Meridian IVR

3270 Gateway Development Guide

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Publication history

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This document is the first standard issue for Meridian IVR release 2.0/I.

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About this guide

Who should use this guide

This IVR 2.0/I 3270 Gateway Development Guide is written for IVR 2.0/I application developers whose voice applications require access to mainframe resources using the 3270 communication protocol.

This guide assumes that the user is familiar with 3270-based applications, and is experienced in creating voice applications with IVR 2.0/I. You should also be familiar with the UNIX operating system and the vi text editor (or another text editor installed on your application processor).

How to use this guide

This guide contains the following chapters and appendices:

Chapter 1: About the 3270 gateway

Provides an overview of the 3270 communication protocol and the features of the IVR 2.0/I 3270 Gateway.

Chapter 2: Template files

Shows you how to write template files that capture the actual flow of screens and fields that must be traversed to transmit information to and from the mainframe computer.

Chapter 3: Getting started

Describes the steps you must perform to activate the 3270 gateway software for use with IVR 2.0/I (after the hardware and software is installed as described in the appendices). This chapter also includes a sample set of template files that would be required to perform a specific transaction.

Chapter 4: Meridian IVR 2.0/I Call flow interface

Explains how to integrate the templates you created in Chapter 3 with your IVR 2.0/I application call flow.

Appendix A: SCO

Provides information on configuring vendor host communication packages specifically for use with IVR 2.0/I.

Appendix B: Host connectivity

Illustrates how to interface with different host computers over systems such as IBM 3270 and 5250.

Additional Nortel manuals

The information supplied with your vendor's host connectivity package will be necessary for hardware and software installation and configuration.

You may find the following manuals useful while reading this guide:

Manual	NTP Number
Application Development Guide	555-9001-310
System Administration Guide	*555-9001-300*

Conventions used in this guide

Throughout this guide, several typographic conventions have been used to highlight certain types of information.

- Items that appear on the IVR 2.0/I screens are identified in quotes (for example, the “Function Code” part of the parameters window).
- IVR 2.0/I buffer names are shown in all upper case characters (for example, the CURRENT MESSAGE buffer).
- Items that are file names or messages are shown in bold (for example, the **/u/ivr/3270/getbalance.act** file).
- Items you must type are shown in a different typeface (for example, type **te3270** at the prompt).
- Variables shown in command lines appear in italics (for example, the *host_cfgn* file, where n is a variable representing a board number).
- Key names you press are enclosed in angle brackets (for example, the <Enter> key).

Chapter 1: About the 3270 gateway

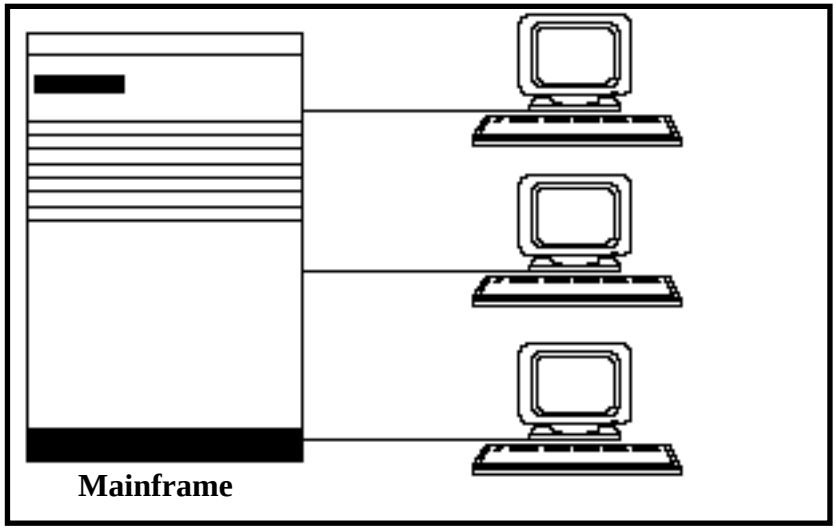
This chapter introduces you to the 3270 Gateway and provides:

- background on the 3270 communication protocol
- descriptions of the 3270 Gateway hardware and software
- a description of how Meridian IVR 2.0/I interfaces with a host computer
- a brief explanation of terms used in this guide

The 3270 communication protocol

The 3270 communication protocol has its origin in the 3278 terminal technology developed by IBM. These terminals gives multiple users access to resources residing on a host computer.

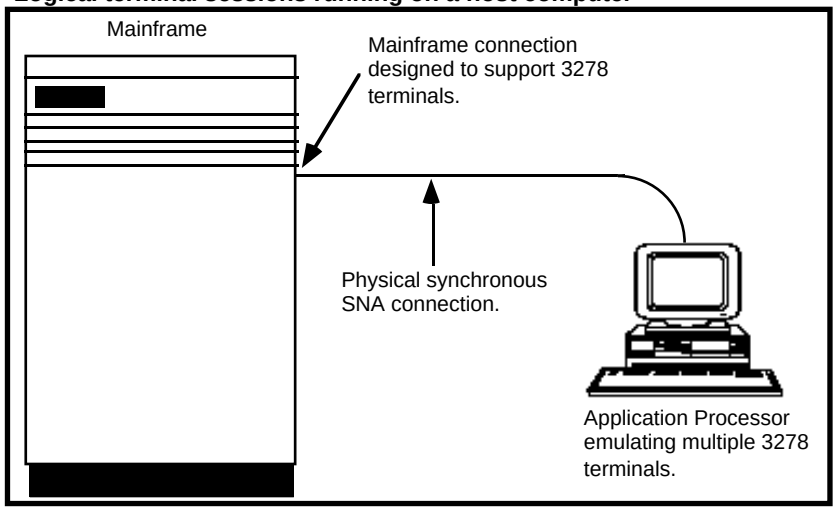
Figure 1-1
Terminals connected to a mainframe



The 3278 terminal uses a specific protocol for displaying information on its screen and returning screen contents to the host. This protocol is based on each field on an input screen having unique attribute information. These attributes identify the characteristics of the information written to the screen (for example, highlighted, reverse video, writable). When a user enters information, field attributes are modified. This protocol became a standard for information transfer and presentation across the IBM product line.

The 3270 communication adapter uses the same technology. One 3270 adapter installed in an application processor can emulate up to 64 concurrent 3278 terminal sessions over a single synchronous connection. By complying with the 3270 communication protocol, Meridian IVR 2.0/I applications can support multiple logical 3270 terminal sessions. No physical terminals are required. Your Meridian IVR 2.0/I applications can access the same host resources as operators sitting at 3278 terminals.

Figure 1-2
Logical terminal sessions running on a host computer



Consider a menu-driven program on a host. This program allows an operator to enter and retrieve account information stored in a database. Instead of connecting a 3278 terminal to the host and retrieving information manually, you could write a Meridian IVR 2.0/I application that logs on to the host, manipulates the host application, then stores the desired information in the Meridian IVR 2.0/I application's buffers. These buffers can then be played to a caller.

Taken a step further, your application could simultaneously run multiple terminal sessions, processing different transactions for different callers.

The 3270 gateway hardware and software

You can install the 3270 Gateway on application processors with the SCO Open Desktop operating system.

The application processor must have:

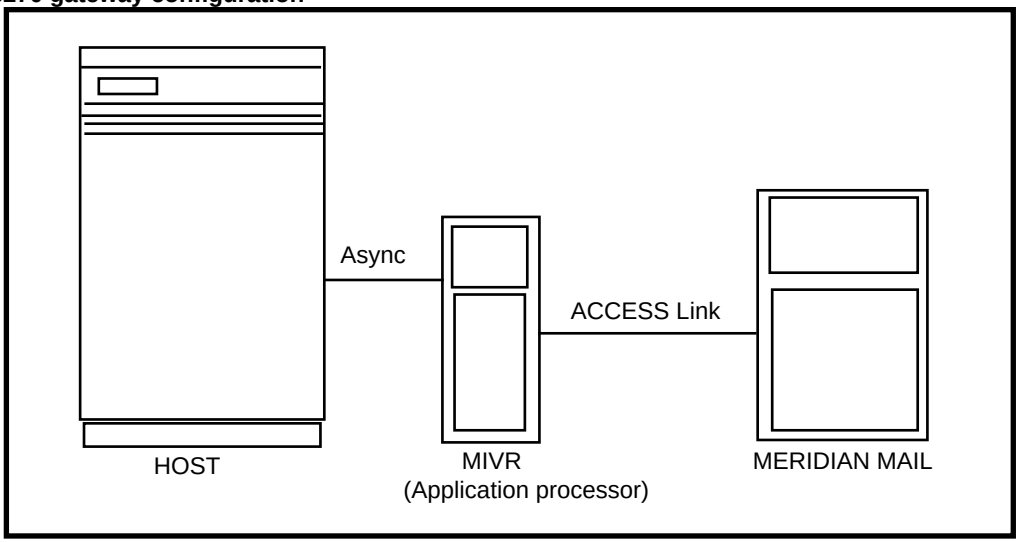
- An ethernet connection for the command link and data transfer.
- A synchronous SNA protocol connection to one or more host computers.

The 3270 Gateway consists of:

- The Terminal Resource Server (TRS)
- The Terminal Resource Server Client (TRSC)
- Vendor communication Software and Hardware

Figure 1-3 shows the typical hardware configuration for the 3270 gateway.

Figure 1-3
3270 gateway configuration



Terminal Resource Server

The Terminal Resource Server (TRS) controls all host communication sessions. TRS controls all installed terminal emulation packages and manages all host connections. TRS runs as a stand-alone process within the Meridian IVR 2.0/I architecture, and starts automatically at Meridian IVR 2.0/I start-up.

TRS passes information between Meridian IVR 2.0/I and the TRS Client (TRSC). It acts as a translator between Meridian IVR 2.0/I and the Host.

To use TRS, place a COMI cell in the Meridian IVR 2.0/I call flow at the point where you need to establish a host connection. The COMI cell sends requests for information to the TRS process, which then passes the requests on to the host. A COMO cell retrieves the information sent to TRS by the host, and then ends the transaction. A COMA cell aborts the host transaction in the case of a hang-up or an error. For information on using Meridian IVR 2.0/I cells, see the Application Development Guide and the Meridian IVR 2.0/I Cell Catalog.

TRSC

The Terminal Resource Server Client (TRSC) communicates with the specific vendor communication package. It takes data from TRS and formats it for use by the different vendor hardware and software. There is a different TRSC for every different host connectivity package.

Vendor communication software and hardware

The vendor communication software and hardware manage the actual host connection. They are responsible for transmitting and receiving data complying with the SNA network protocol. The following table lists the vendor's host connectivity packages.

Table 1-1
Vendor software and hardware

	Dial-up	***Token Ring***
SCO	Apertus	Apertus

Apertus

Apertus provides a multiprotocol adapter board, an expander box, and an application called Express. See the appendices for information on this package.

TRS configurations

TRS runs on a fully-integrated node, where you install the 3270 hardware and software on the application processor.

Chapter 2: Template files

The TRS process uses action and screen templates to maneuver through the screens of a host application. These templates provide the host with the same input as a terminal operator. These templates also receive the output from the host.

This chapter explains how to:

- Determine the actions a terminal operator performs to enter and retrieve information
- Create the action and initial action template files that define the sequence of host application screens for each transaction
- Create the screen template files that define the sequence of fields encountered on each screen

Note: If you make backups of your template files, do not store them in the /u/ivr/3270 directory, or in any subdirectory under /u/ivr/3270. You should make a directory at the same hierarchical level or higher as /u/ivr/3270 (for example, u/ivr/3270). TRS searches the /u/ivr/3270 directory and any subdirectories within it for files with the ***.act*** or ***.scn*** extensions.

Determining the required transactions

Imagine that you are an operator sitting at a terminal. In order to perform a specific task, you type information and press function keys until you accomplish the desired task. Perhaps a caller asks you to look up a customer's account balance, or enter an order. The series of steps you perform at the terminal enable the application on the host computer to complete the transaction.

To develop a voice application that accesses the same information as a terminal operator, you need to tell Meridian IVR 2.0/I how to execute the same series of actions that the terminal operator executes. You provide this information in ASCII files called screen and action template files.

Screen and Action template files provide the layout and content of each screen in the host application as the terminal operator sees them. Figure 2-1 compares a transaction done by a terminal operator to one done by a customer calling into a voice response system.

Note: The first step performed by the terminal operator is not performed by the action template. It is performed by the initial-action template (described later in this chapter). The initial-action template handles the login and moves the application to the appropriate screen to begin the transaction.

TRS requires two types of template files:

- Action templates, which describe the sequence of screens traversed in order to perform a specific transaction. "Terminal operator vs. voice response system" on page 2-3 includes a sample action template file.
- Screen templates, which validate each screen, define the fields on the screen that require data, and define all keystrokes required for the screen. Figure 2-1 illustrates a sample transaction — terminal operator vs. voice response system.

Figure 2-1
Terminal operator vs. voice response system

An operator follows this sequence to retrieve data:

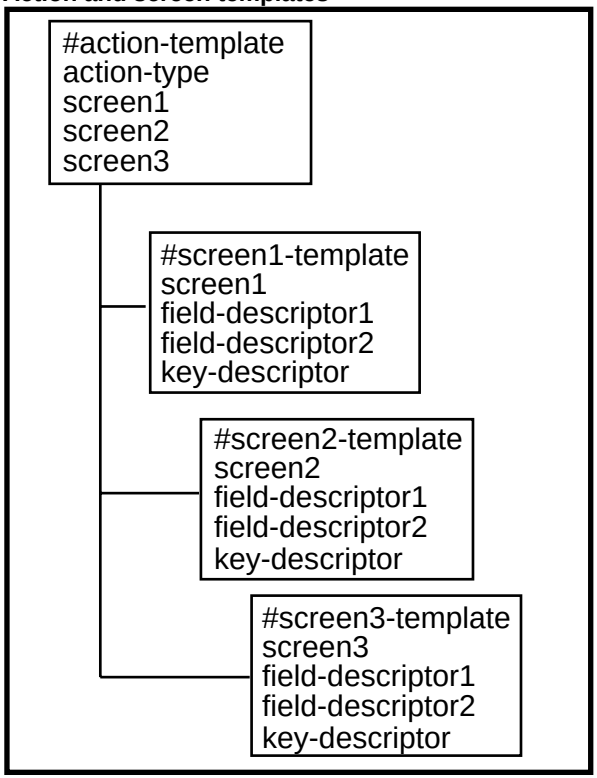
1. Starts the “accounting” application.
2. Selects the “Accounts Receivable” menu option.
3. Asks the caller for account information.
4. Enters the caller’s account number.
5. Reports the balance when the customer’s information appears on the screen.

A customer follows this sequence to retrieve data:

1. Calls into the AP, activating a voice application.
2. When prompted, selects the Accounts Receivable option from a menu prompt.
3. When prompted, enters account information. At this point, the application sends a request for information to TRS. TRS then executes the action template for this specific transaction.
4. Hears the playback of requested information.
5. Hangs up.

“Action and screen templates” on page 2-4 shows how screen templates relate to action templates.

Figure 2-2
Action and screen templates



The action templates, screen templates, and screen.conf file are ASCII text files that use a simple syntax to define the screen flow and input/output fields. The sections that follow provide a detailed explanation of the templates, as well as the information necessary to create the screen.conf file.

Action templates

A 3270 transaction typically moves through several screens until it locates specific information. The screens may be a series of commands issued at the operating system prompt, or they may be screens within an application running on the host computer. Whenever Meridian IVR 2.0/I references an action template, the 3270 Gateway executes the screen templates listed in the action template, moving through the application just as a terminal operator would. An action template must specify the same sequence of screens that the terminal operator traverses.

A separate action template defines each transaction. In the example shown in "Terminal operator vs. voice response system" on page 2-3, if you want to select a menu option other than "Accounts Receivable," you would define another action template.

Action templates describe the flow of the screens that comprise a particular transaction. For example, if you want a transaction to access billing information for a specific client, as a terminal operator you would perform the following steps.

Procedure 2-1
Accessing transaction information

1. Log in to the computer.
2. Start the "acct" application.
3. Select the "Accounts Receivable" menu.
4. When prompted, enter the client's account number and press the Return key. A screen would appear displaying the client's billing information.
5. Read the account information on the screen.

In an Meridian IVR 2.0/I 3270 transaction, an initial-action template performs steps 1 and 2. The TRS automatically executes the initial-action template at TRS start-up (initial-action templates are described later in this chapter). An action template created to execute this transaction would perform steps 3 through 5.

