *badtrk*/*scsibadblk* program, or skip it. Changing the size of the `badtrk` table with the add space option will destroy the drive's current `divvy` table. For more information on running SCO *badtrk*/*scsibadblk*, please refer to your SCO operating system manuals.

Menu: Utilities - Disk Util - FDisk

FDisk runs SCO `fdisk` to place or modify operating system partitions on the hard disk drive.

Your *RecoverEDGE Hard Disk Status Report* shows how the `fdisk` partitions were set up when your *Filesystem Diskette* (etc.) was made. If you are performing a recovery, use `fdisk` to make the Unix partition the same size as shown on the report. Otherwise, make the Unix partition larger or smaller as desired.

> **NOTE:** Changing the `fdisk` partition may destroy the drive's current `badtrk` (if applicable) and `divvy` tables.

> **NOTE:** You MUST make sure that the Unix partition is active before leaving `fdisk`.

For more information on running SCO `fdisk`, please refer to your SCO operating system manuals.

Menu: Utilities - Disk Util - Divvy

Divvy runs the SCO `divvy` program, in install or in view / update mode.

SCO `divvy` divides the active Unix partition into individual filesystems. A primary hard drive would consist of (at minimum) `root` and `swap` filesystems and maintenance filesystems such as scratch and recover.

Your *RecoverEDGE Hard Disk Status Report* shows how the filesystems were laid out when your *Filesystem Diskette* or other media / images were made. If you are performing a recovery, use `divvy` in *Inquire/Update* mode to set up the filesystems exactly as shown on the report. Otherwise, run `divvy` in *Installation* mode and make the filesystems larger or smaller as desired.

If you attempt to run `divvy` on a partition with no current filesystems, the following message will appear.

```
No valid division table.
Run divvy with either the -i flag if this device is
to be initialized with a new root file system, or the -m
flag if it is to be initialized with a number of mountable
file systems.
```

In this event, you MUST run `divvy` in the installation mode. On primary hard drives, installation mode will prompt you for the swap device size (use the number for swap in the `Size` column of the *RecoverEDGE Hard Disk Status Report*), whether you want a `/u` filesystem if applicable (answer Yes if the report indicates you have one), and whether you want to make manual adjustments to the filesystems (answer Yes). On secondary hard drives, installation mode will prompt for a number of default filesystems to create.

> **NOTE:** When you are on the `divvy` screen, you should use the `[c]` create option to force the word YES into the `New FS` column for each of your filesystems. When you exit `divvy` by typing `Q [Enter] I [Enter]`, new, empty, fully optimized filesystems will be created and ready to receive your *BackupEDGE* backups.

If you intend to do a "ROOT ONLY" restore, do not create a new filesystem on any filesystem other than root.

3.15 - Menu: Utilities - Archive Util

```
_Shell   Editor   Write Boot Files   Disk Util   Archive Util   Read Keys   Previous
```

Allows individual selection and execution of *Resource* and archive-related utilities.

```
_Test Drive   Tape SETBLK   Tape SetPart   Previous
```

Menu: Utilities - Archive Util - Test Drive

Selecting *Test Drive* uses the *BackupEDGE* verify option to...

- Check the integrity of *BackupEDGE* archives media before erasing filesystems which may contain valuable data.

- Verify that your archives and archive *Resource* are available while booted from the *RecoverEDGE* media.

- Allow selection of a different **Resource** for both testing and use during recovery.

> **NOTE:** All backup media used with *Recover**EDGE*** should be write protected before being inserted, if applicable.

*Recover**EDGE*** will begin prompting for the archive **Resource** information necessary to verify your backup(s).

The default **Resource** (labeled "**Device:**") will be the one defined as the "`Restore From:`" **Resource** at the time your **Boot Media** was created. This is typically the currently selected *EDGEMENU* **Resource**. The normal response is just to press **[Enter]** to acknowledge each value. `Blocking Factor:` and `Volume Size:` don't need to be touched unless you are replacing a **Resource** name with an actual Unix device name. Don't do this unless instructed to do so by Microlite Corporation support.

At this point you are ready to begin your *BackupEDGE* verify. Write protect your first backup medium (if possible), insert it into the device, and press **[Enter]** to begin or hit the ESCAPE key to terminate the restore operation and return to the MAIN PROGRAM MENU. You may be prompted to select an archive to list, if the **Resource** or media contains more than one.

If you are using bootable backups, you probably do not have to insert the media; it should already be in the drive. Of course, you may switch to a different backup if you'd like.

