Z E T R O N

Model 49 Multibase
OPERATION MANUAL

#025-9173G

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1. OVERVIEW

INTRODUCTION

Multibase is Zetron's advanced multi-site multi-channel software management system that runs on your PC compatible office computer. It manages the Model 49 subscriber database information, retrieves air time, interconnect billing, and repeater loading information from the site equipment, and monitors the site in real-time. Once the software is installed, you can run it at any time.

SYSTEM REQUIREMENTS

The Multibase database management system for your Model 49 sites and channels operates on an IBM PC compatible computer. The following equipment is the minimum computer configuration required to operate Multibase:

PC-XT, AT, 286, 386 compatible
512 Kbytes of RAM
10 Mbytes of hard disk
360 Kb or 1.2 Mb 5-1/4" floppy drive
Monochrome or color display
1200 bps Hayes modem (internal or external)
Printer attached to parallel port
MS-DOS version 3 or above

Note: If you are using Zetron's ZEBRA Billing System we recommend a 286 computer, 40 Mbytes of hard disk, and 1 Mbyte of RAM memory.

The following makes and models of modems have been demonstrated to work on a PC running Multibase. The external modems below also work when connected to the front panel of the Model 49:

Hayes Smartmodem 1200B Modem Board (internal)
Hayes Smartmodem 1200 Modem Box (external)
Hayes Smartmodem 2400 Modem Box (external)
Incomm Midget 241 2400 Modem Board (internal)
Intel 2400EX Modem Box (external)
Packard Bell PB2400Plus Modem Box (external)
Goldstar GSM2400 Modem Box (external)
  set switches on Goldstar: 1=Down, 2=Up, 3=Up, 4=Up

MULTIBASE FIRST TIME INSTALL

If this is the first time you are installing Multibase, follow the steps below:

1. Insert the Multibase diskette #1 (P/N 950-9182) into diskette drive A:
2. Type A:<Enter> to log on to drive A:
3. Type INSTALL <enter>
4. Follow the on-screen instructions.

The INSTALL program will prompt you to enter the directory you want to put Multibas into, we recommend using the directory name \MODEL49. Install will create the directory if it does not exist, then copy the Multibas files into the directory.

5. Once the installation procedure is complete, make sure the program runs by typing MULTIBAS <enter>.

MULTIBASE UPGRADE FROM EARLIER VERSIONS

If you are upgrading from an earlier version of MULTIBAS the INSTALL program will convert the "old" database .dat files into a format compatible with the new version being installed. A back-up of the "old" database files will be created by INSTALL before the conversion takes place. To upgrade follow the steps below:

* 1. Retrieve current air time totals, call detail records and repeater loading data (if the information is important to you) using "Comm Retrieve" from Multibase on your office computer. Backup your data to floppy diskettes with the Backup menu item.
2. Insert the Multibase diskette (P/N 950-9182) into drive A:
3. Type A:<Enter> to log on to drive A:
4. Type INSTALL <enter>
5. When INSTALL prompts for a directory name, enter the name of the directory where the old Multibas has been installed.
6. Follow the on screen instructions.
7. After the installation is complete run the program by typing MULTIBAS, verify that the data was converted successfully before deleting the *.bak, *.bef and *.aud files created during the Install process. (*.bak are backups of the "old" *.dat files, and *.bef are backups of the "old" *.def files. The *.aud files contain information regarding the conversion of one database to another.)

Warning: Do <u>NOT</u> copy files from the new Multibas upgrade disks into an old Multibase directory directly using the COPY command, if this is done user entered data will be lost.

COMPUTER SET UP FOR BILLING

Billing files (for air time, SMDR, etc -- refer to section 5) can either be stored in the \MODEL49 directory or in a separate directory named \MOBILL49. Multibase will first look for the MOBILL49 directory at the root of the hard disk to put the files there. If that directory does not exist, then it puts the files into the MODEL49 directory.

1. Go to the root directory: CD\
2. Create a new directory: MKDIR MOBILL49

The ZEBRA billing package automatically creates the \MOBILL49 directory when it is installed.

RUNNING MULTIBASE

To run Multibase:

1. Go to the Multibase directory: CD \MODEL49
2. Start the program: MULTIBAS

MENUS

Once you start Multibase running, the main menu screen appears, giving you choices of operations to perform. You select a menu item by using the arrow keys (← ↓ → ↑) to select and highlight a menu item, and the enter (ENTER) key to activate your selection. Use the escape (Esc) key to finish an operation and return to the main menu.

The menu line lists eight main selections that Multibase can perform, with a list of sub-menu items underneath:

Edit Create or make changes to database files:
Site Config, Repeater Config, User IDs,
Autodial Table, PTC Users

View Look at database files; cannot make changes:
Site Config, Repeater Config, User IDs,
Autodial Table, PTC Users

Print Produce printed listings of database information:
Site Config, Repeater Config, User IDs,
Autodial Table, PTC Users

ASCII Export ASCII database information to other software programs:
Site Config, Repeater Config, User IDs,
Autodial Table, PTC Users

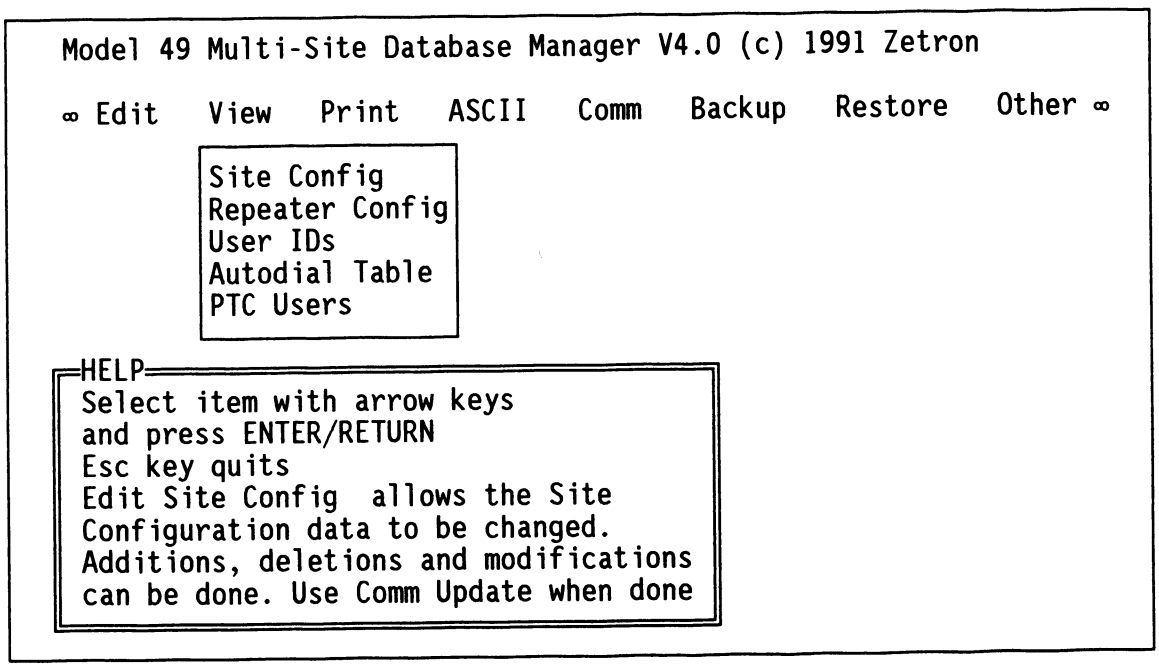
Comm Communicate with Model 49's by communications line:
Update, Verify, Retrieve, Monitor, Rptr Loading, Status Info,
Reset Model 49s, Other

Backup Make backup copies of database files to floppy diskettes:
Config Data, Call Accumulation, Call Detail

Restore Copy database backups into working database files:
Config Data, Call Accumulation, Call Detail

Other Other Multibase functions:
Change PC Modem Parms, Change Multibas Password, Exit

A box in the lower left corner of the screen is labeled "HELP". This window prompts you with information about using Multibase. The information is "context sensitive" and changes when you move around on the screen.



KEYBOARD

A few words about keys; whenever we refer to a specific key on the office computer's keyboard, we use the name as it appears on the key cap. Some keys have only a picture on them; the manual may call them by their common names. For example, while Editing, you may press F4 to fill a record with default entries, F4 is the function key so labeled on its key cap.

Keys are used to navigate through Multibase's "fill in the blanks" forms. The following chart shows the key names used in this manual, the legend on the keyboard key cap, and the action of the key when used with the Index or Data (site, repeater, user ID, autodial or PTC user) windows.

The Shift, Ctrl, and Alt keys are used in combination with other keys to perform special functions in Multibase. To activate a combination, first press and hold the Shift/Ctrl/Alt key while you press the second key of the combination. For example, to do a Back tab press and hold Shift then press Tab.

Note: The Esc (escape) key is your way to gracefully complete a task and exit.

HINT
Press F1 to see the Guide window with hints on what the keys do. Press F1 again to hide the Guide. Press F4 to fill in the fields with the most useful default values.

Key Name	Key Cap	Index Window	Data Window
Return/Enter	←┘	Move to data window	Enter typed data into field and move to next data field
Up Arrow	↑	Previous record	Previous data field
Down Arrow	↓	Next record	Next data field
Left Arrow	←	Previous index field	Back one character
Right Arrow	→	Next index field	Forward one character
Home	Home	Top of index window	Top of data window
End	End	Bottom of index window	Bottom of data window
PgUp	PgUp	Back one index window	Previous data record
PgDn	PgDn	Forward one index window	Next data record
Ins	Ins	Insert new data record	Insert one character
Del	Del	Delete data record	Delete one character
Tab	Tab	Next index field	Enter default data and move to next data field
Back-Tab		Previous index field	Enter default data and move to previous data field
Esc	Esc	Back to main menu	Back to index window
Backspace		Previous index field	Back one character
F1 to F10	F1..F10	F1=Guide info on Fn keys	F1=Guide info on Fn keys
Shift-Fn		No effect	Fill fields with template 'n'
Alt-Fn		No effect	Assign fields to template 'n'

Note: to use the arrow keys on the numeric keypad, make sure that the Num Lock key is off.

ALERT AND STATUS MESSAGES

Messages that are displayed on the computer screen to alert you to special actions come up in the lower left corner of the screen, below the Index window. During some operations such as communicating with the sites, the HELP window changes to a STATUS window to inform you of progress of the operation you have requested.

INDEX WINDOW

You access the data in each Multibase computer file using the Edit or View menu item. These selections show an Index window and a data window. The Index window shows a nine record portion of the data file while the data window shows one data record in full detail.

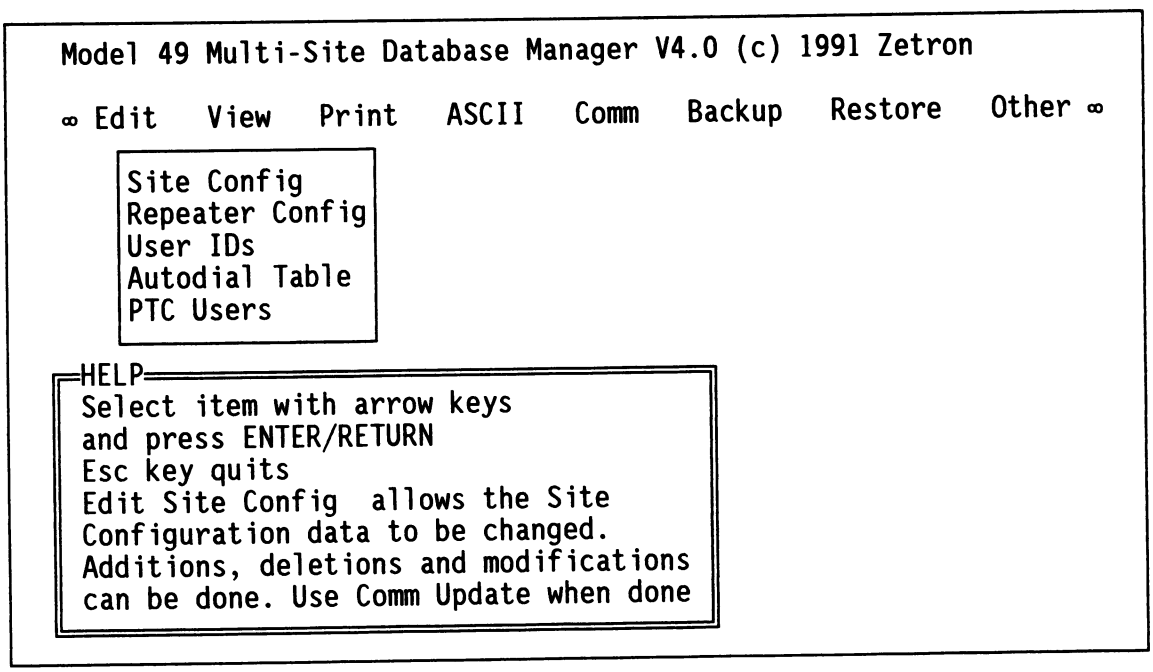
The Index window gives you a quick overview of a few data records. Those data fields that are used for "sorting" are shown in the index window. Use the left or right arrow keys to select a particular index field to "sort" on. Use the up or down arrow keys to move backwards or forwards in the data file. Use the PgUp or PgDn keys to jump 9 data records at a time.

Press the Return or Enter key to move to the data window on the right side of the screen. Now your keystrokes are directed to moving around the data fields. Press the Esc key to move back to the index screen.

EDITING/VIEWING

The Edit menu allows you to add to or change your database. To begin editing you must first select EDIT SITE CONFIG and create a site by entering a number in the Site Number field. Repeaters, User IDs, Autodial Numbers and PTC Users are then entered for each existing site as desired. The View menu allows you to view your database settings but does not allow changes to be made. (Refer to section 3 for more detail on each database).

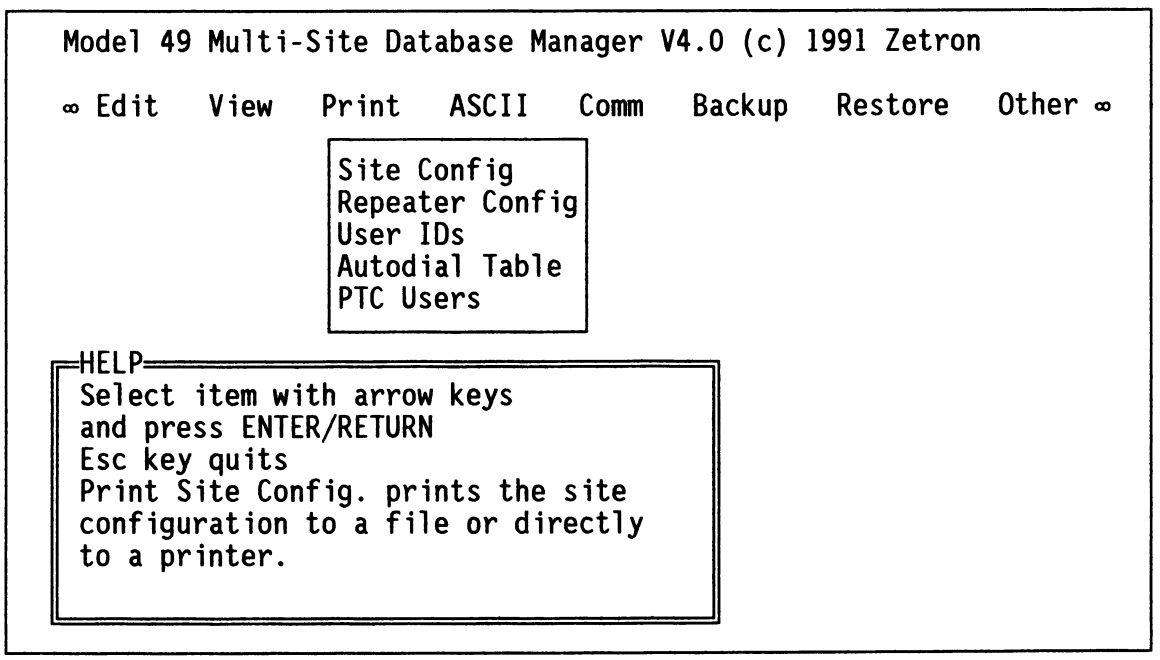
Some fields on a data window are linked to another window which will "Pop-Up" when certain values are entered in the field and RETURN/ENTER is pressed. These fields are marked with a "...".



PRINTING

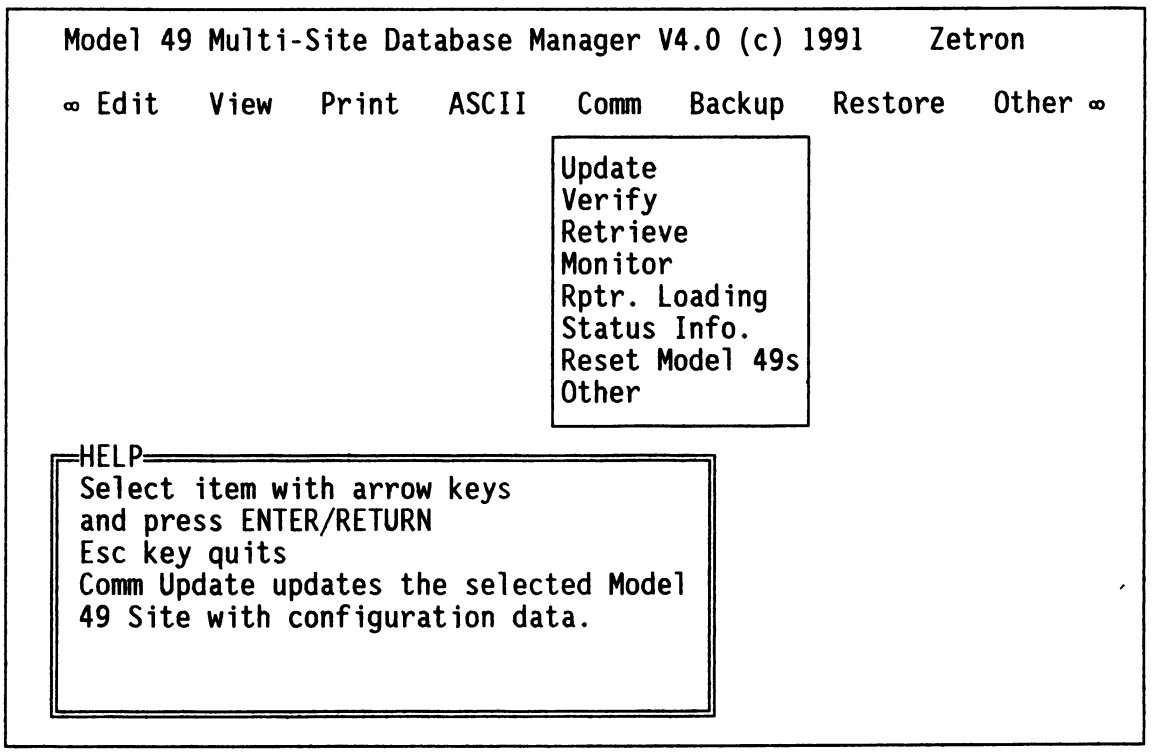
You can print the Site, Repeater, User, Autodial Table or PTC Users database information stored in the computer files to a printer attached to your computer. From the main menu, select Print and Multibase will guide you through your choices.

The printed output can go directly to the printer, or into a disk file. You can sort the printout by any data field that appears on the index screen. For example, you can print the user information sorted by ID, Name, or Account number. Multibase will present you with your choices when you select the Print function for Site Config. data, Repeater data, User ID data, Autodial Table or PTC Users data.



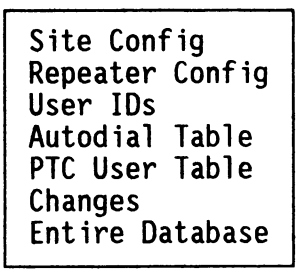
COMMUNICATIONS

To communicate with your Model 49 sites for updating database information, retrieving billing and status information, and for monitoring, you select COMM and your desired choice from the sub-menu. If more then one site exists you will be asked to select the site to which you wish to connect. When a site has been selected Multibas will automatically connect to the Model 49 site using the method set up in the Site Configuration under Site Access (see section 2). Once the connection has been made to the site you will be given the chance to select other options from the COMM menu without disconnecting.



Updating Programming

To update a Model 49 site with your database you select COMM UPDATE. Once a site has been selected Multibas will automatically connect to the selected site. Once the connection is made another window will pop-up from which you can chose what you want to update:



If this is the first time you are updating the site you should select ENTIRE DATABASE.

If you get the message "No bus master, cannot clone data" this means that the unit you updated cannot perform the automatic cloning function to the other Model 49's on the Subscriber Bus. If you are in your shop working with one unit, then ignore the message. If you have dialed your site, then you have a problem on the Subscriber Bus. Either the subscriber master is inoperative, a subscriber bus cable is faulty, or you have not set one of your Model 49's as a Polling Master on the front panel switches (refer to the Model 49 Operation and Installation Manual).

Verifying Programming

If you are curious about whether the programming information in your Model 49's is current, you can verify the information with the Comm Verify function. This selection will dial the selected site, and check the computer files against the Model 49 RAM contents. If a discrepancy is found, Multibase will notify you on the computer screen. If you select Verify Entire Database, a new site will be created in the database named VERIFIED SITE and the data retrieved from the site will be stored. All other selections only verify the data, and no new database is created.

The Verify function only makes comparisons against the Repeaters and Home Repeaters that have been set-up in your computer database for the selected site. If you are using the VERIFY ENTIRE DATABASE to create a new database you must make sure the database for the selected site on you computer has all the desired repeaters and at least one user for each repeater defined before doing the verify.

Retrieve Billing Data

The COMM RETRIEVE menu selection allows you to retrieve billing data from all Model 49s at the selected site. Refer to section 4 for more details on billing and billing retrieval.

Call Accumulation
Call Detail Records

Monitor

The traffic monitor feature of the Model 49 displays, on your computer screen, the activity for every repeater channel at the radio site. Activity is shown for <u>all</u> repeater logic units connected to the repeater bus (Johnson, Uniden, and Zetron alike). You use Multibase to access to your interconnected Model 49 at the remote site.

As mobiles key and release their PTT, the display is updated automatically with a momentary delay. Depending upon the modem data rate, there is approximately a 2 to 4 second delay from site activity to display changes.

The screen shows each repeater number, the mobile (home/ID) using that channel, the type of mobile call (dispatch or interconnect), and how long that conversation has been in progress. If the mobile has been invalidated in the database, a home = 21 will appear on the screen. If the repeater is busied up to send the Station ID, at the end of a phone call or because of a cross-busy condition a 253 will appear in the ID field.

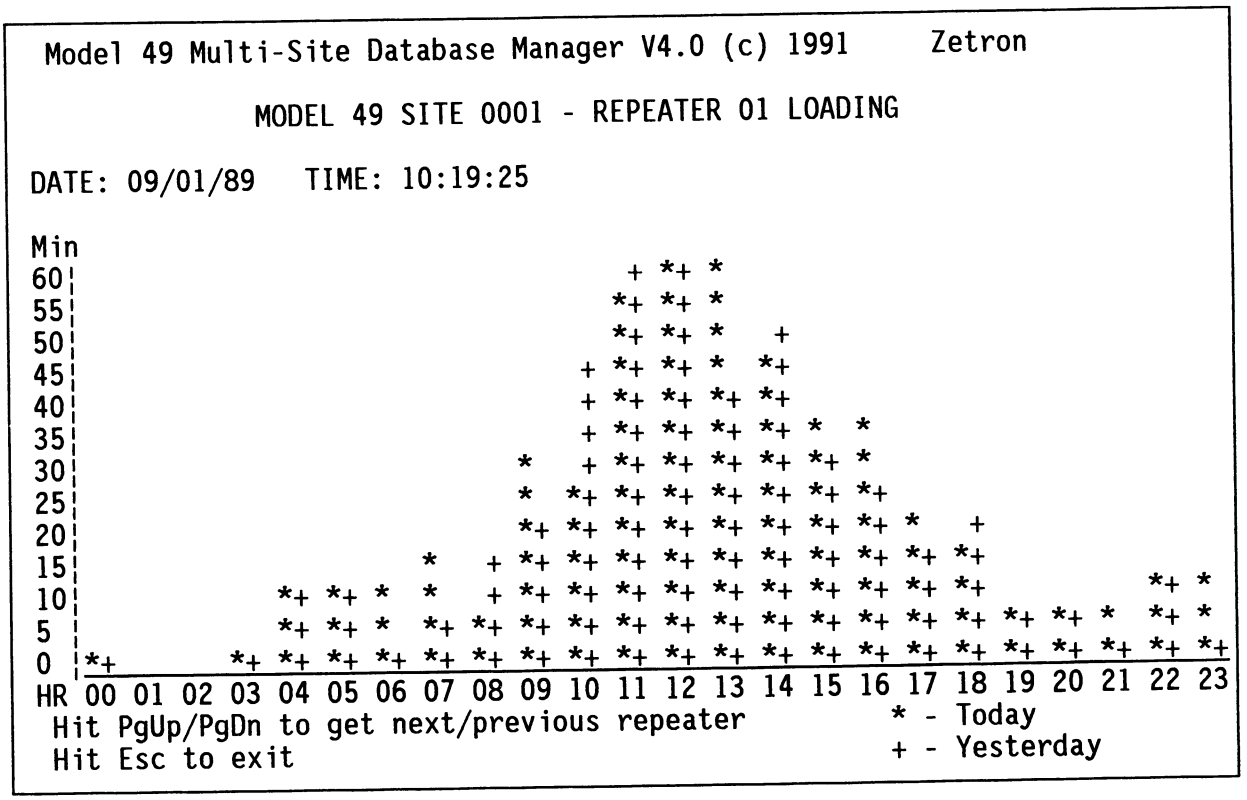
During peak periods, you can watch system activity and see traffic congestion as mobiles move from one channel to another. Select Monitor from the Comm menu and Multibase will connect to your Model 49 and display a screen like this one:

```
Model 49 Multi-Site Database Manager V4.0 (c) 1991     Zetron

              MODEL 49 SITE 0001 - REAL-TIME MONITORING

    DATE: 10/22/89   TIME: 10:23:17   SYSTEM LOADING: 32%

    RPTR #   HH-UUU   TYPE   TIME       RPTR #   HH-UUU   TYPE   TIME
     01      01-020     D    00:12       11        -
     02        -                        12        -
     03        -                        13      13-098     D    00:31
     04        -                        14        -
     05      05-145     I    01:07       15        -
     06        -                        16        -
     07        -                        17      09-117     I    03:29
     08        -                        18        -
     09      01-021     D    00:09       19        -
     10        -                        20        -

enter Esc to exit ....
```

If you want a printed copy of the display, use the PrtScr key on your office computer. Make sure that your printer is attached to parallel port LPT1: and that the printer is on-line and ready for printing.

Repeater Loading
Each Zetron Model 49 keeps a history of repeater use, on an hourly basis. You can use this information to study system usage and predict peak period congestion. You may want to adjust your Model 49 conversation time limits to encourage off-peak usage.

Select Rptr. Loading from the Comm menu and Multibase will connect to your Model 49, retrieve the loading information and display a screen like this one:



Use the PgUp and PgDn keys to select loading graphs for different repeaters at the site. These graphs are also saved to a disk file named MMDD####.RLD, where MM = month, DD = day, and #### = site number. Press the Esc key to escape back to the main menu.

All Repeaters Busy
Each Zetron Model 49 with software version 4.8 or later tracks, on an hourly basis, how often all repeaters in the system are busy.

The All Repeaters Busy information is retrieved from the Model 49s along with the repeater loading information. An additional screen, which shows All Repeaters Busy for the system, is generated with the repeater loading screens. All Model 49s in the system store the repeater busy information, but it is only retrieved from the unit to which Multibase is connected, since the information is redundant.

See the previous subsection on repeater loading for information on retrieving and viewing loading.

Status Information
COMM STATUS INFO retrieves status information from all Model 49s at the selected site. The retrieved information is stored in a file named STAT####.INF where #### = site number, and is displayed on the screen in a format similar to that shown below.

```
           MODEL 49 SITE 0001 - REPEATER 01 STATUS
Version: 4.0
Installed Options: Telco Support  SMDR
                   Tone Generator 1.2+
                   7.328MHZ Hardware (H)

Switches and Jumpers as Last Read
EF Johnson Bus
 Telco Type: E&M

Dip Switches: TEST   VALIDATE  BAUD  POLL SYNC  AREA  REPEATER
               DN       DN     4800   UP    UP    0      01

Current Switches and Jumpers
EF Johnson Bus
 Telco Type: E&M

Dip Switches: TEST   VALIDATE  BAUD  POLL SYNC  AREA  REPEATER
               DN       DN     4800   UP    UP    0      01
# SMDR Records: 77
Avail. Rptrs: 01 05 09 13 17
Alarms (E=Enabled,D=Disabled):Sense 2:E Cur Value:1.2 Alarm:On
Sense 3:E Cur Value:5.0 Alarm:Off Sense 4:E Cur Value:5.0 Alarm:Off
SMDR:E Alarm:Off Sync:E Alarm:Off
```

Reset Model 49s
If you would like to do a "Soft" reset of your Model 49s from Multibas select COMM RESET MODEL 49s. Once Multibas has connected to the site you will be asked again if you want to Reset the Model 49s, answer Y and RETURN, Multibas will automatically disconnect from the site, then the Model 49s will reset.

Other
The COMM OTHER menu selection contains the choices shown below:

```
Change Password
Set Date & Time
Clear Call Accumulation
Clear Call Detail Buffers
Clear Alarms
Change Modem String
```

Change Password allows you to change the Password in the Model 49s, when a new password is selected both the Model 49s and Multibas's passwords will be changed. If you wish to only change the password in Multibas see OTHER FUNCTIONS below.

Set Date & Time allows you to set the date and time in your Model 49s. It is very important that you set the time of day when you install Model 49s since some of the advanced operating features of the Model 49 utilize its built-in clock chip that keeps track of the time of day and day of week. These features include deferred access during non-prime time, air time accumulation during prime and non-prime time, repeater loading statistics by the hour, and telephone call detail date and time-of-day marking.

Note: When setting the date and time, Sunday is considered to be the first day of the week.

Clear Call Accumulation and Clear Call Detail Buffers clears the appropriate information in **ALL** Model 49s at the selected site.

Clear Alarms clears any existing alarms, if the condition that caused the alarm still exists the alarm will be immediately set again.

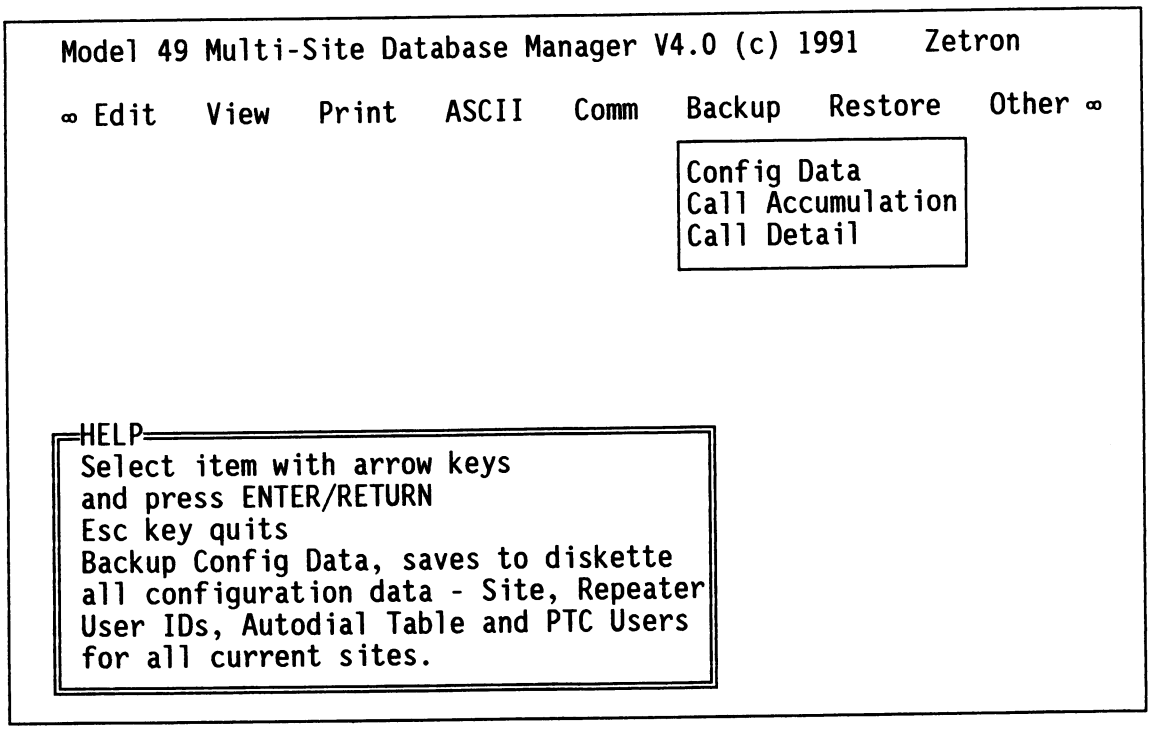
Change Modem String allows you to change the modem initialization string from a Model 49 to an external modem connected to its front panel port.

DATA BACKUP/RESTORE

It is very important that you periodically save an extra copy of your subscriber database. If your hard disk has trouble, or if you accidentally delete one of the Multibase files, or if some other disaster occurs, you will be very happy to have a recent copy of the database. We recommend that you do this daily.

Every time you EDIT the database, the files named ---.dat change on the computer hard disk. As a rule, if you don't have a "paper trail" from which you could easily edit your last backup, then you are in a tenuous position until you make a copy of your database onto "backup" floppy diskettes.

To back up your database, use the Backup Config Data menu item from the main menu:



Before beginning a backup, you need to prepare fresh diskettes with DOS compatible formatting information. You will need approximately one 360K diskette for every 1000 user ID's. So format enough blank diskettes before you start the backup process (FORMAT A: from the DOS C> prompt). The Config. Data, Call Accumulation, and Call Detail must be stored on separate diskettes.