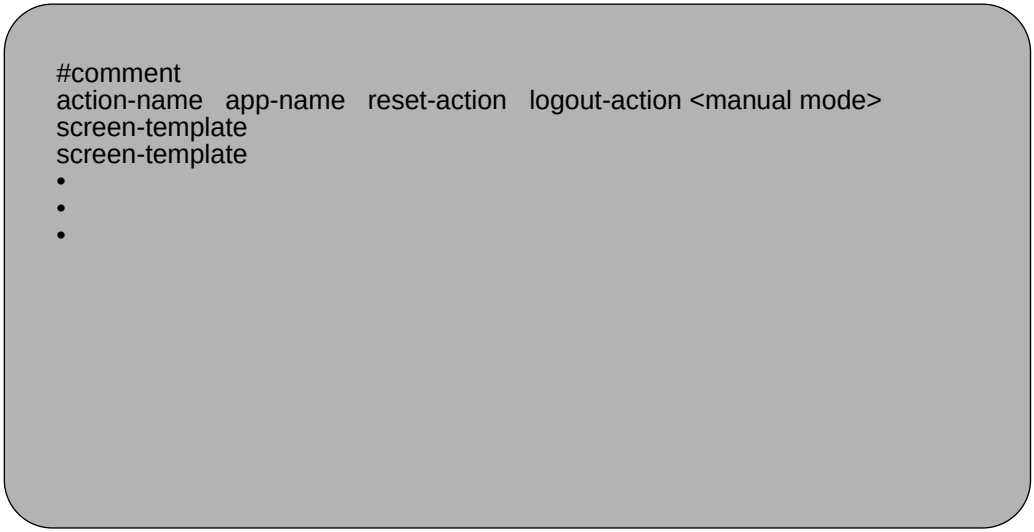
Action template syntax

An action template is an ASCII file created with a text editor. The action template files you create must reside in the /u/ivr/3270 directory or in a subdirectory below /u/ivr/3270, and must have the file name extension .act. For example, if you created an action template called getbalance.act, it would have this path:

```
u/ivr/3270/getbalance.act
```

The syntax of an action template is shown in Figure 2-3.

Figure 2-3
Action template syntax



The lines depicted as • are additional screen templates used in the transaction. Each screen template corresponds to a specific host application screen, and is listed in the action template in the same order as encountered during an actual terminal session (Screen templates are discussed later in this chapter.). The example in Figure 2-4 illustrates an action template file which describes a transaction for retrieving account information.

Figure 2-4
Action template example

```
#Example action template file: filename is getbalance.act
getbalance accounting reset_cust logout_cust
#acctrec chooses the billing option from the main menu
acctrec
#acctno specifies the account number for the customer
acctno
#customer displays the customer information
customer
```

In Figure 2-4, action-name is getbalance, the name of the action template file without the .act extension. The app-name is accounting. The reset-action is reset_cust (file name reset_cust.act), and the logout-action is logout_cust (file name logout_cust.act). Manual mode is omitted because manual mode is not required for this transaction (a description of manual mode follows).

The remaining lines identify the sequence of screens (acctrec, acctno, and customer) TRS must traverse to retrieve the customer billing information. These screens are listed in the order that they must be accessed.

An explanation of each entry in the action template syntax follows.

#comment

The first line of the template in Figure 2-4 is a comment. The comment line is not required, but is recommended to describe the purpose of the action template. It is good practice to heavily comment files so that you or others can easily make changes to the templates in the future.

Comments lines start with the “#” symbol and can be embedded anywhere in the action template. A comment takes the entire line; no non-comment fields may precede or follow the comment in that line.

action-name

The action-name is the file name of the action template file without the .act extension. The action-name is required to begin the transaction. For example, if the action template's file name is getbalance.act, you would enter getbalance for the action-name.

app-name

When you install the 3270 Gateway on your application processor, you must create a trs.conf file that assigns TRS session numbers to the application on the host computer (the trs.conf file is described in Chapter 3). Choose a name for the host computer application name; it does not need to match any actual application name on the host computer.

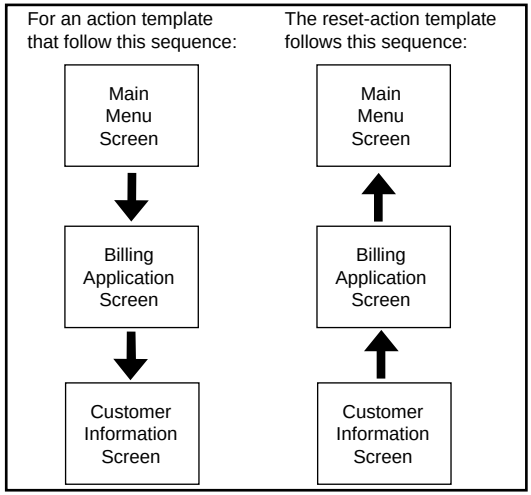
As an example, this guide uses the app-name "accounting" to represent the host computer "acct" application.

The app-name you specify in the action template must exist in the trs.conf file (discussed in Chapter 3). Meridian IVR 2.0/I passes the app-name to TRS function, which uses the name to start the appropriate session with the host computer.

reset-action

The reset-action specifies an action template to be processed when the transaction completes or if the transaction fails. Typically, the reset-action template is used to bring the host computer application back to its main screen so it is ready to process the same type of transaction. Figure 2-5 shows the sequence a sample reset-action template follows.

Figure 2-5
Reset-action template sequence sample



Entering a hyphen in the reset-action entry indicates that no reset-action template is specified.

If no reset-action template is specified and the transaction being executed by the action template fails, the logout-action template (described in the next section) is executed. If the transaction succeeds and there is no reset-action template specified, the host computer application remains at the screen where the transaction ended.

When you create a reset-action template, do not specify reset-action or logout-action templates in it. For example, Figure 2-6 shows a sample reset-action template.

Figure 2-6
Reset-action template sample

```
#This reset-action template returns the host computer application
#to the main menu screen from the customer information screen
#filename: reset_cust.act
reset_cust    accounting    –      –
clrcust
#exit the customer information screen
atmenu
#leave the session at the menu screen
```

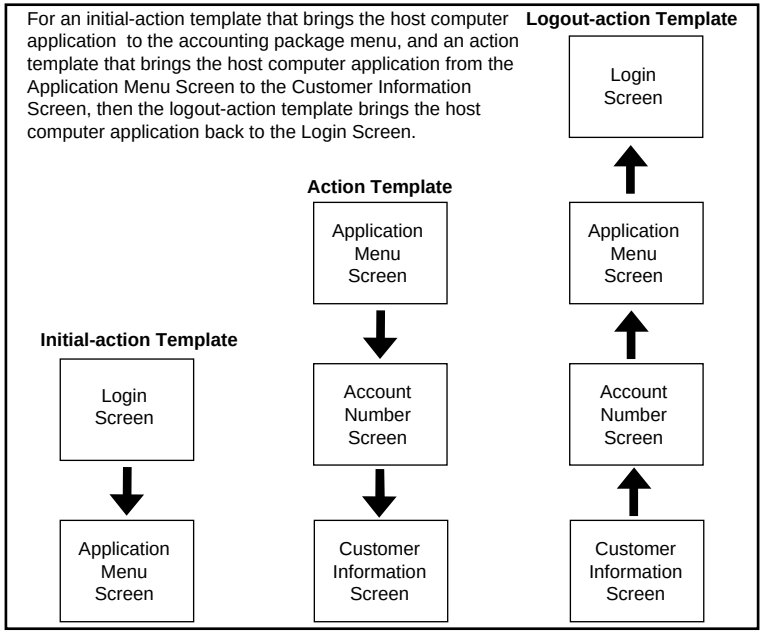
The action template using this reset-action template would enter reset_cust as the reset-action entry.

logout-action

The logout-action specifies a logout-action template to be executed if the reset-action template fails, or if the transaction fails and there is no reset-action template specified. If the transaction succeeds, the logout-action template is not executed.

The TRS uses the logout-action template to return the failed transaction to the initial screen (usually a login screen). After it successfully executes the logout-action template, it executes the initial-action template (described later in this chapter) after 30 seconds. “Logout action flow” on page 2-11 shows the flow of the logout-action template.

Figure 2-7
Logout action flow



The logout-action template locates the screen where the transaction failed. If for example, the transaction failed at the account number screen, the logout-action template locates the screen template with the appropriate validation tag and starts from that screen.

Entering a hyphen for the logout-action entry indicates that no logout-action template is specified. If neither a reset-action template nor a logout-action template is specified and the transaction fails, the host computer application remains at the point where the transaction failed. Future transactions that try to use this session would also experience errors because the screen where the session remained would not be the expected starting screen (unless the transaction can start from any screen).

When you create a logout-action template, do not specify reset-action or logout-action templates. “Logout-action template sample” on page 2-12 shows a sample logout-action template.

Figure 2-8
Logout-action template sample

```
#This logout-action template returns the application to the login
#screen from the customer information screen
logout_cust    accounting     –     –
clrcust
#exits the customer information screen
clrmenu
#exits the acct application, shows the system prompt
```

screen-template

The screen-template (the file name of the template without the .scn extension) identifies the screen template used during the 3270 transaction. Enter the screen templates in the exact order they appear during the transaction. Each screen template must be listed on a separate line. The syntax for screen templates is described later in this chapter.

<manual mode> (optional field)

The <manual-mode> entry allows you to attach a session resource to a particular channel. You can then use the same session for consecutive Meridian IVR 2.0/I transactions. This type of session is not released when the transaction is finished. To exit manual mode you must execute a COMA cell in the Meridian IVR 2.0/I application or process another action template that does not contain the manual mode option. Chapter 4, “Meridian IVR 2.01/I call flow interface” describes how to use the COMA cell.

To specify manual mode, enter manual after the logout-action template name. If you omit manual, automatic mode is used for the template. In automatic mode, the session assigned to the action template is free for use when the transaction is completed.

Note: You should not specify a reset-action template in an action template that uses manual mode. Manual mode is designed to stay at a specific screen. The next transaction received by the session will start at the last screen of the action template that used manual mode. This next transaction should use automatic mode and specify a reset-action template that brings the session back to the starting screen of the first action template (that specified manual mode).

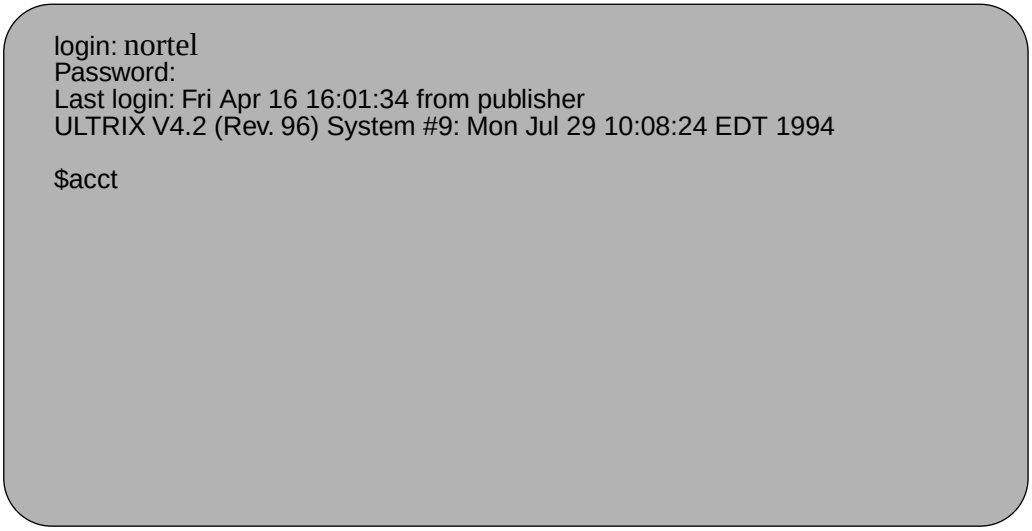
Screen templates

Screens used by the host computer could be a series of commands entered at the system prompt coupled with the system's response to those commands, or screens defined by applications on the host computer. You should define screen templates that issue the system commands to start the application (usually as part of the initial-action template), and then screen templates that make menu selections and enter or retrieve data from the screens displayed by the application. This guide uses an accounting application as an example.

Each screen contains fields. For the 3270 Gateway, a field is any place on the screen where data is entered or displayed. For example, the cursor location after a system prompt where you would type a command is considered a field. Also, within an application, the area on the screen where an account balance is displayed is also considered a field (the traditional definition of a field).

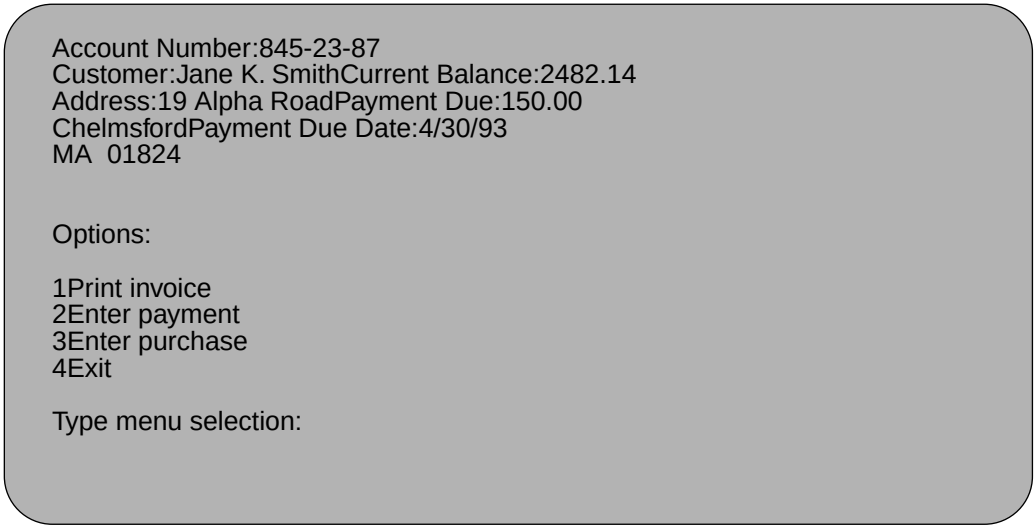
For a specific transaction, specific data is entered in certain fields, and data is read from other fields. A screen template identifies those fields on the screen that are used to process a transaction. Only the fields that are used in the transaction are included in the template. "Fields and the system prompt" on page 2-14 shows a sample screen.

Figure 2-9
Fields and the system prompt



The cursor is shown in “Fields and the system prompt” on page 2-14 because if the Return key had been pressed, the application would have been started and the screen replaced by the application screen. In “Fields and the system prompt” on page 2-14, “nortel” has been entered into the login field. A sample application screen showing fields is shown in “Fields in a host computer application” on page 2-15.

Figure 2-10
Fields in a host computer application



In "Fields in a host computer application" on page 2-15, "Jane K. Smith" is entered in a field.

Different transactions may access different fields on a screen. For example, a transaction to locate the payment due would only need to access that field, while a transaction retrieving the customer's balance would only need to access the Current Balance field.

A screen template is an ASCII file created with a text editor. The screen template files you create must reside in or under the Meridian IVR 2.0/I /u/ivr/3270 directory, and must have the file name extension .scn. For example, if you created a screen template called customer.scn, it would have this path:

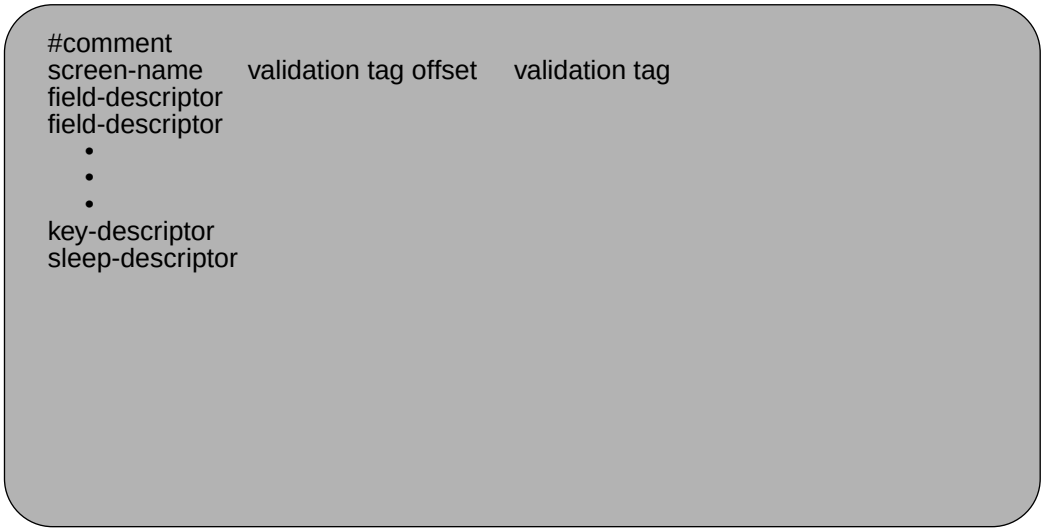
```
u/ivr/3270/customer.scn
```

For each accessed field, there should be a field descriptor specified that governs how data is retrieved from or entered in the field. The screen template can include both data input entries as well as data output entries.