> **NOTE:** Any Resource or device selected here is preserved when returning to the main menu, and will be used for subsequent restores / recoveries.

Menu: Utilities - Archive Util - Tape SETBLK.

For tape drives only.

Selecting **Tape SETBLK** allows the user to change a tape drive on the local system from fixed mode to variable mode, or back, and to set the fixed mode block size. Tape drives will power up in a default mode. If the block mode has been changed manually while booted from the hard drive, you may need to select this option and make the same change before beginning a restore. At the prompt, simply type `0` for variable mode, or enter the appropriate fixed mode block size.

Menu: Utilities - Archive Util - Tape SetPart.

For tape drives only.

Selecting **Tape SetPart** allows the user to select the appropriate tape partition. It is useful only if a tape has been reformatted into partitions, which is possible with DDS/DAT and Ultrium/LTO drives.

Do not confuse partitions with multiple archives per medium. Multiple archives are stored on a single partition. The **Tape SetPart** feature is only rarely used.

4 - Remote Connections

4.1 - Telnet Connection and Recovery

Theory of Operation

When a user boots from the *RecoverEDGE* media and enables **Network Recovery**, it is for the express purpose of allowing an administrator somewhere else on the LAN or WAN access to the system for the purpose of taking over and managing the recovery process.

To this end, two inbound TCP/IP ports are enabled for remote connection:

The initial port (default is 23) is used as the control port. A user establishing a telnet connection to this port takes over the recovery process and inhibits most keyboard input from the console.

A second port (TCP/IP port + 1) is used as an **FDISK**/**DIVVY** monitor port. If a telnet session is established to this port, whenever the menu system runs **FDISK** or **DIVVY** on a particular hard drive, the configuration table in place at the time the **Boot Media** (etc.) was created for that drive is displayed, giving the user the ability to match it exactly or deviate from it. No keyboard input is allowed on this port.

Remote Requirements

The remote administrator essentially takes over the functionality of the boot console, which runs in SCO ANSI mode. Therefore, the remote administrator needs to establish a telnet connection using an SCO ANSI compatible telnet client, or an SCO ANSI compliant terminal emulator logged in to a Unix system, or establish the telnet connection while seated at one or more of the multi-screens of an SCO Unix or OpenServer console. The SCOTERM client running in an X environment will also work.

There are many PC based telnet-capable programs with SCO ANSI emulation, including TERM from Century Software, ICE.TCP From J. River, Inc., ANZIO from Rasmussen Software Inc., and TermLite from SCO. The free PuTTY emulator may also be configured for this purpose.

Establishing A Remote Connection

First, the local system (system to be configured) must be booted from the *RecoverEDGE* diskettes and **Init Network Recovery** must be enabled. See "Network Recovery Boot" on page 24 and "Menu: Network Support - Init Network Recovery" on page 35 for additional information on initializing network recovery.

Next, the remote administrator must establish a telnet connection to the local system. An example of this command on an SCO system would be:

```
telnet remotesys 5000
```

if the local system telnet port on example system **remotesys** was set at **5000**, or simply

```
telnet remotesys
```

if the local system telnet port was left at the default of **23**.

> **NOTE:** If the local system was the only name server for the network, the remote system will have to telnet in using the IP address of the local system instead of the system name.

When the systems connect, the following message is displayed:

```
Connection Established From:        192.150.112.10
You Must Be Connected From An SCO Ansi Compatible Client
User Is At A RecoverEDGE Menu!

Press [CTRL-C] To Disconnect Or
Press [CTRL-L] To Update Display
```

Pressing the **[CTRL-C]** key will terminate the connection.

Pressing **[CTRL-L]** will complete the connection.

1 On the local system console, the border around each console multiscreen (1 through 3) will turn red to indicate that a remote user has taken command.

2 The local system keyboard will be inhibited, except that the **[Alt-F1]** through **[Alt-F3]** keys may be used to switch screens to display additional information.

3 The remote system screen will be cleared and updated with the information currently being displayed on the local console.

4 Keyboard control is passed to the remote user.

The remote user now has command of the system and may configure drives, restore data, etc. as he or she desires.

The local user may monitor the progress of the recovery on the console, but keyboard input is inhibited with the following exceptions:

1 User may press **[Alt-F2]** to view the **FDISK/DIVVY** *Monitor Screen*[1].

2 User may press **[Alt-F3]** to view the *Remote Monitor Screen*.

3 User may press **[Alt-F1]** to return to the **Console Screen**.

While in the Remote Monitor Screen **[Alt-F2]**, user may press **[Ctrl-D]** to terminate the remote connection and take back system and keyboard control.