It is also a good idea to put sticky labels on the diskettes that have the date and disk sequence number (MULTIBASE BACKUP - today's date - disk #n). As you remove each backup diskette from the computer, it is a good idea to "write protect" the diskette (black label covering the notch on 5-1/4" media; shutter open on 3-1/2" media).

Multibase will give you precise instructions on when to insert your formatted floppy diskettes into the computer. Keep more than one set of backups and rotate them through usage. For example, you might keep sets for the odd and even days of the month. That way, if one set becomes damaged, you are still protected.

If you need to restore the database from backup diskettes onto the computer hard disk, use the Restore Config Data menu item. Multibase will give you precise instructions about when to insert your backup diskettes into the computer. Make sure to insert the correct set of backups (if you have more than one set), and in the correct order. Before you insert each backup diskette into the computer, it is a good idea to "write protect" the diskette (black label covering the notch on 5-1/4" media; shutter open on 3-1/2" media).

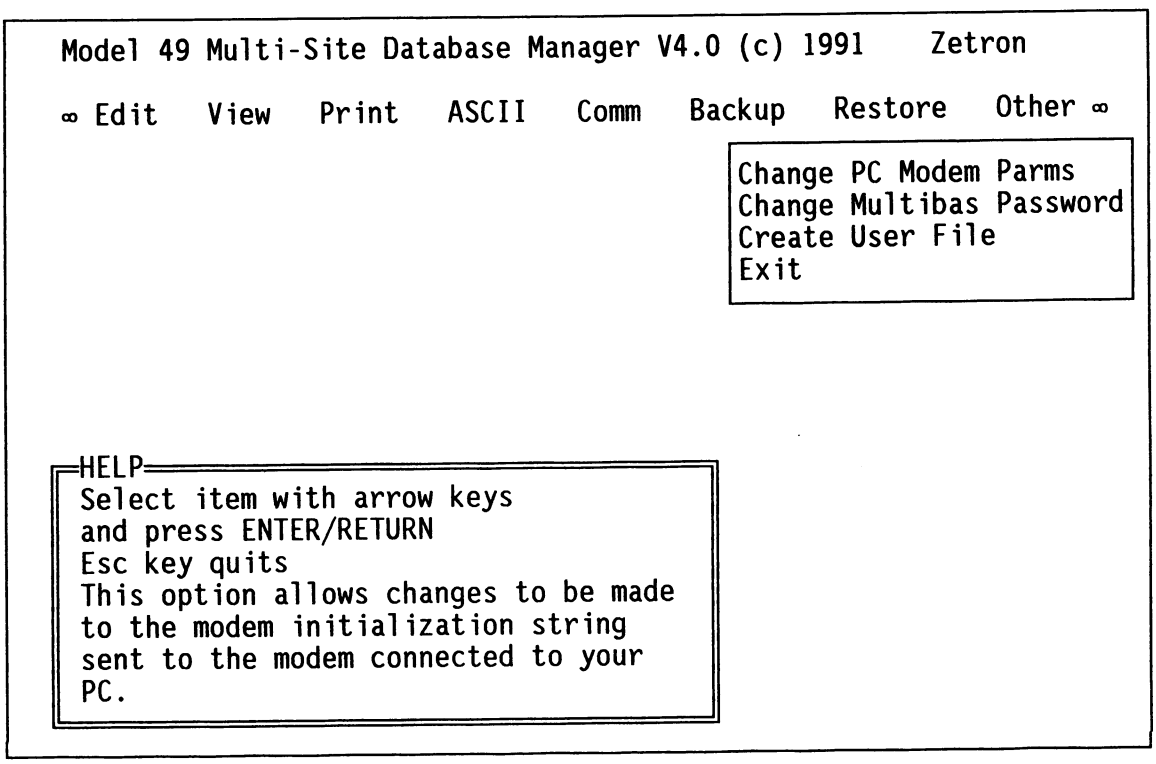
OTHER FUNCTIONS

The menu item labeled Other lets you change the initialization information sent by your office computer to the modem on your computer's serial port. This is sometimes necessary since not all brands of modem are truly "Hayes compatible".

This menu is also used to change the password used for Multibase to access your Model 49's so you can have extra protection against any computer except your authorized one accessing your Model 49's. This selection only changes the password in Multibas and not in the Model 49s. If you wish to change the password in both Multibas and the Model 49s use COMM OTHER CHANGE PASSWORD.

The Create User File menu option allows the *.U00 user file, which is used by the Zetron ZEBRA billing system, to be created for any programmed site without having to retrieve billing information from the site.

You can exit from Multibase by using the Esc key, or by selecting Other Exit.



PASSWORDS

Multibase provides a security feature to prevent unauthorized access. For example, if you leave your computer running Multibase in a high-traffic area and don't want unauthorized persons to access your Multibase files, you can enable passwords as described in this subsection.

The password feature is accessed by pressing Shift-F9 while in the main menu. Figure 1-1 shows the password screen layout:

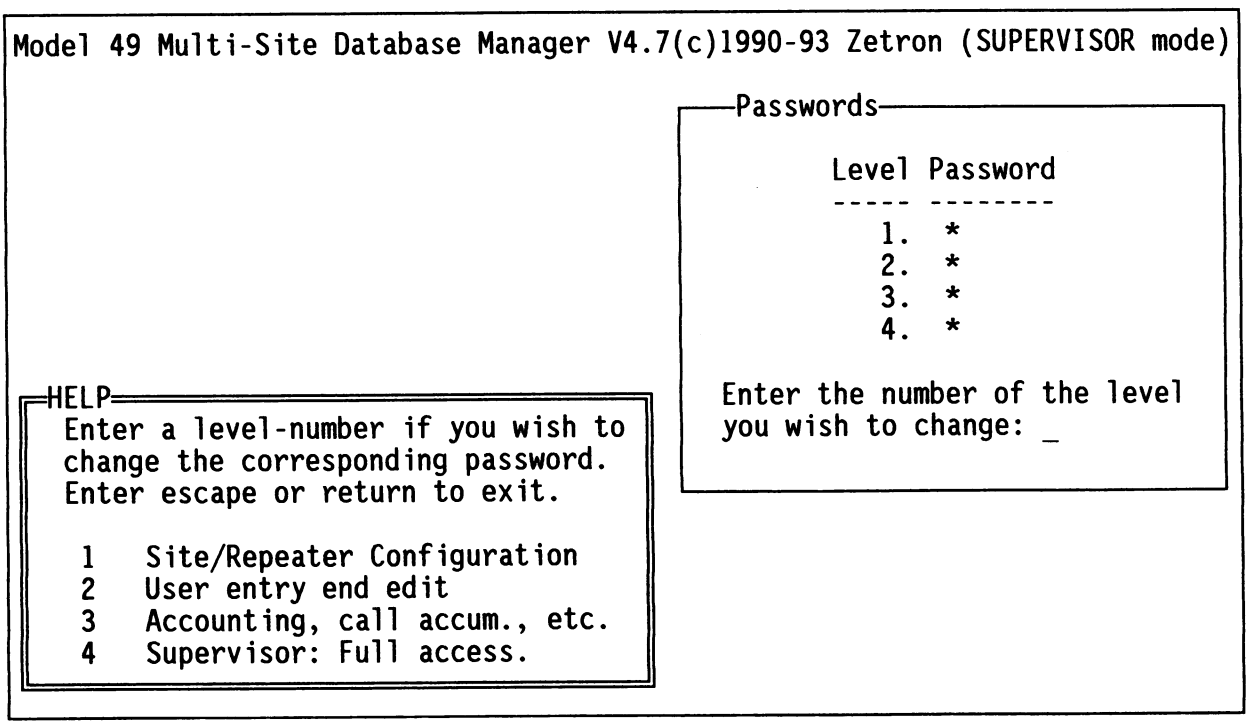


Figure 1-1. Password Screen

After first installing Multibase, Multibase defaults to full user access, which is noted in the upper right of Multibase's screen as "SUPERVISOR mode". This message is displayed to warn you that you have complete access to Multibase. Anyone else who knows the Shift-F9 procedure can change the password and possibly lock you out of the system. If this happens, see the Restoring Passwords subsection.

Multibase remains in the supervisor mode until Shift-F9 is pressed, passwords are changed, and Multibase is restarted.

Each of four levels of security is assigned a password. Users access their level of Multibase with the assigned password for that level.

Levels of Security
There are four levels of security and one lower-level, no password, restricted access mode called Level 0. The levels are numbered, but the numbers do not reflect increasing levels of capabilities. The capabilities of each level are as follows:

Level 0 — Access under the Comm menu: Monitor, Repeater Loading and Status Info. Can exit Multibase. No other access allowed. No password needed for this level.

Level 1 — Access to site and repeater configuration. Can use Edit, View, Print, and ASCII. Can reset Model 49, update and verify Model 49, change PC modem parameters, clear alarms, change modem string, and change own password.

Level 2 — Access to users, autodial, and PTCU. Can use Edit, View, Print, ASCII, Backup, and Restore. Can change own password, update, and verify.

Level 3 — This level is for accounting personnel. Can retrieve call accumulation and call detail. Can generate .UOO user files for each site and change own password. Can use backups and restores.

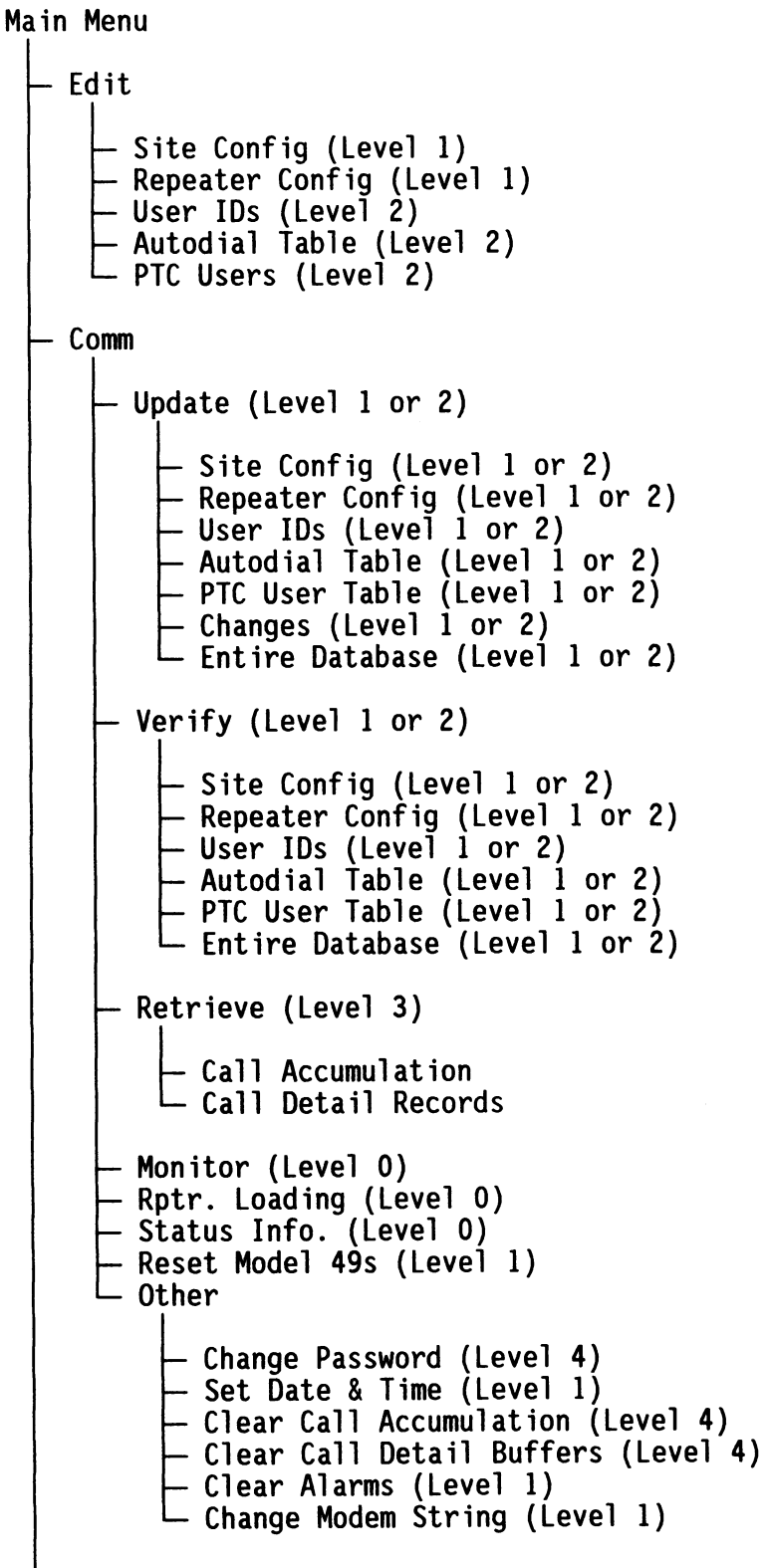
Level 4 — Access to all Multibase functions. Can change all passwords.

Figure 1-2 shows the level of security needed to access Multibase's menus.

To backup and restore files, Level 2, 3, or 4 is needed. To update and verify, Level 1, 2, or 4 is needed.

To change one's own password, Level 1, 2, or 3 is needed. To change all passwords, Level 4 is needed.

Note that these access assignments may change as new features are added to Multibase.



Continued ...

Figure 1-2. Level of Security for Each Menu (Sheet 1 of 2)

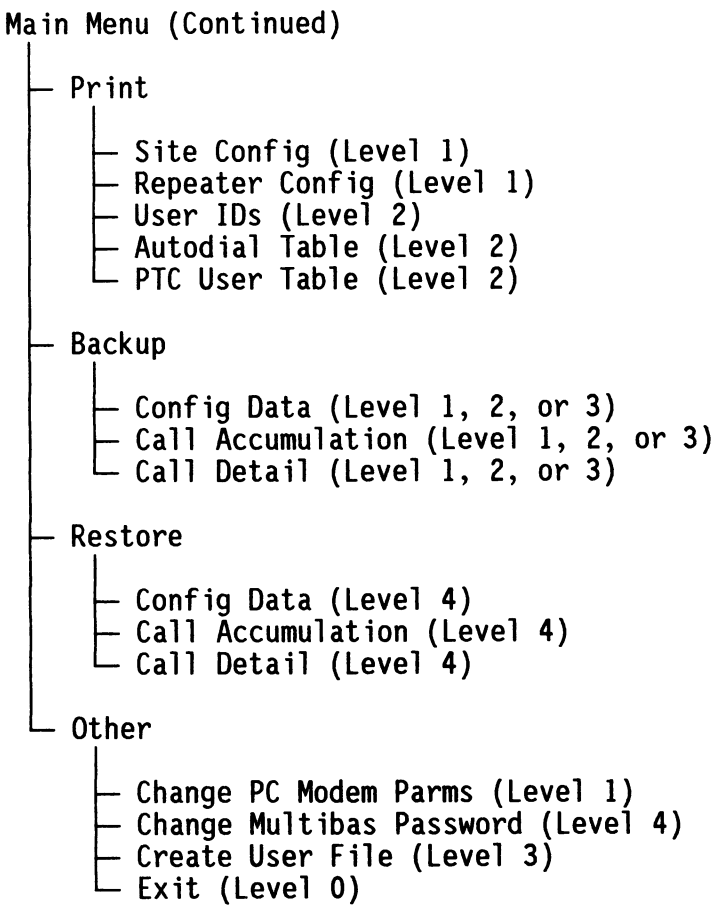


Figure 1-2. Level of Security for Each Menu (Sheet 2 of 2)

Entering Passwords
From the main menu, press Shift-F9 to get the password entry screen shown in Figure 1-1. The password entry screen is accessible *only* from the main menu.

Passwords must be 1 to 8 ASCII characters long. They are case sensitive, and no spaces are allowed within the password. Bad characters are automatically filtered out during entry.

Entering "HELP" as a password is not allowed and will not be accepted.

For each level that is to be password protected, enter a password.

After you have entered a password, you must press Enter to make it valid. To cancel the entry, press Esc. You must exit and restart Multibase to see the effect of the changes.

Entering * for Unlimited Access
If you want unlimited access to a level, enter a single star ("*") for the password. That level will be accessible to all users.

* * * * * * * * * * * * * * C A U T I O N * * * * * * * * * * * * * * *

If you add passwords to all levels except Level 4 and set the Level 4 password to *, when a user enters Multibase, the passwords will be ignored and he/she will be granted Level 4 access.

* *

Certain menu items are accessible from more than one level (that is they are shared). If a password exists for one level of a shared menu item and a star exists for another level of the menu item, access will be denied for users on the star's level.

If you enter the same password (not a star) for more than one level, a user with that password will have access to all levels with that password.

Note that "**" is a valid password and is not interpreted as a single star ("*").

Using Passwords
When Multibase is restarted, you will see the familiar main menu screen. Attempting to access a restricted menu item will result in a prompt asking you for your password. If you enter an incorrect password, you can try again by accessing that menu item. If you enter the correct password, the menu choice will be entered and you will have gained new access privileges. You cannot return to Level 0 without exiting Multibase. If you entered Level 4, you cannot return to any other level without exiting Multibase. The following diagram illustrates this:

Level 0 → Level 1 ↔ Level 2 ↔ Level 3 → Level 4

To prevent unauthorized access to Multibase, users must quit Multibase after they are done.

Changing passwords for Levels 1, 2, and 3
If you press Shift-F9 from the main menu while in security Level 1, 2, or 3, you will only be able to change the password for your current level. When entering a new password, entering "HELP" or "*" is not allowed. The procedure is the same as for password entry.

Restoring Passwords
Multibase provides a means of restoring passwords in case the supervisor forgets them or is locked out of the system.

* * * * * * * * * * * * * * * C A U T I O N * * * * * * * * * * * * * * *

This procedure gives you Supervisor privileges!

* *

You will need to contact Zetron by phone to perform the procedure.

When access is denied by Multibase, enter "HELP" as a password. A five digit number will appear (This number changes each time you enter "HELP"). Figure 1-3 shows a typical value returned after "HELP" is entered.

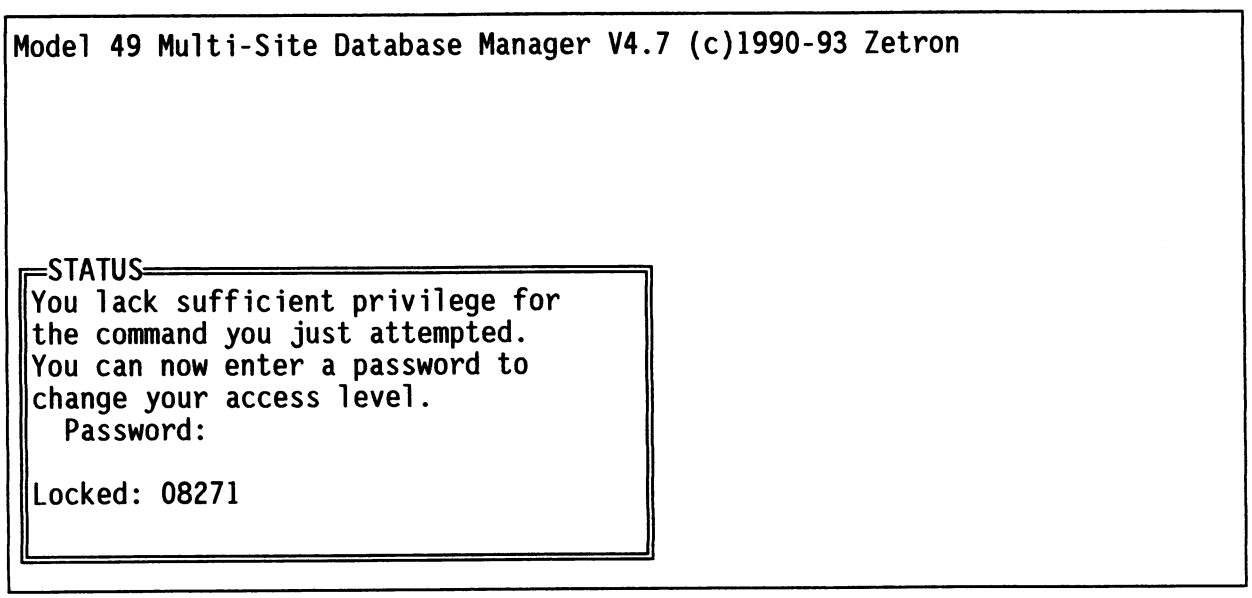


Figure 1-3. Screen Showing Locked Number

Call the Zetron Mobile System Division's Application Engineers at (206) 820-6363 and inform them you have forgotten your password. They will ask you for the number that appeared on the screen, in this case "08271". Then they will give you another number to enter as a new password. The system will unlock and you will now have Level 4 privileges. Press Shift-F9 to verify that your passwords have been restored. Remember your password or change it at this point. Do not reveal this procedure to unauthorized personnel, as they may call Zetron to attempt to gain level 4 access. If users forget their passwords, they should get help from your system supervisor. They should not call Zetron to restore passwords.

2. COMMUNICATING WITH A MODEL 49

PROGRAMMING

You program your Model 49 (and all Model 49's connected to the Zetron Subscriber Bus) in one of three ways:

1) Locally using RS-232 cabling between your PC and the front panel of the Model 49.

2) Remotely with one phone call from your personal computer to a Hayes compatible external modem connected to the Model 49's front panel port, or

3) Remotely with one phone call from your personal computer to an internal modem inside your interconnected Model 49.

LOCAL SHOP PROGRAMMING

You can connect your computer to the Model 49 in your shop for programming with local RS-232 cabling. For initial setup in your shop, or for site visits with a portable computer, you use a "COM" port on your computer and the Model 49 front-panel RS-232 connector:

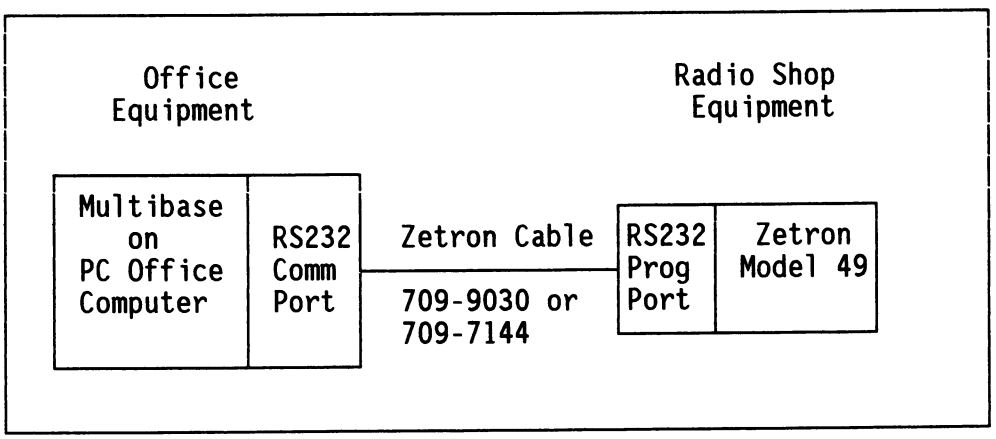


Figure 2.1 - Local Connection from Computer to Model 49

To set up your system for local programming:

* 1. Connect the programming cable from your computer's serial port to the 9-pin RS-232 port on your Model 49. (25-pin PC comm port - use Zetron cable 709-9030; 9-pin AT comm port - use Zetron cable 709-7144:

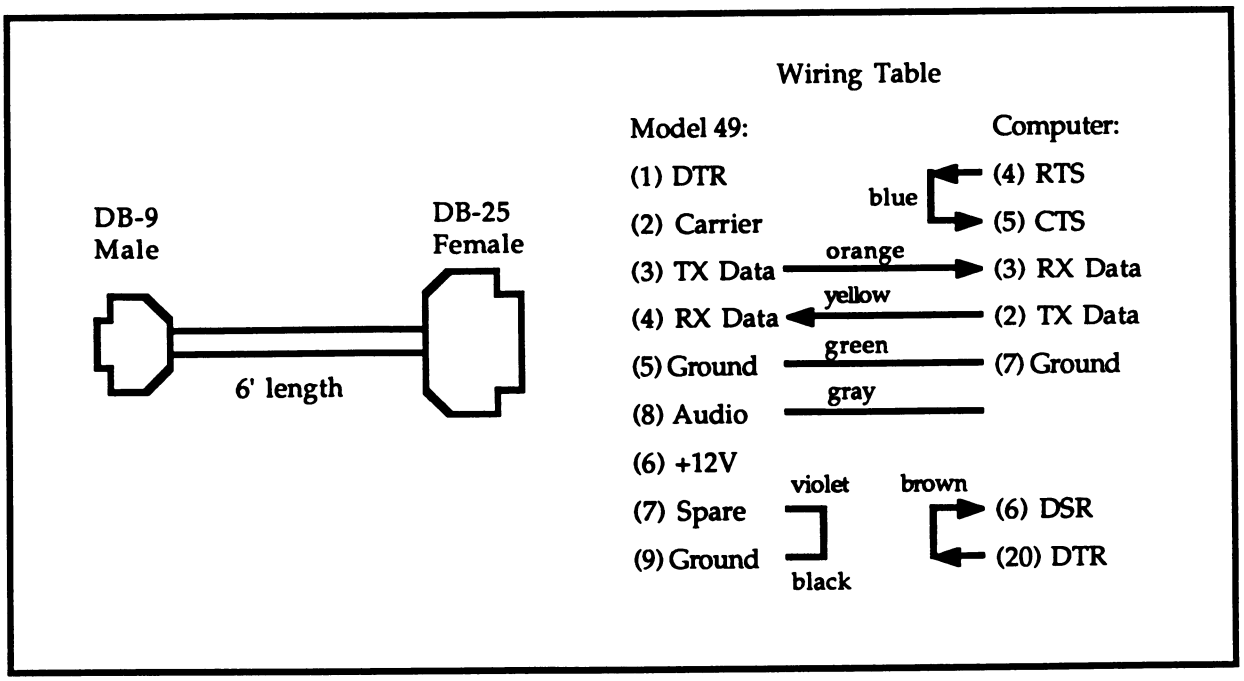


Figure 2.2 - Local RS-232 DB-25 Programming Cable (P/N 709-9030)

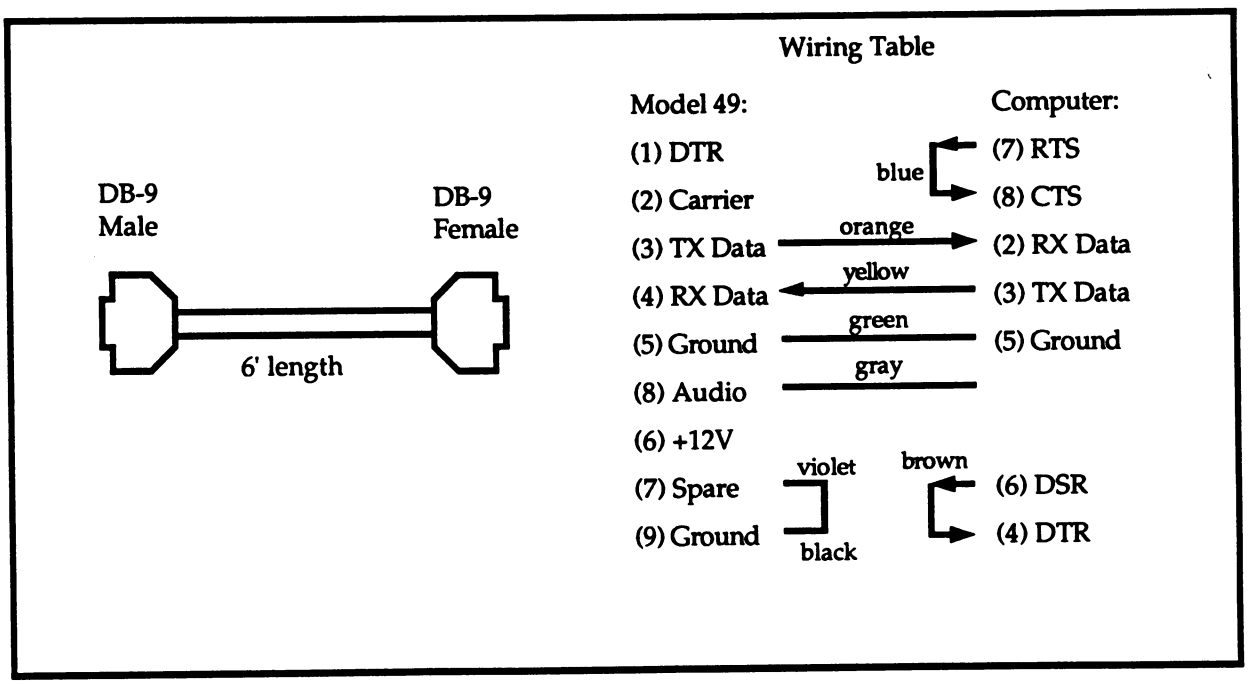


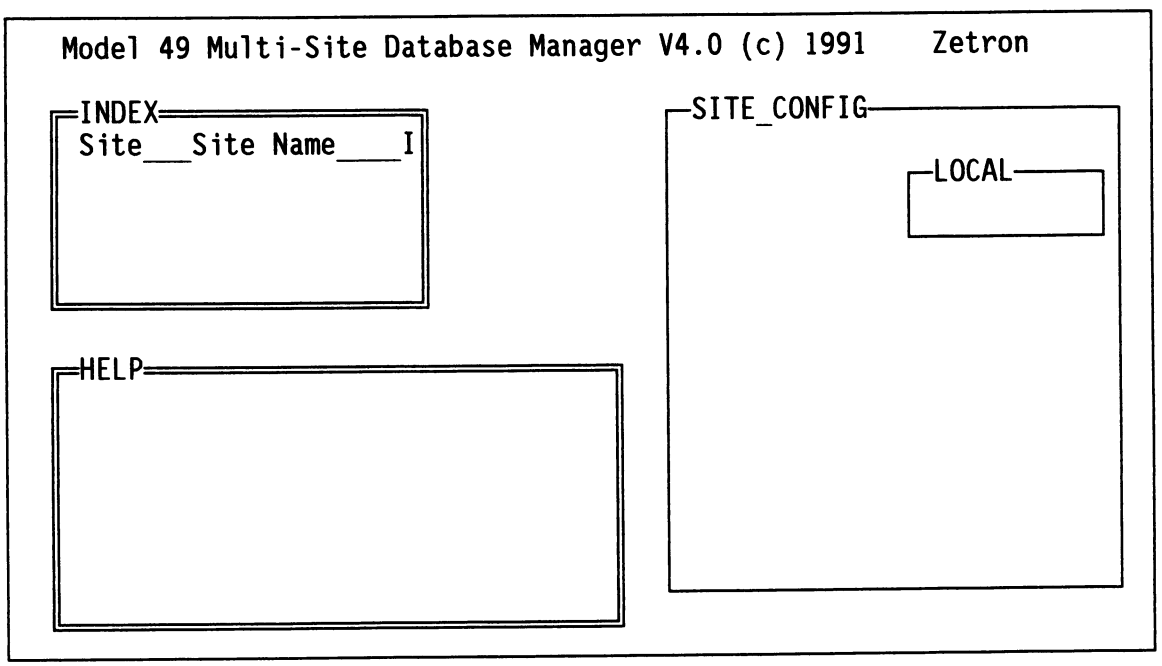
Figure 2.3 - Local RS-232 DB-9 Programming Cable (P/N 709-7144)

* 2. Select a communications speed on the Model 49 on the front panel switches (most people use 4800 bps):

Comm Rate Selected	Baud 2 (switch A:3)	Baud 1 (switch A:4)
* 300 bps	Down	Down
* 1200 bps	Down	Up
* 2400 bps	Up	Down
* 4800 bps	Up	Up

Note: Cycle Model 49 power off then on to make new switch settings take effect.

* 3. From Multibase, select the "Site Config" menu item. In the Site Access field, enter "L" for local access through your PC (no phone dialing) and enter the comm. speed you've set on the Model 49 panel switches. Also fill in the PC Comm Port # for your computer's RS-232 port.



* 4. Power up your Model 49. Select Multibase menu item "Comm Monitor" and you should get the repeater monitor screen to come up. If this works, your connection set up for shop work is good:

```
Model 49 Multi-Site Database Manager V4.0 (c) 1991     Zetron

            MODEL 49 SITE 0001 - REAL-TIME MONITORING

   DATE: 10/22/89   TIME: 10:23:17    LOADING:  20%

   RPTR #   HH-UUU  TYPE   TIME       RPTR #   HH-UUU  TYPE   TIME
    01      01-020    D    00:12       11        -
    02        -                       12        -
    03        -                       13      13-098    D    00:31
    04        -                       14        -
    05      05-145    I    01:07       15        -
    06        -                       16        -
    07        -                       17      09-117    I    03:29
    08        -                       18        -
    09      01-021    D    00:09       19        -
    10        -                       20        -

enter Esc to exit ....
```

Fig. 2.4 Real-Time Monitor Screen

Note: If this does not work and you are sure that your cabling and comm port selection are correct, then verify that the interrupt jumpers for your Comm port in your PC are set right: IRQ4 for COM1 or IRQ3 for COM2.

* 5. Now you can program your Site Config, Repeater Config, and User Config settings and load the settings into the Model 49 from the Comm Update menu (see Section 3).

EXTERNAL MODEM ON MODEL 49

If you have a dispatch-only Model 49, or want high speed modem access, you can connect a Hayes modem to the Model 49 front panel RS-232 connector. The Model 49 issues Hayes "AT" commands periodically to the modem to set its configuration.