Screen template syntax

The syntax of a screen template is shown in Figure 2-11.

Figure 2-11
Screen template syntax



The lines depicted as • are additional field-descriptor lines. The example in Figure 2-12 illustrates a screen template file that obtains the balance from the screen shown in "Fields in a host computer application" on page 2-15.

Figure 2-12
Screen template example

```
#Screen template file to obtain the current balance; filename: customer.scn
customer1,1Account
#places balance into buffer
0,0Balance:$
```

In Figure 2-12, the first line is a comment describing the screen template file. The screen-name is “customer,” the name of the screen template file without the .scn extension. The “1,1” represents the location of the validation tag on the screen. The row is listed first, followed by the column. “Account” is the screen validation tag.

The third line is a comment. The fourth line is the field-descriptor that describes an action to take. This field descriptor is going to find an exact match to “Balance:” and place the contents of the field into a buffer. The field-descriptor line has many variations, depending on what you want to do with a field. For example, the fourth line in Figure 2-12 could be entered as:

```
2,48—$
```

This would place the contents of the field starting at 2,48 into the next buffer. See “field-I/O” later in this section.

An explanation of each entry in the screen template follows.

#comment

The first line of the template in Figure 2-12 is a comment. The comment line is not required, but is recommended to describe the purpose of the action template. It is good practice to heavily comment files so that you or others can easily make changes to the templates in the future.

Comments lines start with the "#" symbol and can be embedded anywhere in the action template. A comment takes the entire line; no non-comment fields may precede or follow the comment in that line.

screen-name

The first non-comment line specifies the name of the screen. This is the screen template file name without the .scn extension.

validation-tag offset

This entry specifies the position of the validation-tag by row and column. You may enter 0,0 for the validation-tag offset in only two cases:

- To indicate that you do not want to validate this screen (you would also need to enter a hyphen, "–", as the validation-tag). You should only ignore the identity of a screen if you want TRS process to perform the actions specified in the screen template regardless of what screen is actually active. For example, if you want to execute a command at the system prompt, you would not need to verify that you are at a specific screen, as long as you are sure the screen has a system prompt.

  Note: In general, you should validate screens whenever possible. This ensures data for the host computer application is sent to the correct screen, and data sent back to the Meridian IVR 2.0/I application is from the correct screen.

- To tell TRS to search the screen for the validation tag. If you do not know the exact location of the validation tag or if the location of the validation varies, you can tell TRS to search the screen for the tag. Enter 0,0 for the offset, then enter the validation tag in the appropriate field.

validation-tag

This entry specifies the validation-tag used on the screen. The entry should be text that always appears in the same location every time this screen displays. For the example, "Account" is always displayed starting at location 1,1 whenever a customer's Account Receivable screen is displayed.

At the end of the previous screen template, you may want to use a clear screen function (or execute the ENTER key 24 times using key-descriptor lines) so you know the starting point for information on the screen, especially if the screens you are accessing on the host computer scroll. For example, if you execute an application and it starts displaying information at the current cursor location, you need to know the current cursor location to be able to validate that screen.

Enter a hyphen, "–", for the validation-tag to indicate that you do not want to validate this screen (you would also need to enter 0,0 as the validation-tag offset). As described previously, you should only use this method of validation if you want TRS process to perform the action specified in the template regardless of what screen is actually active.

Note: If the screen you need to validate is a blank screen, enter this line for the items: screen-name, validation-tag offset, and validation-tag:

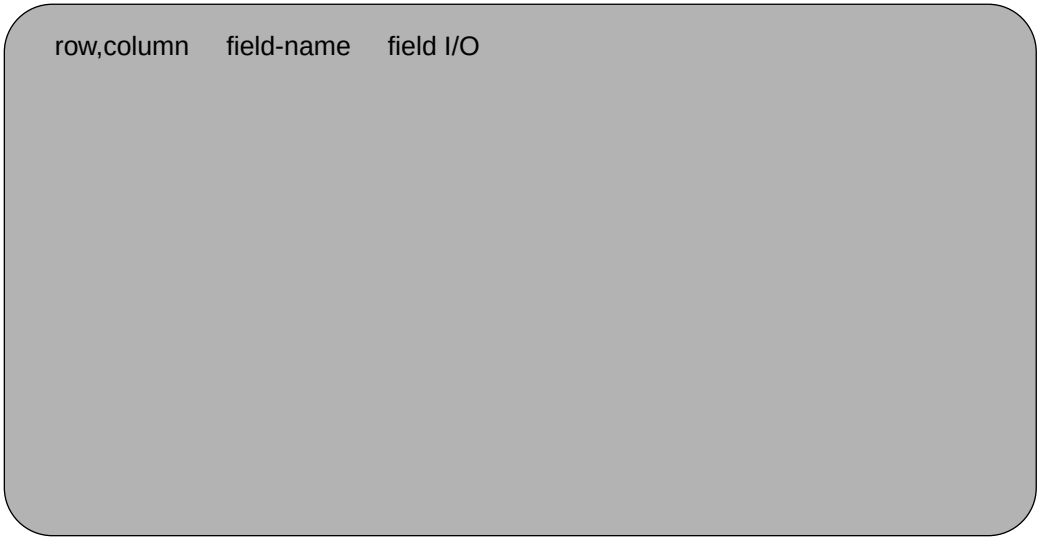
```
blank      1,1      BLANKSCREEN
```

The word "blank" is a placeholder; the 1,1 and BLANKSCREEN are required.

field-descriptor

This line identifies the location and name of a field on the screen, and the action to be performed. You can enter as many field-descriptor lines as necessary to perform the task needed on the screen. The field-descriptor lines should be entered in the same order as they are accessed for the transaction. Figure 2-13 shows the syntax for field-descriptor lines.

Figure 2-13
Field-descriptor syntax



Note: If the application running on the host is stream-based, meaning the screen scrolls as the user enters data and retrieves responses, you should enter the field-descriptor as follows:

```
0,0  -  BLANKOUT
```

In this instance, the field-descriptor will clear TRS memory space associated with the application screen so that your application call flow will know where to retrieve the appropriate data.

row,column

If TRS is going to read information from a field on the host screen, this entry locates the field on the screen. If you know the exact location of the field TRS is reading from, you can enter it in row, column format. If you do not know the exact location of the field TRS is reading from, or if the location of the field varies, you can enter 0,0 and TRS will search for a match to the name specified in field name. For unformatted, character-based applications, you must specify the exact location.

In 3270 transactions, writing to the terminal screen always occurs at the current cursor position. Therefore, if the field I/O action is writing text to the host screen, TRS will write the text to the screen at the current cursor position regardless of the row,column you specify.

If you enter “0,0” and a hyphen for the row,column and field-name entries, the field I/O specified is executed at the current cursor location.

To locate field-names on the screen for reading, the offset of the upper left corner of the screen is 1,1 and the lower, right corner is 24,80.

field-name

This entry identifies the field being accessed on the terminal screen. If the field-descriptor is 0,0 (i.e., for an exact match), the field-name must uniquely match text on the screen or must be a hyphen to indicate that the field is at the current cursor position. When entering the field name, keep in mind that TRS process right-justifies all field names and removes all extra white space. If the transaction fails, this field identifies the current screen so the reset-action template can be executed.

If you enter “0,0” and a hyphen for the row,column and field-name entries, the field I/O specified is executed at the current cursor location.

To specify a location on the screen that does not have an associated field-name, use a hyphen, “–”, for the field-name entry. If you do, you must specify a location, such as 24,8 for the location of the action specified by the field-I/O entry.

field-I/O

This entry indicates the action to be taken on the field. Table 2-1 explains the valid entries for this field.

Table 2-1
Valid field I/O entries

Entry	Description
*	Inputs the contents of the next input buffer (transmitted from the Meridian IVR 2.0/I application) into the field
$num	Outputs the contents of the field into the next output buffer. num is a number in the range 1-31 and represents the number of characters in the field TRS will put in the output buffer. If you do not assign num a value, TRS will place 31 characters into the buffer.
%n$	Outputs the contents of the field into an internal variable named n, which must be a number from 1-9
%n*	Enters the contents of internal variable n into the field
%n$num	Outputs the first num characters of the field into variable n
text	Any text string to be entered in the field. If any of the special characters listed in this table are to entered as text, enclose the entire text in quotes (for example, “$abc”).
BLANKOUT	Clears TRS memory space associated with the host application screen before retrieving output.

Note: Place the asterisk and dollar sign characters in quotation marks if your field-descriptors require their use without their associated buffer commands.

For retrieving data into an output buffer, $num indicates the number of characters to be retrieved from the field; using $ without a number retrieves characters until an attribute is encountered, or a maximum of 31 characters have been retrieved.

Internal variables (indicated by the % symbol) are used within the 3270 screens only and cannot be transmitted through the TRS gateway. You can only use internal variables to store and enter data from one screen to another in the host computer application. To send the data to the Meridian IVR 2.0/I application that called TRS process, you need to store the data in an output buffer.

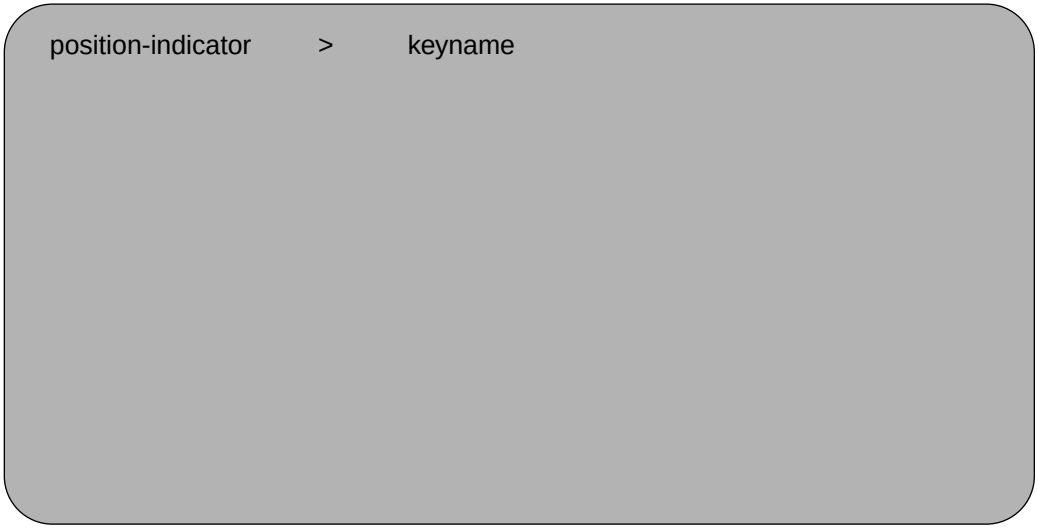
When entering a field-descriptor, the entries on the line should be separated by white space or tab characters. If you are entering text for the field I/O, TRS ignores any white space you include with the value until it encounters the new line character (for example, the value includes several words).

Note: The order of the field-descriptor lines in your screen template file determines how data is entered and retrieved from the screens and written into the input and output buffers of a COMO cell. Chapter 4 describes how to use Meridian IVR 2.0/I cells to retrieve data from the host computer.

key-descriptor

Identifies a key to be used with the screen. To send information to the computer for processing or to execute a command, the terminal operator presses a key on the terminal keyboard. If you do not specify a key, nothing is sent to the host and the current screen does not change. The key could be the ENTER key or a function key. The format of this line is similar to the field-descriptor. "Format of key-descriptor line" on page 2-23 contains the format of the key-descriptor.

Figure 2-14
Format of key-descriptor line



position-indicator

This entry should be set to 0,0.

>

This character indicates that this line contains a key.

keyname

The name of the key for this screen. Table 2-2 lists the valid keys you can enter.

Table 2-2
Valid key names

ATTENTION	FORWARDWORD	PF11
BACKSPACE	HOME	PF12
BACKTAB	INSERTCHAR	PF13
BACKWORD	NEWLINE	PF14
CLEAR	PA1	PF15
CURSORDOWN	PA2	PF16
CURSORLEFT	PA3	PF17
CURSORLEFTDBL	PF1	PF18
CURSORRIGHT	PF2	PF19
CURSORRIGHTDBL	PF3	PF20
CURSORUP	PF4	PF21
DELCHAR	PF5	PF22
DUP	PF6	PF23
ENTER	PF7	PF24
ERASEEOF	PF8	RESET
ERASEINPUT	PF9	SYSREQUEST
FIELDMARK	PF10	TAB

This line may appear anywhere after the screen-name line (i.e., the first non-comment line). As with field-descriptor lines, the entries on this line must be separated by white space or tab characters.

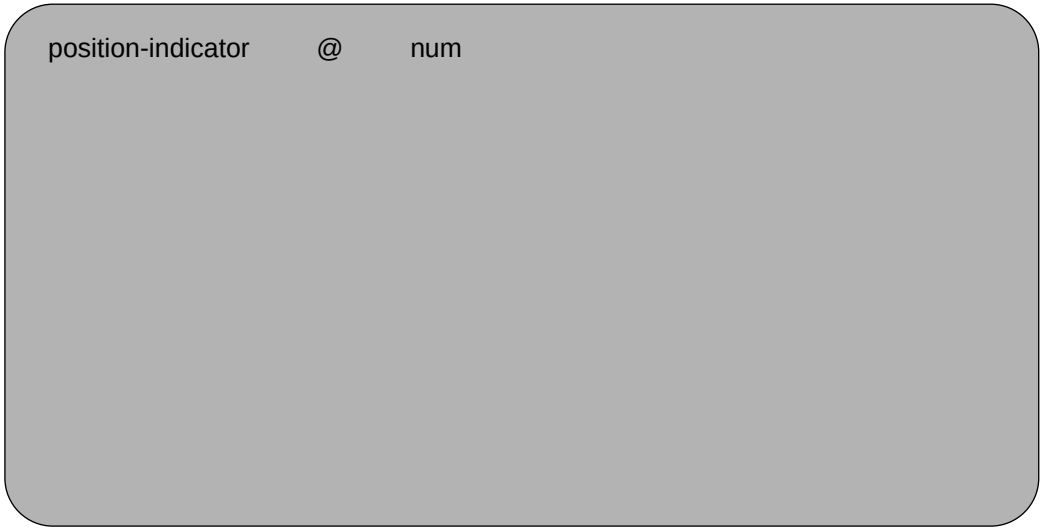
sleep-descriptor (optional)

A sleep-descriptor causes the transaction to pause for a specified number of seconds. You can use a sleep-descriptor to pause the transaction for a specified period of time before or after processing a key-descriptor. The waiting period takes into account the time the host computer may take to process the information entered on the screen, and to move to the next screen. The transaction waits at any point where you place a sleep-descriptor.

Usually, a sleep-descriptor is placed after a key-descriptor to indicate that the session should wait for a specified amount of time to ensure that the next screen is ready.

Each sleep-descriptor follows the syntax shown in Figure 2-15.

Figure 2-15
Sleep-descriptor format



position-indicator

This entry should be set to 0,0.

@

Identifies that this line is a sleep-descriptor.

num

Specifies the number of seconds that the session should sleep. For example, to wait 25 seconds, you would code the sleep-descriptor as

```
0,0   @25
```

Initial-action templates

Before you can process any information on the host computer using the 3270 Gateway, you need to set the starting point for each of your terminal sessions. For example, you may want session 2 to start processing at an application's main menu, whereas session 5 should start at the system prompt.

You automatically initialize each terminal session by defining initial-action templates. Initial-action templates are action templates that specify a sequence of screen templates that position the terminal session at the desired location on the host computer whenever TRS is started up.

The initial-action template follows the same format and syntax as defined for action templates earlier in this chapter. If you must use "*" or "$" characters in your field-descriptors, put them in quotation marks.

Instead of referencing these action templates in the COMI cell, you specify initial-action templates in an ASCII file named ***trs.conf***. See "Chapter 3: Getting started" on page 3-1 for information on the configuration and syntax of the ***trs.conf***.