The remote administrator may disconnect and re-connect to the system at any time using the normal disconnect command associated with their telnet client. During a long restore, where thousands of files may be displayed, it is quite useful to start the restore, disconnect the remote session, then re-connect and check the status later. This will not affect the application, but will prevent possibly megabytes of file list data from being forced through the network connection, slowing down the actual restore while the local system waits and stays in sync. It may also save money if you are paying for network connection charges.

Any time the remote administrator is disconnected, either from the local or remote end, the borders around the console screens will return to black, and keyboard control will be returned to the system console.

FDISK / DIVVY Connection

The information on the **FDISK/DIVVY** *Monitor Screen* may be displayed by the remote administrator on an alternate telnet session whose port number is one higher than the default incoming TCP/IP port. This can be done from a multi-screen on the remote system, from an additional window in a Windows or X environment, or even from a second system. An example of establishing this connection on an SCO system would be:

```
telnet remotesys 24
```

if the telnet port was left at the default of 23. If the local system telnet port on example system **remotesys** was set at **5000**, use:

1.See "Alternate Monitor Screens" on page 27 for additional information on Monitor Screens.

```
telnet remotesys 5001
```

Any **FDISK** or **DIVVY** information passed to the **[Alt-F3]** screen on the console will also be passed to this connection.

4.2 - Modem Connection and Recovery

Theory of Operation

When a user boots from the *RecoverEDGE* media and enables modem recovery, it is for the express purpose of allowing an administrator somewhere else in the world access to the system for the purpose of taking over and managing the recovery process.

This is accomplished by attaching a modem to the **/dev/tty1A** (**COM1**) or **/dev/tty2A** (**COM2**) port and configuring it to allow inbound connections. It is ESSENTIAL that the Unix kernel be linked with appropriate support for the port to be used BEFORE making the boot/recovery diskettes.

Remote Requirements

The remote administrator essentially takes over the functionality of the boot console, which runs in SCO ANSI mode. Therefore, the remote administrator needs to establish a modem connection using an SCO ANSI compatible terminal communications program, or from an SCO ANSI compliant terminal or emulator logged in to a Unix system, or from one or more of the multi-screens of a modem-equipped SCO Unix or OpenServer console. The SCOTERM client running in an X environment will also work.

There are many PC based serial emulator programs with SCO ANSI emulation, including TinyTERM from Century Software, ICE.10 From J. River, Inc., and ANZIO from Rasmussen Software Inc. The free PuTTY emulator may also be configured for this purpose.

From a Unix System, the **cu** utility, the **xc** utility, or a commercial program such as the Unix version of TERM from Century Software may be used.

Establishing A Remote Connection

First, the local system (system to be configured) must be booted from the *RecoverEDGE* diskettes and modem recovery must be initialized. See "Modem Recovery Boot." on page 25 and "Menu: Modem Support - Init Modem Support" on page 36 for additional information on initializing modem recovery.

Next, the remote administrator must establish a modem connection to the local system. An example of this command on an SCO system.

When the systems connect, the following message is displayed:

```
Connection Established From:        Modem
You Must Be Connected From An SCO Ansi Compatible Client
User Is At A RecoverEDGE Menu!

Press [CTRL-C] To Disconnect Or
Press [CTRL-L] To Update Display
```

Pressing the **[CTRL-C]** key will terminate the connection.

Pressing **[CTRL-L]** will complete the connection.

1 On the local system console, the border around each console multiscreen (1 through 4) will turn red to indicate that a remote user has taken command.

2 The local system keyboard will be inhibited, except that the **[Alt-F1]** through **[Alt-F4]** keys may be used to switch screens to display additional information.

3 The remote system screen will be cleared and updated with the information currently being displayed on the local console.

4 Keyboard control is passed to the remote user.

The remote user now has command of the system and may configure drives, restore data, etc. as he or she desires.

The local user may monitor the progress of the recovery on the console, but keyboard input is inhibited with the following exceptions:

1 User may press **[Alt-F2]** to view the **FDISK/DIVVY** *Monitor Screen*[1].

2 User may press **[Alt-F3]** to view the *Remote Monitor Screen*.

3 User may press **[Alt-F1]** to return to the **Console Screen**.

While in the *Remote Monitor Screen* **[Alt-F2]**, user may press **[Ctrl-D]** to terminate the remote connection and take back system and keyboard control.