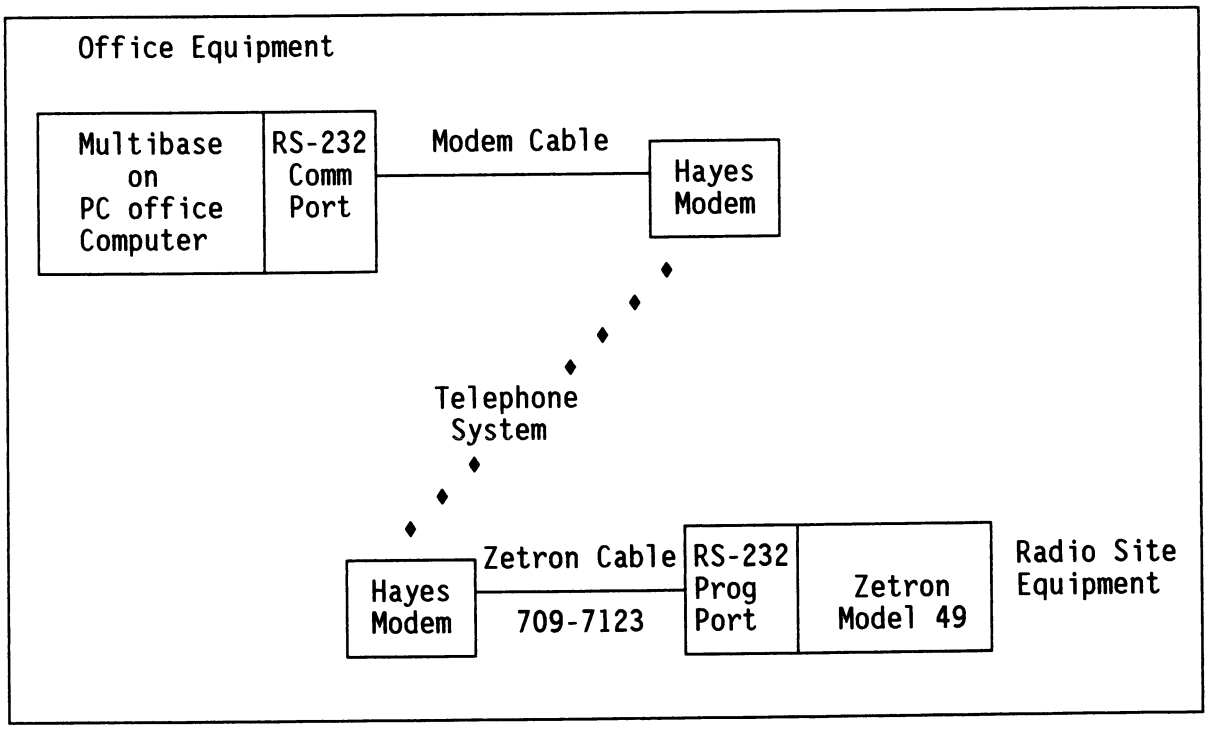


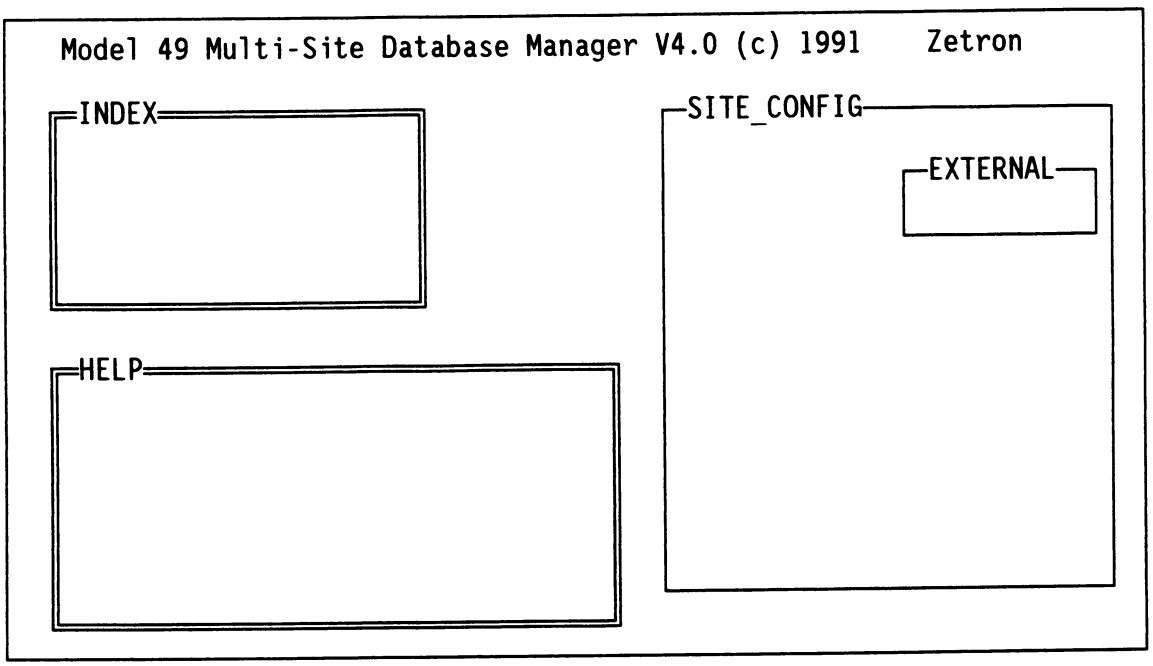
Figure 2.5 - External Modem on Model 49

* 1. Set the speed on the Model 49 front panel switches for the modem connected to the Model 49 Program Port (your modem will probably be capable of 2400 bps):

Comm Rate Selected	Baud 2 (switch A:3)	Baud 1 (switch A:4)
* 300 bps	Down	Down
* 1200 bps	Down	Up
* 2400 bps	Up	Down
* 4800 bps	Up	Up

Note: Cycle Model 49 power off then on to make new switch settings take effect. Each time the Model 49 is reset, it issues "AT" commands to program the modem.

* 2. From Multibase, select the Edit Site Config menu item. In the Site Access field, enter "X" for modem external to your Model 49. Enter the phone number of the site, and the speed (baud rate) of the modem. Also fill in the PC Comm Port number for your computer's RS-232 port.



* 3. Cable the 9-position Program Port on the Model 49 to the 25-position Comm Port on the external modem. Use the Zetron 709-7123 cable (see wiring below). The DTR wire in the cable is used to force the modem to reset when software commands don't work.

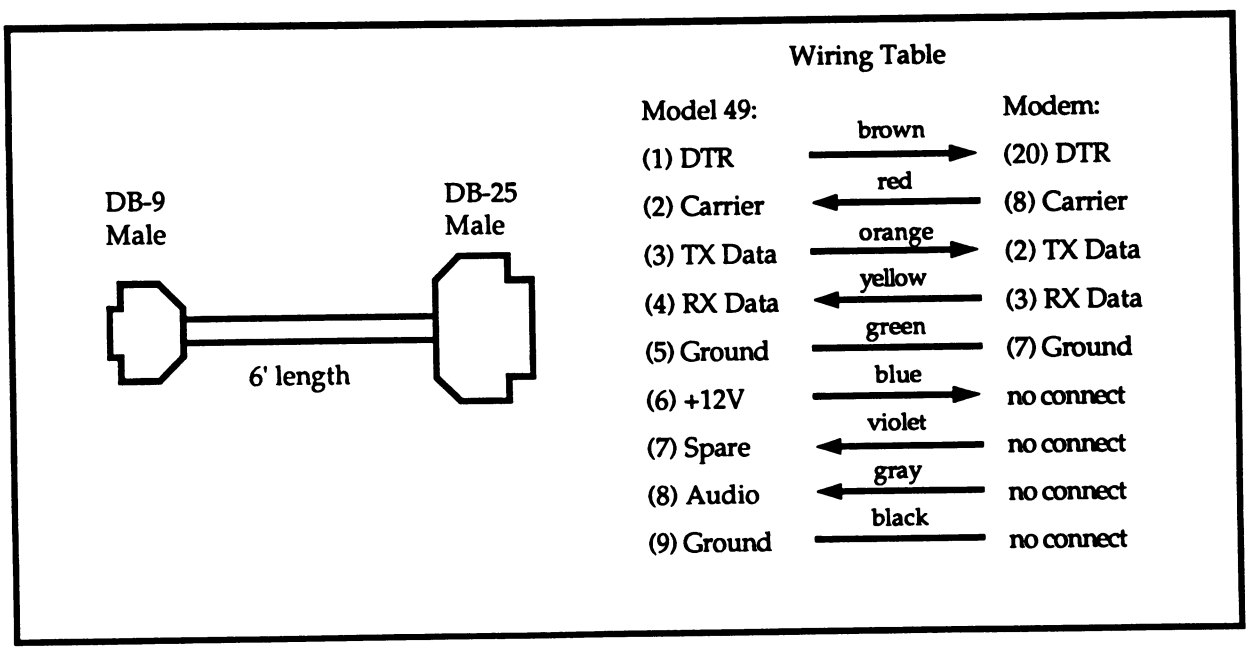


Figure 2.6 - Zetron Model 49 Modem Cable (P/N 709-7123)

Note: See the beginning of this section for a list of compatible modems.

* 4. Make sure to set your Model 49 modem to use the DTR wire for reset. On a Hayes 1200 bps modem, you do this with switch SW1 in the UP position. On most 2400 bps modems, there is a Hayes "AT" command that the Model 49 sends to the modem to do this. Make sure that your modem is set for "Smart" operation so it listens for the Hayes "AT" commands.

  Note: Power up the modem first, then power up the Model 49. After power up and at periodic intervals (every few minutes), the Model 49 gives the modem "AT" commands to keep it working. If you contact Zetron engineers for assistance, make sure you have documentation about your modem in hand for reference.

* 5. Connect the modem on your computer to an RS-232 COM port. Most computer stores carry the necessary modem cable, normally a straight-through wiring. Make sure that your modem is set for "Smart" operation so it listens for the Hayes "AT" commands.

  The connectors have to match the gender and number of pins on your PC and your modem. Most modems have female 25-position connectors, so the cable should have a male DB-25. Most PC Serial COM ports have male 25-position connectors, but some have 9-pin connectors. Make sure you locate the <u>serial</u> port on your PC, <u>not</u> the parallel Centronics printer port. Most PC's have female 25-position connectors for printer ports.

* 6. The modem on your computer requires certain "handshaking" with Multibase. Multibase has been set to talk to Hayes 1200 baud modems. If the modem does not respond to the Hayes "ATZ" and "ATDT" commands, you may have to change the initialization command string sent by Multibase to your computer modem. Use the Multibase menu item Other Change PC Modem Parms to fill in the necessary information.

  Note: If you contact Zetron engineers for assistance, make sure you have documentation about your modem in hand for reference.

* 7. Connect the modular RJ11-C jack labeled LINE or TELCO on each modem to a telephone line. (Don't connect to the jacks labeled PHONE or LOCAL, these are for telephone sets).

You will need <u>two</u> separate telephone lines. Connecting one modem to the other without a telco network in between will not work.

* 8. Make sure your modems and the Zetron are powered ON. Select Multibase menu item Comm Monitor. Your PC should dial the telephone, connect to the Model 49, and display the repeater monitor screen (refer to figure 2.3).

Note: If this does not work and you are sure that your cabling, speed switches, telephone number, and comm port selections are correct, then verify that the interrupt jumpers for your Comm port in your PC are set right: IRQ4 for COM1 or IRQ3 for COM2. Also see the list of compatible modems earlier in this section.

* 9. Now you can program your Site Config, Repeater Config, and User Config settings and load the settings into the Model 49 from the Comm Update menu.

MODEM INSIDE MODEL 49

If you have the Interconnect option in your Model 49, it has 1200 bps modem capability. You can call the Model 49 through its interconnect telephone port and update database settings and retrieve billing information without extra phone lines or modem equipment.

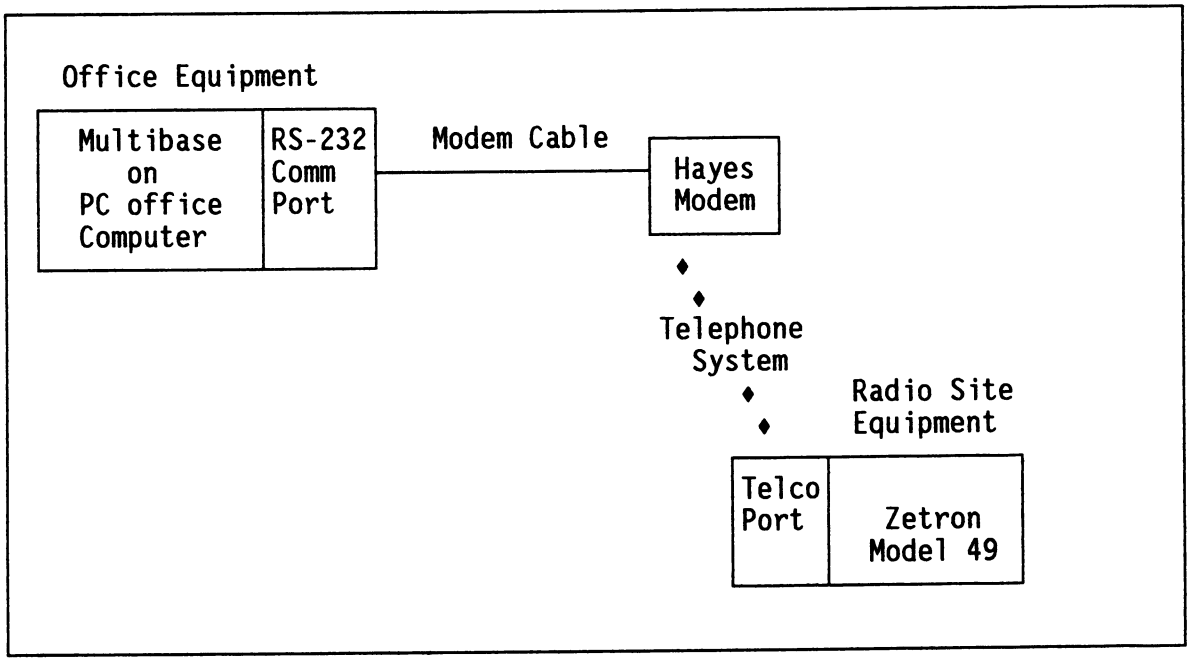
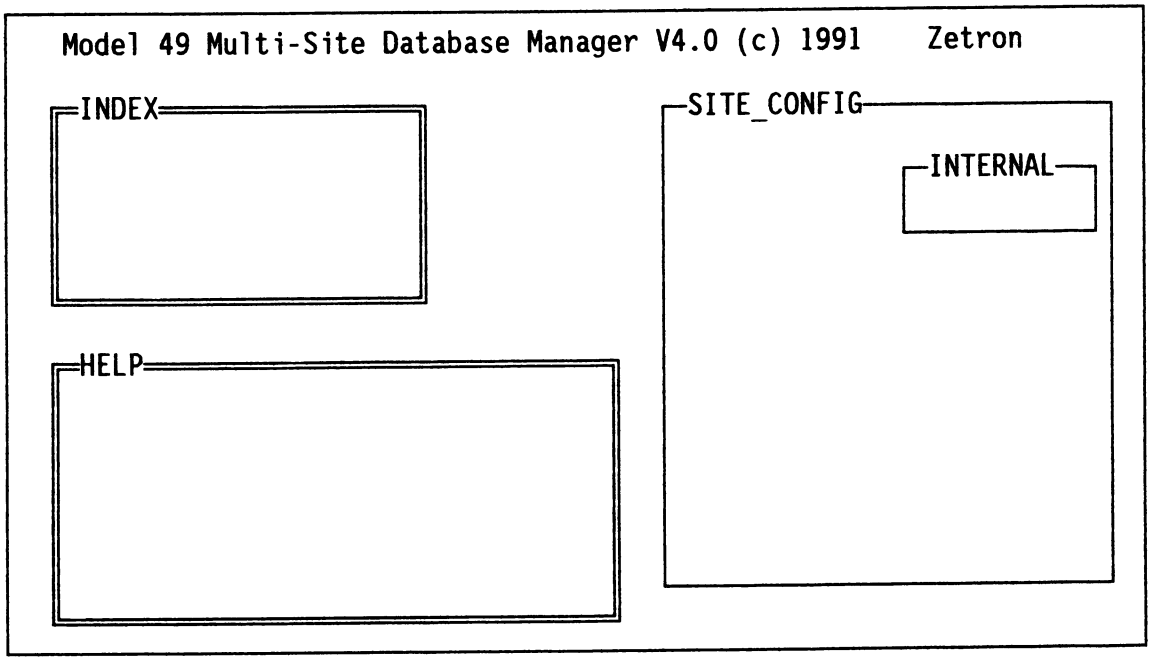


Figure 2.9 - External Modem on PC and Interconnect Modem in Model 49

* 1. From Multibase, select the "Site Config" menu item. In the Site Access field, enter "I" for modem internal to your Model 49. Enter the phone number of the site, and enter 1200 for the speed of the modem in your PC. Also fill in the PC Comm Port # for your computer's modem card.



* 2. Connect the modem on your computer to an RS-232 COM port. Most computer stores carry the necessary modem cable, normally a straight-through wiring.

  The connectors have to match the gender and number of pins on your PC and your modem. Most modems have female 25-position connectors, so the cable should have a male DB-25. Most PC Serial COM ports have male 25-position connectors, but some have 9-pin connectors. Make sure you locate the serial port on your PC, not the parallel Centronics printer port. Most PC's have female 25-position connectors for printer ports.

* 3. The modem on your computer requires certain "handshaking" with Multibase. Multibase has been set to talk to Hayes 1200 baud modems. If the modem does not respond to the Hayes "ATZ" and "ATDT" commands, you may have to change the initialization command string sent by Multibase to your computer modem. Use the Multibase menu item Other Change PC Modem Parms to fill in the necessary information. Make sure that your modem is set for "Smart" operation so it listens for the Hayes "AT" commands.

Note: If you contact Zetron engineers for assistance, make sure you have documentation about your modem in hand for reference.

* 4. Connect the modular RJ11-C jack labeled LINE or TELCO on each modem to a telephone line. (Don't connect to the jacks labeled PHONE or LOCAL, these are for telephone sets).

  You will need <u>two</u> separate telephone lines. Connecting one modem to the other without a telco network in between will not work.

* 5. The audio levels on the Model 49 telephone interface card must be loud enough to permit the modem to operate. Please adjust your Model 49 as described in the Model 49 Operation and Installation Manual before

* 6. Make sure your modem and the Zetron are powered ON. Select Multibase menu item "Comm Monitor". Your PC should dial the telephone, connect to the Model 49, and display the repeater monitor screen (refer to Fig. 2.3).

Note: If this does not work and you are sure that your cabling, speed switches, telephone number, and comm port selections are correct, then verify that the interrupt jumpers for the COM port in your PC are set right: IRQ4 for COM1 or IRQ3 for COM2. Also check the list of modems earlier in this section.

* 7. Now you can program your Site Config, Repeater Config, and User Config settings and load the settings into the Model 49 from the Comm Update menu.

3. SETTING UP A DATABASE

DATABASE OVERVIEW

The default state of the Model 49, after a hard reset, makes all ID's valid dispatch ID's.

The programming of the Model 49 database is divided into 5 sections: Site Configuration, Repeater Configuration, User ID's, Autodial Table, and Push to Connect (PTC) Users.

The Site Configuration programming is used in all channels at a site and will be found in each Model 49.

The Repeater Configuration programming is what gives each channel its own operating personality. Each Model 49 contains the programming for all channels in a system. It is the DIP switches in the front of the Model 49 that determine which channel or repeater programming is used for this particular channel. For systems with mixed logic, Zetron and EFJ or Zetron and Uniden, it is important that Multibase have all channels, including EFJ and Uniden logic channels, programmed in the Repeater Configuration. For EFJ or Uniden logic channels only the repeater number is used in general operation, therefore only the repeater number must be programmed in Multibase.

The User ID programming gives a user dispatch or interconnect calling privileges as well as other options, such as Full Duplex Y/N, Companding Y/N, etc.

The Autodial Table (also called system speed dial) can be programmed to allow a preprogrammed phone number to be dialed by an interconnect mobile user by pushing star and a two-digit number, *nn.

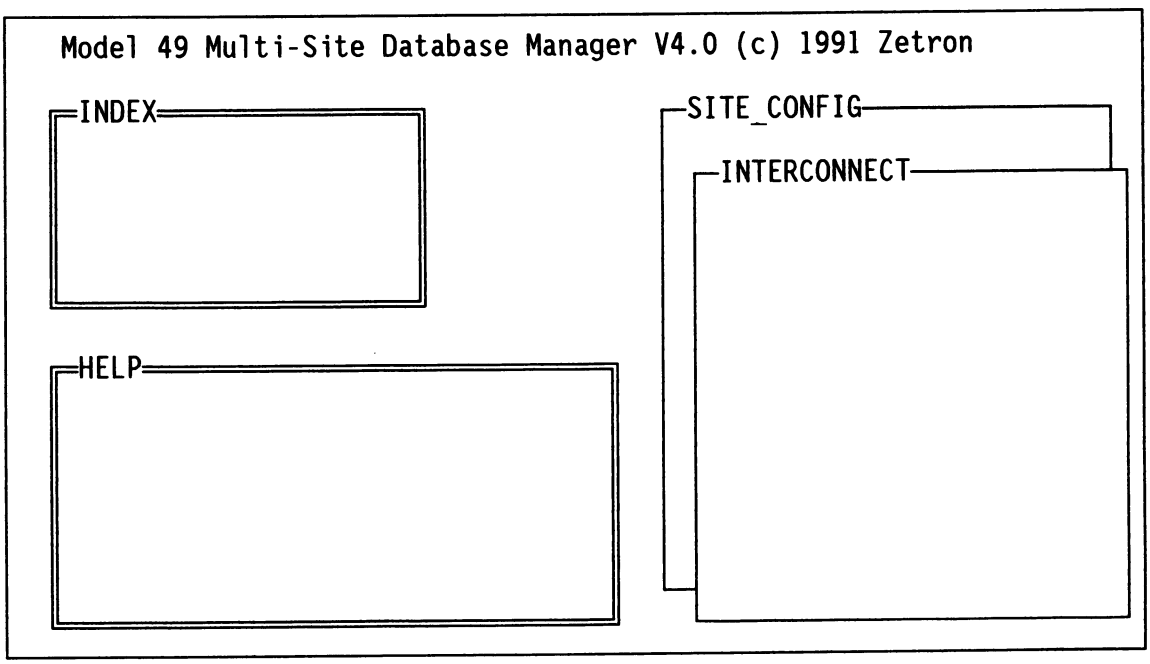
The PTC User programming is for an interconnect user that has delayed or instant access to the autodial table. This user doesn't have to enter any DTMF digit on the keypad; therefore, microphones that do not have DTMF keypads can do speed dial interconnect calls.

SITE INFORMATION

To begin defining a database for your new Model 49 LTR site you must first create a site. The Site database contains information that applies to all the repeaters that are connected together as a System.

From the Multibase main menu, select Edit Site Config and press the Enter key. the blinking cursor appears in the Index window. Press the Enter key again and the cursor moves to the Site Config window on the right side of the screen. Begin typing in a number for your new site and Multibase will start a new data record filled in with default values.

You can move around from one data field to the next with the Up-Arrow and Down-Arrow keys. Other keys perform additional functions. Press F1 to see the Guide window with hints on what the keys do. Press F1 again to hide the Guide.



The Site Configuration contains the following fields:

Site Number: A four-digit number that uniquely identifies the site. This number is used to create the corresponding Repeater, User, Autodial and PTC User files for each site. (Range: 0000-9999, Default: None)

Site Name: Name of the site, up to 20 characters. This field is not required, although it can be used for sorting records for printout etc.

Site Access: This field indicates what method is being used to communicate with the site for programming. Depending on what is entered here a pop-up window will appear in which you will enter the site phone number if required and the baud rate. (Refer to section 2 for more details) (Range: I,L,X, Default: L)

PC Comm Port: This field indicates what port on your PC should be used when communicating with the Model 49 Site. (Range: 1-4, Default: 1)

Alarms: Enter Y(es) to this field if you are making use of the alarm feature at this site. When Y <return> is entered a Pop-Up window will appear containing the following fields: (Default: No)

> **Alarm ID:** The User ID (HH-UUU) to contact when an alarm condition is met. This feature of the alarms can be enabled or disabled for each individual alarm. When this User is contacted they will hear an "Alarm Tone" and a voice prompt (if available). (Default: None)
>
> If '00' is entered as the home repeater, the repeater number on which the alarm occurred is used as the home.
>
> **Alarm Rpts:** The number of times the alarm is to be repeated once an alarm condition is met. After the Alarm Rpts has been meet for a particular alarm condition, if another alarm occurs the alarm will be sent again. (Range: 0-999, Default: None)
>
> **Alarm Interval:** Amount of time to wait between alarm repeats. (Range: 0-999 secs, Default: None).

Prime Time Intervals: These fields set up start and stop times for 2 prime time intervals. Airtime accumulation is stored either as Prime or Non-Prime. If nothing is entered in these fields, or if the start time is equal to the stop time, all airtime will be stored as Non-Prime time. (Default: 00:00)

Compat. Mode: This field affects how a Model 49 will sound to a user accessing the system. If your site consists of only Model 49s any of the three choices can be selected. If your site consists of Model 49s and EF Johnson Logic "J" should be selected, and if your site consists of Model 49s and Uniden Logic "U" should be selected. If "Z" is selected, a pop-up window appears with the question: "Play End-of-Call Tone? Y/N". If N is selected, no tones are played before the call is disconnected. (Range: J,U,Z, Default: J)

Unassigned Users: This field selects if unassigned users should be treated as Valid or Invalid. By default a new Model 49 considers all users to be unassigned and treats them all as valid dispatch. If you select invalid for this field only those users that you program as valid in the User Config will be given access to the system. (Range: I,V, Default: V)

Idle Msg Time: This field indicates the amount of time the Model 49 is to wait between transmitting idle repeater packets. This value should normally be set to 10 seconds. (Range: 0-25, Default: 10 secs)

COR Hold Time: The amount of time the COR signal may drop or fade without the mobile losing the repeater. It is recommended that this field be left at the default value. If this value is set too long, frequent audio squelch tails may result. (Range: 0-2 secs, Default: 0.3)

Repeater Hold Time: The amount of time to hold the repeater keyed after transmitting a data packet. If the PTT relay is "chattering" when the home channel is free, but one of the mobiles has been trunked off, this value should be increased. (Range: 0.0-5.0 secs, Default: 0.3)

Repeater Timeout: The maximum amount of time a dispatch mobile may continuously occupy the repeater. Once this time elapses the mobile is invalidated - turn-off codes are sent, and no audio is repeated. The mobile will however, remain on the channel until PTT is released. (Range:30-999 secs, Default: 180).

Cross Busy Delay: This field sets the amount of time in 100 ms steps that the Model 49 will delay after detecting a "cross busy" condition on Sense 1 before the Model 49 will actually be busied up. This allows COR to be fed into Sense 1, and the delay allows time to decode LTR packets and not busy-up if the COR is from an LTR mobile. This field has no effect if the Cross Busy feature is not being used. (Range: 0-7 [100 ms steps], Default: 0).

Interconnect: If any of the repeaters in your system are interconnected you must answer Y(es) to this question. Once you have entered Y for this field another window will Pop-Up containing information that applies to interconnect operation. (Default: No)

> **DTMF Timeouts - Interdigit:** The maximum amount of time the Model 49 will wait between DTMF digits before it concludes that dialing is complete. (Note: The Model 49 will also stop regenerating digits on outgoing calls if PTT is released between digits.) (Range:2-9 secs, Default: 5)
>
> **DTMF Timeouts - First Digit:** The maximum amount of time the Model 49 will wait for the first DTMF digit to be entered. If the first digit is not entered within this time the call will be dropped. (Range: 2-9 secs, Default: 5)
>
> **Regenerated Digits - Min:** The minimum number of digits required from a mobile before the Model 49 will assume dialing is complete. If less then the minimum digits is entered and the interdigit timeout expires, the call will be dropped. (Range:1-12 digits, Default: 7)
>
> **Regenerated Digits - Max:** The maximum number of digits that will be regenerated by the Model 49. Extra digits may or may not be lost, depending on if the user is allowed to dial after regeneration is complete. (Range:3-16, Default: 11)
>
> **Require Dialtone:** This field determines if dialtone is required for the Model 49 to make an outgoing call. If N is entered, the Model 49 goes ahead and dials after the Start Supervision Seek Time, even if dialtone is not detected. (Range: Y/N, Default: N)

Mobile Turn-Around Time: The maximum amount of time a half-duplex mobile is allowed between transmissions. A warning "beep-beep" is played 5 secs before this time expires, the mobile must key-up immediately to prevent the call from being disconnected. (Range: 1-90 secs, Default: 30)

Mobile Answer Time - A: The maximum amount of time that ringing will be issued to the mobile for an incoming landline call if mobile answer time A is specified for the called user ID. (Range: 10-90, Default: 30)

Mobile Answer Time - B: The maximum amount of time that ringing will be issued to the mobile for an incoming landline call if mobile answer time B is specified for the called user ID. (Range: 10-90, Default: 30)

Overdial Access #: If Y(es) is entered here callers must overdial the users 4-digit access code (programmed in the User Config) instead of the 5 digit home repeater and ID code to contact a user. (Default: No)

Repeat Audio Half-Duplex: A Y(es) entered here indicates that audio should be repeated out the transmitter on half-duplex calls. This allows multiple mobiles with the same interconnect ID to hear the whole phone conversation. Otherwise, only the phone side of the conversation will be heard. (Default: Yes)

Overdialing Time Limit: The amount of time after the beginning of a call that DTMF overdialing will be allowed. This field is only used if D or A is selected for the 2ND Dialtone/DTMF Thru field, full overdial is allowed otherwise. (Range: 0-250 secs. Default: 0)

2ND Dialtone/DTMF Thru: This field sets some conditions that apply after DTMF regeneration is complete. 'B' selects disconnect on 2nd dialtone or 5 busy cycles. Dialtone is only detected when the mobile is unkeyed. 'D' selects no DTMF thru, extra digits are inserted whenever DTMF is detected from the mobile to prevent the user from making additional calls. If the Overdialing Time Limit is greater then 0, then DTMF is allowed until that time expires. 'A' selects both conditions 'B' and 'D'. 'N' selects none. (Range: B,D,A,N, Default: N)

Prompt Tone Level: This field selects the level at which prompt tones will be played. 'H' = Half Level, 'F' = Full Level. DTMF is always played at full level. (Range:H,F, Default: F)

Warning Tone Time: This field sets a time after which a warning tone is played. The warning tone is repeated three times at a 15-second interval. This tone can be used to warn users that their call has exceeded some limit and billing has started or the billing rate has gone up. A 0 entered in this field indicates that no tones will be played. (Range: 0-999 secs, Default: 0)

Min. Call Time to Store: This field sets the minimum call length required on an interconnect call before time is added to the call accumulator, or a record is stored in SMDR. For Toll calls if the call length exceeds the minimum of 30 secs, and the min. call time, it will be stored in the SMDR. If this field is set > 0 it will greatly reduce the number of records stored in the SMDR since error calls will not be stored. (Range: 0-999 secs, Default: 0)

Round Call Accum. to Nearest Min.: A Y(es) entered in this field causes the call time for interconnect calls to be rounded to the next minute before it is stored in the call accumulator. If less then 6 secs the time is rounded down, otherwise it is rounded up. Dispatch call times are never rounded. (Default: No)

Edit Dynamic Call Limit Table: This table sets up the interconnect call limits for incoming and outgoing calls for both low and high priority users. These limits are set to a default of six minutes. If you would like to take advantage of the Dynamic limiting feature of the Model 49 or would like limits other then six minutes you must enter Y to this question and hit RETURN. When the Dynamic Call Limit Table appears fill in the values you would like.

Edit Max. Simultaneous Calls: If you would like to limit the maximum simultaneous calls allowed on the system at any one time enter Y to this question and hit RETURN. When the Max. Calls Table "Pops-Up" fill in the values you desire.

Edit Prefix Tables: If you would like to set-up some allowed or restricted prefixes, enter Y to this question and hit RETURN. Two tables of allowed/restricted prefixes are available, each table can be individually marked as allowed or restricted, and up to 10 4-digit prefixes can be entered in each table. A '?' can be entered in place of a digit, and is treated as a wildcard. These tables are then enabled by user ID. If a user has toll privileges they will be allowed all local calls and the prefixes will only apply to toll calls. (Default: None)

Note: 911 will always be allowed regardless of the number of required minimum digits. However, if 911 is restricted in the restrict table 911 won't be allowed.

When you have finished entering your new site press the F10 key to save record. You may continue entering new sites or changing existing ones just by typing on the screen.

When you have your sites the way you want them, press Esc twice. Multibase will ask if you are done with editing. Answer Y for yes. The main menu will appear. Then proceed to enter your repeater settings (see following section).