Chapter 3: Getting started

Before you use your 3270 Gateway product, you must complete these tasks:

- Install the 3270 communication adapter board. See the documentation accompanying your host connectivity hardware for installation information.
- Create the action and screen templates necessary to navigate through the host application and return the desired information (discussed in Chapter 2).
- Create the trs.conf file. The trs.conf file is described later in this chapter.
- Create the trs.sdf file. The trs.sdf file is described later in this chapter.
- Download the communication board configurations. You must download the board configurations each time you power up your application processor. You can configure your application processor to automatically download the configurations (this process is described later in this chapter).
- If you are going to connect to the host via modem, make sure you configure the modem with the correct settings and attach it to the 3270 board.
- Start Meridian IVR 2.0/I on the application processor. The TRS processes start when you issue the gen start command.
- If you have a dial-up connection, you must know the telephone number of the 3270 host.
- Start the 3270 Gateway.

During startup, the trs.log file remains empty unless the verbose option (-v) is added. To debug the application put the TRS process into debug mode. Check the trs.log file or the trs.temp file for errors. To put the TRS process into verbose mode go to /u/ivr/startup and change the ./trs -b line so that it reads ./trs -b -v.

To check your template and action file run ./trs -c. This displays information on the version of trs and also verifies the correctness of the application templates and action files.

Note: Everytime any of the control files are modified (trs.sdf, trs.conf, action templates, or screen templates), you must stop, then restart Meridian IVR for the trs process to pick up the changes.

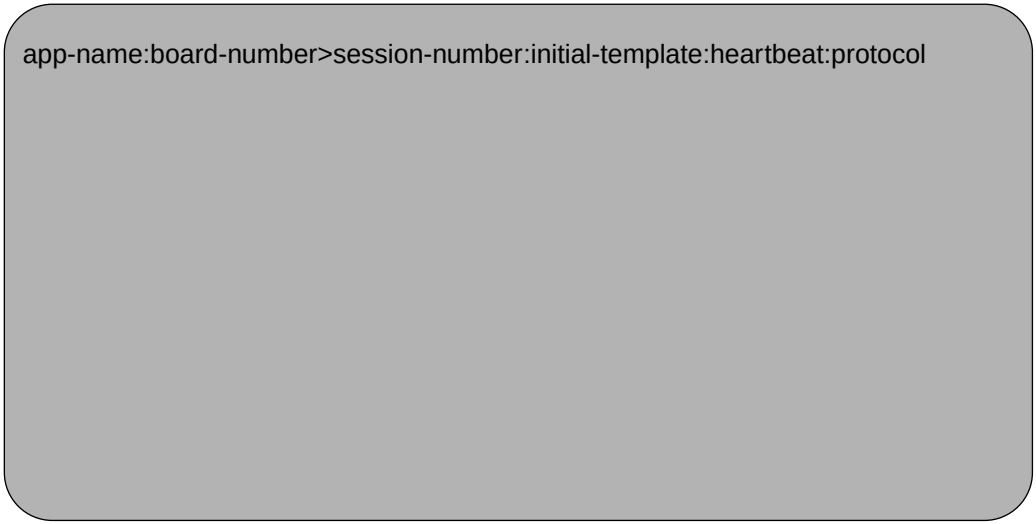
If you need to use the application processor as a terminal connection to the 3270 host, you must first:

- Start the terminal connection software (described later in this chapter).
- Make sure the terminal you use for terminal connection has been previously defined for this purpose. See the documentation included with your communication board for more information.

Setting up the trs.conf file

The trs.conf file specifies the initial-action template for each session you define on the Meridian IVR 2.0/I application processor. The trs.conf file must reside in the /u/ivr/3270 directory. Figure 3-1 shows the syntax for the trs.conf file.

Figure 3-1
trs.conf file syntax



The colons and the greater than symbols are used as field delimiters and must be placed in the specified positions without any additional white space.

app-name

The app-name entry identifies the application on the mainframe to which you assign the session. The name entered here is the same name you enter in the action templates that are executed by the Meridian IVR 2.0/I application.

board-number

The board-number entry should be 0 for the first (or only) board, 1 for the second.

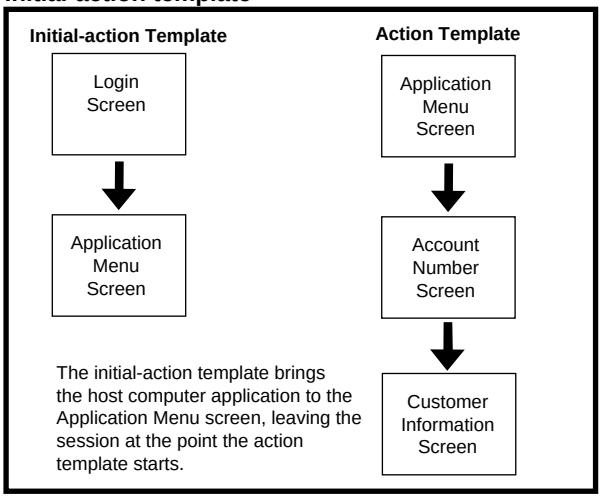
session-number

The session-number entry determines the number of Logical Units to activate at startup. You can use a dash to specify a range of LUs. For example, you can specify LUs 7 through 16 inclusive by entering 7-16. Note that you cannot specify a punctuated range with commas. For example, you cannot specify LUs 7 through 16 and 18 by entering 7-16,18. You must enter 7-16 in one entry, then 18 in another.

initial-template

The initial-template entry identifies an initial-action template (without the .act file extension) for setting the startup action for the specified sessions when connecting to the host computer. The start-up action brings the specified sessions to the screen on the host computer where the action templates start when processing requests. Figure 3-2 shows the flow of a sample initial-action template.

Figure 3-2
Initial-action template



The initial-action template follows the same format described earlier for action templates. The screen templates specified by the initial-action template must also be created. The screen template for a login screen (or the login prompt) must specify the correct login ID and password (if appropriate) to access the host computer. You should not specify a reset-action template in the initial-action template, although you should specify a logout-action template.

heartbeat

You can specify an optional heartbeat action for the application specified by app-name. You can use this feature to send an indication to the host that a session is still active. Some hosts log out sessions that remain idle for a period of time. You can also use the heartbeat action to check connectivity, verifying that the session remains on the appropriate screen. Typically, the heartbeat action contains a logout-action template which brings the session back to the login screen if the connectivity with the mainframe fails. If you do not need a heartbeat action, enter a hyphen for this action.

You specify the heartbeat in this format: actiontemplate@n, where n is the number of seconds between each execution of the action template when the session is idle.

The heartbeat action template uses the same syntax as the action templates described earlier in this chapter, and usually only specifies a single screen template. That screen template is usually the last screen specified in the initial-action template. Typically, your screen template would only include a key-descriptor line, usually the ENTER key and validation-tag.

protocol

The protocol entry indicates the communications protocol being used by app-name. This field is required and should be set to 3270.

Example “trs.conf” file

Consider the following example. Initial-action template files login.act and signin.act have been defined and reside in the */u/ivr/3270* directory. There are four applications which you want to access on the host computer:

- accounting, accesses the accounting software
- market, tracks stock market activity
- banking, retrieves credit balances
- airline, for purchasing tickets on a local commuter carrier

The application names shown here are not necessarily the actual names assigned on the host computer, but they are the names assigned on the application processor for the trs.conf file and all action templates that use these applications.

You want to set up the 3270 Gateway to initialize the sessions as follows:

- initialize sessions 2-3 for accounting with signin.act,
- initialize sessions 4-8 for market with login.act,
- initialize sessions 9-10 for banking with login.act, and
- initialize sessions 15-17 for airline with signin.act

Figure 3-3 illustrates how you should set up trs.conf to implement this configuration.

Figure 3-3
trs.conf file sample

```
#trs.conf file to set up sessions for the Meridian IVR 2.0/I AP
accounting:0>2-3:signin:ping@60:3270
market:0>4-8:login:-:3270
banking:0>9-10:login:-:3270
airline:0>15-17:signin:ping@60:3270
```

Setting up the trs.sdf file

The trs.sdf file maps the short name of each session to the LU number. To find the Session User Name and the Session Short Name, run the utility <express -c -u express> from the root account. Then, go to “Server Configuration”, “Define User/Sessions” and “<Users>”. The Express Username is listed to the right of the User label. The Session Short Name is listed to the right of the Session label. To find the LU Number, run the <express -c -u express> utility. Go to “Server Configuration” and “Define Communications”, and <SNA>. Highlight the first LU and press <Enter>. The LU Addresses is the LU Number.

Note: The trs.sdf file must reside in the /u/ivr/3270 directory.

TRS requires the trs.sdf file when using Apertus’s Express host connectivity package. See the documentation accompanying the Apertus Express package for information on configuring Express for your environment. Configuring Express provides you with the values for the trs.sdf file. The trs.sdf file follows this format:

U: *Express Username*	
Session Short Name	LU Number
Session Short Name	LU Number
Session Short Name	LU Number
•	•
•	•
•	•

You can list up to 8 sessions and LUs under each Express Username. You can add comments anywhere in this file by preceding them with a pound sign. Figure 3-4 shows an example trs.sdf file.

Figure 3-4
trs.sdf file sample

```
U: express
a 2
b 3
c 4
d 5
e 6
f 7
g 8
h 9
U: expressa
i 10
j 11
k 12
l 13
m 14
n 15
o 16
p 17
U: expressb
q 18
r 19
s 20
t 21
```

ATTENTION!

You must add a space in the U: express lines for the code to work.

A complete sample transaction

The following sections provide an example of action and screen templates and their corresponding mainframe screens:

- Initial-action template
- Action template
- Reset-action template
- Logout-action template
- Screen templates that support the above action templates

The sample transaction being performed in this section uses these templates in the following way:

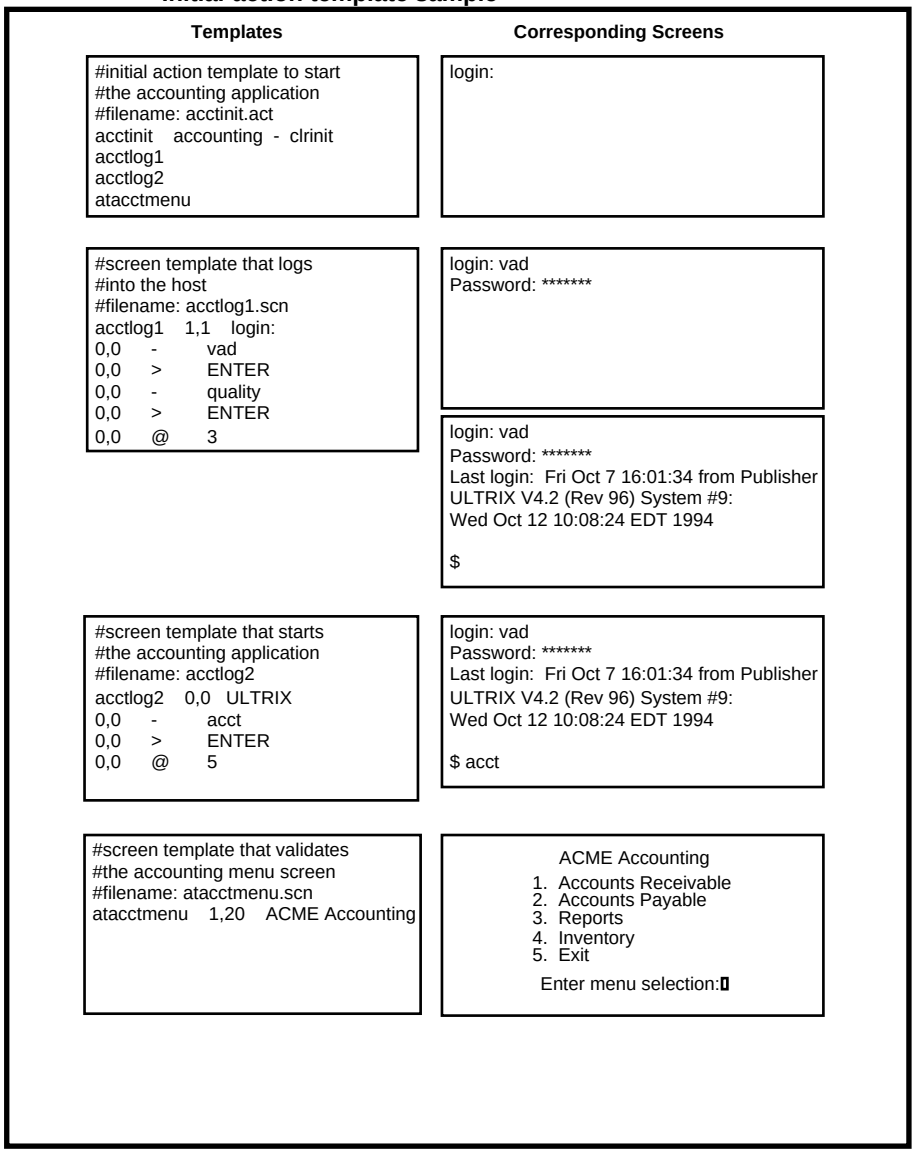
- The initial-action template logs on to the host computer and starts up the “acct” application.
- The action template chooses the “Accounts Receivable” option from the application’s menu and retrieves a customer’s balance.
- The reset-action template returns to the application’s menu screen and waits for the next transaction.

The logout-action template is included in case an error occurs at any time during the transaction.

Initial-action template

Once the TRS process is invoked, the initial-action template acctinit.act brings the session assigned to the accounting application to the menu screen. Figure 3-5 shows the initial-action template, its supporting screen templates and the corresponding screens on the host computer.

Figure 3-5
Initial-action template sample



The initial-action template starts the accounting session with the host computer by accessing accounting from the trs.conf file. It then executes the

screen templates acctlog1, acctlog2, then atacctmenu.

The screen template acctlog1.scn does the following:

- Enters the login name
- Enters the password
- Waits three seconds for the host to process the login action

The screen template acctlog2.scn does the following:

- At the system prompt, enters the command to run the application
- Types the ENTER key to start the application
- Waits 5 seconds for the host to run the accounting application

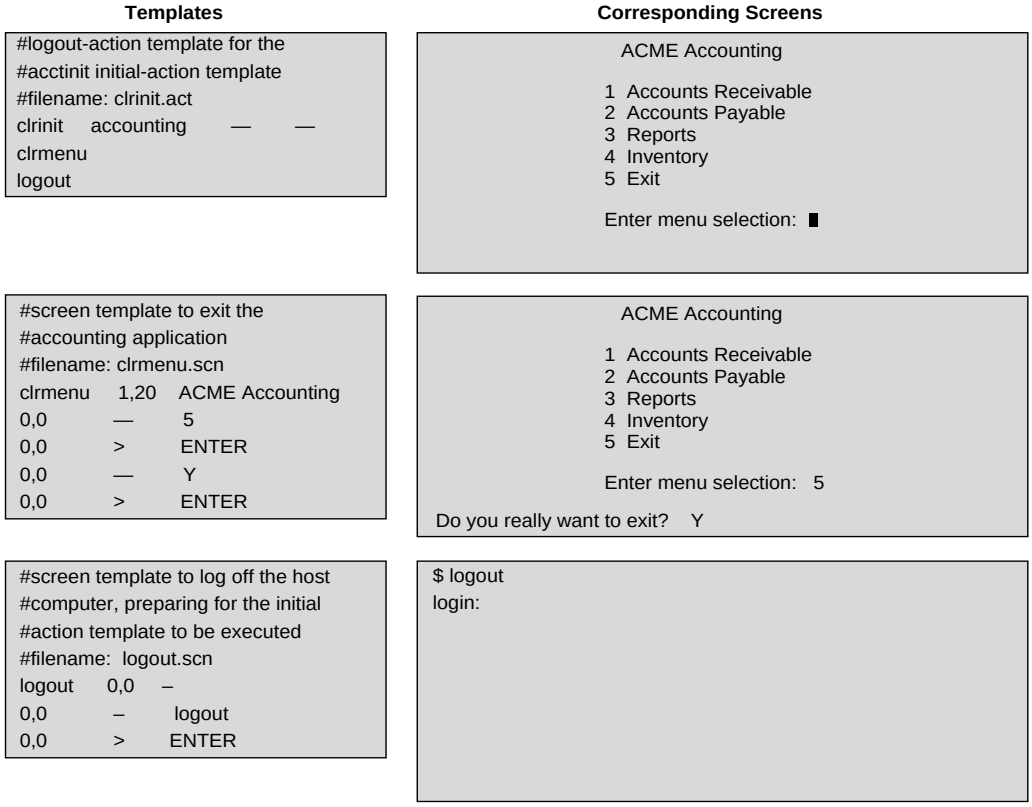
The screen template atacctmenu.scn validates the accounting main menu screen, but performs no action.

The acctlog1 and acctlog2 screen templates use “0,0” as the row, column location and a hyphen for the field-tag to indicate that all text will be entered at the current cursor position. This method is used because the login prompt and the first prompt may not always appear in the same location on the screen. Prompts vary from system to system, and can include longer, customized names.