The remote administrator may disconnect and re-connect to the system at any time using the normal disconnect command associated with their communications software. During a long restore, where thousands of files may be displayed, it is quite useful to start the restore, disconnect the remote session, then re-connect and check the status later. This will not affect the application, but will prevent possibly megabytes of file list data from being forced through the modem connection, slowing down the actual restore while the local system waits and stays in sync. It may also save money if you are paying for long distance or toll connection charges.

Any time the remote administrator is disconnected, either from the local or remote end, the borders around the console screens will return to black, and keyboard control will be returned to the system console.

Outbound Terminal Session

At times when a modem is attached, but not initialized for remote recovery, it is possible for the local user to switch to the *Modem Terminal Screen* by pressing **[Alt-F4]**. This screen can connect directly to the serial port and act as a standard "dumb" terminal connection to either:

1 Communicate with and program the modem using standard **AT** commands.

2 Use dial commands to initiate a remote connection session.

It is possible to use the *Modem Terminal Screen* even while remote recovery is initialized, as long as a connection is not currently in progress.

1.See "Alternate Monitor Screens" on page 27 for additional information on Monitor Screens.

5 - RecoverEDGE BTLD Support

BTLDs (**Boot Time Loadable Device Drivers**) are supported by *RecoverEDGE*. They allow a user to switch SCSI host adapters during a Bare Metal Recovery. This is especially important for systems for which the host adapter being used before a system crash is no longer available.

Note that if you are switching host adapters as part of a planned upgrade, it is faster and easier to build a kernel with the proper host adapter driver and place it on your *RecoverEDGE* diskette than it is to use a BTLD. There are caveats to using BTLDs which will be explained later in this chapter.

5.1 - Theory of Operation

OpenServer 5generally requires all drivers for a particular device to be linked into the kernel (`/unix`) before the device will operate. Most important for disaster recovery are the adapters that control the hard drives and the backup device(s).

The best kernel to use with *RecoverEDGE* is generally the current system kernel, which contains drivers for all the currently used storage devices, plus drivers for networking and modem support.

Installation kernels and "safe" kernels generally do not support multiple host adapters, and networking, which make them unsuitable for disaster recovery on anything but a basic system.

RecoverEDGE with BTLD support allows you to use your current system kernel, with all of its device drivers, for local or remote Bare Metal Recovery, plus switch hosts adapters if necessary.

5.2 - What are the Caveats?

The traditional way of supporting BTLDs on Bare Metal Recovery diskettes was simply to place an un-stripped system or install kernel on the boot diskette, along with the "link" program.

There are many disadvantages here…

- *RecoverEDGE* supports network disaster recovery, and recovery on systems with more than one host adapter. These can't be done with the install kernel.

- Full un-stripped kernels, plus the link program, might not fit on the boot diskette. For optical media, removable disks, and OBDR tapes, this is not generally a concern.

- Basic installs, with no networking or other enhancements, work reasonably well using the traditional method. However, adding almost any device drivers creates a kernel symbol table which is far too large for the memory constraints of the `/boot` program when it is trying to load the symbol tables necessary to link in a BTLD during the boot process.
  The user could easily create diskettes which would be fine during a normal Bare Metal Recovery, but would fail to load the full symbol table if you attempted to use the "link" command to load a BTLD. Worse yet, the kernel symbol table might load, but after inserting the BTLD diskette and starting to load the driver, the symbol table would fill at this point, and you'd still be out of luck, and not know it until it is entirely too late.

Every system in use at Microlite failed to load a BTLD when the traditional method was employed, and so we developed a more reliable solution.

RecoverEDGE employs new techniques to…

- allow BTLD support to work with your standard system kernel, preserving multiple host adapter, hard drive and network support.

- save space on the boot diskette.

- greatly improve the probability that BTLDs will load properly when needed.

On very large systems, the tools necessary may still not fit on a boot floppy, in which case *RecoverEDGE* will ask you to disable BTLD support and try again. Remember that OpenServer 5.0.7 and above support 1.68MB floppy diskettes, in addition to 1.44MB ones. See the caveats at the beginning of this manual before doing this, however.

Some systems may still fail to load the symbol table when the link command is used. However, the number of systems where a BTLD will not be loadable when needed will be dramatically reduced compared to boot floppies where the traditional method is employed.

Switching to or away from an IDE hard drive (using the `wd` driver) generally does not work with BTLDs. More often than not, it will fail to link or fail to find any hard drives. If you know in advance you will be doing this, it is strongly recommended that you create a special kernel with the appropriate drivers enabled and use that as `/kernel.edge` when making the boot media. See the description of `/kernel.edge` in "Handling Very Large Kernels" on page 21. As mentioned above, this is good advice any time you plan to switch host adaptors.