REPEATER INFORMATION

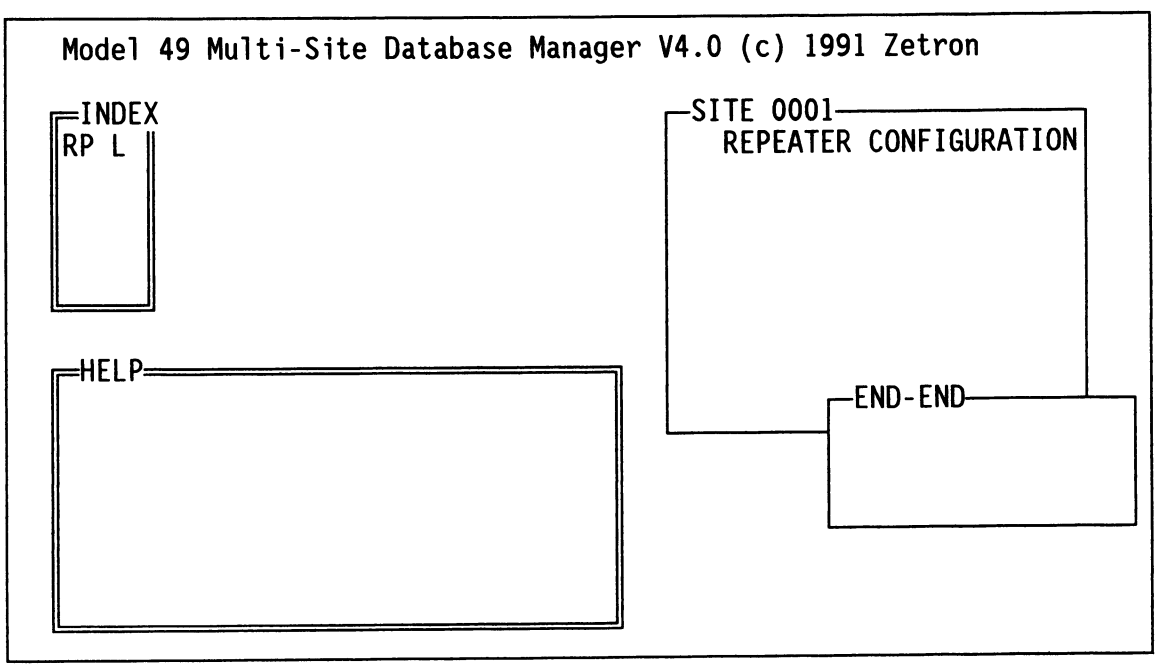
The Repeater database contains information about all of your repeaters (Zetron, Johnson, and Uniden) for each site. Your Zetron units use the information about the non-Zetron ones for validation and free repeater allocation.

From the Multibase main menu, select Edit Repeater Config and press the Enter key. Multibase will present you with a list of sites that you have programmed. Select one site and press Return. If only one site has been programmed, that site will be automatically selected.

The blinking cursor appears in the Index window. Press the Enter key again and the cursor moves to the Repeater Configuration window on the right side of the screen. You can move around from one data field to the next with the Up-Arrow and Down-Arrow keys. Other keys perform additional functions. Press F1 to see the Guide window with hints on what the keys do. Press F1 again to hide the Guide.

Begin typing in a repeater number (1 to 20) for your new repeater and Multibase will start a new data record filled in with default values.

Fill in the repeater settings. These settings can be different for each repeater logic/interconnect at the site. The settings for voice prompts, compandor, and telephone line type will not apply unless your Model 49 is equipped with these options.



Repeater Configuration Contains the following fields:

Repeater #: Number of the repeater being programmed. (Range: 1-20)

Trunking: From: This field provides information to the repeater you are programming on how to make its trunking decisions. It is recommended that this field be left as "T" - use Telco Line type. Other settings can affect the efficiency of your system if used incorrectly. Five settings are available for this field. (These settings only affect how the next free repeater is determined):

T - Use Telco Line Type. This repeater will trunk according to its Telco Line Type. If the Telco Line Type is 'N' (None) or 'D' (DID), or the Outgoing calls is 'N(o)' this repeater will trunk to other repeaters designated as dispatch first. If Telco Line Type is 'E' (End-End) or 'M' (E&M) this repeater will trunk to other interconnected repeaters first.

D - only To Dispatch Channels. This repeater will only trunk to other repeaters designated as dispatch or no outgoing calls allowed. If only interconnected channels are available the free repeater field will be set to 0 indicating no free channels.

I - only to Interconnect Channels. This repeater will only trunk to other repeaters designated as interconnect with outgoing calls allowed. If only dispatch channels are available the free repeater field will be set to 0 indicating no free channels.

W - only to Networked Channels. This repeater will only trunk to other repeaters designated as "Networked" in the Trunking: From field.

N - Not to trunk at all. The next free repeater will always be set to zero.

Trunking: To: This field provides information to the other repeaters in the system as to how you want it treated for trunking purposes. It is recommended that this field be set to 'T' - use Telco Line Type. Other settings can affect the efficiency of your system if used incorrectly. Seven settings are available for this field. These settings only affect how the free repeater is determined.

T - Use Telco Line Type. The telco line type is used to determine if this repeater should be treated as dispatch or interconnect.

A - As Next Available. This repeater is always trunked to if it is available regardless of its line type.

D - As Last Available Dispatch. Other dispatch repeaters will be used if available, this repeater will only be trunked to if it is the last dispatch available. (This setting overrides the Telco Line Type for trunking purposes.)

I - As Last Available Interconnect. Other interconnect repeaters will be used if available, this repeater will only be trunked to if it is the Last Interconnect available. (This setting overrides the Telco Line Type for trunking purposes.)

L - As Last Available. This repeater will only be trunked to if all others are busy.

W - As Networked. This repeater is trunked to as the last dispatch or by repeaters marked to Trunk From: As Networked.

N - Not at all. This repeater is never designated as the next free repeater. This repeater does however trunk to other repeaters in the normal manner.

When more than one repeater has the same programming for "Trunking To" and "Trunking From" the software will treat the 2 repeaters the same and can trunk to either of the two channels.

Play Station ID: If you wish this repeater to play the Morse code station ID enter Y <RETURN> to this field and enter the interval and call sign:

```
Play Station ID:Y

 Interval:__
 Call Sign:_________
```

Only one repeater in each system should be set to play the Station ID.

Alarms Enabled: If you wish to make use of the alarm monitoring capability of this Model 49 enter Y. Each alarm can be enabled individually as desired. (The Alarm ID is entered in the Site Config.)

```
Alarms Enabled:Y

┌ALARM-FEATURE──────────────────┐
│                               │
│Sense 2 -                      │
│  Enable Alarm:_               │
│  Valid Range - Low:___ High:___
│Sense 3 -                      │
│  Enable Alarm:_               │
│  Valid Range - Low:___ HIgh:___
│Sense 4 -                      │
│  Enable Alarm:_               │
│  Valid Range - Low:___ High:___
│                               │
│Enable SMDR Alarm:_            │
│Enable Loss of SYNC Alarm:_    │
│                               │
│Set Relay for Alarm - 2:_ 3:_ 4:_
│                               │
│Call Alarm ID for Alarm -      │
│ 2:_ 3:_ 4:_ SMDR:_ Sync:_     │
└───────────────────────────────┘
```

For each sense input you are using on this repeater you must enable the alarm, and specify a range in which the input is considered valid, the available range is 0-5 volts. When the Model 49 detects a value outside the specified range the alarm will be set. If the Set Relay field for that sense is set to Y the relay state will be changed and if the Call Alarm ID is set to Y the Alarm ID entered in the Site Config. will be called. The alarm will not reset unless the site is called and the Alarms are manually cleared from Multibase.

Voice Prompts If you have a voice prompt card installed in this unit enter 'Y'. Refer to the Model 49 Operation and Installation Manual for information on recording, erasing and playing voice prompts. (Default: N)

Test ID Code: This field sets up the ID code to be transmitted when the Model 49 is in test mode 1. The home repeater is assumed to be the same as the repeater transmitting the ID. (Range: 1-255, Default: 1)

Audio Compandor - Installed: If you have a compandor card installed in this unit enter 'Y'. The compandor is then enabled by User ID. If your enter 'Y' and no card is installed there will be no audio for users that have the compandor turned on. (Default: N)

Audio Compandor - Expandor On: If there is a compandor installed and you would like the expandor on for all interconnect calls enter 'Y'. (Default: N)

Keyup Delay: This field sets the amount of time the Model 49 waits after keying the transmitter before it begins sending data packets. If this time is set too long or short, radios may have trouble accessing the system, it is recommended that this value be left at its default initially. (Range: 0.00-0.08, Default: 0.02)

Turn Off Idle Msg.: This field allows the idle packets to be turned off for the repeater being programmed. (Range: Y/N, Default: N)

* * * * * * * * * * * * * * * C A U T I O N * * * * * * * * * * * * * * *

Entering a Y for Turn Off Idle Msg can affect trunking performance.

* *

Telco Line Type If you have interconnect on this unit you must enter the Telco Line Type in this field, otherwise users will not be able to make telephone calls. Available line types are:

N - None, this repeater is not interconnected. (Default)

E - End-End, this is selected if you have an End-End card installed, or an E&M card that you would like to look like End-End on incoming. When E is selected a "pop-up" appears with the following fields:

Line Supervision Type: This field selects L - Loop start, or G - ground start for this line. If you have an E&M card that you are setting up as End-End you must select L - Loop Start . (Default: L)

End of Call Conditions: If the C.O. provides battery you can select disconnect on 1 - battery reversal, or 2 - battery removal as required. Select 3 if no battery is available. If you have an E&M card installed select 2 - if you would like the Model 49 to disconnect on lose of loop current, 3 - otherwise. (Default: 3)

Rings Until Answer: This field selects the number of rings from the landline before the Model 49 answers. (Range: 1-9, Default: 1)

Dial Click Decode Mode: If you have a Dial Click Card installed, Dial Click Decode Mode must be enabled. If you don't want to decode dial clicks this field must be set to N or DTMF will not be decoded properly. The available choices are:
N - Dial Click not enabled.
0 - Decode clicks Mode 0.
1 - Decode clicks Mode 1.
2 - A leading '0' is required to calibrate the software.
3 - A leading '0-1' are required to calibrate the software.

D - DID, This is selected if you have a DID (Direct Inward Dial) card installed. When D is selected a "pop-up" appears with the following fields:

Line Supervision Type: This field selects the type of supervision of the incoming DID line. This information should be provided by the phone company when the line is purchased. "I" indicates Immediate Start - the C.O. sends feed digits immediately after the line is answered, "W" indicates Wink Start - the C.O. waits until the Model 49 "winks" the line before sending the feed digits. (Range: I,W, Default: I)

Signaling Type: This field selects the type of signaling used by the C.O. to send the feed digits to the Model 49. The available choices are: D - DTMF, P - Pulse, or M - MF. (Range: D,M,P, Default: D)

Number of Feed Digits: This field selects the number of feed digits expected from the C.O. (Range: 2-4, Default: 2)

M - E&M (DID in, End-End Out), is selected when you have a 4-wire E&M card installed. When M is selected a "pop-up" appears with the following fields:

Line Supervision Type: This field selects the type of supervision of the incoming E&M line. This information should be provided by the phone company when the line is purchased. "I" indicates Immediate Start - the C.O. sends feed digits immediately after the line is answered, "W" indicates Wink Start - the C.O. waits until the Model 49 "winks" the line before sending the feed digits. (Range: I,W, Default: I)

Signaling Type: This field selects the type of signaling used by the C.O. to send the feed digits to the Model 49. The available choices are: D - DTMF, P - Pulse, or M - MF. (Range: D,M,P, Default: D)

Number of Feed Digits: This field selects the number of feed digits expected from the C.O. (Range: 2-4, Default: 2)

Line Description: If you are using the Model 49 with Type I lines, '1' should be selected so that the Model 49 will only disconnect on loss of loop current after it has received Answer Supervision. If you would like the Model 49 to disconnect on loss of loop current select 'N' for Normal E&M. If you don't want the Model 49 to disconnect on loss of loop current enter 'S' for Special. (Range: 1,N,S, Default: N)

Incoming Calls If you have interconnect you must enter 'Y' here if you wish to receive incoming calls. When you enter 'Y' <Return> a 'pop-up' window will appear.

Answer Mode: The Model 49 can be set-up to answer an incoming line in one of four ways:

B - Answer, play 'RIC' prompt.

D - Answer, play dialtone.

C - Answer, play 'RIC' prompt and if no digits or not enough digits are entered, the test code ID along with the repeater number on which the call is being made is called automatically. For DID, this setting indicates Allow Overdial if the feed digits are for ID = 20-250. (Only one DID, ID=20-250, may use the system at any one time.)

N - The test code ID along with the repeater number on which the call is being made is called automatically. The phone line isn't answered until the mobile answers the call. The Model 49 will wait 20 seconds for a mobile to answer, and then briefly go off-hook to listen for modem tone.

Timing - Connect Time Required: This field programs the amount of time the connect signal must be stable to recognize the start of an incoming call. This should be set to about 0.5 secs for End-End, and to about 0.06 for DID and E&M. (Range: 0 - 2.50, Default: 0.5)

Timing - Delay Before Prompt: This fields sets the delay after the line has been answered before the prompt is played. It is possible for the answer prompt to false a modem calling in to do programming. In such cases, the delay before prompt should be set long enough to allow the Model 49 to detect modem carrier before it plays the prompt. (Range:0.5 - 5.0 secs, Default: 1.0)

Outgoing Calls If you have interconnect you must enter 'Y' here is you wish outgoing calls to be allowed. For DID outgoing calls are never allowed regardless of how this field is set. When 'Y' <return> is entered a 'pop-up' window will appear.

Dial-Out Mode: The Model 49 can be programmed to dial out in one of four ways: 0 - Slow DTMF (5 digits/sec), 1-Fast DTMF (10 digits/sec), 2 - Slow Pulse (10 pulses/sec) or 3 - Fast Pulse (14 pulses/sec).

Start Supervision Seek Time: This fields sets the amount of time for the Model 49 to wait for supervision after the phone line has been seized. For example: the amount of time to wait for dial tone. If we do not detect dial tone within the given time limit the Model 49 will attempt to dial anyway. (Range: 3-25 secs, Default: 3)

Delay Before Dialout: This field sets the amount of time the Model 49 will wait after detecting supervision before it begins to dial out. (Range: 0.0-9.9 secs, Default: 0.0)

Direct Link: This field indicates that this Model 49 is directly linked to another site or another piece of equipment. Usually this indicates that the Model 49 does not have to dial a phone number to connect to the other site. The available choices are: N - No - Not a direct link (default), A - Direct link to LTR site, overdial access code, I - Direct Link to LTR site, overdial ID Code, D - Direct Link to Non-LTR site, or S - Direct Link to 7032 Switch.

Finish entering your new repeater by pressing the F10 key (save record). You may continue entering new repeaters or changing existing ones just by typing on the screen.

If you have several Repeaters to enter into Multibase, you can save time by using the F5 - Add function key (refer to Guide window by pressing F1). This key allows you to enter a range of repeaters that are numbered sequentially. You create a record for the starting repeater, hit F5 and specify the number of repeaters to add.

When you have your repeaters the way you want them, press Esc twice. Multibase will ask if you are done with editing. Answer Y for yes. The main menu will appear. Then proceed to enter your user settings (see following information).

USER ID INFORMATION

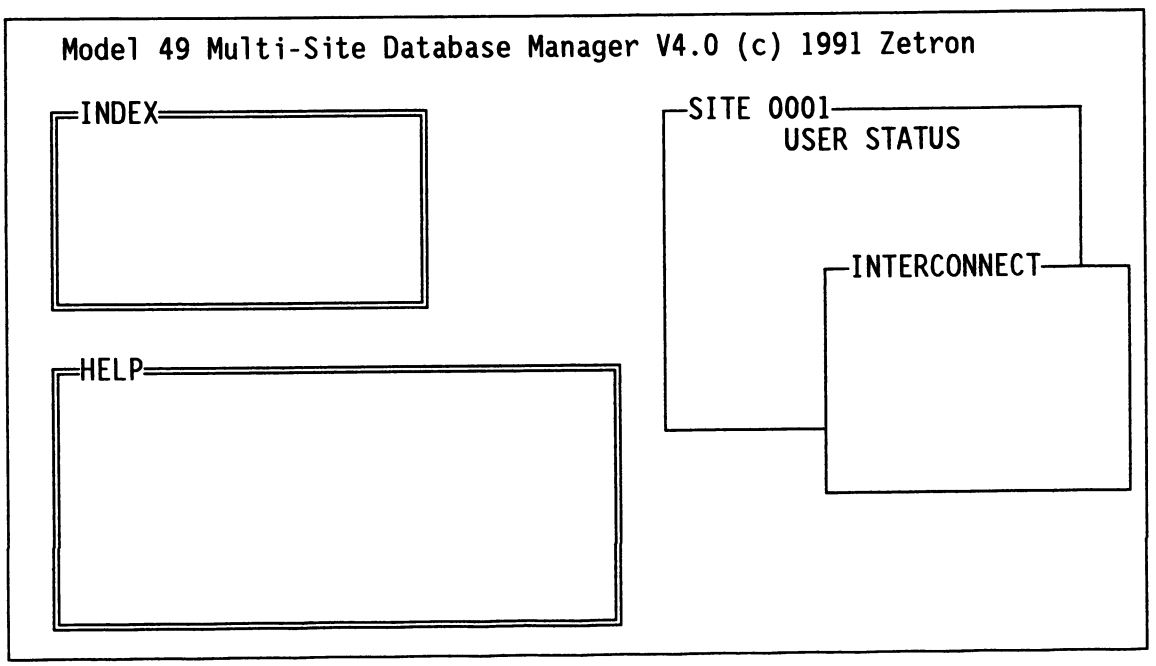
From the Multibase main menu, select Edit User IDs and press the Enter key. Multibase will present you with a list of sites that you have programmed. Select one site and press Return. If only one site has been programmed, that site will be automatically selected.

The blinking cursor appears in the Index window. Press the Enter key again and the cursor moves to the User Status window on the right side of the screen. You can move around from one data field to the next with the Up-Arrow and Down-Arrow keys.

The User ID database contains information about all of your LTR users at that site. To enter a new user, type in an ID (01001 through 20250) and Multibase will automatically start a new data record. If you wish to make changes to an existing user ID, you can move around in the Index window with the PgUp and PgDn keys.

Fill in the user's settings. The Help information in the lower right hand corner gives suggestions for each data field. The customer account and rate code information is used for billing purposes and is optional.

If your user has interconnect, fill in "I" in the ID Type field which pops up an interconnect detail window:



If this user is to be treated as an "Auto-Overdial" user enter an 'A' in the ID Type field. Refer to the Autodial Table section below, for more details on Auto-Overdial

Any information you desire can be added in the comments fields. Multibase automatically maintains the create date (when you first added the ID to the database) and the alter date (when you make changes).

User Configuration Contains the following fields:

User ID: ID code of the user you are entering into the database. The user ID has the format HH-UUU or HHUUU where HH = Home Repeater, and UUU = ID Code.

Status: Each user can be programmed as V - Valid - Allowed access to the system, I - Invalid - Access never allowed, D - Deferred - Treated as valid only during non-prime time, invalid otherwise, or U - Unassigned, treated as valid or invalid depending on the Unassigned field in the Site Config. Entering a user and setting it to Unassigned has the same affect as not entering the user at all.

ID Type: An ID can be one of three types: D - Dispatch, I - Interconnect, or A - Auto-Overdial. The ID type should correspond to the type used when programming the mobile. Auto-Overdial (A) IDs should be programmed in the mobile as interconnect IDs.

A user defined as type 'A' is able to do the following:

a. Dial an interconnect call according to its toll privileges if the channel being accessed has a dial-out line.

b. Select a number from the autodial table by entering *nn. If the number selected from the autodial table connects to another LTR site the Model 49 will automatically overdial the ID or access code associated with the user initiating the call.

c. Directly link to another site and have the Model 49 overdial the ID or access code as in b. above if the direct link is to another LTR site. The user must be on its home channel or a channel marked as Networked to be validated. (Refer to the Trunking and Direct Link fields in the Repeater Configuration).

If 'I' or 'A' is entered a pop-up window will appear with the following fields:

Priority: Interconnect users can be programmed as either H(igh) or L(ow) priority. These priorities are used in dynamic call limiting and maximum simultaneous calls set-up in the Site Configuration. (Range: H,L Default: L)

Mobile Answer Time: Each user ID can be assigned one of two times (A or B) that the Model 49 will wait for the mobile to answer. These times are set-up in the Site Configuration Interconnect window. (Range: A,B, Default: A)

Toll Privileges: Toll Privileges are assigned to each interconnect ID code. The available privileges are:

N - No outgoing, this user can receive incoming calls, but cannot make outgoing calls.
A - Autodial only, this user can only select numbers from the autodial table by entering *nn where nn is the autodial table entry.
L - Local Calls, this user is allowed to make local calls but no 1+ or 0+ calls.
C - Credit Card Calls, this user is allowed to make 1+0 calls, as well as local Calls.
O - Operator Assisted, this user is allowed to make 0+, 1+0 and local calls.
T - Toll Calls, this user is allowed to make 1+, plus all preceding types.
I - International, this user is allowed to make all types of calls including international.

(Range: N,A,L,C,O,T,I, Default: L)

Allow/Restrict Prefixes: Group A: If you wish the Allow/Restricted prefixes group A, defined under Site Configuration to apply to this user a Y must be entered here. If group A has been defined as Allowed then this user will only be able to dial numbers with prefixes defined in table A.

If group A has been defined as restricted all prefixes except those defined in the table will be allowed. (Range: Y,N, Default: N)

Allow/Restrict Prefixes; Group B: Refer to the description under group A above.

Turn-Around Beep: If Y is entered in this field a courtesy beep will be played whenever a half-duplex mobile releases PTT. (Range: Y,N, Default: N)

Audio Compandor in Use: If Y is entered in this field the audio compandor installed in the Model 49 will be turned on for this user ID. The Compandor Installed field in Repeater Config. must be set to Y for this field to have an affect. (Range: Y,N, Default: N)

Full Duplex Radio in Use: If the radio using this ID is full duplex a Y should be entered here. If more then one radio is used with this ID and some are full-duplex and some are half-duplex enter Y. (Range: Y,N Default: N)

Access #: This field assigns a 1-4 digit number to a user ID. This number is used for DID or E&M and E-E if Overdial Access # is set to Y in the site Config. When using the access number for DID purposes, any unused most significant digits must be zero for proper operation. In other words, if there are two feed digits the access must have the following format: 00??. This field can be left blank if access numbers are not being used. (Range: 0000-9999, Default: None)

Cust. Acct: This field allows a customer account number to be assigned to this User ID for billing purposes. This field can be left blank. Up to 10 characters can be entered.

Rate Code: This field allows a rate code of up to 5 digits to be assigned to this user for billing purposes.

Bill as Duplicate: A Y in this field is used to indicate that this customer appears elsewhere and allows duplicate charges to be avoided. This field is for billing purposes only. (Range: Y,N, Default: N)

Num. of Mobiles: This field contains the number of mobiles with this ID code. This field is used for billing purposes only.

Comment 1: Up to 10 characters of comments can be entered here. This field is keyed and can be used for sorting.

Comment 2: Up to 20 characters of additional comments can be entered in this field.

Create Date: This field contains the date that this user record was first created. It is automatically filled in by Multibas, although it can be changed if desired.

Alter Date: This field contains the date that this user record was last altered. It is automatically filled in by Multibas, although it can be changed if desired.

Finish entering your new user ID by pressing the F10 key (save record). You may continue entering new users or changing existing ones just by typing on the screen.

When you have your users the way you want them, press Esc twice. Multibase will ask if you are done with editing. Answer Y for yes. The main menu will appear. Proceed to Comm/Update to communicate your changes to the Model 49, or to Edit Autodial Table if you wish to make use of the Autodial feature.

If you have a lot of User ID's to enter into Multibase, you can save time by using the F5 - Add function key (refer to Guide window by pressing F1). This key allows you to enter a range of ID's that are numbered sequentially for a specific repeater. You create a record for the starting ID, then hit F5 and specify the number of users to add.

AUTODIAL TABLE INFORMATION

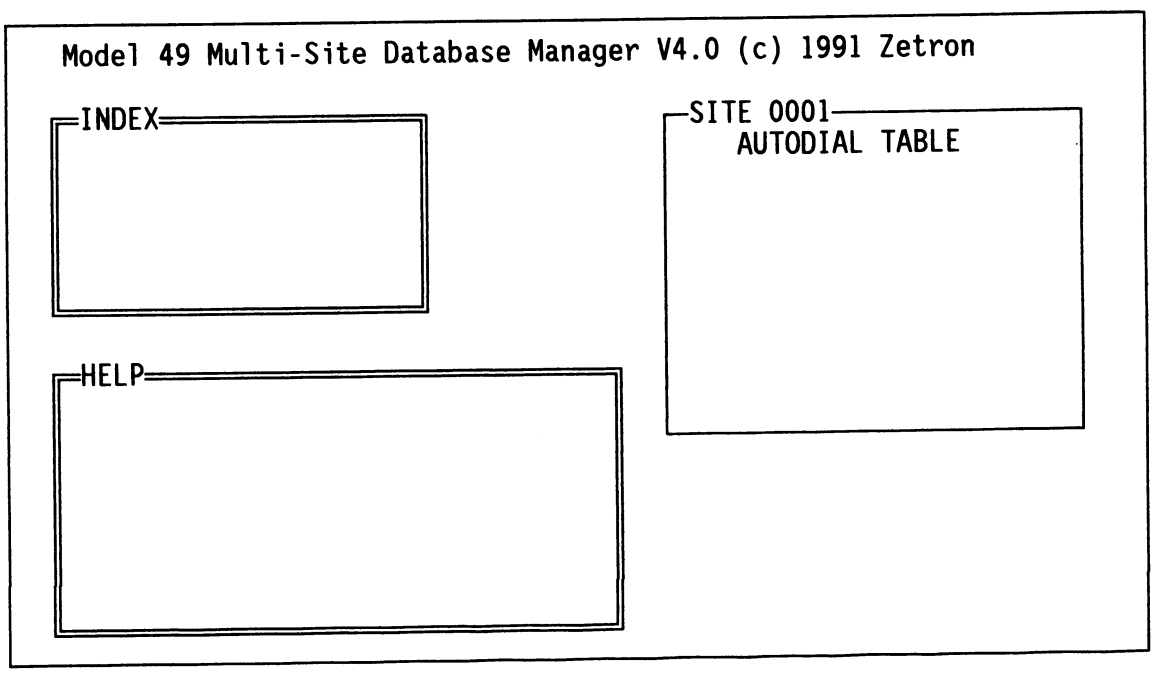
If you wish to make use of the Autodial feature of the Model 49, from the Multibase main menu, select Edit Autodial Table and press the Enter key. Multibase will present you with a list of sites that you have programmed. Select one site and press Return. If only one site has been programmed, that site will be automatically selected.

The blinking cursor appears in the Index window. Press the Enter key again and the cursor moves to the Autodial Table window on the right side of the screen. You can move around from one data field to the next with the Up-Arrow and Down-Arrow keys.

The Autodial Table allows up to 100 numbers to be set-up per site, that interconnect and Auto-Overdial users can access by dialing *nn - nn = the Autodial Table Entry.

If a user is programmed as Auto-Overdial, and he/she selects an autodial number, if that number connects to another LTR site the ID code or access number of the initiating mobile will automatically be overdialed to the answering site.

For each autodial table entry, access can be limited to users programmed as Auto-Overdial, and toll restriction can be enabled or disabled.



The Autodial Table contains the following fields:

Table Entry: This number indicates where in the table this record is to be stored. This number corresponds to the nn of *nn that the user enters to access a number from this table. (Range: 00-99, Default: None)

Phone Number: This field contains the phone number that the Model 49 will dial if this entry is selected. A ',' indicates that a 1 second pause should be inserted when dialing, and a '!' indicates a 5 second pause. For example: 9,18005556677 would tell the Model 49 to dial 9 then pause 1 sec before dialing the rest of the number.

Number Connects To: This field indicates what the phone number entered above connects to. The available choices are: A - another LTR site - overdial access number, if the user accessing this number is an Auto-Overdial user the access number will automatically be dialed, I - another LTR site - overdial ID Code, if the user accessing this number is an Auto-Overdial user the ID code will automatically be dialed, or P - Regular phone. (Range:A,I,P, Default:P)

Interconnect Users Allowed: A 'Y' entered in this field indicates that users with type 'I' are allowed access to this number. If no is entered only users with the 'A' are allowed access. (Range:Y,N, Default:Y)

Toll Restrict: If Y is entered in this field the phone number is toll restricted according to the accessing users toll privileges. If N is entered NO toll restriction is performed. (Range:Y,N, Default:Y)

Addtl. Time to Wait for Answer: This field contains the additional amount of time, over 5 seconds, that the Model 49 will wait for an answer from another unit before overdialing.

Finish entering your new table entry by pressing the F10 key (save record). You may continue entering new entries or changing existing ones just by typing on the screen.

When you have your table entries the way you want them, press Esc twice. Multibase will ask if you are done with editing. Answer Y for yes. The main menu will appear. Proceed to Comm/Update to communicate your changes to the Model 49, or to Edit PTC Users if you wish to make use of the Push to Connect features.

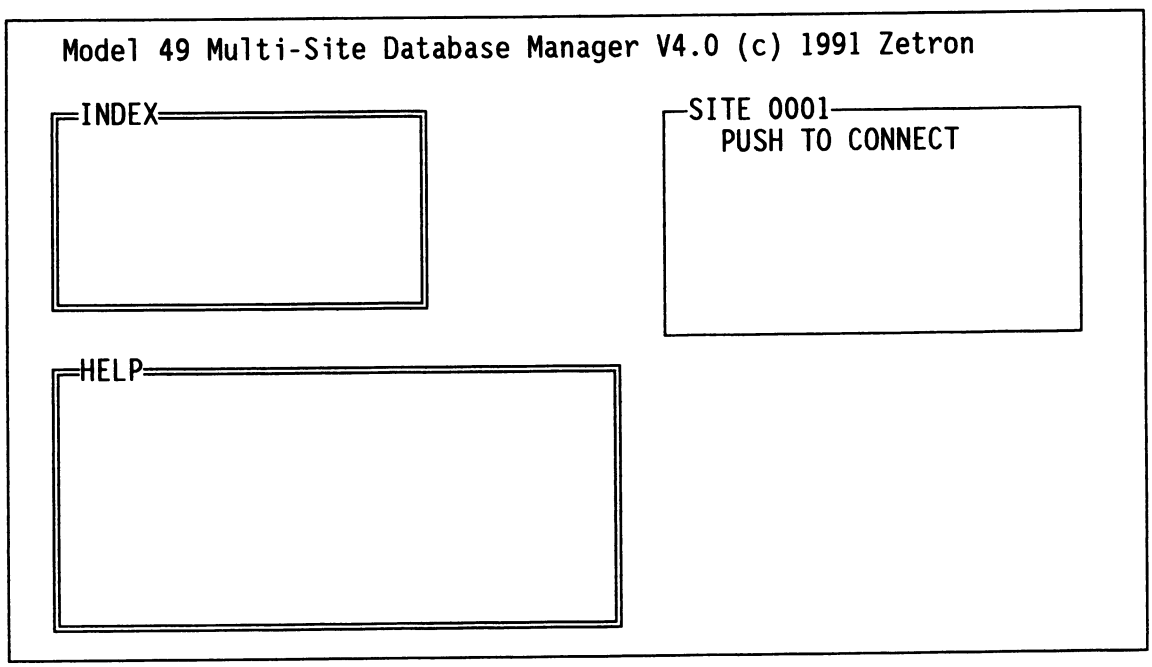
PUSH TO CONNECT USERS INFORMATION

If you wish to make use of the Push To Connect feature of the Model 49, from the Multibase main menu, select Edit PTC Users and press the Enter key. Multibase will present you with a list of sites that you have programmed. Select one site and press Return. If only one site has been programmed, that site will be automatically selected.

The blinking cursor appears in the Index window. Press the Enter key again and the cursor moves to the Push To Connect window on the right side of the screen. You can move around from one data field to the next with the Up-Arrow and Down-Arrow keys.

The Push To Connect Users table allows up to 200 interconnect users per site to be designated as Push To Connect (PTC).

An entry in this table designates a user ID, an autodial table entry to be accessed when the PTC user accesses the system, and a corresponding ID Code or Access Number to send to the answering site if required.



The Push To Connect Users Table contains the following fields:

PTC User ID: ID Code of user to be defined as PTC. This user ID must be defined in the User database and have a type of I(nterconnect) or A(uto-overdial).

Autodial Table Entry: This field contains the number of the autodial table entry that you want this user to automatically connect to. A number of 100 entered here indicates that this users home channel is a direct E&M link so no number needs to be dialed. (Range:0-100, Default: None)

Time Allowed to Enter *nn: A PTC user can be given up to 7 secs to enter a phone number or *nn before automatic dialing takes place. (Range: 0-7, Default: 0)

Type of Overdial: This field indicates the type of overdialing required to the answering site. The available choices are: I - User ID Code, A - User Access Code, or N = No auto-overdial, the user must enter manually, or no overdialing required.

Overdial - ID Code: If Type of Overdial is set to I, enter the ID Code (HH-UUU) to overdial to the answering site. (Range: Home Repeater (HH) 1-20, ID Code (UUU) 1-250, Default: None)

Overdial - Access #: If Type of Overdial is set to A, enter the Access Code to overdial to the answering site. (Range: 0000-9999, Default: None)

Finish entering your new PTC User by pressing the F10 key (save record). You may continue entering new users or changing existing ones just by typing on the screen.

When you have your PTC Users the way you want them, press Esc twice. Multibase will ask if you are done with editing. Answer Y for yes. The main menu will appear. Proceed to Comm/Update to communicate your changes to the Model 49.

UPDATING PROGRAMMING

Once you have edited your site, repeater, user information, Autodial table and PTC Users as needed, Multibase has produced computer files on your office computer with your programming data. To send these files to your radio sites, select the Comm Update menu item. This option will activate the modem in your office computer to dial the sites, enter the site passwords, and update the Model 49 databases.

Make sure that you have the Site Access, Baud Rate, and PC Comm Port set correctly in the Site Config for your particular installation. Remember that if you are in your shop connected through the Model 49 front panel, set the Site Access to "L". If you are dialing into your site through the Model 49's internal modem, set Site Access to "I" and fill in the site's telephone number. If you are dialing into your site through an external modem connected to the front panel of the Model 49, set site access to 'X'.

You can update the selected site by answering the questions that appear after you select Comm Update.

Then select whether you wish to update the Site Config, Repeater Config, User IDs, Autodial Table, PTC Users, just the Changes since the last update, or the Entire Database. Multibase will give you information in the Status window as it performs the update.