Note: No key-descriptor is specified for the “atacctmenu” screen template. This means once the screen is validated, this screen remains active until the next transaction is executed.

The initial-action template shown in Figure 3-5 specifies the clrinit.act logout-action template, and does not specify a reset-action template. Figure 3-6 shows the clrinit logout-action template, its corresponding screen templates, and the associated application screens.

Figure 3-6
Logout-action used by initial-action template



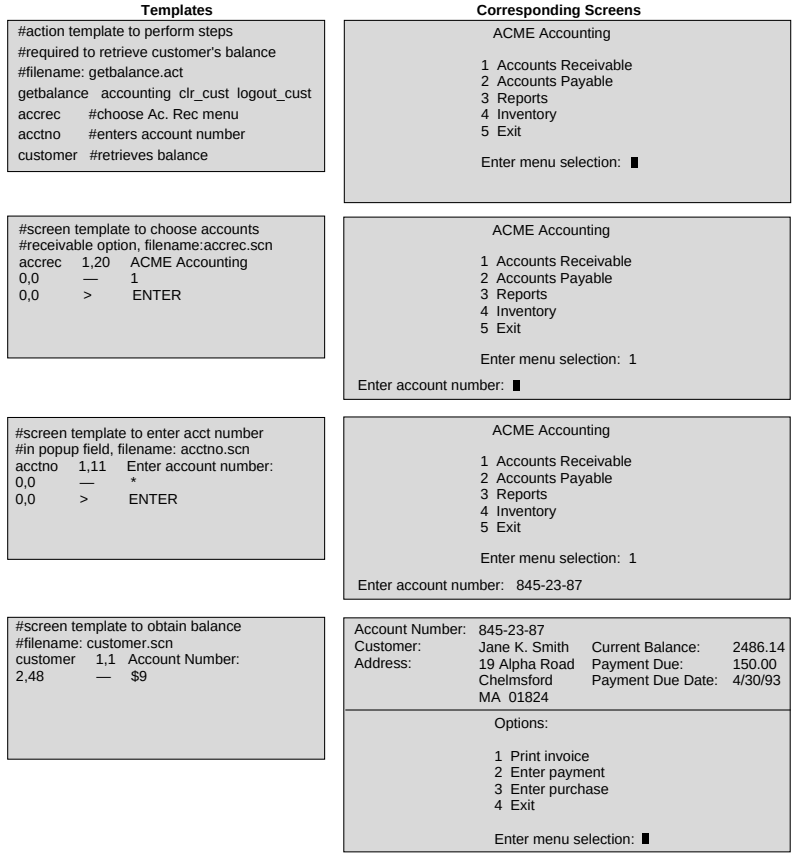
The final screen template listed, logout, brings the host application back to the initial screen, leaving the connection open and waiting for the TRS process to log in. TRS always executes the initial-action template for a session (after a pause of 30 seconds) after any logout-action template is executed.

Action template performing a transaction

As shown in Figure 3-5, the initial-action template brings the session to the application's menu screen. The action template created to get a customer's balance starts at that screen. Figure 3-7 shows the action template, its screen templates, and the corresponding host computer screens that perform the following functions:

- Chooses the Accounts Receivable option from the application's menu.
- Enters (on the line that pops up at the bottom of the screen) the customer account number from an input buffer provided by the COMI cell.
- When the customer information screen displays, the template places the current balance in an output buffer to be transmitted to the COMO cell.
- Execute a reset-action template to return the session application to the application's menu screen.

Figure 3-7
Action template sample



The number 1 and the account number are entered at the current cursor location. Therefore, you do not need to specify a location or a field-tag. The last line in the “customer” screen template places the contents of the field starting at location 2,48 (the number 2486.14) into the next output buffer.

The reset-action template is designed to return the session to the “acct” application’s menu screen where it awaits the next transaction. Figure 3-8 shows the reset-action template, and its accompanying screen templates.

Figure 3-8
Reset-action template sample

Action Template

```
#reset-action template for the getbalance
#action template, filename: clr_cust.act
clr_cust     accounting    —     —
clrcust          #exits customer info screen
atacctmenu  #validates application menu screen
```

Screen Template

```
#screen template to clear customer info
#screen, filename: clrcust.scn
clrcust       1,1     Account Number:
0,0           —       4
0,0           >       ENTER
```

```
#screen template that validates the acctng
#menu screen, filename: atacctmenu.scn
atacctmenu    1,20   ACME Accounting
```

Notice that the atacctmenu screen used in the reset-action template is the same screen used in the initial-action template. This screen template verifies that the menu screen has returned, but it performs no function.

Figure 3-9 shows the logout-action template, and its accompanying screen templates, that return the host computer to the login screen if an error occurs and the reset-action template also experiences an error.

Figure 3-9
Logout-action template sample

Action Template

```
#logout-action template for the getbalance
#action template, filename: logout_cust.act
logout_cust     accounting   —    —
clrcust     #exits customer info screen
clrmenu  #exits applicatoin menu
logout     #logouts out to prepare for login
```

Screen Template

```
#screen template to clear customer info
#screen, filename: clrcust.scn
clrcust       1,1    Account Number:
0,0            —      4
0,0            >      ENTER
```

```
#screen template to exit the
#accounting application
#filename: clrmenu.scn
clrmenu     1,20   ACME Accounting
0,0           —       5
0,0           >       ENTER
0,0           —       Y
0,0           >       ENTER
```

```
#screen template to log off the host
#computer, preparing for the initial
#action template to be executed
#filename:  logout.scn
logout      0,0     –
0,0           –       logout
0,0           >      ENTER
```

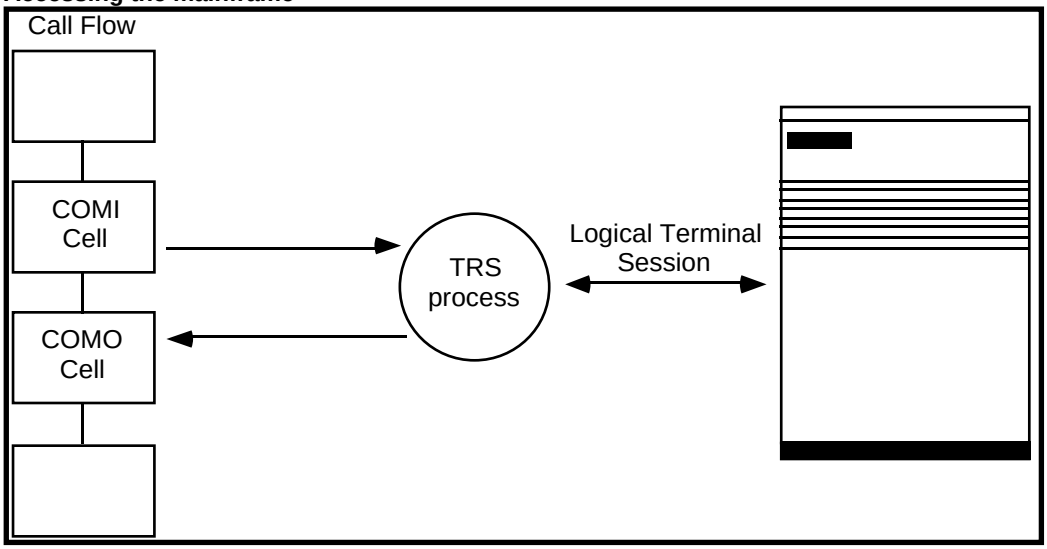
The logout-action template brings the host computer back to the login screen. The TRS then executes the initial-action template, as it does whenever any logout-action template is successful.

If the transaction fails before the customer screen is accessed, the logout-action template searches the other screen templates until a valid tag match is found, then it executes that screen template and the following screen templates.

Chapter 4: Meridian IVR 2.0/I call flow interface

Now that you understand how to script host transactions as action and screen templates, you can begin integrating these templates into your Meridian IVR 2.0/I Applications (see Figure 4-1).

Figure 4-1
Accessing the mainframe



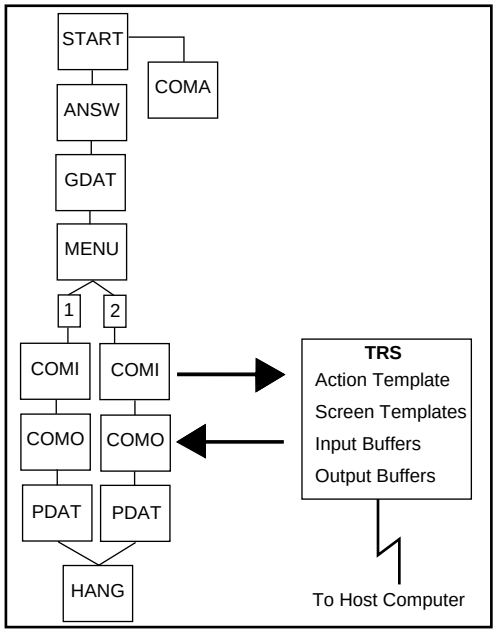
This chapter explains:

- How to code your applications to perform host transactions
- How to use the COMI, COMO, and COMA cells to communicate with the host computer

Using the COMI, COMO, and COMA cells to access the host computer

With Meridian IVR 2.0/I, the links between the Meridian IVR 2.0/I call flow and the TRS are the COM cells. The COMI cell sends input to the TRS process and identifies the action template file, the COMO cell receives output from the TRS process, and the COMA cell aborts a transaction in progress (usually used in the clean-up branch in case a caller hangs up before the transaction completes). Figure 4-2 illustrates this.

Figure 4-2
Activating the gateway from a COMI cell



To develop an application that processes one or more terminal sessions, just start as if you were developing any other voice application:

- Determine the telephone interaction with the caller and create the corresponding Meridian IVR 2.0/I call flow.
- At the point in the call flow where you require interaction with the host computer, insert a COMI cell.
- Insert a COMO cell to receive the output from the TRS transaction.

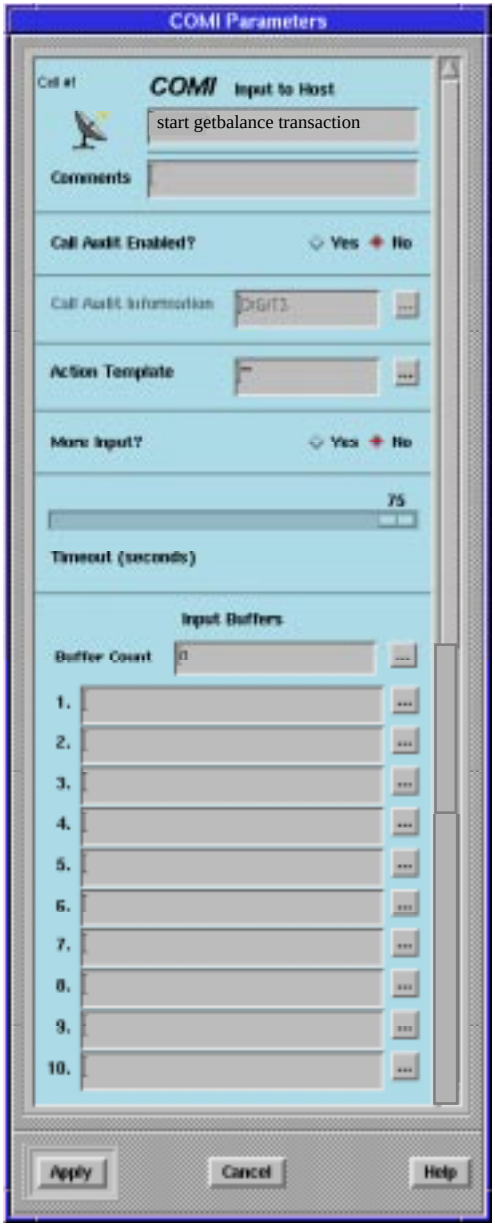
You must always follow a COMI cell with a COMO cell, even if you do not require the return of any data.

The following sections show you how to code each of these cells for use with the same example transaction presented in Chapter 3.

Setting the COMI cell parameters

Figure 4-3 shows the parameter window for the COMI cell.

Figure 4-3
COMI cell parameter window



The following sections describe what you should enter in each area of the parameter window.

COMI cell name

In order to make the cell easy to identify, include the name of the action template the cell calls out. The cell name shown in Figure 4-3 is “start getbalance transaction.”

Call Audit Enabled

Determines if this cell logs the following information to the call audit statistics file (audit_stat.d):

- Application Name
- Cell Name
- Cell Number
- Date and Time of Cell Execution
- Contents of the Cell Comment field
- Contents of the Call Audit Information buffer

The default setting is No.

Call Audit Information

When you enable Call Auditing, the Call Auditing process logs the contents of this buffer to the audit_stat.d file. The default setting is DIGITS.

COMI action template

Enter the name of the action template, in quotes, and leave off the .act suffix. Figure 4-3 shows “getbalance” as the entered name.

COMI cell more input

If you need to send more than 10 input buffers to the host computer, click the button in front of “Yes”; if you are sending 10 or less input buffers, click the button in front of “No.” If you specify “Yes,” place additional COMI cells on the drawing board until you have enough input buffers. Connect the Success branch of the first COMI cell to the Input branch of the following COMI cell. Connect the rest of the COMI cells in this fashion. The final COMI cell should have the “No” button selected for the “More Input?” parameter.

COMI cell timeout

Select the number of seconds you want the TRS process to wait for the transaction to complete by moving the slider under "Timeout". There is an available range from 1 to 75 seconds. This indicates the maximum time for the COMI cell to start the transaction and send the necessary input buffers, and for the COMO cell to receive the output buffers. The TRS process rejects the transaction and sends back a timeout if the action is not performed within the time allotted.

> ***Note:*** The application will take the timeout branch of the COMI cell if a timeout occurs.

COMI cell buffer count

You do not need to enter a value in this field as Meridian IVR 2.0/I automatically calculates the number of buffers when you click the "Apply" button.

COMI cell input buffers

Enter the names of the input buffers containing the information to pass to the TRS process. The input buffer shown in Figure 4-3 is ACCOUNTNUMBER, without any quotes. In this example, you must program your application to place the customer's account number in the ACCOUNTNUMBER buffer before the COMI cell is executed.

In this example, ACCOUNTNUMBER is a user-defined buffer; you can use any name for your applications, or you can use system buffers.

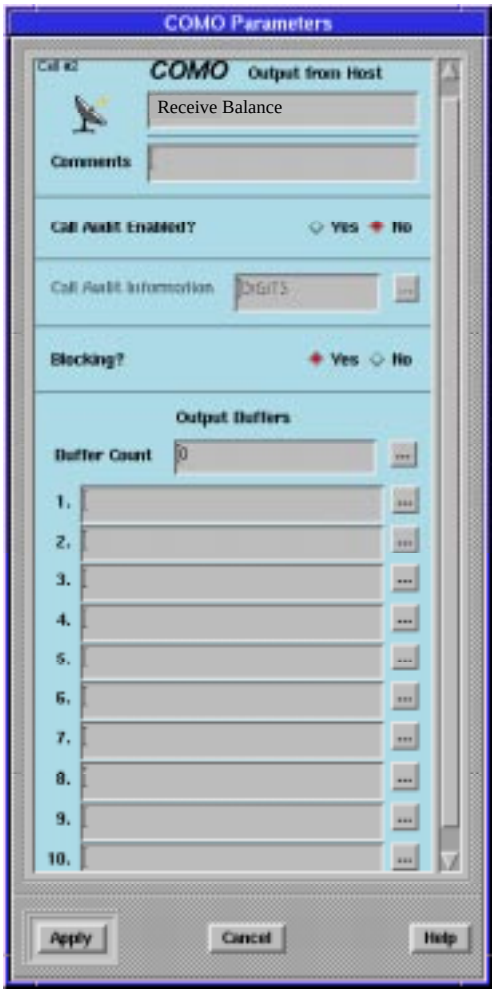
> ***Note:*** You must enter the input buffers in the same order the host computer uses them.

If you need to use more than 10 input buffers in your application, make sure you select "Yes" for "More Input?", then string COMI cells together until you have enough input buffers. Connect each additional COMI cell to the previous one's "SUCCESS" branch.

Setting the COMO cell parameters

Once you have set the COMI cell to send information, code the COMO cell to receive information. You must place a COMO cell directly after the COMI cell to complete the transaction, even if the host computer is not sending any data to any output buffers. The TRS process sends verification that the transaction completed successfully or notification that there was an error in the COMO cell. Figure 4-4 shows the parameter window for the COMO cell.

Figure 4-4
COMO cell parameter window



The following sections describe what you should enter in each area of the parameter window.

COMO cell name

The cell name shown in Figure 4-4 is “Receive Balance.” The name helps identify the function of the cell.