5.3 - Making RecoverEDGE BTLD Media

As documented in the manual, you may log in as **root** and type...

```
re2
```

or you may run **edgemenu** and select...

```
Admin -> Make RecoverEDGE Media
```

The default diskette creation mode for *RecoverEDGE* is to attempt to create diskettes with BTLD support enabled. If the enhanced kernel still will not fit on the boot diskette, a warning message will be issued. You will be asked to go into the ***Configure*** sub-menu, disable BTLD support, and try again. This will create standard diskettes without BTLD support, and much larger kernels will fit. For other recovery media types, it is unlikely that the kernel size will impact media generation. It **is** still possible that symbol space will be exhausted if you try to use BTLD support during recovery, however.

Remember to use the Configure sub-menu to enable creation of a **Network Diskette** if you wish to do remote Bare Metal Recovery.

5.4 - Testing Boot Media (Normal)

As described in the manual, we ALWAYS recommend testing the recovery media after making them to be sure they will work when you need them.

When the system can be safely brought down, boot from the media into the main menu.

Select **Utilities -> Archive Util -> Test Drive** and read from the backup for a few minutes, just to make sure everything is OK.

If you plan on doing remote Bare Metal Recovery, enable modem or network support and use another machine to dial or telnet in and test this capability. List files from the remote ***Resource*** if that feature will be used.

5.5 - Constructing BTLD Boot Strings

Whenever you are booting and need to use a BTLD, you must tell the boot command...

- the directory name of the BTLD on the BTLD diskette.
- the actual BTLD driver name.
- The devices (typically hard drives and tape drive) that are attached to the host adapter controlled by the BTLD driver.

This is done by constructing a boot command listing the appropriate directives. Consider the following command syntax:

```
defbootstr link=XXXXX Sdsk=YYYYY(0,[0,]0,0)  Stp=YYYYY(0,[0,]0,0)
                        |             |   |   | | |
       Btld Name---+    |             |   |   | +--Lun Number
                                      |   |   +----SCSI ID
      Actual Driver Name-------+      |   +-------Optional Bus Number
                                      +----------Drive Number
```

where **defbootstr** means to use the current default boot string, **XXXXX** is the on-disk directory name of the BTLD you are trying to load, **YYYYY** is the actual driver to be installed, and the **zeros** should be replaced with appropriate values for your hardware configuration (at minimum the SCSI ID for the tape drive (**Stp**) must be different from the SCSI ID for the hard drive (**Sdsk**)).

Bus numbers are rarely used, so they can usually be ignored, leaving...

```
defbootstr link=XXXXX Sdsk=YYYYY(0,0,0)  Stp=YYYYY(0,0,0)
                        |             |   | | |
       Btld Name-----+  |             |   | | +--Lun Number
                                      |   | +----SCSI ID
     Actual Driver Name---------+     +------Drive Number
```

The on-disk directory name (**BTLD Name**) and the **Actual Driver Name** are **usually** identical. This is true for all drivers downloaded from the Xinuos (formerly SCO) web site.

However, on other web sites such, as the MicroSemi/PMC/Adaptec web site, BTLD diskettes may have drivers for multiple operating systems on them. On their latest driver diskette, the OpenServer 5 driver is located in the **blad325** directory, while the driver itself is called **blad**. In this special case, **XXXXX** would be **blad325**, while **YYYYY** would be **blad**.

As an example, suppose we wanted to construct a command to link the Adaptec 29160 driver (**ad160**) from the driver diskette image on the SCO ftp site, with the primary hard disk on SCSI ID **0** and the tape drive on SCSI ID **2**. In this instance the disk name and the driver name are identical, so the command would look like this...

```
defbootstr link=ad160 Sdsk=ad160(0,0,0)  Stp=ad160(0,2,0)
```

Remember, you have to identify each tape or disk device you intend to use during a BTLD recovery. After the recovery is complete and you want to permanently install the BTLD driver, you can boot into single user mode specifying only the **link** command and root hard drive (**Sdsk**).

This example would be used with the BTLD diskette from the Adaptec web site to load the **alad** driver.

```
defbootstr link=alad325 Sdsk=alad(0,0,0)  Stp=alad(0,2,0)
```

You may substitute **network** or **modem** for **defbootstr** in any of the above if you want to automatically initialize network or modem support upon boot. These may also be initialized after the *RecoverEDGE* menu appears.