If you get the message "No bus master, cannot clone data" this means that the unit you updated cannot perform the automatic cloning function to the other Model 49's on the Subscriber Bus. If you are in your shop working with one unit, then ignore the message. If you have dialed your site, then you have a problem on the Subscriber Bus. Either the subscriber master is inoperative, a subscriber bus cable is faulty, or you have not set one of your Model 49's as a Polling Master on the front panel switches.

Note: When in the Comm menu, be sure to select "Other" then select "Set Date & Time". The clocks in the Model 49 must be set so that billing data will be useful.

QUICK TYPING TEMPLATES

As you set up your database for the first time or add new clients to a working database, you will soon find that many client records look alike. Some information changes such as the ID, customer name, and customer account.

To save you typing time, you can define a set of 10 different "data templates" with the Alt-Fn key. Then you can retrieve a template to fill in a new data record with the Shft-Fn key.

To define a template:

1. Press F9 to start a new record
2. Fill the template in the data window with information that stays the same for your users. (leave the field ID blank)
3. Press and hold Alt and select one of the ten Fn keys
4. This will assign the template to the Fn key you select.

To use a template:

1. Press F9 to start a new record
2. Press and hold Shft and select one of the ten Fn keys
3. This will fill the fields on the screen with the info. from the template. If a field in the template is blank, the information on the screen for that field will not be affected.

Note: Your templates are automatically saved along with the database information when you complete your editing so you can use them next time.

FIND/SEARCH

When your user ID database gets large (more than a few hundred ID's), it is difficult to locate a particular user by scrolling up and down the database with the PgUp and PgDn keys. To make your life easier, Multibase can search and find a particular user by their ID, Access #, or Account.

To find a particular user:

1. Go to the Index Screen
2. Select the ID, Name, or Account field by using the Left-Arrow and Right-Arrow keys to move the blinking cursor
3. Press the F8 key (Multibase will put the cursor into the User ID window)
4. Type in the information to search for
5. Press the Return or Enter key
6. Multibase will find the user and show you the information in the User ID window. If the user is not there, Multibase will display the message "CAUTION! not exact match" and show you the user just beyond the one you were searching for.

4. BILLING AND STATISTICS

COMPUTER SET UP FOR BILLING

Billing files (for airtime, SMDR, etc -- refer to subsections below) can either be stored in the \MODEL49 directory or in a separate directory named \MOBILL49. Multibase will first look for the \MOBILL49 directory to put the files there. If that directory does not exist, then it puts the files into the MODEL49 directory.

* 1. Go to the root directory: CD\

* 2. Create a new directory: MKDIR MOBILL49

RETRIEVE AIR TIME ACCUMULATORS

Every Zetron Model 49 comes equipped with air time accumulation. Regardless of which channel a mobile actually uses, the mobile's home channel Model 49 accumulates its air time usage.

There are two accumulators for each user ID; one for prime-time and a second one for non-prime time. (You set up the prime time-of-day periods from the Site Config screen). With this flexibility, you can bill for premium usage without all of the cumbersome detail files that some accumulators require you to sort through.

You obtain the air time accumulators using Multibase on your office computer to call your sites, retrieve the data, and write computer files to your hard disk. When you wish to clear the air time accumulators, you can do so after you have retrieved your data using a separate function (see paragraphs below).

Since the accumulators have enormous counting capacity, there is no urgency to retrieve the data. For safety reasons, you may wish to retrieve the data and back it up periodically a few times between billing periods. You can retrieve the air time accumulators as often as you wish without affecting the accumulator values. At the end of each billing cycle, you probably want to retrieve the accumulators then clear them to zero for the next billing period.

Note: Be sure that the clocks in the Model 49(s) have been set. Failure to set the clocks will result in meaningless billing data.

Select Retrieve from the Comm menu. Then select Call Accumulation. The airtime accumulation information will be written into computer files on your hard disk in the directory named MOBILL49, or if there isn't one in the MODEL49 directory.

CLEAR AIR TIME ACCUMULATORS

You can retrieve the air time accumulators as often as you wish without affecting the accumulator values. At the end of each billing cycle, you probably want to retrieve the accumulators then clear them to zero for the next billing period.

First retrieve the counts as described earlier in this section. Make sure that the counts are properly written to your computer files. Then to clear the counts, use the Comm Other menu item. Select Clear Call Accumulation and Multibase will tell each Model 49 at the selected site to set its air time accumulators to zero. The option is also given to clear the accumulators immediately after they have been retrieved.

BACKUP AIR TIME DATA

It is a good idea to backup your retrieved air time accumulators to flexible diskettes. This is especially important at the end of each billing cycle when you clear the counts to zero in the Model 49's. To perform a data backup, select Backup Call Accumulation from the main menu.

Before beginning a backup, you need to prepare fresh diskettes with DOS compatible formatting information. You will need approximately one 360K diskette for every 1000 user ID's (3000 users on a 1.2M diskette). So format enough blank diskettes before you start the backup process (FORMAT A: from the DOS C> prompt).

It is also a good idea to put sticky labels on the diskettes that have the date and disk sequence number (MULTIBASE AIRTIME - today's date - disk #n). As you remove each backup diskette from the computer, it is a good idea to "write protect" the diskette (black label covering the notch on 5-1/4" media; shutter open on 3-1/2" media).

Multibase will give you precise instructions on when to insert your formatted floppy diskettes into the computer. Keep more than one set of backups and rotate them through usage. For example, you might keep sets for the odd and even days of the month. That way, if one set becomes damaged, your data is still protected.

If you need to restore the database from backup diskettes onto the computer hard disk, use the Restore Call Accumulation menu item. Multibase will give you precise instructions on when to insert your backup diskettes into the computer. Make sure to insert the correct set of backups (if you have more than one set), and in the correct order. Before you insert each backup diskette into the computer, it is a good idea to "write protect" the diskette (black label covering the notch on 5-1/4" media; shutter open on 3-1/2" media).

AIR TIME FILE FORMAT

Call accumulator information collected by the Model 49 is stored as ASCII text files on your PC hard disk in the directory named MOBILL49, or if there isn't one, in the MODEL49 directory. Once loaded into your computer from the site using Multibase, Zetron's software billing package ZEBRA can take this ASCII data and create billing information.

If you wish to use an alternative billing system you can use this ASCII data yourself. The Call accumulator files start with a header record identifying the site, repeater, date, time of day, etc. The data records follow the header record and are sorted by user ID. Each data record is the same fixed number of bytes in length. Only IDs with some air time used will have airtime accumulator records.

Data for all repeaters at the site are contained in files made for each repeater for each retrieval session. The files are named MMDD####.A$$, where: MMDD is the current month and day, #### is the site number, A is an indicator that these are airtime accumulator files, and $$ is the repeater number. An additional file named MMDD####.U00 contains user ID and account number information that is useful to your billing system.

An example airtime file for repeater #01 is as follows:

```
M49 0001A03/22/9015:45:5603/22/9018:18:00   6
01001    100   7      5   4
01009     50   7      5   4
01100     22   7      5   4
01101      4   7      5   4
01123     34   7      5   4
01127    194   7      5   4

(etc. for more data records sorted by user ID...)
```

Note: 1. All fields are in ASCII characters
2. Numeric fields are right adjusted
3. Character fields are left adjusted

The Airtime File Header has the following format: (60 characters long)

Name	Type	Len	Description
Device Name	char	5	M49
Site Number	num	4	Site these user IDs are on
A	char	1	A = airtime accumulation
Start Date	char	8	MM/DD/YY
Start Time of Day	char	8	HH:MM:SS
End Date	char	8	MM/DD/YY
End Time of Day	char	8	HH:MM:SS
Num. of Records	num	5	Number of records in the file
Processed Flag	char	1	
Spare	char	10	
CRLF	char	2	Carriage return, Linefeed

A diagram of the Airtime File Header is shown in Figure 4-1.

M49	0001	A	03/22/90	15:45:56	03/22/90	18:18:00	6		
DEVICE	SITE NUMBER	AIRTIME ACCUMULATION	START DATE	START TIME	END DATE	END TIME	NUMBER OF RECORDS	PROCESSED	SPARE

Figure 4-1. Airtime File Header

Each Airtime Data Record has the following format: (33 characters long)

Name	Type	Len	Description
Home Repeater	num	2	User's home repeater (1-20)
User ID	num	3	User ID Number (1-250)
Total Time Prime	num	8	Accumulated seconds of use during prime time
# Access Prime	num	5	Number of Accesses during prime time
Total Time Non-Prime	num	8	Accumulated seconds of use during non-prime time
# Access Non-Prime	num	5	Number of Accesses during non-prime time
CRLF	char	2	Carriage return, Linefeed

A diagram of the Airtime Data Record is shown in Figure 4-2.

01	001	100	7	5	4
01	009	50	7	5	4
01	100	22	7	5	4
01	101	4	7	5	4
01	123	34	7	5	4
01	127	194	7	5	4
HR OE MP EE A T E R	U S E R I D	TOTAL SECONDS PRIME TIME	# ACC'S PRIME TIME	TOTAL SECONDS NON-PRIME TIME	# ACC NON-PRIME TIME

Figure 4-2. Airtime Data Record

RETRIEVE CALL DETAIL (SMDR)

Your Zetron Model 49 may be equipped with an optional call detail (SMDR) buffer. This option stores a call record for each interconnect call placed through the Model 49. Since the mobiles may trunk to the Model 49 from any home channel, the SMDR buffer may contain calls from any interconnected mobile on the system. To fully account for all telephone calls, each interconnected Model 49 should be equipped with a call detail buffer option so calls are accumulated for all channels.

You obtain the call detail data using Multibase on your office computer to call your sites, retrieve the data, and write computer files to your hard disk. A new computer file is created for each repeater's data for each retrieval session.

The call detail buffer in a Model 49 can hold approximately 6000 records if you have software version 4.03 and above and hardware version H and above. If you have earlier software or hardware, the call detail buffer holds approximately 2000 records.

Assuming short 2-minute calls for 6 hours/day and long 10-minute calls for 10 hours/day, an average channel will generate about 240 calls per day. Data should be retrieved at least once per week (or at about 1700 calls). If the data is retrieved and stored to disk successfully, the records are automatically cleared in the Model 49.

Note: You can get more effective use of the buffer by discarding local calls that are shorter than a specified period of time. Depending upon the setting in the Site Config Interconnect database, you can save storage space and retrieval time by not storing short local calls. Refer to the "Min. Call Time to Store" field.

You can retrieve the call detail buffers as often as you wish. Each day's retrieval is stored in a separate computer file. If you retrieve more than once per day, your data is appended to end of the data in the daily file.

Select Retrieve from the Comm menu. Then select Call Detail Records. The airtime totals are written into files on your hard disk in the directory named MOBILL49, or if there isn't one in MODEL49.

CLEAR CALL DETAIL BUFFERS

If call detail retrieval is completed successfully the records are automatically cleared from the Model 49. If a transfer is interrupted midstream, the records will remain intact in the Model 49. If you need to clear your Call Detail Records and don't wish to retrieve them first, they can be cleared by selecting the Clear Call Detail Buffers option in the Multibase Comm Other menu.

BACKUP CALL DETAIL DATA

It is a good idea to backup your retrieved call detail records to flexible diskettes. This is especially important at the end of each billing cycle when you move the data to your billing system for posting. To perform a data backup, select Backup Call Detail from the main menu.

Before beginning a backup, you need to prepare fresh diskettes with DOS compatible formatting information. You will need approximately one 360K diskette for every 6000 records (20,000 records on a 1.2M diskette). So format enough blank diskettes before you start the backup process (FORMAT A: from the DOS C> prompt).

It is also a good idea to put sticky labels on the diskettes that have the date and disk sequence number (MULTIBASE SMDR - today's date - disk #n). As you remove each backup diskette from the computer, it is a good idea to "write protect" the diskette (black label covering the notch on 5-1/4" media; shutter open on 3-1/2" media).

Multibase will give you precise instruction on when to insert your formatted floppy diskettes into the computer. Make a new set of backups for each week in the billing period. That way, you always have archived data for billing should your hard disk data become damaged.

If you need to restore the database from backup diskettes onto the computer hard disk, use the Restore Call Detail Records menu item. Multibase will give you precise instruction on when to insert your backup diskettes into the computer. Make sure to insert the correct set of backups, and in the correct order. Before you insert each backup diskette into the computer, it is a good idea to "write protect" the diskette (black label covering the notch on 5-1/4" media; shutter open on 3-1/2" media).

CALL DETAIL FILE FORMAT

Telephone call detail information collected by the Model 49 is stored as ASCII files on your PC hard disk in the directory named MOBILL49, or if there isn't one, in the MODEL49 directory. Once loaded into your computer from the site using Multibase, Zetron's software billing package ZEBRA can take this ASCII data and create billing information.

If you wish to use an alternative billing system you can use this ASCII data yourself. The Call Detail files start with a header record identifying the site, repeater, date, time of day, etc. The data records follow the header record and are sorted chronologically. Each data record is the same fixed number of bytes in length and corresponds to a telephone call handled by a Model 49.

Data for each repeater at each site is contained in a separate file. The files are named MMDD####.D$$, where: MMDD is the current month and day, #### is the site number, $$ is the repeater number, and D indicates that these are call detail files An additional file named MMDD####.U00 contains user ID, account number information that is useful to your billing system. If an error occurs when retrieving the information, such as an interruption of the modem call, the current file will be renamed. The format of this file is MMDD####.T$$. If it is not possible to retrieve the call detail information completely and accurately due to a complete failure of the Model 49, this file can be renamed to the MMDD####.D$$ format for proper use by ZEBRA.

An example call detail file is as follows:

```
M49 0001D03/22/9015:06:3903/22/9015:33:48   3
13235EM15:10    01                1303/22/90   4
13235CM15:11    08206363          1303/22/90  10
13235CM15:13  3618206363          1303/22/90   9

(etc. for more data records sorted chronologically...)
```

Note:
1. All fields are in ASCII characters
2. Numeric fields are right adjusted
3. Character fields are left adjusted

The Call Detail File Header has the following format: (60 characters long)

Name	Type	Len	Description
Device Name	char	5	M49
Site Number	num	4	Site these user IDs are on
D	char	1	D = Call Detail
Start Date	char	8	MM/DD/YY
Start Time of Day	char	8	HH:MM:SS
End Date	char	8	MM/DD/YY
End Time of Day	char	8	HH:MM:SS
Num. of Records	num	5	Number of records in the file
Processed Flag	char	1	
Spare	char	10	
CRLF	char	2	Carriage return, Linefeed

A diagram of the Call Detail File Header is shown in Figure 4-3.

M49	0001	D	03/22/90	15:06:39	03/22/90	15:33:48	3		
DEVICE NAME	SITE NUMBER	DETAIL	START DATE	START TIME	END DATE	END TIME	NUMBER OF RECORDS	PROCESS	SPARE

Figure 4-3. Call Detail File Header

Each Call Detail Data Record has the following format: (49 characters long)

Name	Type	Len	Description
Home Repeater	num	2	User's home repeater (1-20)
User ID	num	3	User ID Number (1-250)
Qualifier	char	1	C = Call complete N = Call not answered D = No dial tone I = Invalid user R = Restricted telco dialed E = Other error B = ID called was busy, or too many simultaneous calls
Type of Call	char	1	L = Land line initiated M = Mobile initiated
Time of Day Call Commenced	char	5	HH:MM
Length of Call	num	5	Length of call (seconds)
Phone # Called	char	16	Phone number dialed
Line #	num	2	Line call went through (repeater number)
Date of Call	char	8	MM/DD/YY
Actual Condition Code	char	4	For Landline to Mobile 1 - Normal Call 2 - Normal Call Timed Out 3 - Not Enough Rings 4 - Dialing Not Done in Time 5 - Invalid User 6 - Mobile Did Not Answer 7 - Turn Around Timer 8 - Too Many Calls, Busy ID or No outgoing 9 - 2nd Dialtone 10 - # from Mobile 11 - # from Landline 12 - Incorrect Linetype 13 - Battery Removal/Reversal For Mobile to Landline 1 - Normal Call 2 - Normal Call Timed Out 3 - Dialtone Not Detected 4 - Dialing Not Done in Time 5 - Restricted Access Dialed 6 - Not Used 7 - Turn Around Timer 8 - Too Many Calls 9 - 2nd Dialtone 10 - # from Mobile 11 - # from Landline 12 - Incorrect LineType 13 - Battery Removal/Reversal
CRLF	char	2	Carriage return, Linefeed

A diagram of the Call Detail Data Record is shown in Figure 4-4.

13235	E	M	15:10	0	1	13	03/22/90	4
13235	C	M	15:11	0	8206363	13	03/22/90	10
13235	C	M	15:13	361	8206363	13	03/22/90	9
USER ID	QUALIFIER	CALL TYPE	TIME OF DAY CALL COMM-ENCDE	LNGTH OF CALL	PHONE NUMBER CALLED	LINE #	DATE OF CALL	COND CODITION

Figure 4-4. Call Detail Data Record

BILLING DATA TRANSFER

You can transfer the air time usage and call detail data into your preferred accounting program. The billing data is stored into MS-DOS compatible sequential data files in ASCII format.

Air time accumulators for each repeater at each site are contained in a separate file. The files are named MMDD####.A$$, where MMDD is the current month and day, #### is the site number, $$ is the repeater number, and A is an indicator that these are air time accumulator files.

Call detail data for each repeater at each site is contained in a separate files MMDD####.D$$, where: MMDD is the current month and day, #### is the site number, $$ is the repeater number, and D indicates that these are call detail files.

An additional file named MMDD####.U00 contains information from the User ID's file that is useful to identify to your billing system which user ID's belong to which billing account:

The User File Header has the following format: (28 characters long)

Name	Type	Len	Description
Device Name	char	5	M49
Site Number	num	4	Site these user IDs are on
U	char	1	U = User
Num. of Records	num	5	Number of records in the file
Processed Flag	char	1	
Spare	char	10	
CRLF	char	2	Carriage return, Linefeed

Each User Data Record has the following format: (63 characters long)

Name	Type	Len	Description
Home Repeater	num	2	User's home repeater (1-20)
User ID	num	3	User ID Number (1-250)
User Type	char	1	D = Dispatch, I = Interconnect, A = Auto-Overdial
User Status	char	1	V = Valid I = Invalid U = Unassigned D = Deferred
Customer Account	char	10	Account code
Rate Code	char	5	Billing rate code
Comments 2	char	19	Comments line 2
Create Date	char	8	MM/DD/YY user record created
Alter Date	char	8	MM/DD/YY user record altered
Duplicate	char	1	Y/N, bill user as duplicate
Num. of Mobiles	char	3	Number of mobiles with this ID code
CRLF	char	2	Carriage return, Linefeed

5. EXAMPLE SITES

GENERAL DESCRIPTION

Screens for four example sites are included in this section. Site 0001 is a five-channel dispatch only system. Site 0002 is a five-channel interconnected site with 2 DID lines and 3 End-End lines. Sites 0003 and 0004 are interconnected sites that have one channel dedicated to a direct 4-wire E&M link between the two sites.

SITE 0001

This site consists of 5 dispatch only channels. These five channels have been assigned repeater numbers 1, 5, 9, 13, and 17. Programming of the site is done through a local connection to the front panel of one of the Model 49s.

Figure 5-1 shows the site configuration screen, note the Site Access field and the Interconnect field.

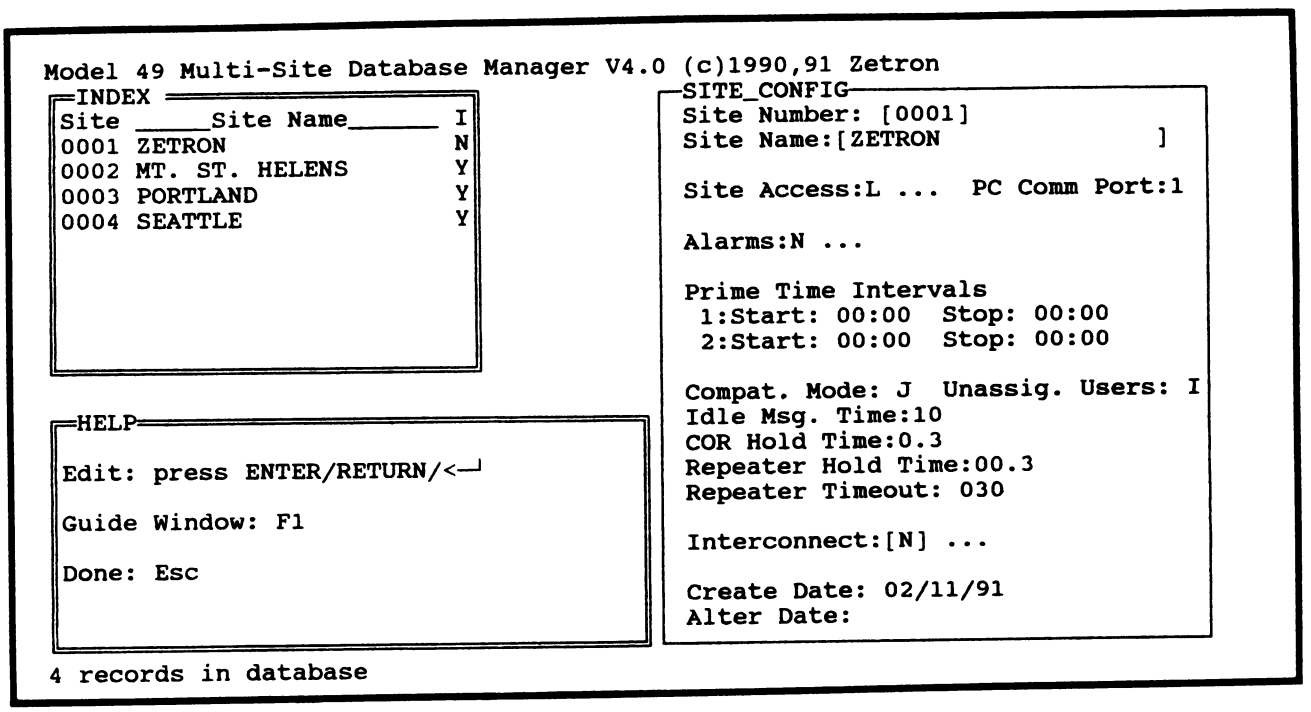


Fig. 5-1 Site Configuration - Site 0001

Figure 5-2 shows the Repeater Configuration for repeater 01. Note the Telco Line Type field is set to 'N' indicating a dispatch unit. Also note that this repeater is set to play the Station ID. All other repeaters at this site are programmed the same except Play Station ID is set to N.

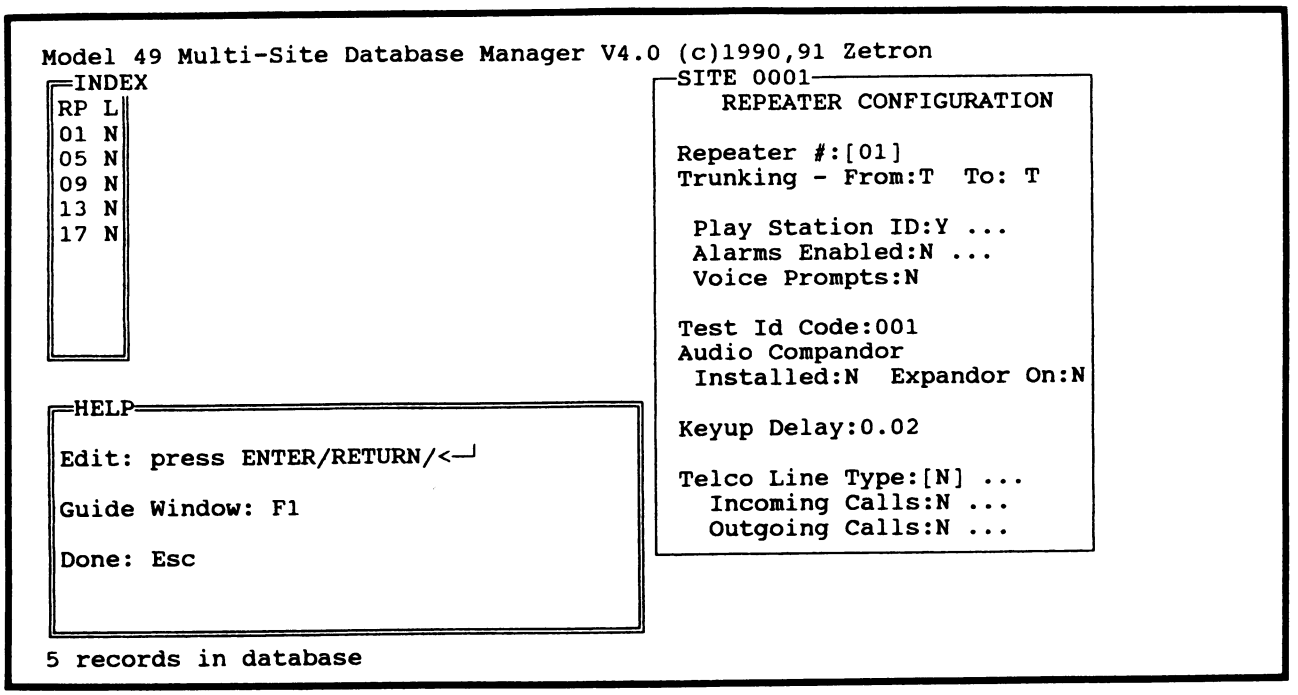


Fig. 5-2 Repeater 01 Configuration - Site 0001

Figures 5-3 and 5-4 show example screens of dispatch users on site 0001. Fig. 5-3 shows a valid dispatch user, while Fig. 5-4 shows an invalid user.

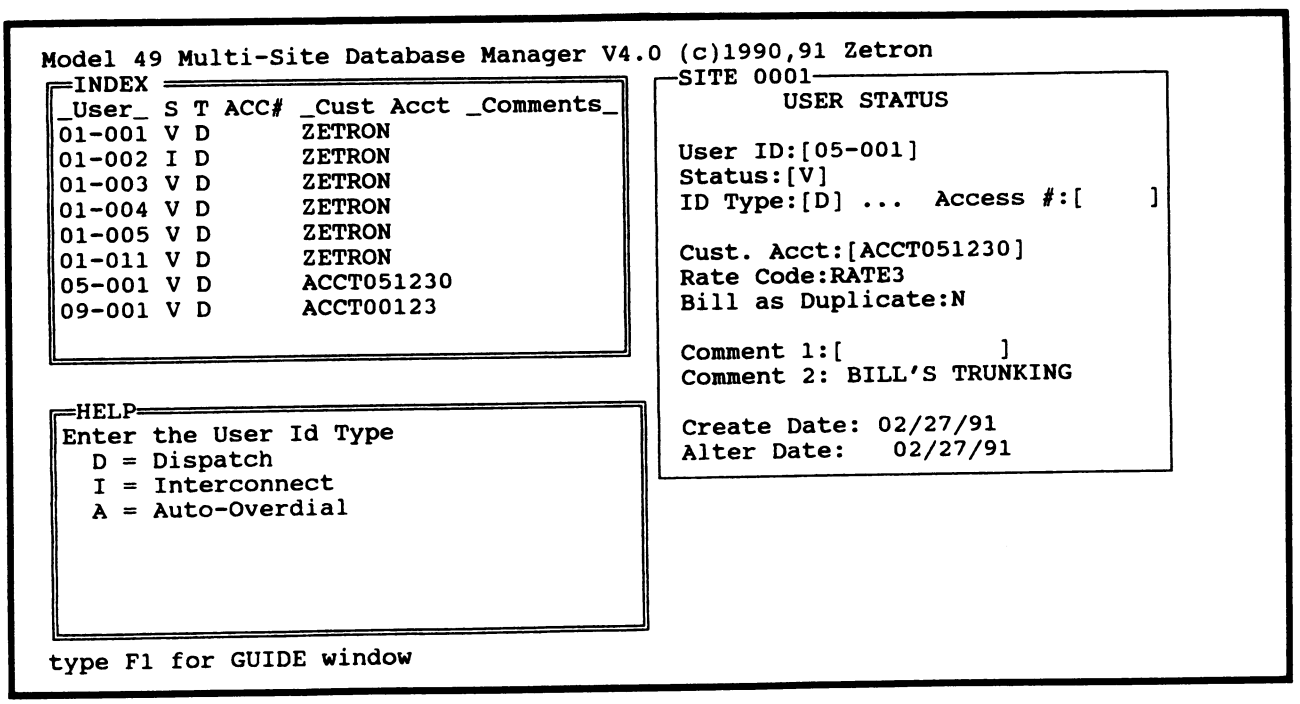


Fig. 5-3 User Status - Site 0001

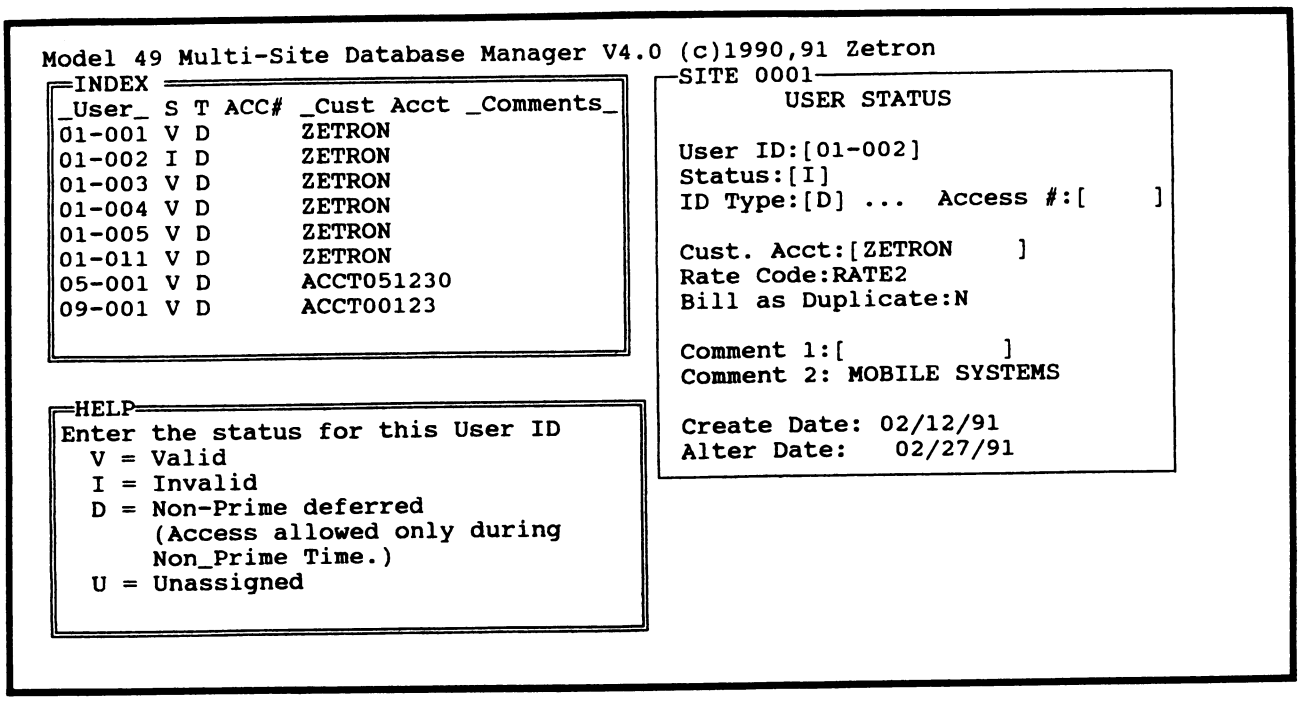


Fig. 5-4 User Status - Site 0001

SITE 0002

This site consists of 5 interconnected channels. These five channels have been assigned repeater numbers 1, 3, 5, 7, and 9. Repeaters 1, 3 and 5 contain End-End telco cards, and repeaters 7 and 9 contain DID telco cards. Programming of the site is done through an internal modem. Alarms are enabled on this site.

Figures 5-5 through 5-10 show examples of various pop-up windows that appear when the internal modem is selected, alarms are enabled and interconnect is available.