Call Audit Enabled

Determines if this cell logs the following information to the call audit statistics file (audit_stat.d):

- Application Name
- Cell Name
- Cell Number
- Date and Time of Cell Execution
- Contents of the Cell Comment field
- Contents of the Call Audit Information buffer

The default setting is No.

Call Audit Information

When you enable Call Auditing, the Call Auditing process logs the contents of this buffer to the audit_stat.d file. The default setting is DIGITS.

COMO cell blocking?

Activating blocking tells the COMO cell to wait for the transaction to complete before continuing to the next cell. The application will wait until the TRS interaction ends before it continues through the Meridian IVR 2.0/I application (only one of the branches “MORE DATA” or “END OF DATA” is to be connected to the subsequent cell). If you select “No,” the COMO cell receives a status code from the TRS process. If the transaction is complete, the application follows the “END OF DATA” or “MORE DATA” branch (whichever one connects to another cell). If the transaction is not complete, the application follows the ”NOT READY” branch. You could use this branch to play a prompt notifying the caller that the transaction is in progress, and then feed the call flow back into the COMO cell.

COMO cell buffer count

You do not need to enter a value in this field as Meridian IVR 2.0/I automatically calculates the number of buffers when you click on the "Apply" button.

COMO cell output buffers

Enter the name of the buffers that will accept the output from the host computer. Figure 4-4 shows BALANCE (no quotes) as the only output buffer for this example.

> ***Note:*** You must enter the output buffers in the same order they will be used by the TRS process.

If your application uses more than 10 output buffers, string COMO cells together until you have enough buffers. Connect the input branch of each subsequent COMO cells to the "MORE DATA" branch of the previous COMO cell.

COMO cell branches

As shown in Figure 4-5, the COMO cell has several branches.

Figure 4-5
COMO cell

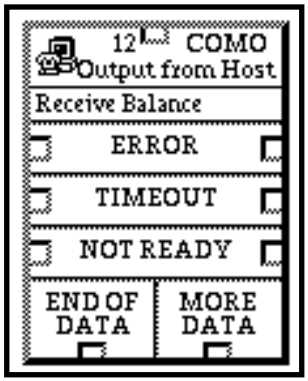


Table 4-1 describes each branch of the COMO cell.

Table 4-1
Branches of COMO cell

Branch	Reason Taken
ERROR	Any problem with any part the host transaction will cause the application to take the error branch.
TIMEOUT	The transaction took more than its allowed time as specified in the COMI cell.
NOT READY	The transaction did not complete and Blocking was set to “No”.
END OF DATA	The transaction successfully completed.
MORE DATA	The transaction requires additional output buffers.

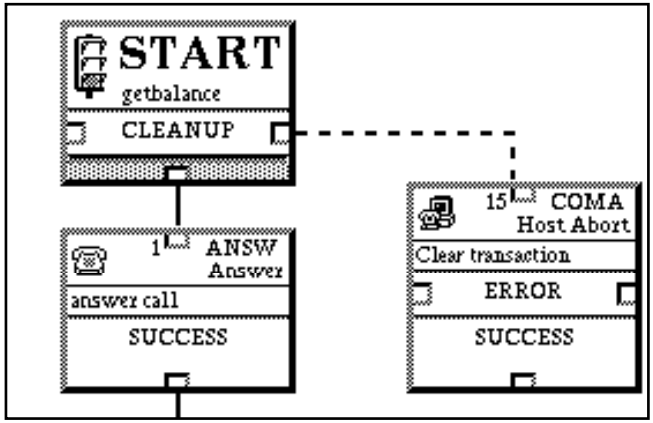
For each COMO cell, use either the “END OF DATA” branch, or the “MORE DATA” branch, but not both. If you use the “MORE DATA” branch, the next cell must be another COMO cell. The last COMO cell should use the “END OF DATA” branch.

Setting the COMA cell parameters

Use a COMA cell in the clean-up branch of the START cell to deal with an error like a caller hanging up in the middle of a transaction. See Figure 4-6.

If you selected manual mode in the application template, use the COMA cell to abort a transaction in progress and release the session (see Chapter 2).

Figure 4-6
COMA cell in the clean-up handler



The COMA cell frees all memory and buffers associated with the COMI and COMO cells.

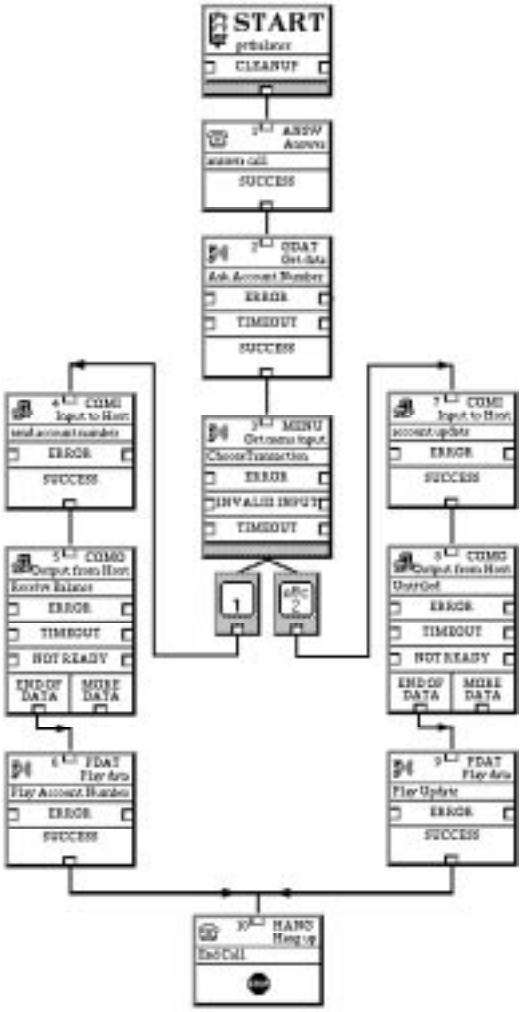
The COMA cell parameters window contains a cell name field, and a comments field. The COMA cell in Figure 4-6 has “Clear transaction” as its cell name.

Sample application using the COMI, COMO, and COMA cells

Figure 4-7 shows a sample Meridian IVR 2.0/I application that uses the COMI, COMO, and COMA cells to retrieve a customer’s account balance stored on a host computer. This example application uses the action and screen templates created in Chapter 3. A caller activates this example application by pressing “1” after hearing the prompt played by the MENU cell. A separate action template and its associated screen templates would need to be created to support menu choice 2.

To illustrate the logic of the call flow, these applications are shown as one page applications with no error branches. In reality, these applications would span several pages and would have all error branches connected appropriately.

Figure 4-7
Application accessing the TRS process from the COMI and COMO cell



Prior to the execution of this application, the initial-action template is executed (when Meridian IVR 2.0/I is started on the application processor). Once a call from a customer is received, the Meridian IVR 2.0/I application performs these steps:

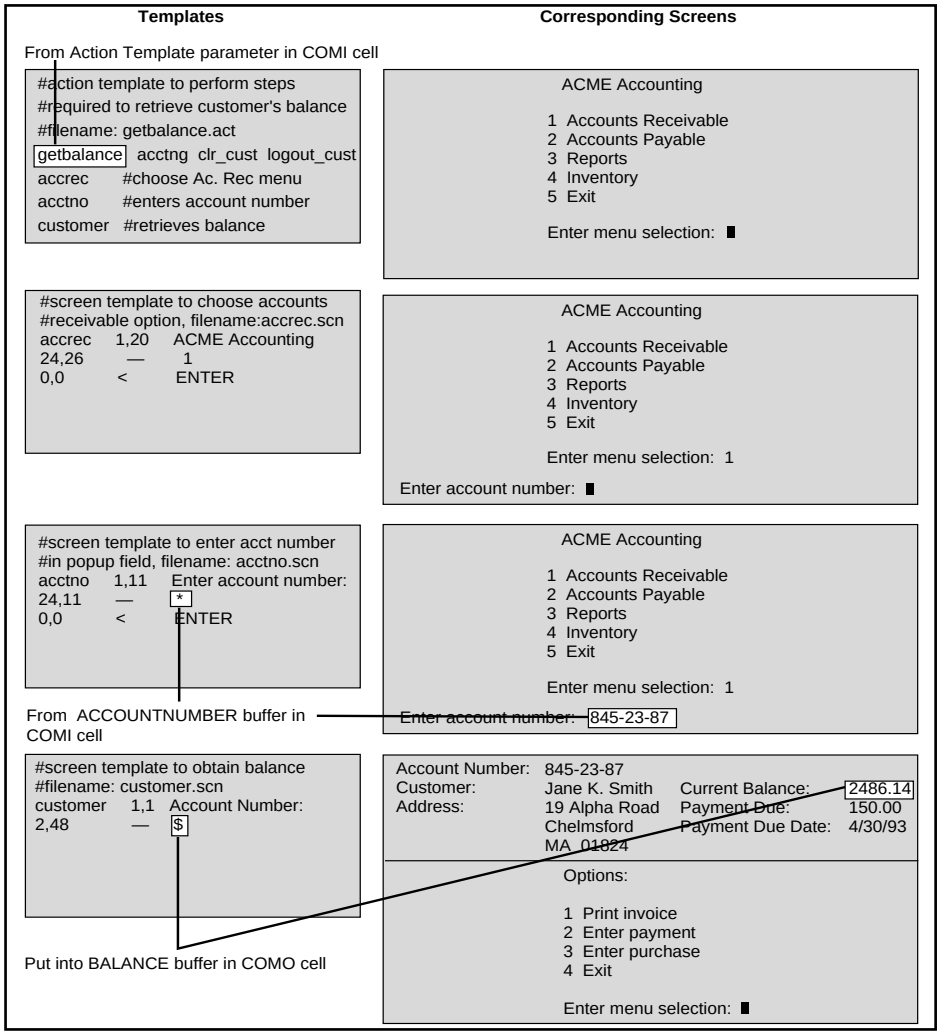
Table 4-2
Application cell functions for Figure 4-7

Cell 1	The ANSW cell answers the incoming call.
Cell 2	The GDAT cell plays a prompt requesting the caller to enter an account number. The number entered is stored in the ACCOUNTNUMBER buffer.
Cell 3	The MENU cell plays a prompt instructing the caller to press 1 to get an account balance, or press 2 to get an account update.
Cell 4	When the caller presses “1” on the telephone, the COMI cell starts the transaction. The action template specified in the COMI cell parameter window is “getbalance,” - the same template used in the example transaction described in Chapter 3. The COMI cell provides the contents of the ACCOUNTNUMBER buffer to the host computer application.
Cell 5	The COMO cell receives the customer’s balance from the BALANCE buffer.
Cell 6	The contents of the BALANCE buffer is played to the user.
Cell 7-9	These cells support menu choice 2, which provides an account update in a similar manner.
Cell 10	The caller hangs up and the application ends.

If the caller hangs up before the transaction is completed, the COMA cell in the clean-up branch of the START cell clears the memory and buffers associated with the application.

Figure 4-8 shows how the COMI and COMO cell parameters relate to the screens defined on the host computer. This transaction uses an action template, getbalance, to call three screen templates - one to choose the Accounts Receivable menu, one to enter the account number, and one for the customer information screen. Each screen template lists the fields that will be accessed.

Figure 4-8
COMI, COMO cell parameters, TRS templates, and host screens



Appendix A: SCO

In the trs.conf file, set the protocol field to 3270.

Table A-1 lists the default settings which may be used when defining users and sessions in Apertus's Express host connectivity package.

Table A-1
Default settings for Express

Group	sysadm
User	express
Terminal	Access Mode:Individual Printer Process:Shared
Session	Session Type:3270 Display

When defining Communication in EXPRESS, the settings for Node, Link, Station, and Logical Unit should be:

Node	**The node name of your Application Processor**
Link	SDLC
Station	Connection Type: Host Restart connection if it fails XID Format:Format 3
Logical Units	Type: 3270 Display Pool

If a setting is not specifically addressed in these tables, then its default setting is acceptable. For further information on configuring Apertus/EXPRESS, refer to Apertus's documentation.

The following information should be contained in the **/etc/rc2.d/S99express** file:

```
if [ $1 = start ]
then
rm -f /u/express/db/cdmst
fi
su root -c "/u/express/bin/express_adm $1"
su root -c "/u/ivr/sys_files/vtekhost_adm $1"
```

Communication scripts

This section outlines and describes the different scripts available to control and manage communications start-up.

The /u/ivr/sys_files/vtekhost_adm script automates the starting of the Apertus background processes and automates the enabling of the links and stations of a configuration during a reboot.

The script needs to be customized on site. An example of the script follows:

```
# Customizable option : location of shell
#
#! /bin/sh
```

```
#####################################################################
#
#
#
# Customizable option : location of express profile
#
. /u/express/.profile
#
# error message definitions
#
MESSAGE1="\nInvalid request usage: manager (start | stop)"
MESSAGE2="\nTimeout occurred. Necessary daemons not active after 5 minutes"
MESSAGE3="\nAll daemons now running, executing express start"
#
#  check to see an action parameter (start or stop) was passed in
#
if [ "$#" -lt 1 ]
then
                        echo $MESSAGE1
                        exit 1
fi
#
# start the express background processes
#

express_adm start

#
# loop to verify all necessary daemons are running then start express
# in hidden mode
#
loopCount=0
retryCount=0
#
# hang out in a loop until all express daemons are running.  This process
# will time out after 5 minutes
#
# Customizable option : Verify all processes below do execute on your system
#
while [ $loopCount -eq 0 ];do
(ps -fe | grep cdm | grep -v grep) &&
```

```
(ps -ef | grep agent | grep -v grep) &&
(ps -ef | grep executive | grep -v grep) &&
#(ps -ef | grep jobex | grep -v grep ) &&[1]
(ps -ef | grep watchdog | grep -v grep)

if [ $? -ne 1 ]
then
                        echo $MESSAGE3
                        break
else
                    retryCount=`expr $retryCount + 1`
                    if [ $retryCount -eq 12 ]
                    then
                        echo $MESSAGE2
                        exit 2
                    else
                        sleep 5
                    fi
fi
done
case "$1" in
'start' )
#
# Customizable option : Name of token ring link.  Comment out if this is
# a serial connection
#
# stst << !
#   start datalink trLink
#!
#
# Customizable option : Name of token ring station.
#
stst << !
  start connection SDLCstation[2]
!
#
# Customizable option : Name of express users
```

1. Not all processes execute on all platforms. For instance, jobex does not execute on the standard SCO installation. Therefore, remove comment notation (#) from this line.
2. Name of the station which needs to be started. This can be found by running the Express user interface.

```
#
     express -u express -h[1]
                        ;;
'stop' )
     echo "STOP Session Managers"

#
# Customizable option : Name of express users
#
     express -x -u express
#
# Customizable option : Name of token ring link.  Comment out if this is
# a serial connection
#
stst << !
 stop connection SDLCstation
!
#
# Customizable option : Name of token ring station.
#
stst << !
   stop datalink trLink
!
                        ;;
esac
```

1. List of the Express user that you want to have started.

Appendix B: Host connectivity

Host connectivity options provide an IVR application with the ability to interface with several types of host computers over a number of different topologies. IVR 2.0/I supports the following host communication environments:

- IBM 3270/SNA over SDLC
- IBM 3270/SNA over Token Ring
- IBM 5250/SNA over SDLC (also referred to as APPC or LU6.2)
- IBM 5250/SNA over Token Ring (also referred to as APPC or LU6.2)
- VT100

The IVR system emulates 3270 and 5250 through the use of software called Express from Apertus.

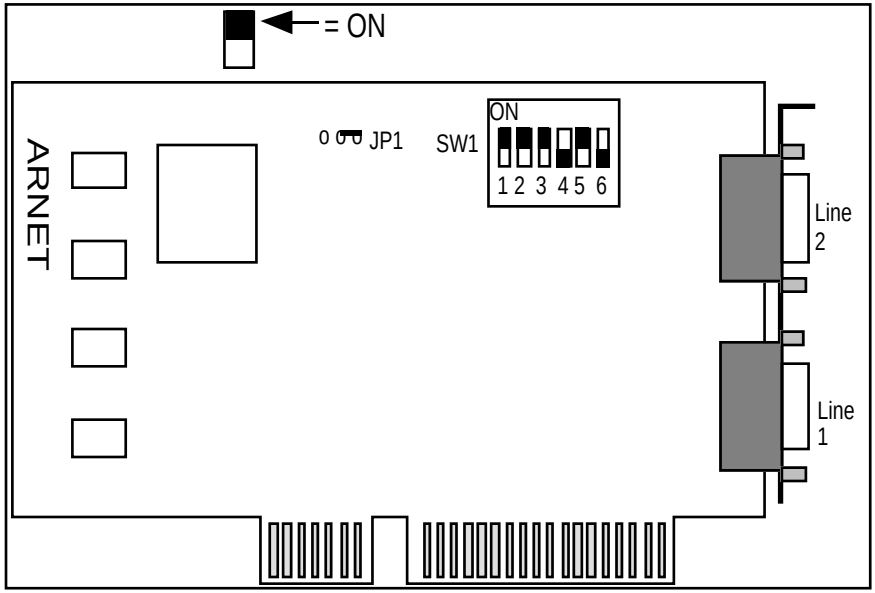
IBM 3270 emulation characteristics

Express provides full emulation of IBM 3174 cluster controllers and their attached 3178/3179 terminals for access to host environments such as MVS, VM, and VSE. Express emulates IBM 3270 display station models 1, 2, 3, 4, and 5 and provides screen presentation spaces ranging from 12 rows by 40 columns to 27 rows by 132 columns. It also supports seven colors; extended highlighting features and full status display. Express uses LU1, LU2, and LU3 in support of 3270 emulation.