5.6 - Testing Boot Media (BTLD)

You should always test a set of BTLD-enabled recovery media to be sure that drivers can be linked into them if necessary. BTLDs shouldn't be trusted unless this test completes successfully. This test must be performed **IN ADDITION TO** the tests described in "Testing Boot Media

(Normal)" on page 47.

Obtain a BTLD diskette with an **mdac**, **blad**, **ad160** or any other device driver.

Boot from the *Recover**EDGE*** **Boot Diskette** or other media. At the...

```
Boot
:
```

prompt, type an appropriate boot/link command as described in the previous section...

The kernel will load and you will be prompted to insert the BTLD diskette at the appropriate time.

If you get all the way to the...

```
Please Insert Your RecoverEDGE Filesystem Diskette and Press [Enter]
```

prompt, **without** getting a **"driver_name" not loaded** message, your BTLD support is working properly. You may power off, remove the diskettes, and re-boot under the hard drive at this time.

Of course, if you are not using floppy disks, you will be taken into the RecoverEDGE menu system rather than to the prompt for the **Filesystem Diskette**.

5.7 - Using The RecoverEDGE BTLD Media

If you are in a Bare Metal Recovery situation and do NOT need to use BTLDs, simply follow the normal procedure outlined in your *Recover**EDGE*** manual. If you have changed host adapters, follow the instructions listed in the previous section to boot and load the correct host adapter driver.

Then, insert your *Recover**EDGE*** **Filesystem Diskette** if prompted, proceed to the main menu, and continue your Bare Metal Recovery.

When you have finished restoring, remember that the kernel on the hard drive does NOT have a device driver for the host adapter you've used. Follow the procedures in the next section to boot into single user mode and permanently link the BTLD driver into the boot kernel.

5.8 - Installing The Driver Into The Boot Kernel

Now that you've done a Bare Metal Recovery, you need to link the driver into the boot kernel. Here is the procedure:

Boot again from the *Recover**EDGE*** **Boot Diskette** or other recovery media (not from the hard drive). At the...

```
Boot
:
```

prompt, type...

```
boothd link=ad160 Sdsk=ad160(0,0,0)
```

replacing the **ad160** references above with the name of the BTLD disk name and driver name that you used previously, and **0,0,0** with the appropriate root hard drive information (**0,0,0** is usually correct).

This will load the **/stand/unix.re.Z** kernel from your hard drive and prompt you for the BTLD diskette when needed.

If for any reason the **unix.re.Z** file was removed or doesn't load, instead type...

```
bootfd link=ad160 Sdsk=ad160(0,0,0)
```

making the appropriate replacements. This will load the kernel from the recovery media, which is slower but accomplishes the same thing.

You MUST type the **root** password at the [**Ctrl-D**] prompt and go into single user mode,

At the command prompt:

Mount the BTLD floppy diskette...

```
mount -r /dev/fd0135ds18 /mnt
```

Run the BTLD installer...

```
btldinstall /mnt
```

The floppy will be read and a list of available drivers that can be installed will be displayed.

```
       ------------------------------------------------------------
        The following packages are on this diskette:
         NAME             DESCRIPTION

         (List of package Names Displayed)


         Please enter the names of the packages you

         wish to install, or q to quit:
     -----------------------------------------------------------
```

At this point, enter the name of the package (Driver) you used previously.

After the driver has been installed you may see...

```
 Do you want to make the (Driver) adapter your default boot adapter?
 Answer "yes" if you want to boot from the (Driver)
 Answer "no " if you want to boot from another adapter such as the
 AHA-1542, AHA-2742T or any other type of adapter.
 (y/n) _
```

Answer **yes** (**y**).

You'll get the following message, followed by a **boot** prompt...

```
 File /etc/conf/cf.d/mscsi has been modified to boot from (Driver}
 Note: A new kernel must be built for the changes to take effect.
 Installed (Driver)
```

Before building the new kernel, check the file **/etc/conf/cf.d/mscsi**.

Make sure you change **all** of the devices reflect the correct host adapter driver.

You may optionally turn off the old SCSI driver to save space in the kernel. Do this by editing **/etc/conf/sdevice.d/XXXX**, where **XXXX** is the old driver name. For example **/etc/conf/sdevice.d/alad**. Change field **2** in each line from a **Y** to an **N**. This will disable the driver in subsequent kernel builds.