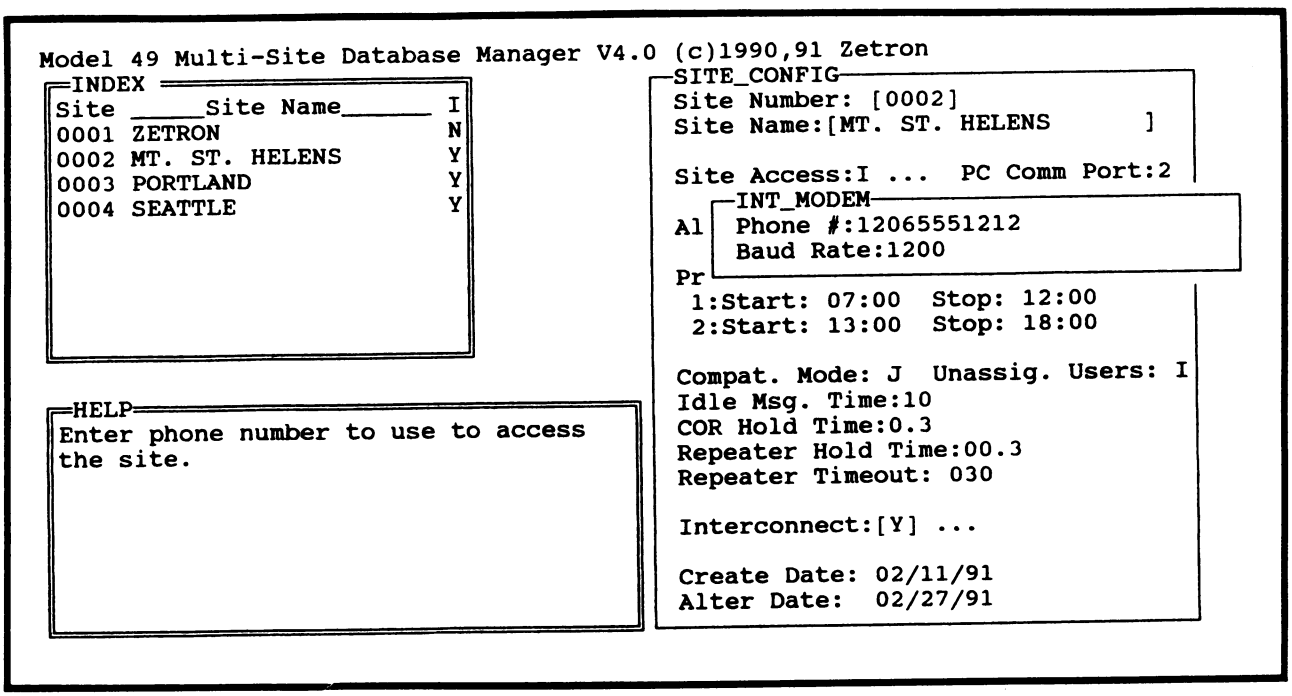


Fig. 5-5 Site 0002 - Internal Modem Window Configuration

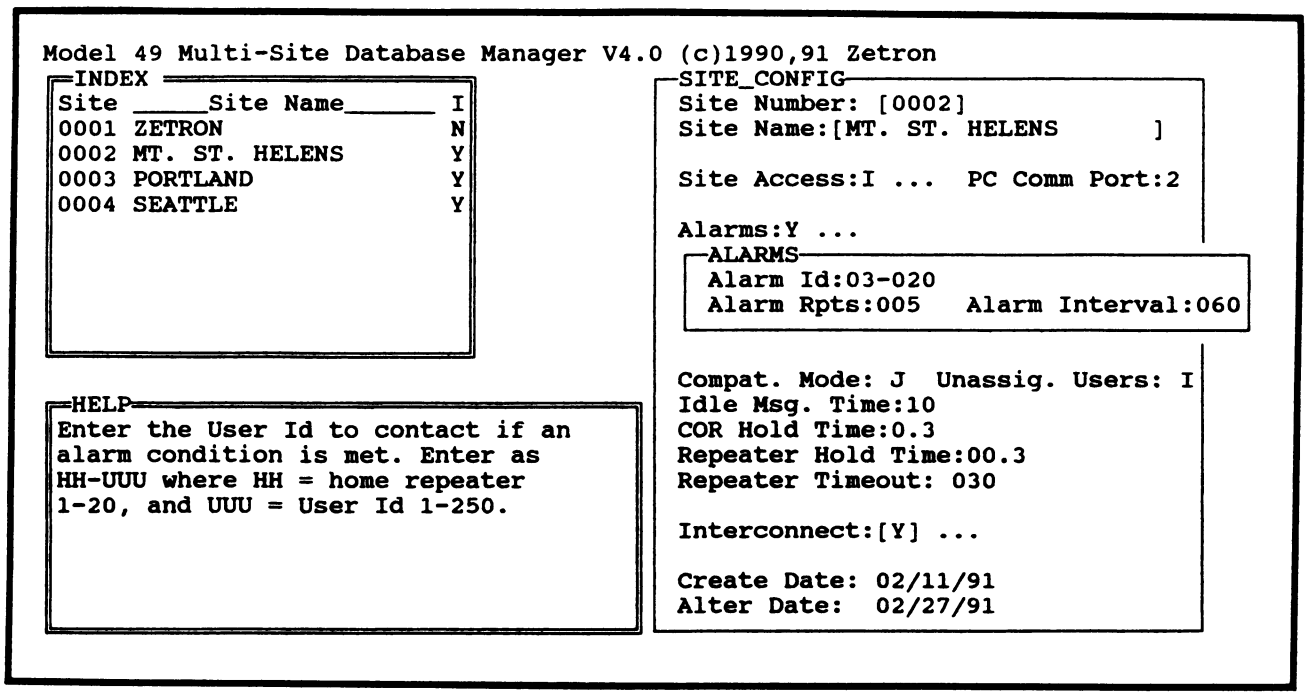


Fig. 5-6 Site 0002 - Alarms Window

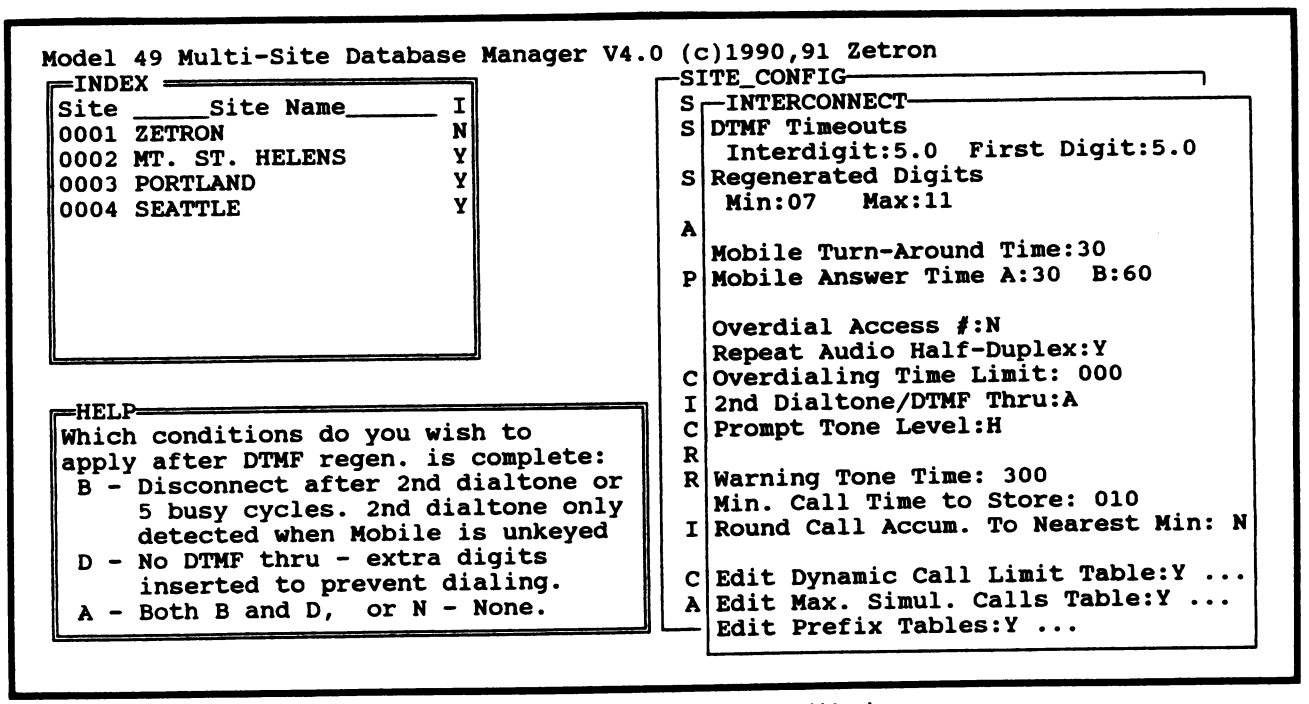


Fig. 5-7 Site 0002 - Interconnect Window

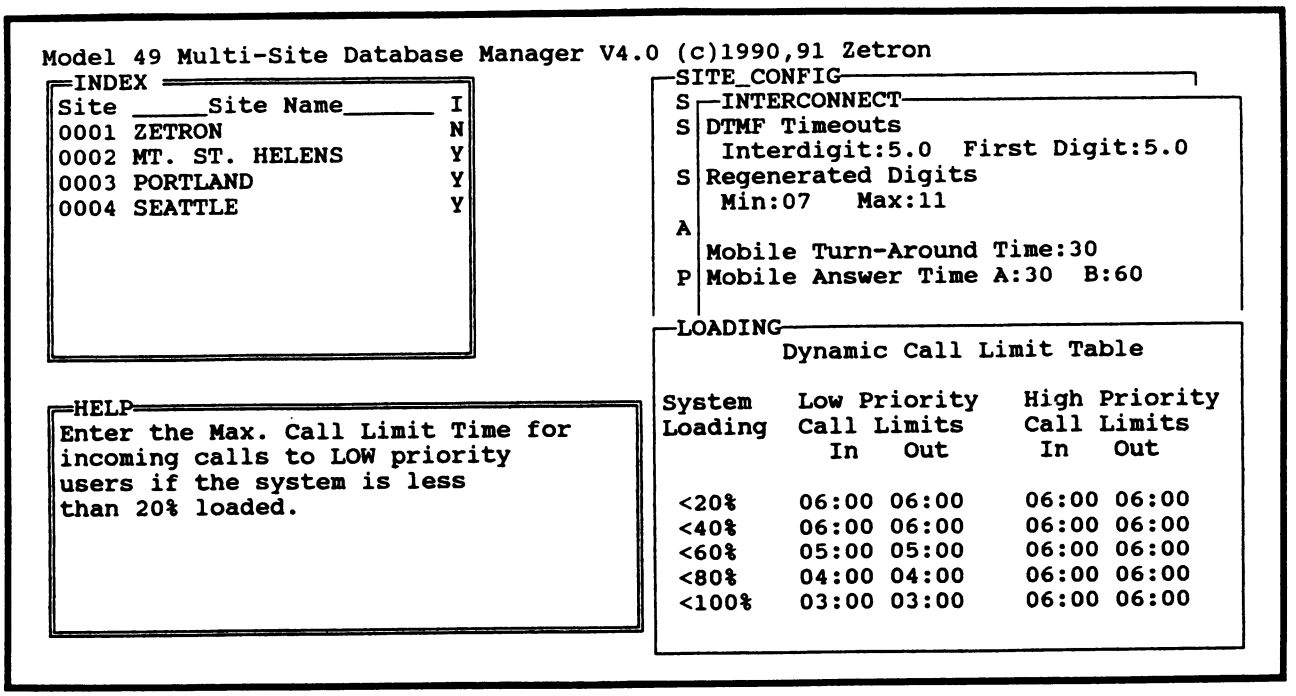


Fig. 5-8 Site 0002 - Dynamic Call Limit Table

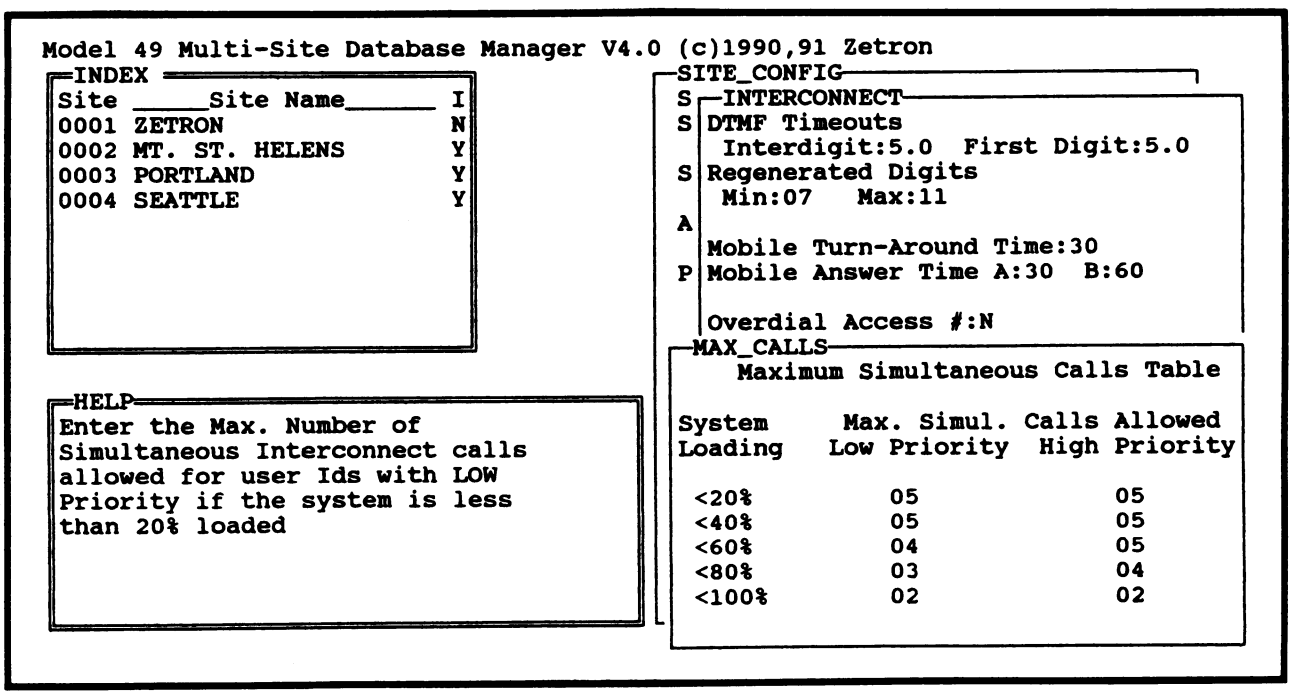


Fig. 5-9 Site 0002 - Maximum Simultaneous Calls Table

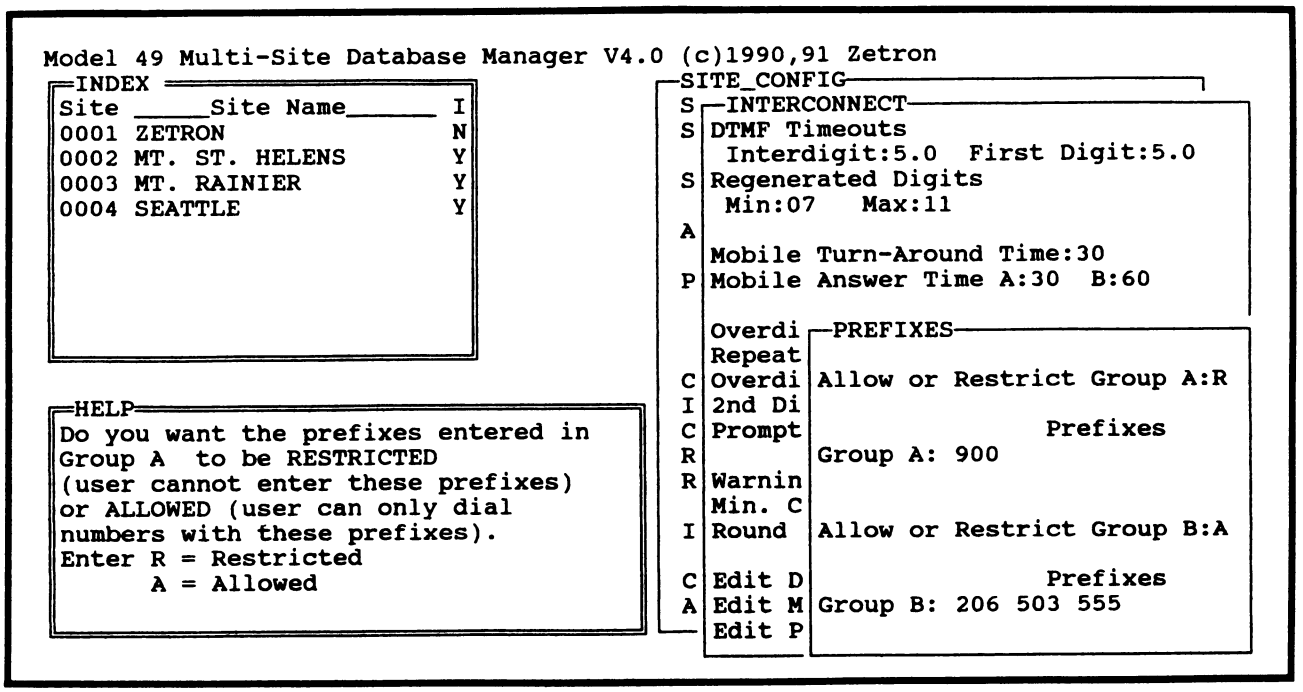


Fig. 5-10 Site 0002 - Prefixes Window

Figures 5-11 through 5-18 show various Repeater Configuration windows. Note that the Connect Time Required field is different for End-End and DID. (Refer to figures 5-13 and 5-16). Figure 5-18 shows the window that appears when alarms are enabled.

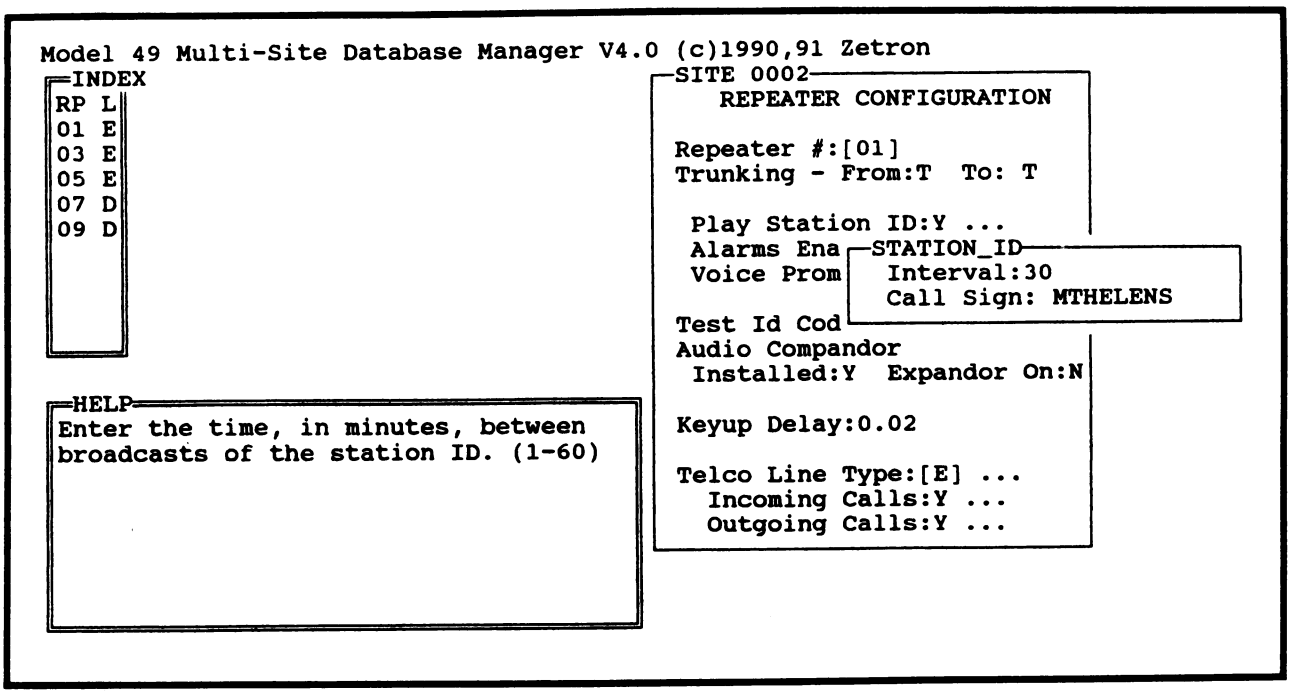


Fig. 5-11 Site 0002 - Repeater Config - Station ID

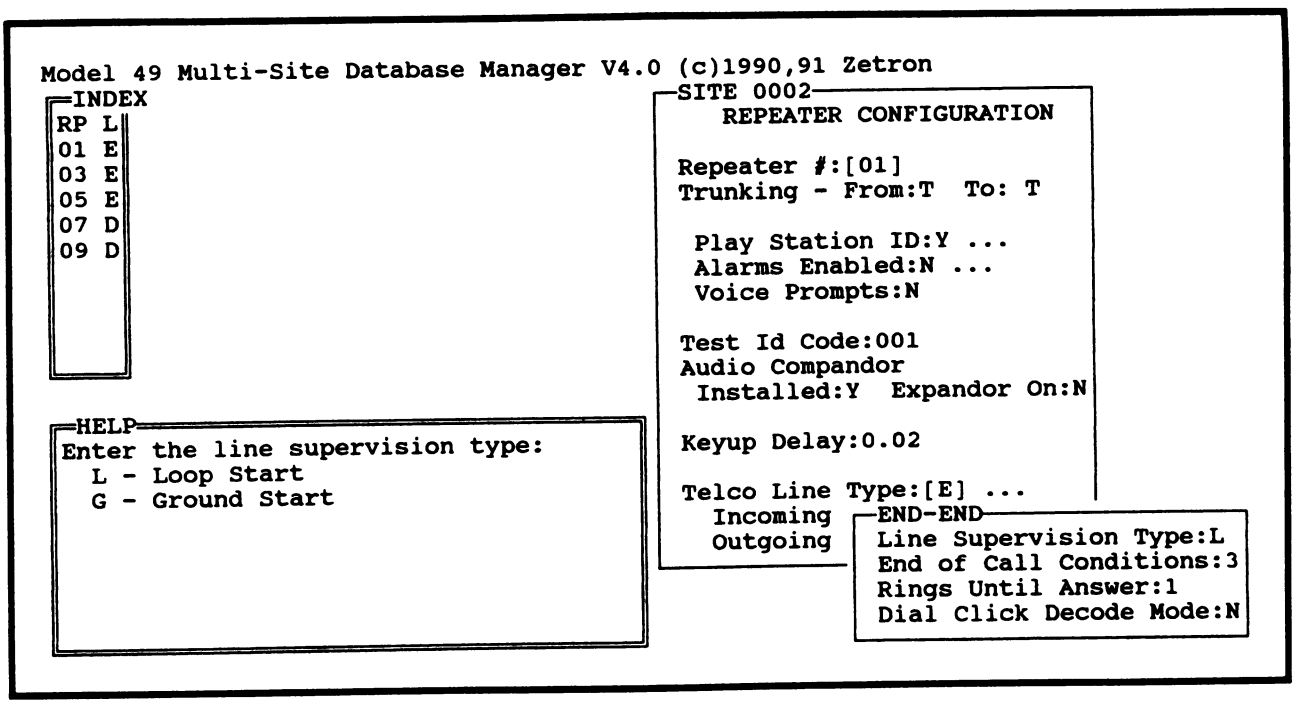


Fig. 5-12 Site 0002 - Repeater Config - End-End Telco Type

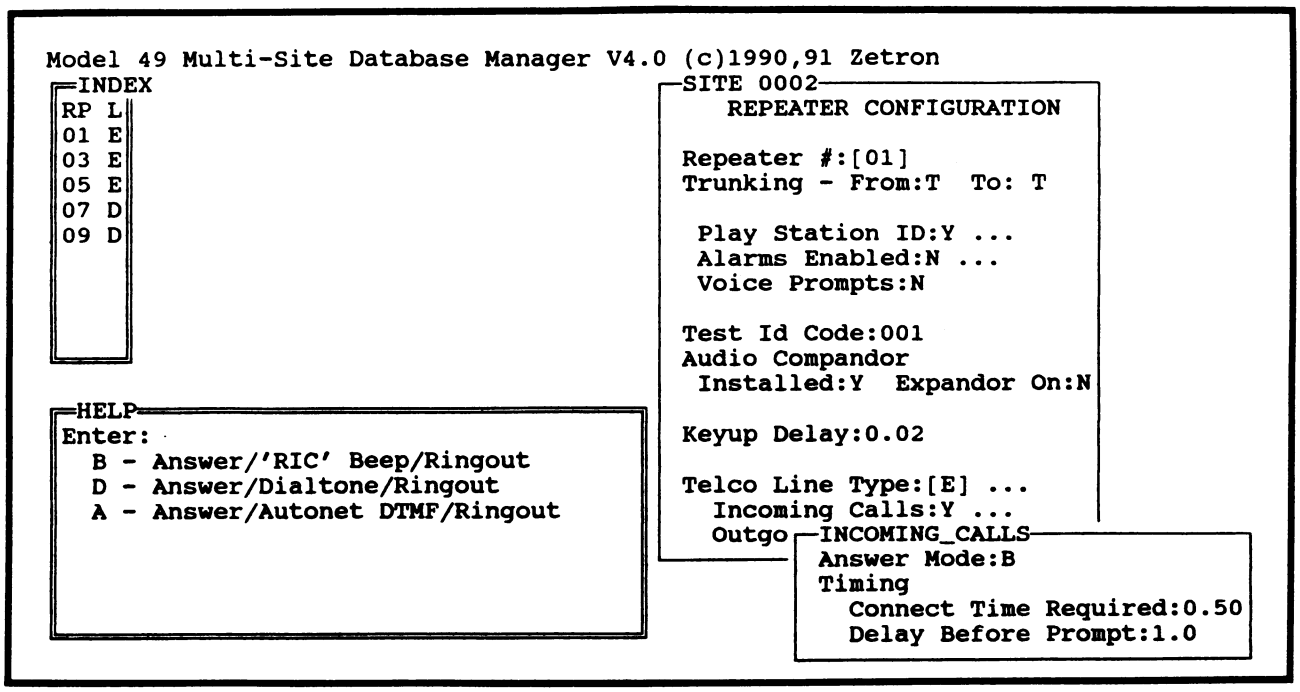


Fig. 5-13 Site 0002 - Repeater Config - Incoming Calls

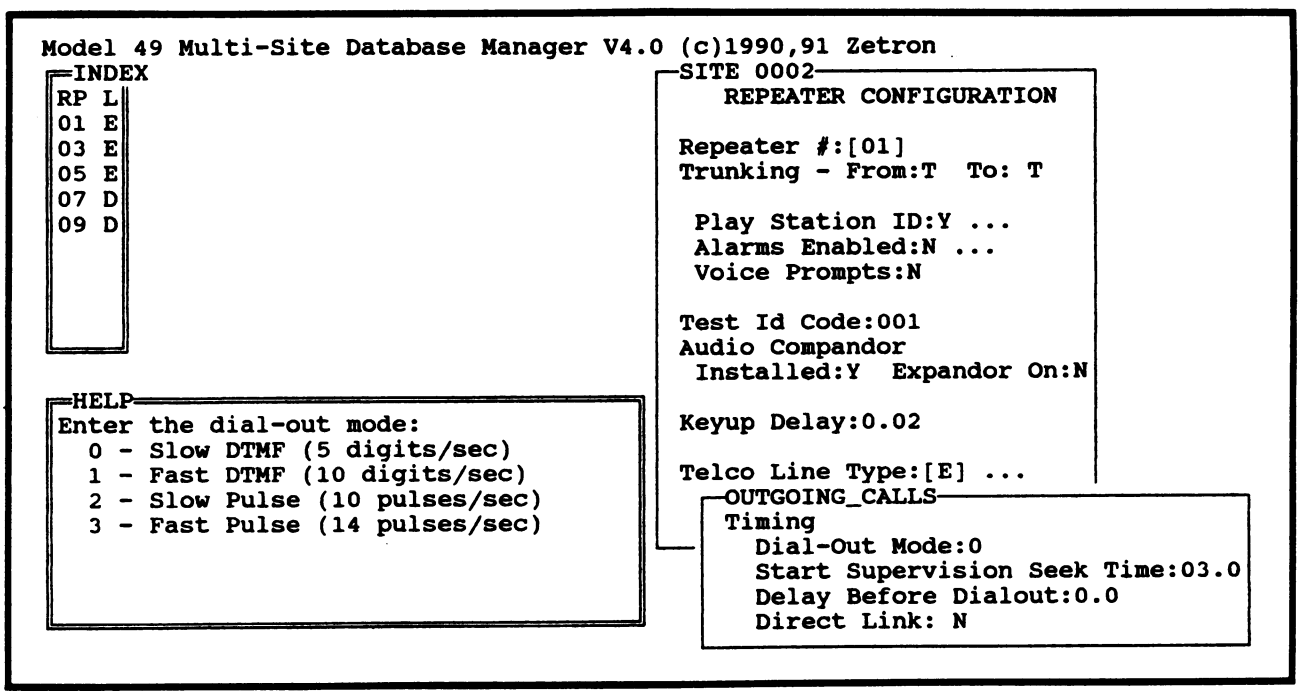


Fig. 5-14 Site 0002 - Repeater Config - Outgoing Calls

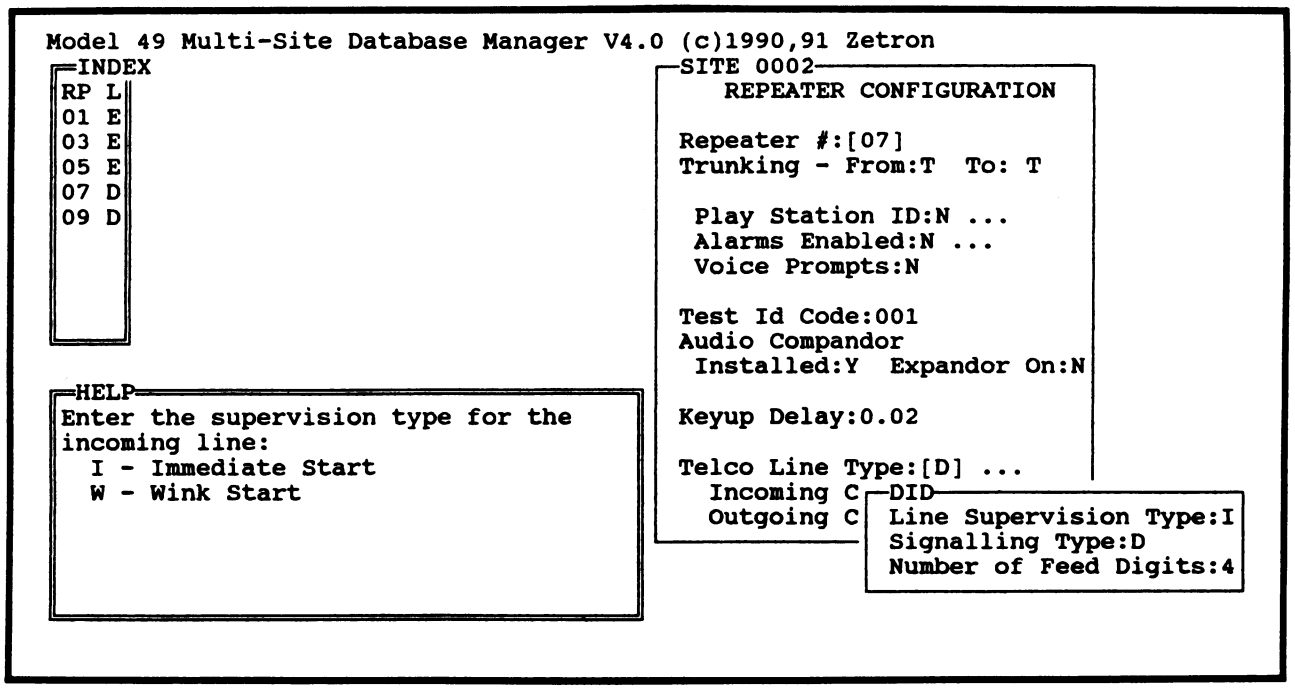


Fig. 5-15 Site 0002 - Repeater Config - DID Telco Type

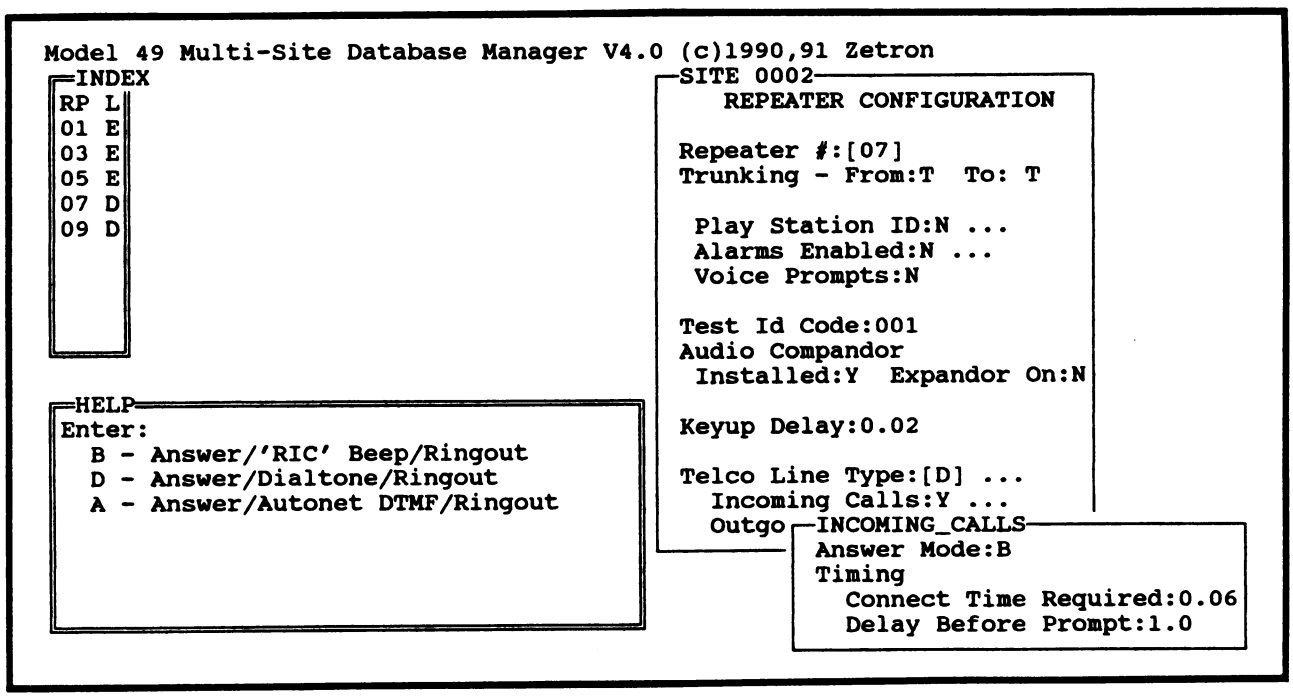


Fig. 5-16 Site 0002 - Repeater Config - Incoming Calls (DID)