3270/5250 SNA/SDLC card

The Arnet SYNC/570 card is used for connectivity to the host using SNA/SDLC. The Arnet SYNC/570 is a high-performance expansion board which connects into an ISA expansion slot and contains 2 communication ports. Included with the Arnet SYNC/570 adapter are 2 cables (9 pin male to 25 pin male) for attaching to line 1 and 2 of the adapter. Also included is a loopback connector for diagnostics. The two ports of the SYNC/570 each have a high density DB-15 connector to connect any device with an EIA-232-D interface to the computer. The board operates at line speeds from 4800 baud to over 115K.

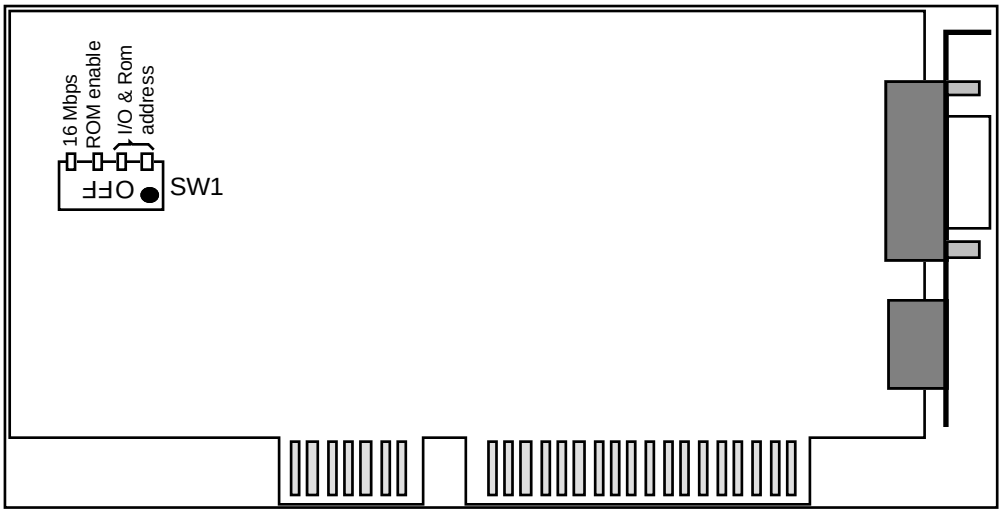
Figure B-1
ARNET SDLC card



3270/5250 Token Ring card

The Madge Smart 16/4 AT Plus Ringnode card is used for connectivity to the host using Token Ring.

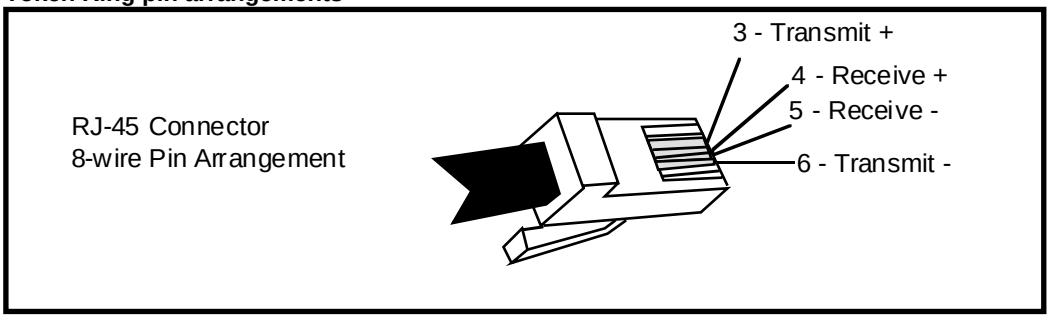
Figure B-2
Madge Smart 16/4 AT Plus Ringnode token ring host card



The LED indicators on the back of the card have the following indications:

LED	Function
Yellow	Indicates the NIC is inserted into the Token Ring.
Green	Indicates data is passing through the NIC.

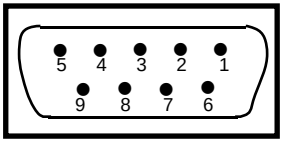
Figure B-3
Token Ring pin arrangements



9-Pin connector pinouts

The 9-pin “D” subminiature STP cable pinouts on the Network Interface card consist of the following:\

Figure B-4
Subminiature STP cable pinouts



Pin	Cable	Signal
1	Red	Receive+
5	Black	Transmit-
6	Green	Receive-
9	Orange	Transmit+

Pins 2, 3, 4, 7, and 8 are unused. The connector shield grounds the chassis.

Configuring 3270 for SDLC host communications

The Express software pre-defines a user called express in the Express database. When configuring the hosts communications software, the root log in can be used.

1 Log into the AP as root.

2 Enter the root password at the prompt.

3 The /etc/profile file contains all the commands which are executed upon login for all non-root users.

4 To allow root to have all the environment variables set up which normal users will have, enter the following command:

./etc/profile

5 The Express software automatically starts at boot time and must be started before the configuration can be accomplished.

6 To verify that it has started, enter the following command:

express_adm check

The system displays the following screen:

```
# express_adm check
(c) Copyright 1989,1992 Apertus Technologies Incorporated.
All Rights Reserved.  Restricted Rights Legend: Use,
duplication, or disclosure by the government  is subject
to restrictions as set forth in subparagraph (c)(1)(ii) of
the  Rights in Technical Data and Computer Software
Restricted Rights clause at DAFRS 252.227-7013 and/or the
Commercial Computer Software Restricted Rights clause at
FAR 52.227-19(c).  Apertus Technologies Incorporated, 7275
Flying Cloud Drive, Eden Prairie, MN 55344 U.S.A.
agent running:
    root   502     1  0 10:15:08  ?      0:00 agent
executive running:
    root   498     1  0 10:15:05  ?        0:00 executive
watchdog running:
    root   504     1  0 10:15:08  ?        0:00 watchdog
cdmserver running:
    root   367     1  0 10:14:51  ?        0:07 cdmserver     nortel:/u/express/db/cdmstst
Checking EXPRESS database divisions ...
Checking EXPRESS clients ...
```

Four daemons should appear in the running state. If the information above does not display, then express is not running. The express software may be started with the following command:

express_adm start

7 Begin the Express configuration by entering the following command:

express -c -u express

If the error “express: not found” appears, issue the command in step 5 above (. /etc/profile).

If the error is:

- initializing display capabilities...
- terminal type 'ansi' not defined for user 'express' in the EXPRESS database.
- DCINIT failed...EXPRESS terminating

then the terminal type is not set up for your log in session. The valid terminal types available for Express can be obtained with the following command:

ls_screens -u express?

Set the terminal type to a valid terminal type using the following command:

TERM=vt220;export TERM

8 The system displays the following screen:

```
Initializing display capabilities...
Retrieving database information for express.......


  ----------------EXPRESS Global Options--------------
                     Welcome  to  EXPRESS
 This first time that you run EXPRESS, you are asked to
select initial
 values for global parameters and options.  You are also
asked to
 characterize your planned usage of EXPRESS features.
EXPRESS
 will then make available just those tasks and displays
you need to
 utilize these selected features.
 You may change this information later through Set Global
Options.
                    ========
                    _   OK   _
                    ========
```

9 Press <Enter> to display the following screen. This screen only appears the first time express is run.

```
 ------------EXPRESS Global Options------------
 An EXPRESS domain is a single computer or a group of
networked
 computers on which EXPRESS is installed.  EXPRESS provides
 central, domain-wide operation and administration.
 Please enter the following domain identification.  This
information
 is attached to configuration backups and communication
traces.
 It is also the default SNA Node identification.
      Domain Name: [                                       ]
      Location:    [                                       ]
```

10 The Domain Name and Location are not required for a stand-alone configuration (they are required for a network configuration), but since the information will appear in traces, enter a meaningful name such as the name of this company for the domain name and press <Enter>.

11 The following screen appears:

```
   --------------EXPRESS Desktop Features----------------
Please select the features of the EXPRESS Integrated
Desktop that you plan to use.

Terminal Emulation   Other Services
[*] 3270 Display     [ ] Remote Job Entry
[ ] 3270 Printing    [ ] CPI-C Transaction Programs
[ ] 5250 Display

             ==========   -------------   ------------
             ¯Continue¯   ¯ Options...¯   ¯Security...
             ==========   -------------   ------------
```

12 Press Space to place an asterisk in the 3270 Display selection.

Press <Enter> to proceed to the next screen.

```
----------------EXPRESS Desktop Features--------------
  Please select the following Server types that
  EXPRESS Integrated Desktop will use.

  [*] EXPRESS
  [ ] Netware for SAA
  [ ] Telnet Host

      ============           -----------
      _ Continue _           -  Back   -
      ============           -----------
```

13 Ensure the asterisk is in the EXPRESS selection and then press <Enter> to proceed to the following screen.

```
 ----------------EXPRESS Server Features--------------
  Please select the features of the EXPRESS SNA Server
  that you plan to use.

  [ ] LU 6.2 - Needed for CPI-C, 5250, and IP/LU6.2
  [ ] X.25 - Needed for QLLC, XLI, X.PAD, and IP/X.25
  [ ] IP Router - Needed for IP/LU6.2 and IP/X.25

  Please select the client types supported by the
  EXPRESS SNA Server.

  [*] EXPRESS
  [ ] Telnet 3270/5250
  [ ] Netware for SAA

                      ============
                      _ Continue _
                      ============
```

14 Make sure the asterisk is in the EXPRESS selection and press <Enter> to proceed to the next screen.

```
[-] File  Edit  Preferences  Window  Task  Help

-------------------EXPRESS Manager------------------
 Personal
  Status       1. Control and Administration
Menu:          2. Server Configuration
 <Esc><Ent     3. Desktop Configuration
Cancel:
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
```

Notes:

1 If any of the parameters which initially displayed need to be changed, they can be found under the Set Global Options menu selection of the Preferences menu item.

2 The layout of the EXPRESS Manager screen contains the function of the keys to the left of the vertical line, three selections to the right of the vertical line, and menu item selections along the top. The function keys which display to the left of the vertical line will vary depending on which terminal is being emulated during this configuration. The meanings of the function keys in the example above are:

- <Esc> then <Enter> = allow using the Menu
- <Ctrl+^> = cancel from selection chosen
- <Esc> then "q" = the <Alt key> (usually followed by another character)
  - — that is, if the O of OK is highlighted, OK can be selected by doing an <Alt+O>, which would be keystrokes <Esc> then q then O.
- <Esc> then "!" = obtain the UNIX shell (type exit to return)

Verifying that Express recognizes the hardware

15 To verify that the Express software recognizes the communications adapter, perform the following steps:

Select Server Configuration by pressing the number 2. The following screen appears:

```
-----------------Server Configuration--------------
    I.D.    Description                 Status
      !     Define Communications
      ;     Define LU6.2
      ?     Define Users/Sessions
      &     Define Hardware
      /     Define Job Entry Stations
```

16 Select Define Hardware. The following screen appears:

```
 [-]  Profile  Edit  Display  Preferences  Task  Help
--------------------Define Hardware-------------------------
 Personal  Type        Name       Description
  Status
Menu:      Config     Express   Default configuration for EXPRESS
<Esc><Ent  System     nortel     Computer System nortel
Cancel:     Adapter   nortel.hpa0       HPA Adapter
 <Ctrl>^     Port     nortel.hpa0.0     HPA Port 0
Alt Key:     Port     nortel.hpa0.1     HPA Port 1
```

The screen should display the Adapter line indicating that the adapter has been recognized. If the Adapter lines do not appear, then check the hardware configuration using express_adm admin and/or check the settings on the adapter itself.

17 Select the Profile menu item and then choose Exit to return to the Express Manager window.

18 To complete the configuration of the Express software requires the completion of the following configurations:

a. defining the Node

b. defining the Link—there must be a link for each line to the host.

c. defining the Station

d. defining the LU

e. defining the 3270 Users/Sessions

Defining the node

19 From the Express Manager window, select Server Configuration by pressing the number 2.

The following screen appears:

```
-----------------Server Configuration--------------
    I.D.    Description                 Status
      !     Define Communications
      ;     Define LU6.2
      ?     Define Users/Sessions
      &     Define Hardware
      /     Define Job Entry Stations
```

20 Select Define Communications.The following screen appears:

```
-----------------Select Display-----------------
 Please select the type of
Communications Profiles you wish to work with

<SNA>

----------
 Cancel
----------
```

21 Ensure SNA is displayed, and press <Enter>.

The following screen appears:

```
----------------- Insert New SNA Node -----------------
 Under Configuration Express
 Name.....[ACME            ]
 Description...[                          ]

==========   ----------
    OK       Cancel
==========   ----------
```

22 The Name and Description are copied from the Domain Name and Location of the initial screen which was completed. Although the Name is required and cannot contain spaces, it is only used to name this configuration.The description is not required, but it can be helpful to describe the type of configuration such as “3270 SDLC configuration”.

Enter a Name and Description and press <Enter>.

The following screen appears.

```
-----------------SNA Node ACME-----------------
Network ID
    [         ]                  ---------------
Control Point                        XID...
    [         ]                  ---------------
                                 ---------------
Process...[nortel.kernel   ]*        RTM...
                                 ---------------
==========   ----------          ---------------
-  OK    -    Cancel             Alert Gen...
==========   ----------          ---------------
```

23 Enter the Network ID. This parameter is obtained from the customer and is usually in the VTAM gen on the mainframe called NETID. This parameter identifies the IVR system and is assigned by the mainframe.

Enter the Control Point. This parameter is obtained from the customer although it can be any value if the IVR system is talking to VTAM on the mainframe. Express requires this parameter be completed. This parameter identifies the IVR system and is assigned by the mainframe.

The Process parameter is only required if the express database is being shared among other Application processors (of which IVR 2.0/S is not). Leave the information in this field which appears here.

The Response Time Monitoring (RTM) is a feature which Netview on the host can use. There is normally nothing to change here.

The Alert feature is another item which can send messages to Netview on the host. There is normally nothing to change here.

Select XID and the following screen appears:

```
---SNA Node ACME - XID---
 XID Format
 (*) Format 3
 ( ) Format 0

 XID Block...[E05 ]
 XID ID......[00000 ]

 ==========   ---------
 |   OK   |   | Cancel|
 ==========   ---------
```

24 Ensure the XID Format is set to Format 3. Format 0 is an old format which is not normally used anymore unless the host is using old software.

The XID Block and XID ID together make up the XID. These parameters are obtained from the customer.

Complete the fields and press <Enter>.