Then rebuild the kernel with...

```
 cd /etc/conf/cf.d
 ./link_unix
```

Answer **yes** (**y**) when you are asked...

```
 The UNIX Kernel has been rebuilt.

 Do you want this kernel to boot by default? (y/n)
```

Unmount the floppy diskette by typing...

```
cd /
umount /mnt
```

Then shut down and reboot. The system should be fully functional with the new host adapter driver.

5.9 - The Final Step

After a successful BTLD-based Bare Metal Recovery and driver install, always remember to re-create and re-test your *RecoverEDGE* media and images to reflect your current system configuration.

5.10 - Additional BTLD Information

Current Xinuos (Formely SCO) drives may be found at:
ftp://ftp.xinuos.com/pub/openserver5/507/drivers/

6 - Compatibility Issues / Limitations

RecoverEDGE has many capabilities, and is limited mostly by hardware capabilities and the number of devices / filesystems configured in the kernel on the **Boot Media**. It is important to know the limitations of *RecoverEDGE*. Here are some important considerations affecting the proper operation of *RecoverEDGE*...

- You must have a functional and accessible storage **Resource** in order to use *RecoverEDGE*. To perform remote restores, **TCP/IP** must be functional on your system in order to create **Boot Media** with network support enabled.

- For **Remote Recovery** via modem, you must have a functional modem on **COM1** (**/dev/tty1A**) or **COM2** (**/dev/tty2A**) of the system and the appropriate serial device driver must be linked into the kernel.

- If you want to recover using an encrypted backup made with the optional **Encryption Module**, then you must have decryption keys on a **Decryption Key Backup** in addition to your *RecoverEDGE* media and backup tape! Without these keys, encrypted files will be skipped! A **Decryption Key Backup** can be made through **EDGEMENU**.

- You may not be able to use *RecoverEDGE* if your storage **Resource** cannot operate while booted from a RAMDISK boot filesystem. This is usually only case with some legacy tape drives which operated from the floppy disk controller. If in doubt, generate a set of *RecoverEDGE* media, boot from them, and attempt to perform an archive verification operation. If your verification fails to start, (typically with a "device busy" message), your device configuration is incompatible with *RecoverEDGE*.

- *RecoverEDGE* utilizes the standard operating system disk preparation utilities to configure or reconfigure hard disk drives. These utilities are **dkinit**, **fdisk**, **badtrk** (or **scsibadblk**), and **divvy**. Some hard drives do not require **dkinit** or **badtrk**. If your system utilizes disk drivers that are not compatible with the above mentioned programs, *RecoverEDGE* will not function. Known incompatibility problems exist with Buslogic/Chantal. Veritas, and 1776 are among companies whose software is known to be incompatible with *RecoverEDGE*.
If *RecoverEDGE* determines that the **Veritas Volume Manager** program is installed, and that the executable **/etc/divvy.bk** exists, this file will be assumed to be the true **divvy** command and will be copied to the **Filesystem Diskette** as **/etc/divvy**. *RecoverEDGE* is not guaranteed to run on **Veritas** equipped systems and technical support cannot be provided if it fails.

- *RecoverEDGE* does **not** support the Virtual Disk Manager (VDM) or any other software based RAID system.

- You cannot store backups for use during a recovery on the system that is being recovered. Do not try to use an FSP without an AF (i.e., a local directory backup) with *RecoverEDGE*. Doing so makes very little sense.

- *RecoverEDGE* performs intense device checking to match multiple hard drives and host adapters when preparing media. Device drivers that deviate from the operating system norm for identifying themselves, or that use device node major and minor numbers different from the operating system standard, may not be detected properly.

- You cannot use *RecoverEDGE* to add hard drives to your current configuration. The **Boot Media** contain information only for devices configured at the time the media was created. However, you can use *RecoverEDGE* to redistribute the files across multiple hard drives by manually editing the captured mount table information before beginning a reconfiguration. While you could (usually) use the BTLD procedure to specify additional drives, it is recommended that you create recovery media that supports the right number of drives.

- You must have installed all current TCP/IP updates for your operating system before creating diskettes.

If for any reason your computer system configuration is incompatible with *Recover**EDGE***, all is not lost. Simply refer to "Recovery Without RecoverEDGE" on page 56 and follow the "generic" recovery procedures used by those who have systems for which *Recover**EDGE*** is unavailable.

7 - Additional Capabilities

7.1 - RecoverEDGE As A Hard Disk Optimizer

RecoverEDGE can be used as a fast, effective hard disk optimizer. Of all the optimization techniques used by various third party optimizers, most of the benefits are gained by optimizing filesystem continuity and the free list map. This same level of optimization can be gained by creating empty filesystems and restoring *BackupEDGE* backups.