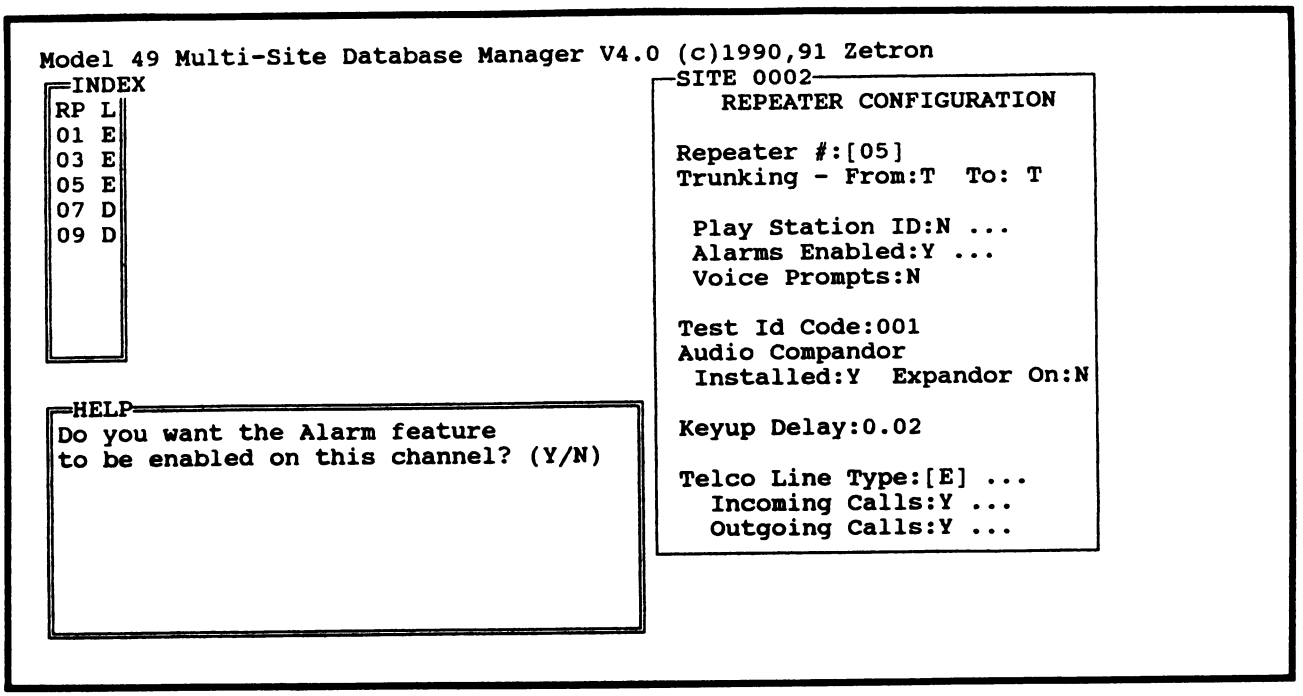


Fig. 5-17 Site 0002 - Repeater Config - Alarms Enabled

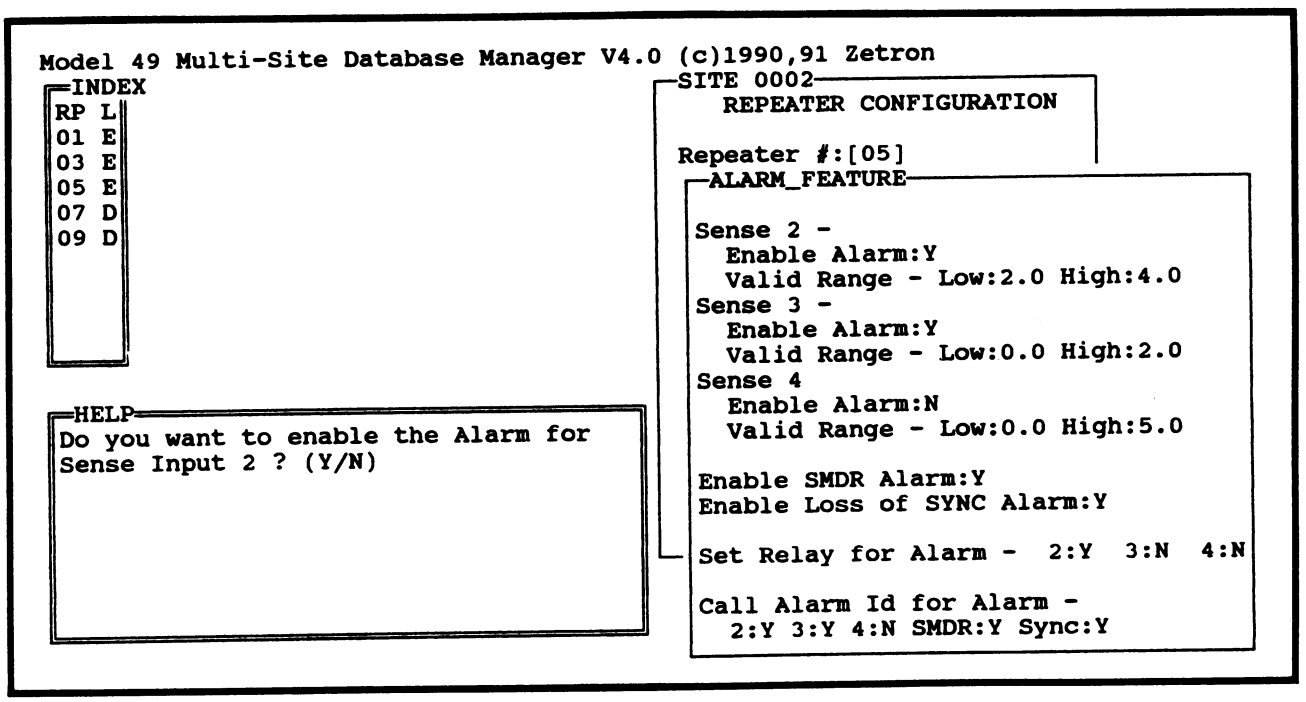


Fig. 5-18 Site 0002 - Repeater Config - Alarm Feature

Figures 5-19 through 5-20 show interconnect user programming. These users have been assigned access numbers corresponding to the feed digits that will be received on the DID lines. Note in Fig. 5-21, that the user has toll privileges but Allow/Restrict Prefixes Group B is set to Y. In Fig. 5-10 the Prefixes Table B was shown to be set to 'A'llowed, and the prefixes 206, 503 and 555 were in the table. This indicates that this user is allowed to make all local calls, but may only make toll calls with the prefixes in the table.

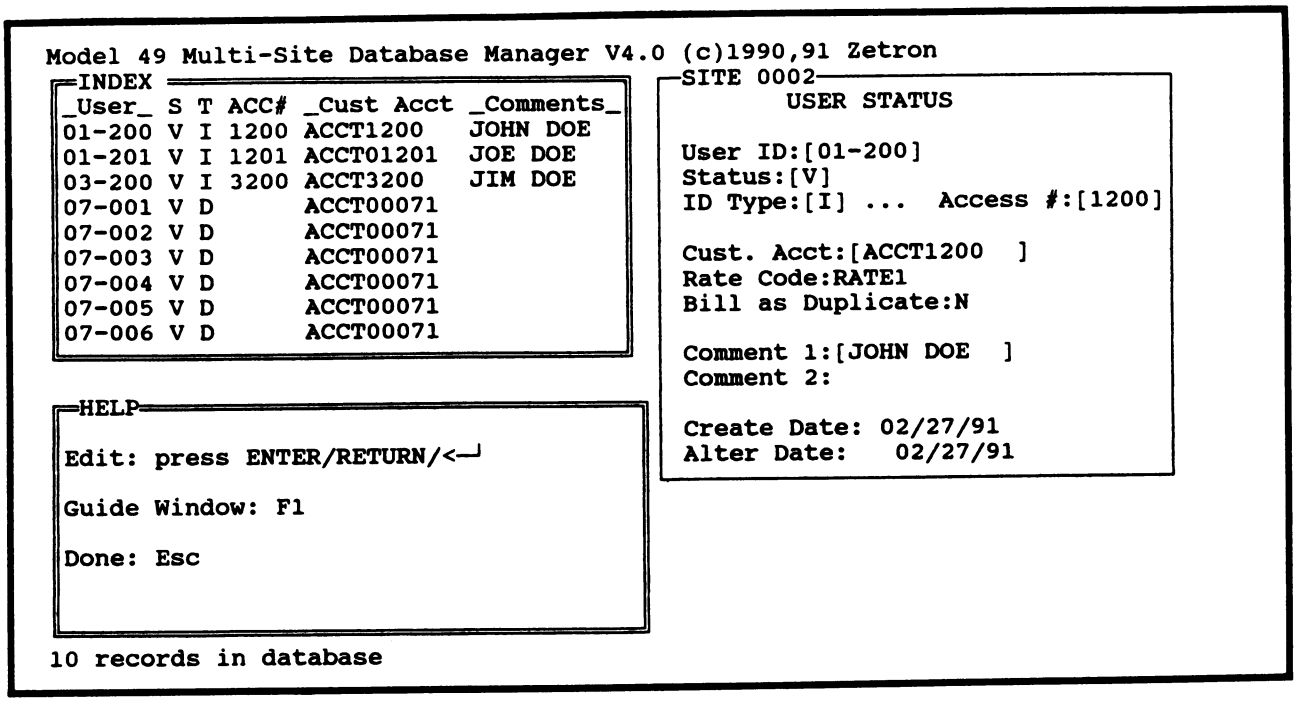


Fig. 5-19 Site 0002 - User Status

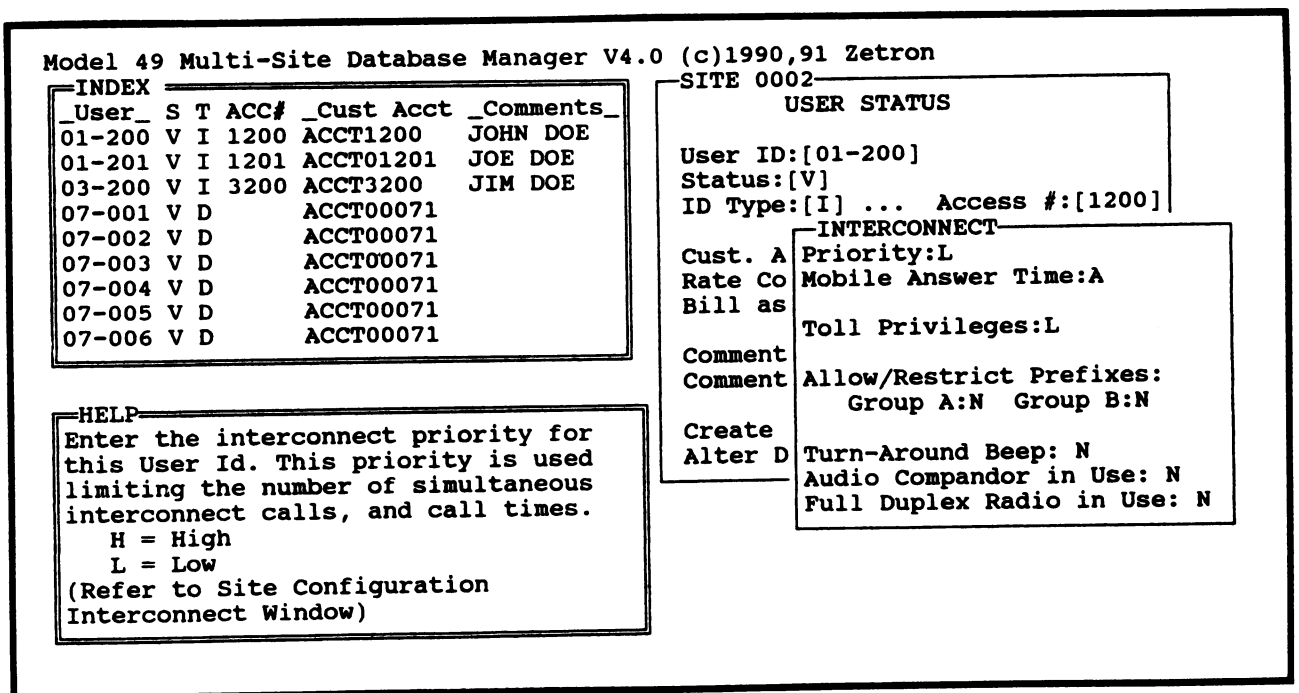


Fig. 5-20 Site 0002 - User Status - Interconnect

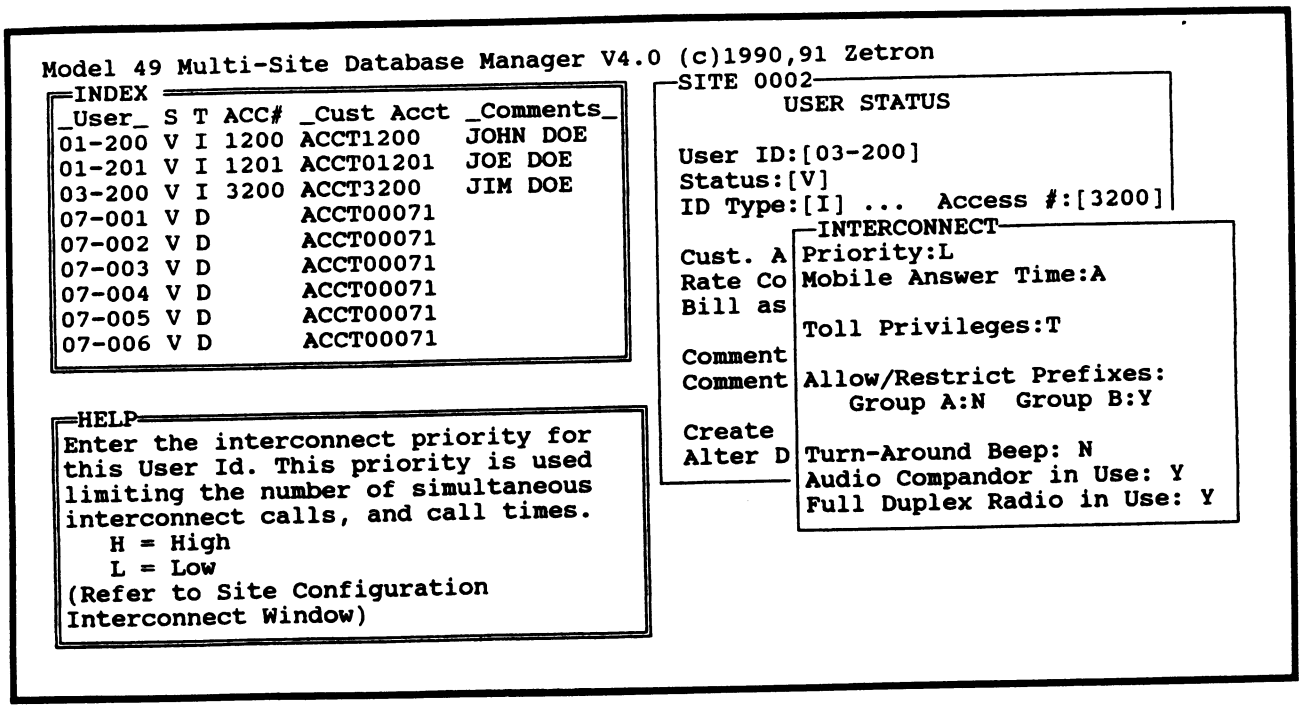


Fig. 5-21 Site 0002 - User Status - Interconnect

SITES 0003 and 0004

Site 0003 is a five channel system which has one channel with a direct E&M 4-wire link to site 0004 which is a four channel system.

Figures 5-22 and 5-23 show the Site Configuration screens.

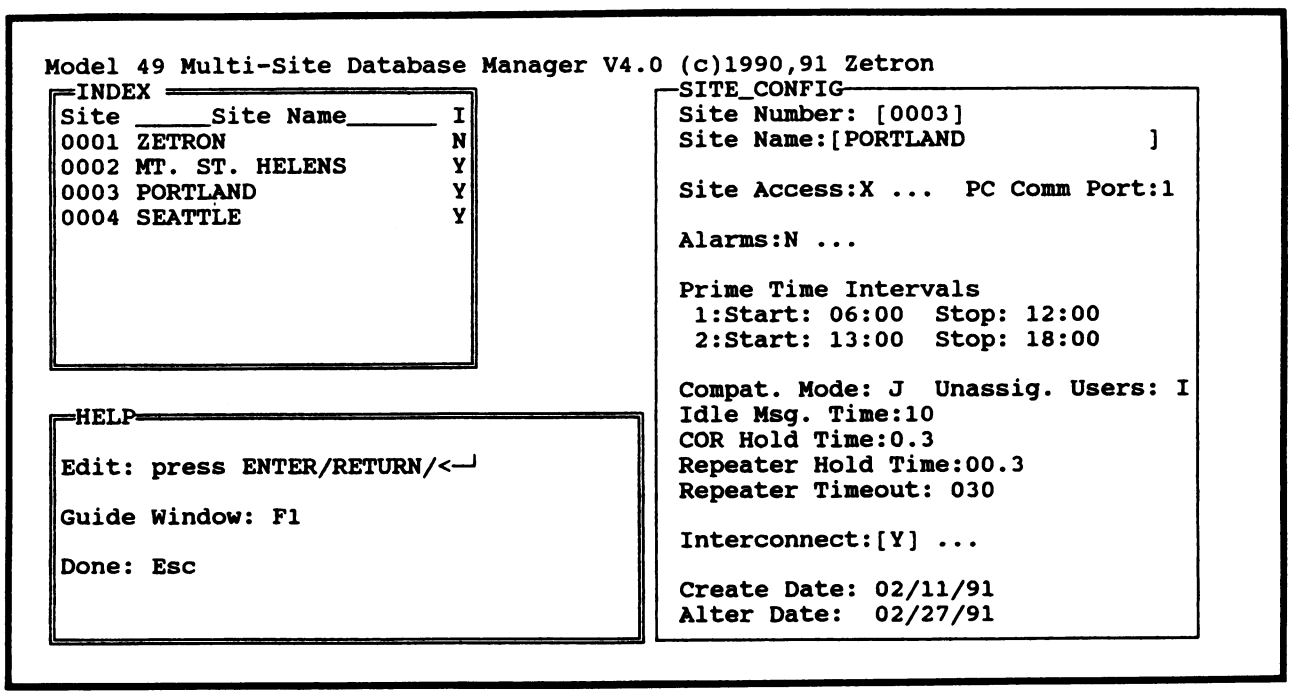


Fig. 5-22 Site 0003 - Site Configuration

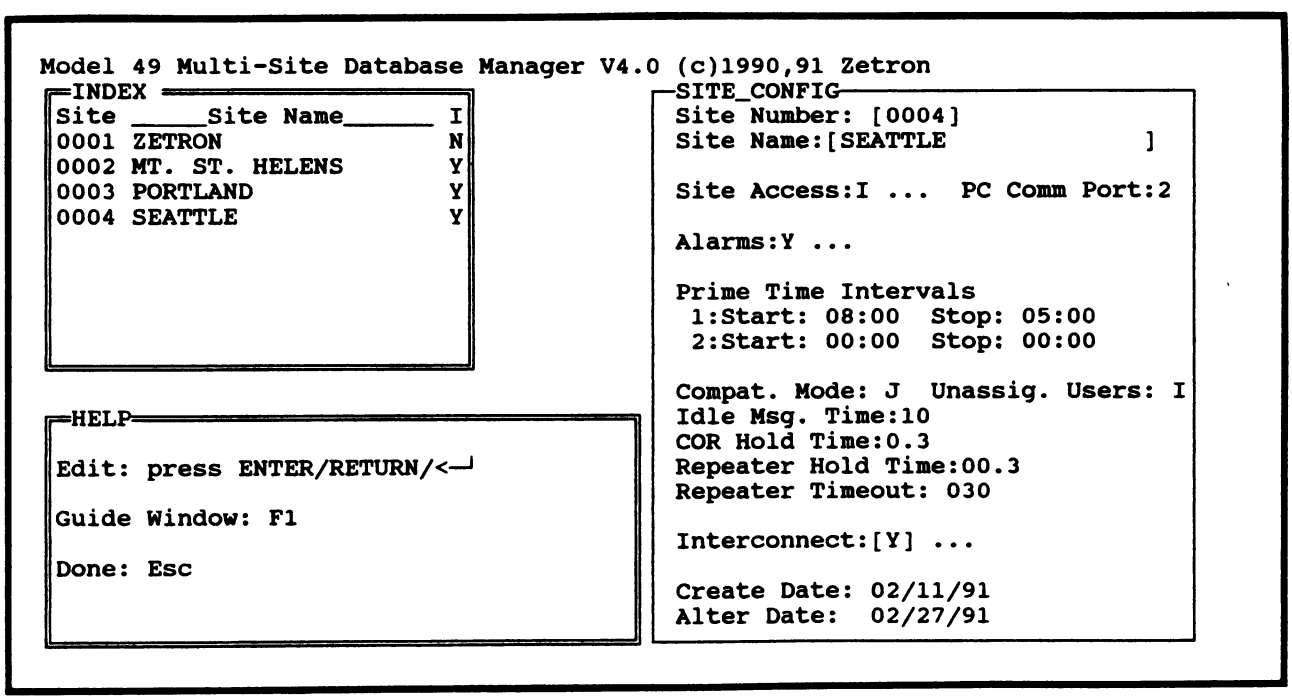


Fig. 5-23 Site 0004 - Site Configuration

Both Sites 0003 and 0004 have the direct microwave link on repeater 1. Figures 5-24, 5-25 and 5-26 show the repeater configuration for repeater 1 of Site 0003. Site 0004 repeater 1 configuration would be the same. Note in Figure 5-25 that the Direct Link field is set to A - Direct to LTR site, overdial access code. Also note, that in Figure 5-26 that the Answer Mode is set to A - Answer/Autonet DTMF. Although in the E&M mode no prompts are played this field is used to indicate that if the user being called is marked as type Auto-Overdial no ringing tones are sent to the mobile, the audio is passed through immediately. This field also tells the Model 49 to regenerate the # out the phone when the mobile hangs up to help disconnect the call quickly.

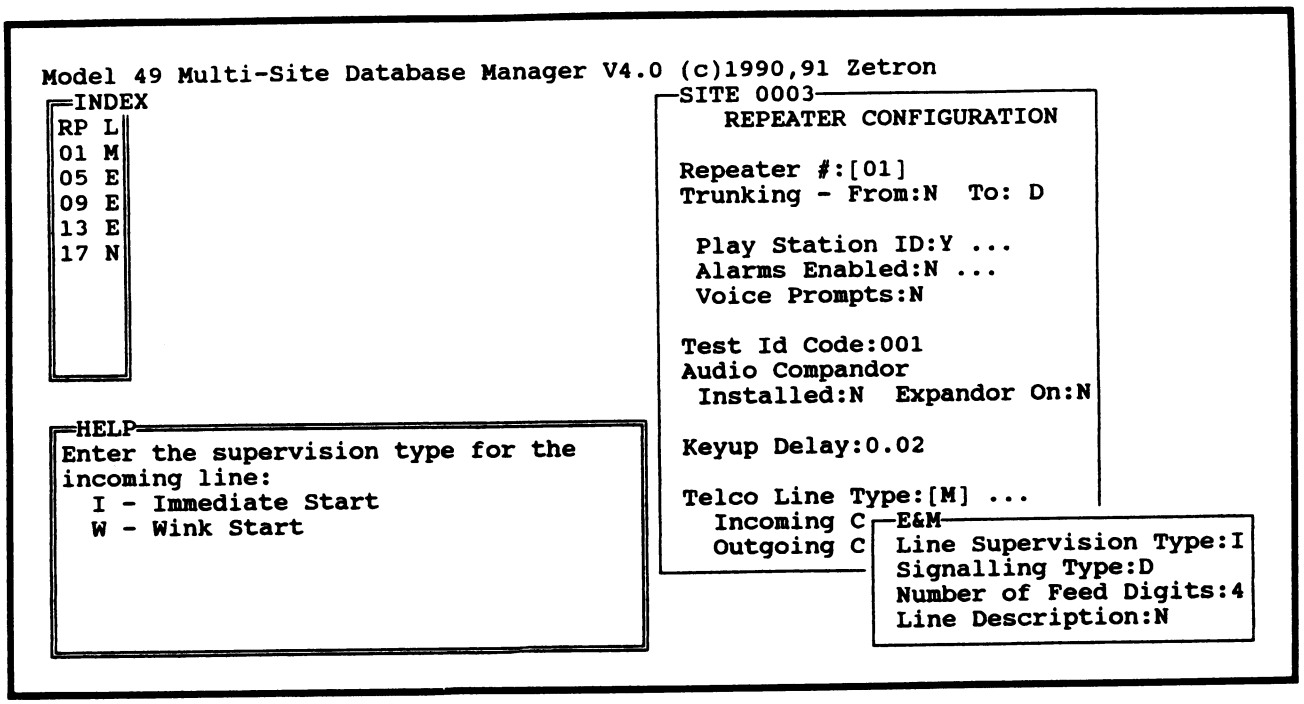


Fig. 5-24 Site 0003 - Repeater Config - E&M

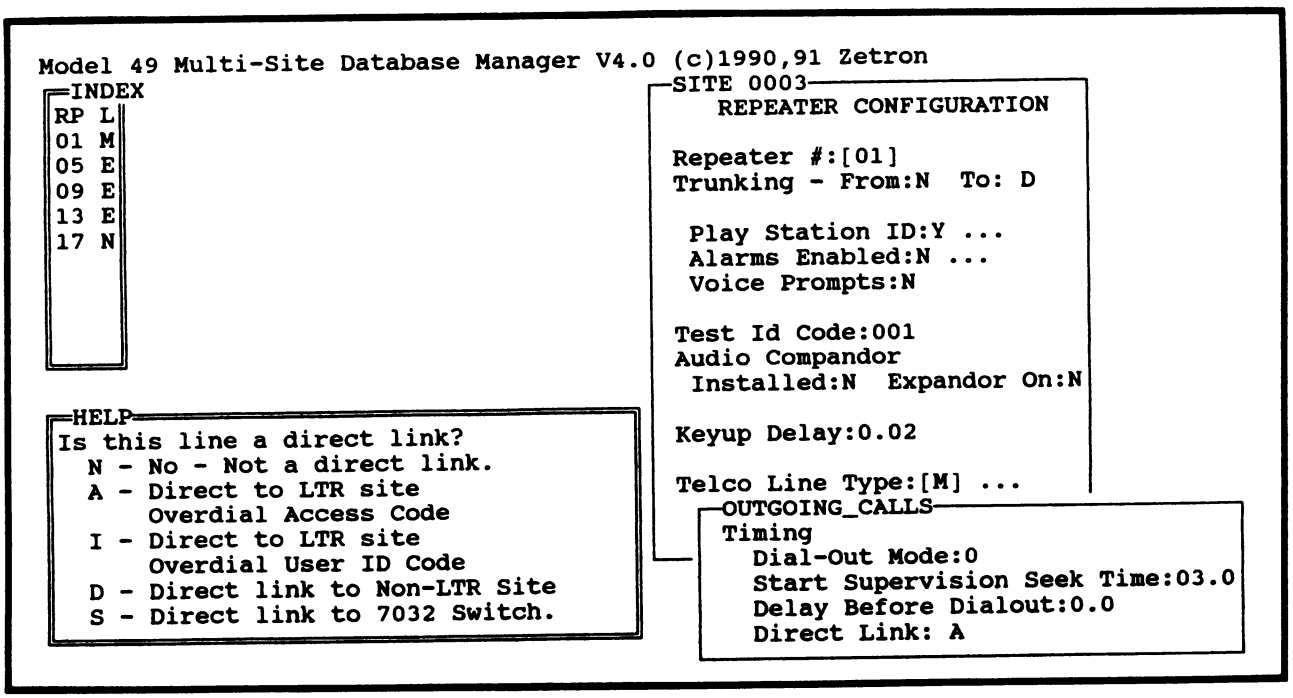


Fig. 5-25 Site 0003 - Repeater Config - Outgoing Calls

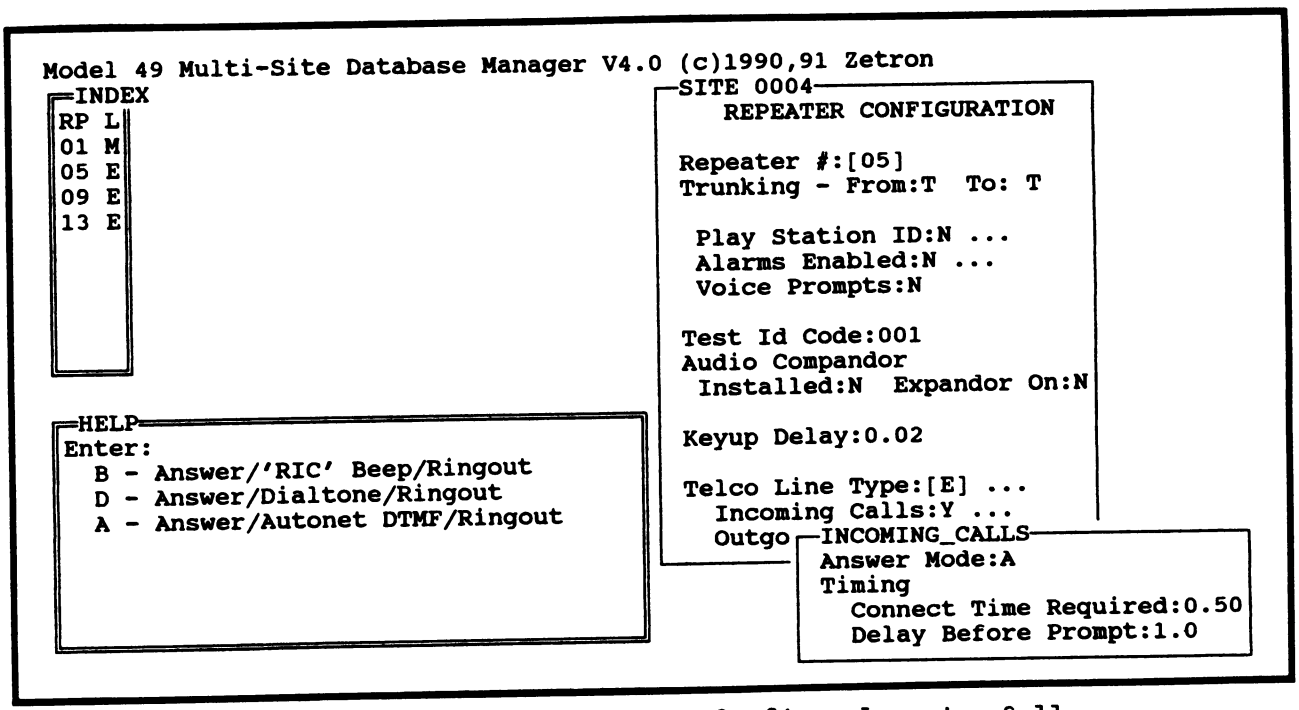


Fig. 5-26 Site 0004 - Repeater Config - Incoming Calls

Figures 5-27, 5-28 and 5-29 show users that have been validated on the two sites. On both sites user 01-021 through 01-025 have been programmed as type 'A' - Auto-Overdial. When any of these users key-up on their home channel (they will be invalidated on other channels), a connection will be made to the other site through the microwave link and the Model 49 on the initiating site will automatically overdial the access code of the initiating mobile. Once dialing is complete the person initiating the call can key up and begin speaking.

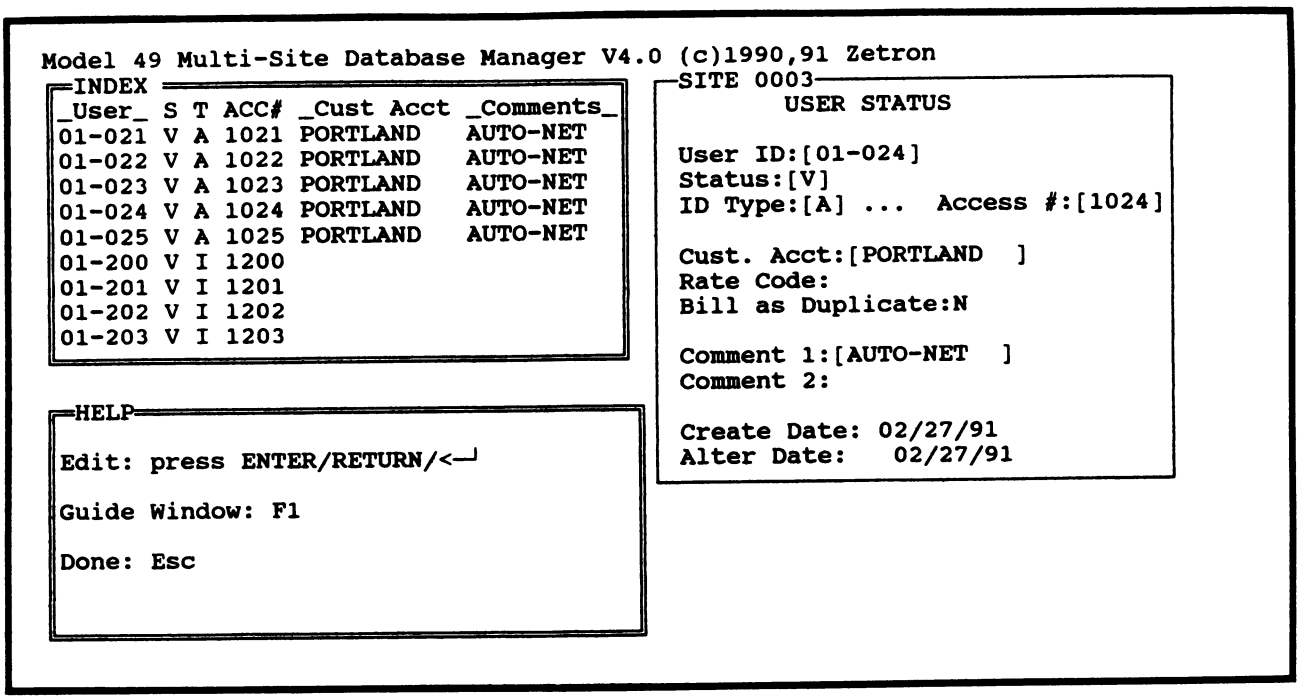


Fig. 5-27 Site 0003 - User Status - Auto-Overdial

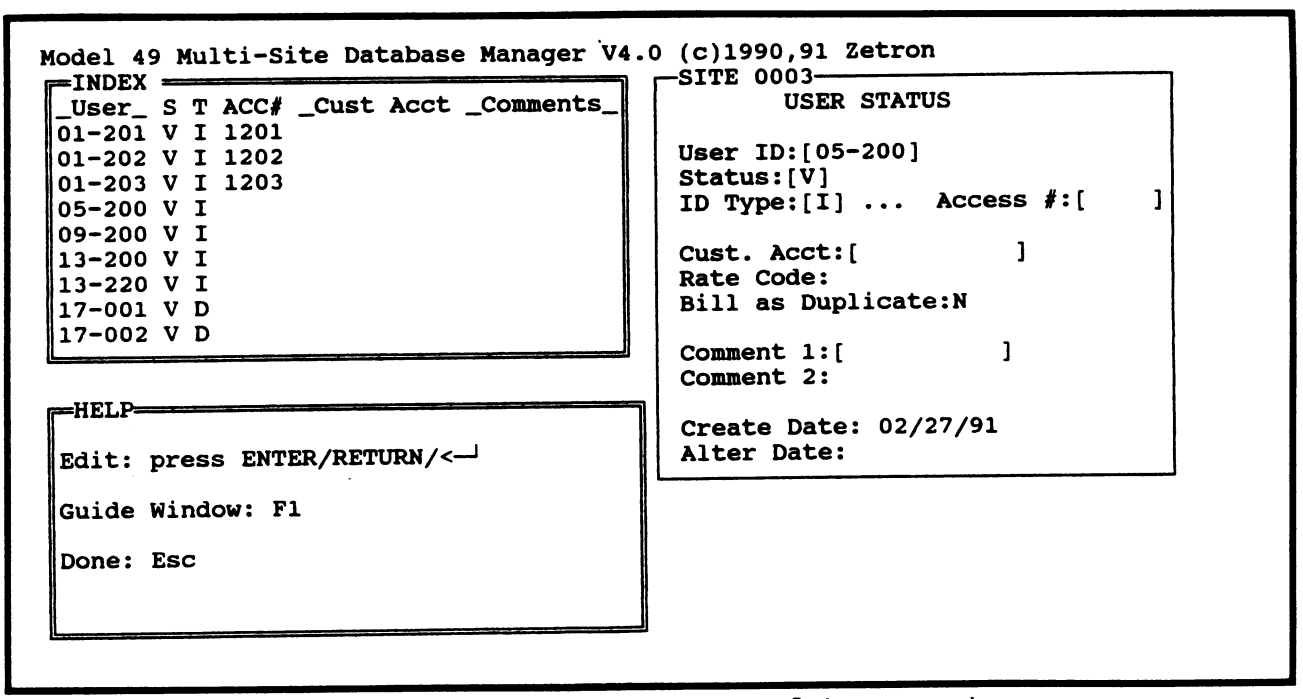


Fig. 5-28 Site 0003 - User Status - Interconnect

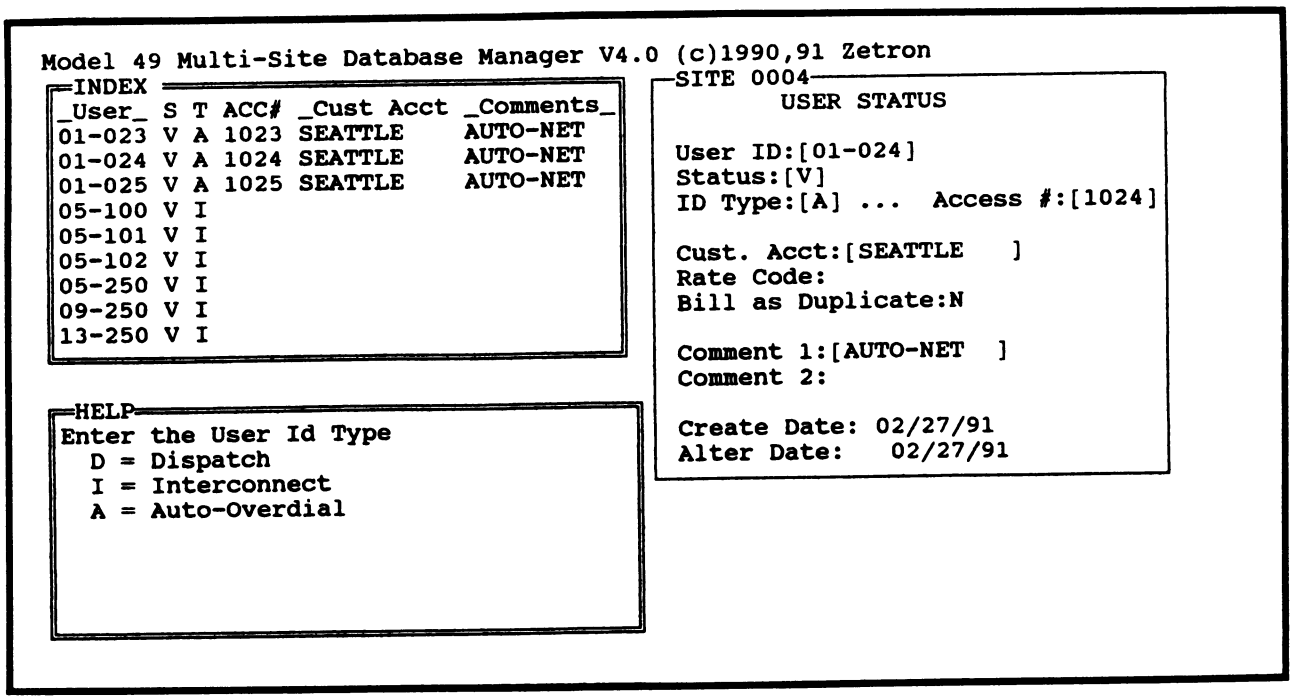


Fig. 5-29 Site 0004 - User Status - Auto-Overdial

In addition to the direct link between the two sites, PTC (Push to Connect) Users are also set-up so that when they key-up the phone number of the other site is automatically dialed and the indicated ID code is overdialed.

Figures 5-30 and 5-31 show the Autodial Tables for Sites 0003 and 0004. Entry 01 is the phone number of one of the repeaters on the opposite site.

Note that Number Connects To is set to 'I' indicating this number is to another LTR site - Overdial Id Code. Entry 02 is a regular phone number. Figures 5-32 and 5-33 show PTC Users set up on each site. Figure 5-32 shows user 05-200. When this user keys-up, the number in autodial table entry 01 will be automatically dialed (this number is to Site 0004). When the called site answers the ID code 05-100 will automatically be overdialed. Figure 5-33 shows user 13-250 on Site 0004. When this user keys-up they have 2 secs to enter the first digit of a number, if they don't the number in autodial table entry 02 is dialed. This number is to a regular phone so no ID codes are overdialed.

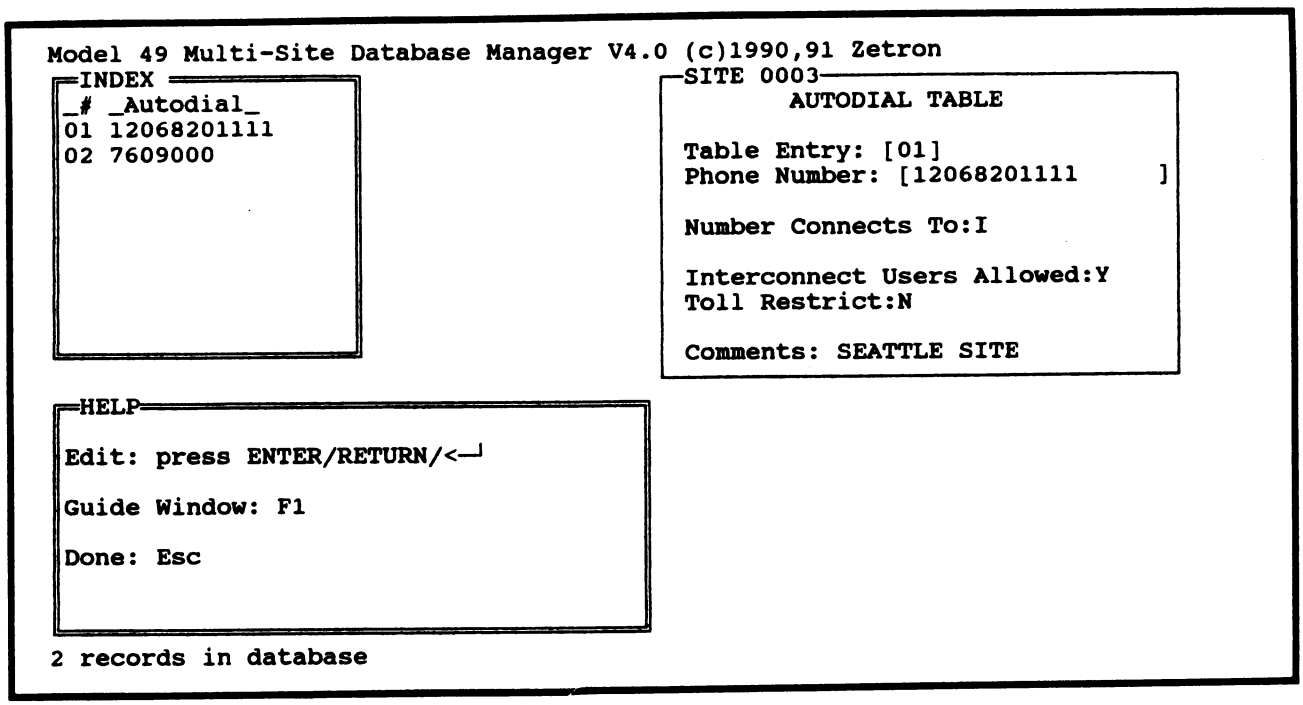


Fig. 5-30 Site 0003 - Autodial Table - Entry 01

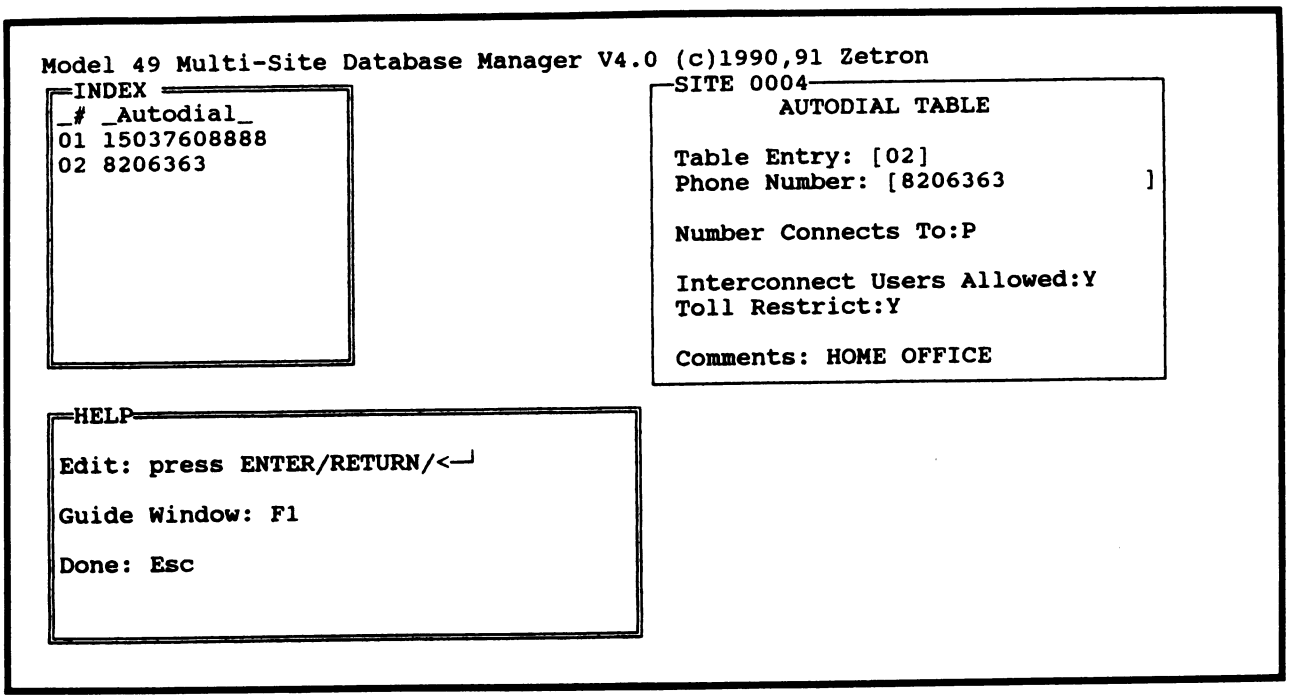


Fig. 5-31 Site 0004 - Autodial Table - Entry 02

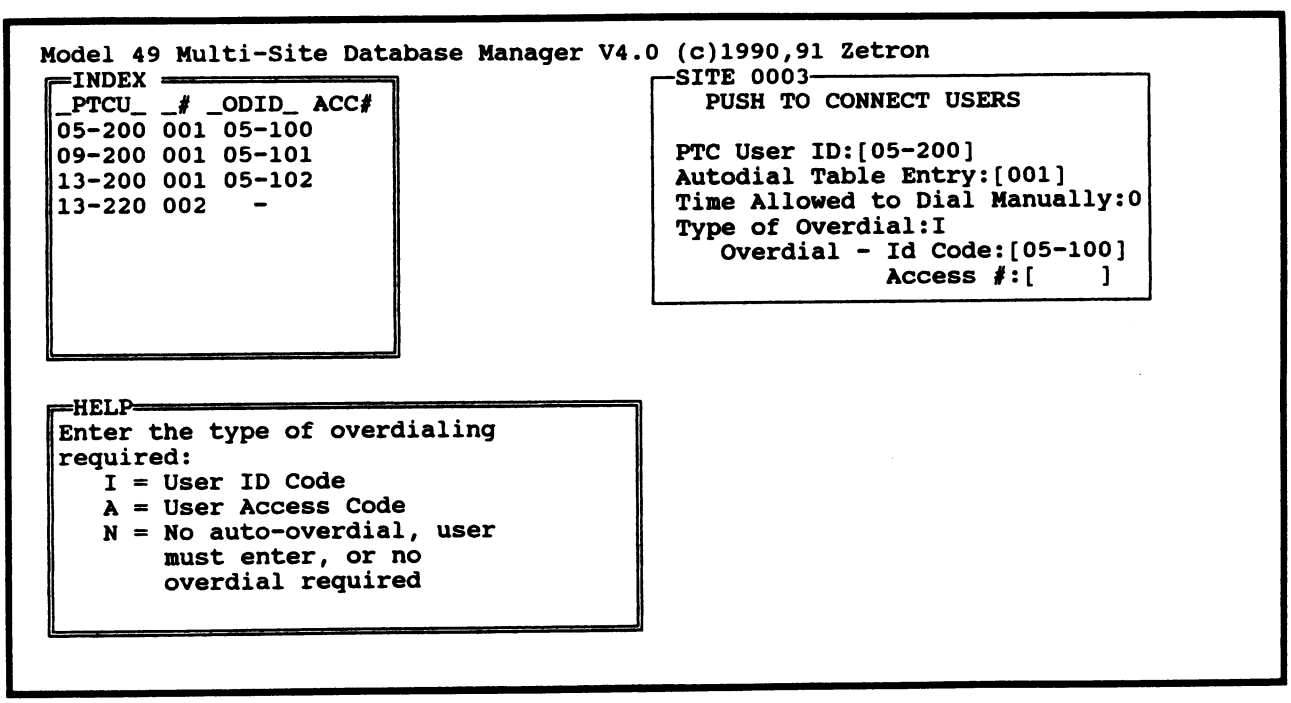


Fig. 5-32 Site 0003 - Push To Connect Users

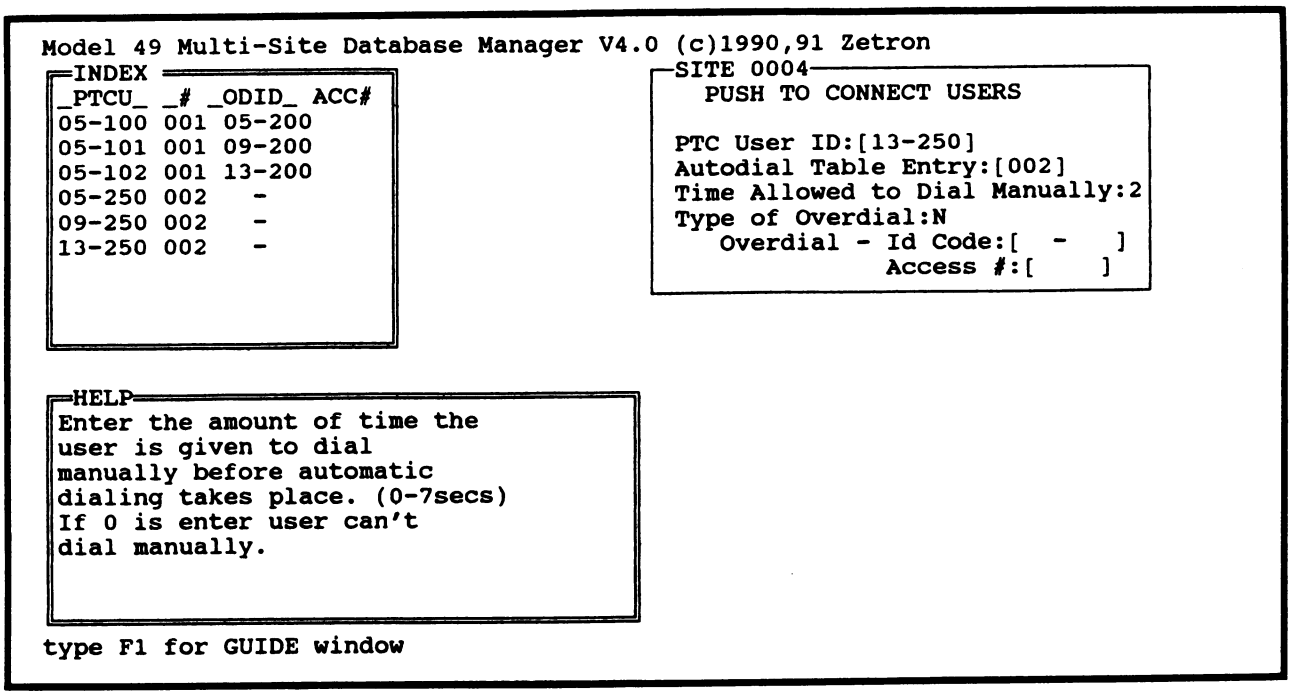


Fig. 5-33 Site 0004 - Push To Connect Users

APPENDIX A

ZETRON MODEL 49 TRUNKING REPEATER MANAGER

Wide Area Dispatching With AutoNet

AutoNet is a dispatch networking system (mobile to mobile) using the interconnect option of the Model 49. There are two ways to connect two AutoNet Model 49s together for a dispatch call. The first method is Direct Connect. This method uses an E & M telco card at each Model 49. The two Model 49s connect together via an RF link or Microwave (see figure 1). The second AutoNet configuration uses Model 49s connected to the PSTN network and uses the autodial feature of the Model 49 (see figure 2).

Here is a brief explanation of how Zetron's AutoNet completes a dispatch call using the **Direct Connect Method.** This type of AutoNet dispatch call takes less than 3 seconds to complete.

1. User #1 selects the correct AutoNet system and group on site 1 (see figure 3) and keys his mic. This is a predetermined ID code programmed into both mobiles and enabled in the M49 as an Autonet ID.

2. The site 1 Model 49 signals the site 2 Model 49 via the RF link or microwave and sends the correct AutoNet ID to site 2.

3. The site 2 Model 49 receives the ID code and keys its transmitter to call User #2 or a group of users.

4. User #1 then rekeys his mic and gives his message. (User 1 to User 2)

5. The link between the two sites remains keyed for the duration of the call, and the LTR transmitters at both sites also remain keyed. For this purpose, the mobiles need to be programmed as interconnect mobiles for this ID code. Otherwise, the mobiles will be locked out of the conversation based on how an LTR mobile handles a dispatch call.

6. The AutoNet call can be disconnected two ways. The users can allow the M49s to time-out, with the mobile activity timer, if they do not have a DTMF mic. The second way is for one of them to key their radio and send a DTMF # to disconnect the call. The DTMF # passes to the other M49 through the link, allowing for disconnect of the both systems.

PTC Autonet Calls, using dial-up telephone lines, occur the same way with the exception being the time it takes to complete the site to site call. This time is based on how fast your telephone office can receive and process a phone call. Total time for this type of AutoNet call is approximately the time it takes you to phone your office.

1. User #1 selects the correct AutoNet system and group on site 1 and keys his mic. This is a predetermined ID code programmed into both mobiles and the M49 as an AutoNet ID.

2. The site 1 Model 49 goes off-hook with its phone line and waits for dial-tone. When dial-tone occurs, the M49 automatically dials the phone number of the other AutoNet site. When the second M49 answers the AutoNet call, the first M49 overdials the correct 4 digit access number or 5 digit user ID number. The second M49 then validates the ID code as being an AutoNet call, keys the transmitter, and places User 1 on the air to complete the call. The call disconnects by one or both mobiles sending a DTMF #.

AutoNet is a first generation networking product and does not have any follow-me capabilities. All the IDs and phone numbers must be programmed into the Model 49s, and the users need to know where the other mobiles are located in order to complete the calls.

This is a list of programming parameters needed for an AutoNet call. Some parameters will follow the normal programming for the options selected. The actual parameters as shown in Multibase are in bold print. A question mark (**?**) after the parameter indicates the system operator must decide how to best program this parameter. A letter or number (**Y** or **4**, etc.) after the parameter indicates specifically how the parameter should be programmed.

SITE CONFIGURATION

Interconnect . . . Y — This must be answered Yes

Overdial Access # = Y — This should be answered yes to speed up the dialing process for the AutoNet overdial.

REPEATER CONFIGURATION

Trunking - From ? To ? — This question will be answered depending on the number of Model 49s at your site. If you are using the Direct AutoNet method (2 M49s connected together via a microwave or dedicated line), you will not want any interconnect users to trunk to this repeater. This can be accomplished by programming the To question to **D** for Last available dispatch for your AutoNet Model 49.

You must then program your other interconnect Model 49s on the system to trunk From **I** for interconnect. This will allow all your M49s to be used for dispatch.

For Model 49s setup as PTC AutoNet, the From and To can be left as **T** to allow full trunking on the system.

Other combinations are possible depending on how you want your complete system to operate, but care should be taken to keep interconnect call off the Direct AutoNet channels.

Telco Line = ? — This should be an **M** (E&M) for Direct AutoNet. This is the only telco card you can use for direct connect. For PTC AutoNet, you should select whichever card is in your M49. (**M** for E&M or **E** for End to End).

For an E&M card and Direct AutoNet:

Line supervision = I	Immediate start
Signaling = D	DTMF
# of feed digits = 4	4 digits access number.
Line description = N	This should be set to N to allow positive disconnect for the call should something happen to the connection between the 2 Model 49s.
Incoming calls = Y	
Connect time required = .06	
Outgoing calls = Y	
Dialout mode = 0 or 1	DTMF signaling slow or fast depending on your link responses.
Direct link = A or I	Direct link to LTR site.

All other repeater programming parameters will be set up as necessary for your system operation.

USER ID

ID Type = ? — Interconnect or **A**uto Access

This should be answered **I** if you want the Autonet call to ring out on the air with normal telephone style ringing. If you set this to **A**, the AutoNet caller will be placed directly on the air, allowing the caller to give an oral page to 1 of many users. (Base to unit 101, etc.) This gives a true dispatch feel to your AutoNet calls.

Access # = ???? (4 digits) — This is where you will put the 4 digit user access number programmed in the PTC Users Menu from the other M49. It can be a 4 digit number from **0000** to **9999**.

AUTODIAL TABLE

This will only be programmed for the PTC AutoNet calls. Direct AutoNet calls do not use the Autodial table.

Table entry = ?? — **00** to **99**

Phone # = ?????????? — This is the phone number for the other AutoNet site. Commas (,,,) can be added after the phone number to allow for the proper delay between the actual phone number and the user access number.

Number connects to = A — This dials the User access number after the phone number. The user ID can also be used if you are calling a non-Zetron site with this feature.

Interconnect users allowed = N — For an AutoNet number, only AutoNet PTC calls should be using this autodial number.

PTC USERS

PTC User ID = ??-??? — Whichever AutoNet ID you are using.

Autodial table entry = ?? (00-99) — This selects the phone number for the site you are calling.

Time allowed t/dial manually = 0 — This does not allow a user to overdial a phone number and speeds up the AutoNet access.

Type of overdial = A — This overdials the access number for the AutoNet call.

Overdial-Access # = ???? (4 digits) — This is the 4 digit number sent to the other Model 49 to call the correct AutoNet user. This number should match the Access number programmed in User ID section of the other Model 49 connected to the AutoNet system.

DIRECT AUTONET

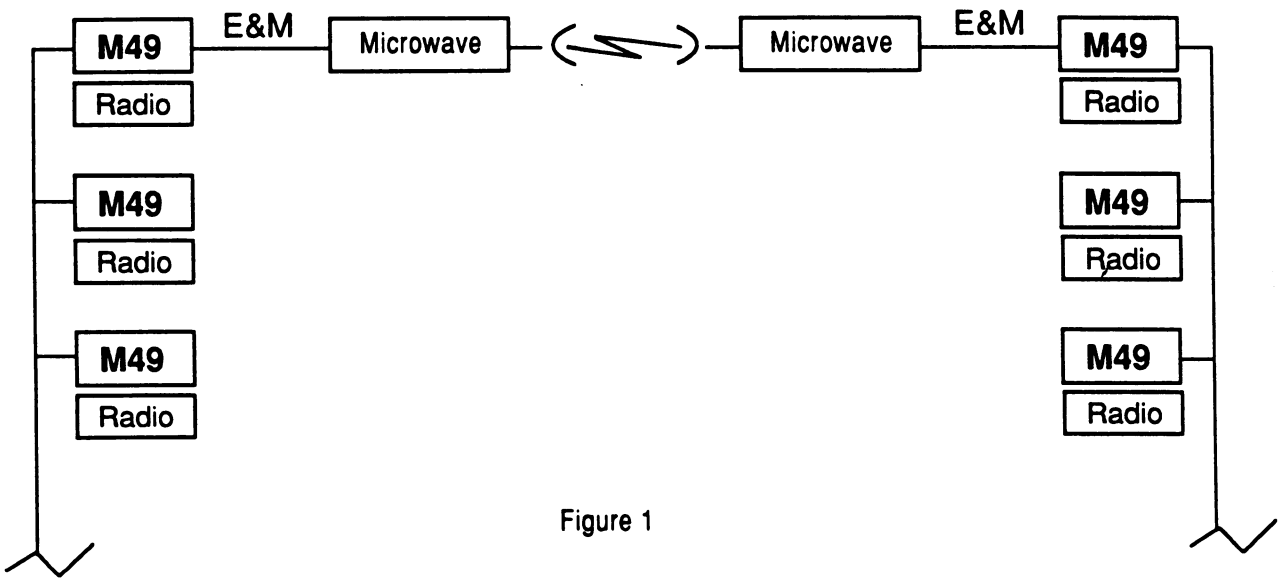


Figure 1

PTC AUTONET

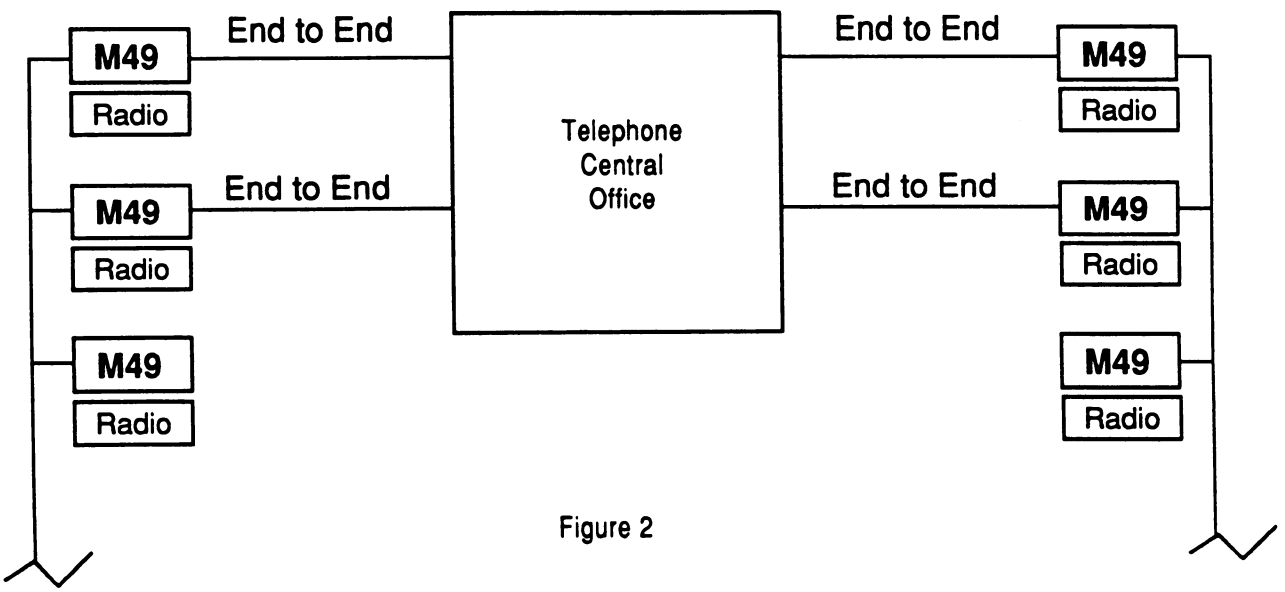


Figure 2

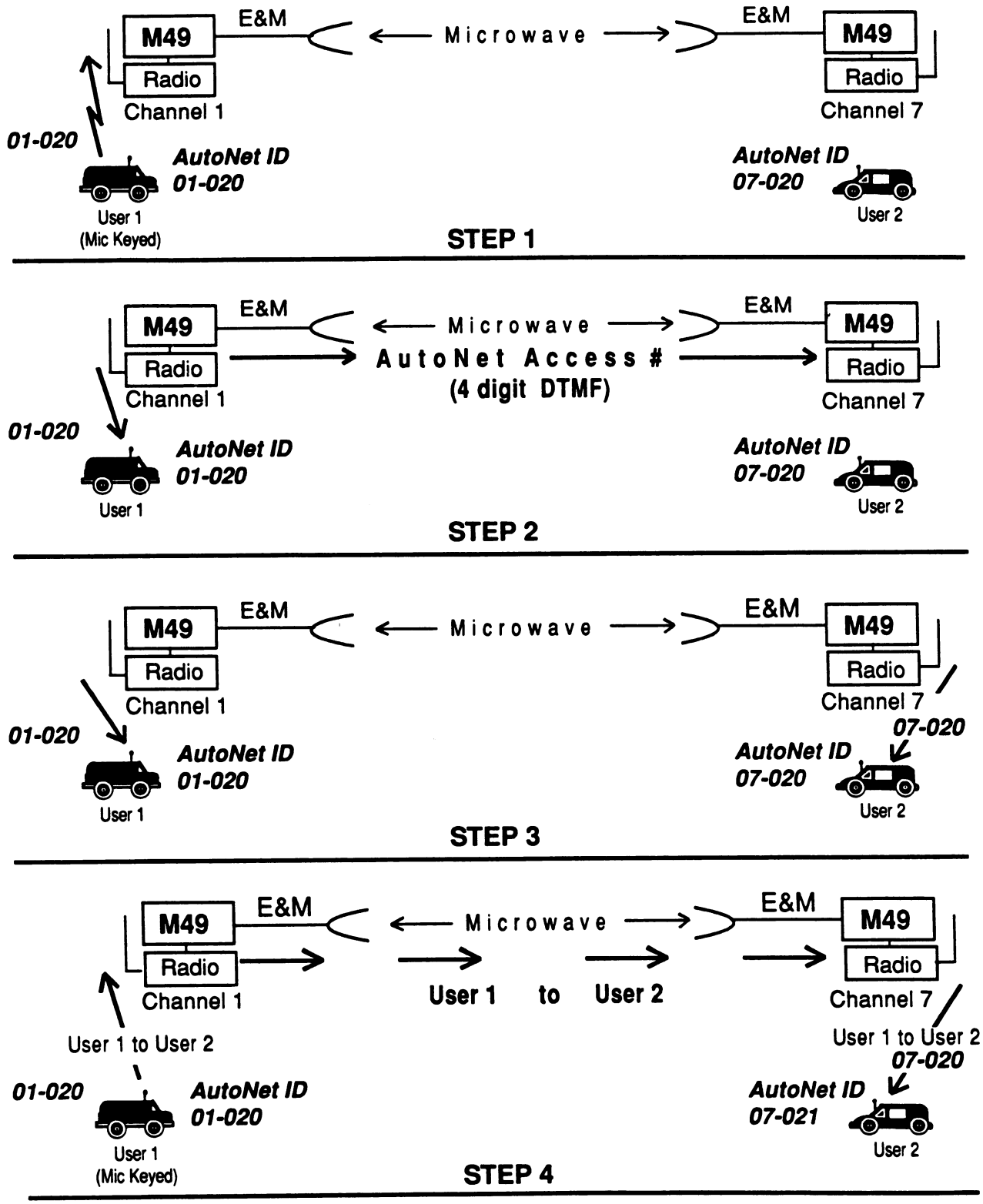


Figure 3

Zetron, Inc. Mobile Systems Division 12335 134th Ct. N.E. Redmond WA 98052
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