To optimize your hard drives...

1 Create **TWO** sets of *RecoverEDGE Media*. (Let's be safe).

2 Create and verify **TWO** *BackupEDGE Master Backups*. (Let's be extra safe). It is a good idea not to encrypt these backups, so that you do not need decryption keys to read them. If you do create encrypted backups with the optional Encryption Module, then you must have the decryption key on a Decryption Key Backup also, since these keys are not stored on the *RecoverEDGE Media*, or on the *Master Backup*!

3 Boot from the *RecoverEDGE Media*. **Test** the archive **Resource**.

4 Select *Utilities*, then **Disk Utilities**. Select and run **divvy** in Inquire / Update mode once for each hard drive.

5 While in **divvy**, use the **C** "Create a new filesystem on this division" for each of your filesystems. When you exit **divvy** using the **Q** "Quit" and **I** "Install the division set-up shown" options, new blank filesystems will be created.

6 Return to the MAIN PROGRAM MENU and select *Restore*. Restore your backups.

7 Return to the MAIN PROGRAM MENU and select *Quit*.

8 Re-boot from your optimized hard drives.

7.2 - Manually Excluding Filesystems From Being Mounted

You may wish to prevent a filesystem from being mounted during a recovery operation. For instance, you may want to have all of the files in the **/u** filesystem restored to a larger root partition...

1 While booted from the *RecoverEDGE* diskettes, select *Utilities*, then *Edit* to invoke the file editor.

2 Select the file **/etc/RE2.MOUNTLIST** and remove the line containing the filesystem you no longer want to be mounted.

3 Return to the MAIN PROGRAM MENU, select *Restore* and begin the recovery operation.

Data will be restored to the filesystem on which the excluded filesystem was originally mounted (typically **root**).

If the filesystem you excluded was originally created using the **mkdev fs** command, Unix will attempt to mount the filesystem whenever you go into multi-user mode. To prevent this...

1 Start Unix in single-user mode.

2 Edit the files **/etc/default/filesys** and **/etc/checklist** and remove any reference to the excluded filesystem.

7.3 - Manually Excluding Files/Directories From Restores

You may wish to prevent particular files or directories from being restored during a recovery operation...

1 While booted from the *RecoverEDGE* media, select **Utilities**, then Edit to invoke the file editor.

2 Select the file **/etc/RE2.EXCLIST** and add 1 line for each file or directory you wish to exclude from the restore. Lines should look like this...

```
Exclude /usr/rworld
Exclude /usr/acct/bill
```
Use the word **Exclude**, followed by a tab, followed by the name of the file or directory to be excluded.

3 Return to the MAIN PROGRAM MENU, select **Restore** and begin the recovery operation.

8 - Recovery Without *RecoverEDGE*

NOTE: If for some reason your system is incompatible with *RecoverEDGE*, all is not lost. Use this simple method for recovering from disasters.

The nightmare of every computer user is to have a catastrophic failure resulting in the loss of all data on the hard disk. Fortunately, now that you are using *BackupEDGE* this can be reduced to a mere annoyance.

Here are the general steps required to completely rebuild your file systems. Your system may not require all of the steps, but you should have no difficulty adapting this procedure to your needs.

1 Identify the problem which resulted in your data loss and have it corrected.

2 Boot from your original boot media, format your primary hard disk drive, partitioning for swap space, etc. as necessary, and install your base operating system.

3 If you had to install a special device driver for your *BackupEDGE* backup device, redo it now.

4 If you have secondary hard drives, reformat and remount them. Some operating systems require kernel reconfiguration as part of this process. Striped, mirrored, and other special hard drives must also be prepared properly.

5 Make sure network filesystems, if needed, are mounted properly.

6 Install *BackupEDGE*. Run **EDGEMENU** and set up for your save device(s).

7 If you are going to restore from an encrypted backup, then you should restore the appropriate decryption key from a Decryption Key Backup now. Otherwise, encrypted files will be skipped during the restore!

8 Restore your last **Master Backup**.

9 Restore your last **Incremental Backup** (if you have one and it is more recent than your last **Master Backup**).

10 Shut Down And Re-Boot Your System.

That's It! Your system should be back up and running, and up to date as of the time of your last Backup. Eventually, any Unix filesystem gets fragmented, with portions of long files scattered all over the hard disk, reducing system performance. Periodically performing a **Master Backup** followed by the above procedure will optimize your filesystem and result in increased system throughput.

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