The following screen appears:

```
------------EXPRESS Tree Builder-
 If you wish to insert another profile,
 please select:

 For SNA Node ACME:
    <New Link...>

 For Configuration Express:
    <New SNA Node...>

    <End Insert>
```

Defining the link

25 Leave the cursor on New Link and press <Enter>. The following screen appears:

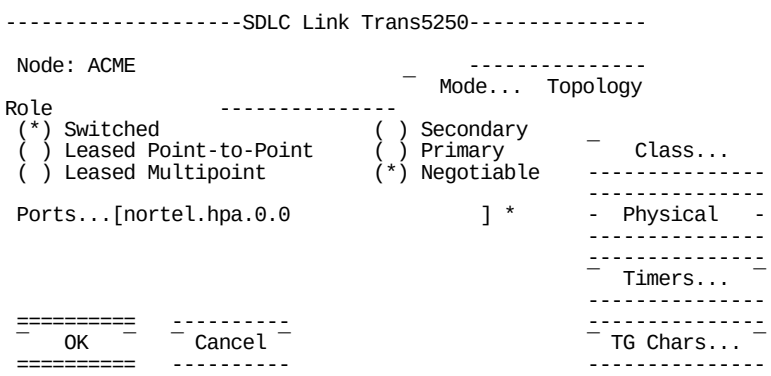
```
-------------Insert New Link--------------

 Under SNA Node ACME

 Type
 (*) SDLC
 ( ) Channel
 ( ) Token Ring
 ( ) QLLC

 Name..........[               ]
 Description...[                                   ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

26 Make sure the asterisk is beside (*) SDLC (use the arrow keys to move to new selections under Type and Space bar to place the asterisk next to the correct selection).

Tab to the Name and enter a meaningful name (no spaces allowed) which describes this configuration. This name is only used by the Express database.

Tab to the Description and enter a meaningful description. This name is only used by the Express database.

Press <Enter> and the following screen appears:



27 Select the correct Topology for this IVR System.

Switched is a dial-up link connecting two stations.

Leased Point-to-Point is a non-switched data link which directly connects to the host and the IVR system is the only station on the remote side.

Leased Multi-point is a non-switched data link which connects multiple secondary stations to a single host. That is, other 5250 terminals are on this line along with some sort of a splitter.

28 Select the correct Role for this IVR system.

Secondary—the local station is the secondary link station on this link.

Primary—the local station is the primary link station on this link.

Negotiable—the role of the local station will be negotiated at connect time. A leased multi-point line cannot be defined as negotiable.

29 Select the correct Port for this configuration. The software should automatically enter the “nodename.hpa0.0” item which signifies the first board and the first port, that is, nortel.hpa0.0 nortel.hpa0.1 would signify the second port of the HPA board. An entry of nortel.hpa0.0 1 tells Express that if link 0 does not work, automatically try port 1.

Select the Mode and the following screen appears:

```
 --------------SDLC Link ACME - Mode--------------
Maximum Frame Size...[521   ]

Sequencing
(*) Normal   (mod 8)
( ) Extended (mod 128)

Two Way Operation
(*) Alternate
( ) Simultaneous   [ ] REJ
==========     ----------
    OK         Cancel
==========     ----------
```

30 Select the Maximum Frame Size as specified by the host. Frame size specifies the maximum number of bytes in the I-field of an I-frame which may be transmitted or received on this data link. Standard sizes are 265 and 521, although the values may range from 0 to 32767.

Select the Sequencing as specified by the host. Sequencing specifies the type of SDLC sequencing used for this link. The local and remote link stations must agree on the value of this parameter, otherwise communication is not possible.

Normal sequencing allows a maximum of 7 SDLC I-frames to be sent in a single poll sequence; this is the most common mode.

Extended sequencing allows a maximum of 127 I-frames to be sent.

Two Way Operation—specifies SDLC mode of operation. The local and remote link stations must agree on the value of this parameter; otherwise communication is not possible.

Alternate—each link station takes turns transmitting data. There is no simultaneous data transmission; this is the most common mode. This is like Half Duplex communications.

Simultaneous—both link stations may transmit frames simultaneously. This is like Full Duplex communications.

Press <Enter> to return to the previous screen.

```
   Select Physical and the following screen appears:
--------SDLC Link ACME - Physical--------
 Bit Encoding   RTS Control   Idle
 (*) NRZ        (*) Toggled   ( ) Flag
 ( ) NRZI       ( ) Constant  (*) Mark

 ==========   ----------
 _   OK   _   _ Cancel _
 ==========   ----------
```

31 Set the Bit Encoding, RTS Control, and Idle parameters to the values as specified by the host. The local and remote link stations must agree on these values, otherwise communication is not possible.

Press <Enter> after the parameters have been set. The previous screen appears.

Select Timers and the following screen appears:

```
------ SDLC Link ACME - Timers ------

 Timers (in seconds, immediate, or forever)
   XID Negotiation...[forever   ]*
   Inactivity........[forever   ]*
   RR Poll...........[0.4       ]*
   Response..........[3.0       ]*
   DSR Wait..........[120.0     ]*
   CTS Wait..........[3.0       ]*
   CTS Down..........[0.5       ]*
   DSR Down..........[0.5       ]*

 Retries (value, none, or unlimited)
   XID Attempts      [20        ]*
   Response Limit....[5         ]*

 [ ] Disconnect upon inactivity timeout

 ==========   ----------
 _   OK   _   _ Cancel _
 ==========   ----------
```

32 Ensure the XID Negotiation and Inactivity timers are set to forever by pressing the down arrow when the cursor is on that field.

Press <Enter> after the parameters have been set. The previous screen appears.

33 Place the cursor on OK and press <Enter> to complete the Link Definition.

The following screen appears:

```
------------------EXPRESS Tree Builder------------------
 If you wish to insert another profile,
 please select:

 For SDLC Link ACME:
    <New SDLC Station...>

 For SNA Node ACME:
    <New Link...>

    <Up a Level>

    <End Insert>
```

34 Press <Enter> with the cursor on New SDLC Station. The following screen appears:

```
-------------- Insert New SDLC Station ------------------
 Under SDLC Link IBMainframe
 Name.........[                    ]
 Description...[                                        ]

 ==========   ----------
 _   OK   _   _ Cancel _
 ==========   ----------
```

Defining the station

35 A station needs to be defined for every 254 sessions. In the Name field enter a meaningful name (no spaces allowed) which describes this configuration. This name is only used by the Express database.

Tab to the Description and enter a meaningful description. This name is only used by the Express database.

Press <Enter> and the following screen appears:

```
-----------------  SDLC Station TR -----------------

 Node: Nortel
 Link: ACME

 Connection Type
 (*) Host
 ( ) Peer-to-Peer

 Secondary Station Address...[01 ]

 Send XID                Remote Node Name
   Block...[E05 ]          Network ID......[NETID    ]
   ID......[00000 ]        Control Point...[HOST     ]

 [ ] Remote Node is Network Node

 [*] Restart connection if it fails
 ==========   ----------              ---------------
 _    OK    _  _ Cancel _              _     XID...    _
 ==========   ----------              ---------------
```

- Connection Type—be sure to change this to Host for 3270.
- Fill in Send XID Block and ID from the customer host.

  Fill in the Network ID and Control Point from the customer host.

  Make sure an asterisk [*] is NOT next to Remote Node is Network Node.

- Make sure there is an asterisk [*] next to Restart connection if it fails.

36 Press <Enter> and the following screen appears:

```
------------------EXPRESS Tree Builder-------------------

 If you wish to insert another profile,
 please select:

 For SDLC Station ACME:
    <New Logical Unit...>

 For SDLC Link IBMainframe:
    <New SDLC Station...>

    <Up a Level>

    <End Insert>
```

Defining the logical unit

37 Leave the cursor on New Logical Unit and press <Enter>. The following screen appears:

```
---------------  Insert New Logical Unit -----------------

 Under SDLC Station 3270Stn

 Type
 (*) 3270 Display Pool
 ( ) 3270 Printer
 ( ) Local LU 6.2
 ( ) RJE LU Pool
 ( ) LU Type 0

 Name.........[LU2]
 Description...[  ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

38 Make sure the asterisk is next to 3270 Display Pool. Tab down to Name and Description and provide a descriptive name. Include in the name or description which LU this is (for example, LU2). Press <Enter> and the following screen appears:

```
-------- 3270 Display Pool 3270pool ---------

 Node:    Nortel
 Link:    IBMainframe
 Station: 3270Stn

 LU Addresses
   [2]

 ==========   ----------       --------------
 _    OK    _  _ Cancel _       _   Setup...   _
 ==========   ----------       --------------
```

39 For the IVR system, one LU address will be defined for each separate session. Express software has the capability to specify all addresses on one LU, but the Meridian IVR software would not function when configured in this way.

The first address must start with 2, the next one 3, etc. Zero (0) and 1 are reserved.

Type a 2 in the LU Addresses field and press <Enter>. The following screen appears:

```
---------------EXPRESS Tree Builder---------------

 If you wish to insert another profile,
 please select:

 For SDLC Station ACME:
    <New Logical Unit...>

    <Up a Level>

    <End Insert>
```

40 Continue selecting New Logical Unit until all Logical Units have been defined. When all LUs have been created, tab to End Insert and press <Enter>. The following screen appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
  -------- Define Communications - SNA ---------------
Personal  Type        Name      Description
Status
Menu:      Config      Express    Default configuration for EXPRESS
<Esc><Ent   Node          ACME    TR loc test
Cancel:      Indep. LUs   6.2 LUs Using All Stations
 <Ctrl>^       LU         ACME    Control Point LU
Alt Key:     Link         ACME    3270 SDLC
 <Esc>q       Station     TR      3270 station
ShellEsc:      LU         LU2
Task: !        LU         LU3
Search:        LU         LU4
 Down          LU         LU5
```

41 Select Profile and then Exit from the menu. The following screen appears:

```
 [-]  File  Edit  Preferences  Window  Task  Help
-------------------EXPRESS Manager------------------
 Personal
  Status       1. Control and Administration
Menu:          2. Server Configuration
 <Esc><Ent     3. Desktop Configuration
Cancel:
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
User:
```

Defining the 3270 users/sessions

42 Select 2. Server Configuration and press <Enter>. The following screen appears:

```
-----------------Server Configuration--------------
    I.D.    Description                Status
      !     Define Communications
      ;     Define LU6.2
      ?     Define Users/Sessions
      &     Define Hardware
      /     Define Job Entry Stations
```

43 Select Define Users/Sessions. The following menu appears:

```
----------- Select Display -------------

Please select the type of
profiles you wish to work with

<Users>
<Terminal Emulation Services>

----------
¯ Cancel ¯
----------
```

44 Select Users. The following menu appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
------- Define Users/Sessions - Users ----------
 Personal  Type         Name              Description
  Status
Menu:      All Users    All        Configuration: Express
<Esc><Ent   Group       sysadm     System Administrators Group
Cancel:      User       express    Default user of EXPRESS
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
```

45 Move the cursor to highlight the User line which reads “Default user of EXPRESS”.

From the pull down menu select Profile and then New. The following screen appears:

```
--------------- Insert New Session -----------------

 Under User express

 Session Type
 (*) 3270 Display
 ( ) 3270 Printer
 ( ) 5250
 ( ) Local

 ID.............[a ]
 Description...[                                    ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

Session Type—place an asterisk next to 3270 Display

ID—for the first session enter an “a”. Subsequent sessions will be “b”, “c”, etc. up to session ID “h” for the first user.

46 Press <Enter> and the following screen appears:

```
------------------- 3270 Session a ---------------------

 Defined for User express
 Type: Display

 [*] Displayable task
 [ ] Graphics Supported

                                        ---------------
 LU/Host.....[LU2                    ]* _ Printing... -
 Language....[US                      ]* ---------------
 Long Name   [          ]                _ Initself... _
 Model       [2 ]*                       ---------------
                                         ---------------
 ==========   ----------                 _  EHLLAPI...  _
 _    OK    _  _ Cancel _                 ---------------
 ==========   ----------
```

47 Press <Enter> and the following screen appears:

```
-------------------EXPRESS Tree Builder------------------
```

If you want to insert another profile,

```
please select:

For User express
   <New Session...>

   <Up a Level>

   <End Insert>
```

48 Continue selecting New Session and create session b, then c, etc., until eight sessions have been created. ONLY EIGHT SESSIONS SHOULD BE CREATED PER USER. More sessions will require another user.

When eight sessions have been created, select End Insert and the following screen appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
------- Define Users/Sessions - Users ----------
 Personal  Type         Name              Description
  Status
Menu:      All Users    All        Configuration: Express
<Esc><Ent   Group       sysadm     System Administrators Group
Cancel:      User       express    Default user of EXPRESS
 <Ctrl>^      Session   a          session a
Alt Key:      Session   b          session b
 <Esc>q       Session   c          session c
ShellEsc:     Session   d          session d
 <Esc>!       Session   e          session e
Task: ;       Session   f          session f
 Down         Session   g          session g
              Session   h          session h
```

49 If more than eight sessions need to be configured, add a new user of “expressa” by performing the following steps:

a. Place the cursor on the “Group” line.

b. Select Profile from the menu.

c. Select New from the Profile menu.

The following screen appears:

```
----- Group User sysadm -----

 Insert New
   <Session>
   <User>

        ----------
       _ Cancel _
        ----------
```

d. Place the cursor on User and press <Enter>. The following screen appears:

```
------------------- Insert New User --------------------

 Under User Group sysadm

 Name........[               ]
 Full Name...[                                      ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

e. Enter a name of expressa for the second user which will support the next eight sessions, expressb for the third user which will support the next eight sessions, etc. Press <Enter>. The following screen appears:

```
----------------- User expressa -----------------------

 Group: sysadm
            Supervisory Tasks
 ----------------------------------------
+  Control Communications & Diagnostics
+  Display Log
+  Display Trace
+  Administer Configurations
+  Administer Log
+  Define Communications
+  Define LU 6.2
   Customize Messages
+  Define Users/Sessions
 ----------------------------------------
 '+': defined for       ---------------------
   Group or All Users   _ Session Support... _
                        ---------------------
 ==========   ----------      ----------------
 _    OK    _  _ Cancel _      _ Password...  _
 ==========   ----------      ----------------
```

f. Press <Enter> to accept all the Supervisory Tasks. The following menu appears:

```
-------------------EXPRESS Tree Builder------------------
 If you wish to insert another profile,
 please select:

 For User expressa
    <New Session...>

 For User Group sysadm:
   <New Session...>
   <New User...>

    <Up a Level>

    <End Insert>
```

g. With the cursor on New Session, press <Enter> to create a new session for the new express user.

```
--------------- Insert New Session -----------------
 Under User expressa

 Session Type
 (*) 3270 Display
 ( ) 3270 Printer
 ( ) 5250
 ( ) Local

 ID.............[i ]
 Description...[                                      ]

 ==========   ----------
 _    OK    _   _ Cancel _
 ==========   ----------
```

- Session Type—place an asterisk next to 3270
- ID—for the first session of the second user enter an “i”. Subsequent sessions of the second user will be “j”, “k”, etc. up to session
- ID “p” for the second user. For the third user, use ID q, r, s, etc. User ID's may also be uppercase letters.

h. Press <Enter> and the following screen appears:

```
------------------- 3270 Session i ---------------------

 Defined for User expressa
 Type: Display

 [*] Displayable task
 [ ] Graphics Supported
                                         ---------------
 LU/Host.....[LU10                     ]* ¯ Printing... -
 Language....[US                       ]* ---------------
 Long Name   [         ]                  ---------------
 Model       [2 ]*                        ¯ Initself... ¯
                                          ---------------
 ==========   ----------                  ---------------
 ¯    OK    ¯   ¯ Cancel ¯                ¯   EHLLAPI... ¯
 ==========   ----------                  ---------------
```

i. Press <Enter> and the following screen appears:

```
-------------------EXPRESS Tree Builder------------------

 If you wish to insert another profile,
 please select:

 For User expressa
    <New Session...>

    <Up a Level>

    <End Insert>
```

j. Continue selecting New Session and create session j, then k, etc., until eight sessions have been created. ONLY EIGHT SESSIONS SHOULD BE CREATED PER USER. More sessions will require another user.

When eight sessions have been created, select End Insert and the following screen appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
------- Define Users/Sessions - Users ----------
 Personal  Type         Name              Description
  Status
Menu:      All Users    All        Configuration: Express
<Esc><Ent   Group       sysadm     System Administrators Group
Cancel:      User       express    Default user of EXPRESS
 <Ctrl>^      Session   a          session a
Alt Key:      Session   b          session b
 <Esc>q       Session   c          session c
ShellEsc:     Session   d          session d
 <Esc>!       Session   e          session e
Task: ;       Session   f          session f
 Down         Session   g          session g
              Session   h          session h
             User       expressa    Expressa user
              Session   i          session i
              Session   j          session j
```

After the configuration is completed, exit the Express Manager by choosing Exit from the Profile pull-down menu.

Proceed to "Testing 3270 and 5250 host communications" on page B-53.

Configuring 3270 for Token Ring host communications

The Express software pre-defines a user called express in the Express database. When configuring the hosts communications software, the root log in can be used.

1 Log into the AP as root.

2 Enter the root password at the prompt.

3 The /etc/profile file contains all the commands which are executed upon login for all non-root users.

4 To allow root to have all the environment variables set up which normal users will have, enter the following command:

./etc/profile

5 The Express software automatically starts at boot time and must be started before the configuration can be accomplished.

6 To verify that it has started, enter the following command:

express_adm check

The system should display

```
# express_adm check

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Prairie, MN

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agent running:
    root   502     1  0 10:15:08  ?        0:00 agent
executive running:
    root   498     1  0 10:15:05  ?        0:00 executive
watchdog running:
    root   504     1  0 10:15:08  ?        0:00 watchdog
cdmserver running:
    root   367     1  0 10:14:51  ?        0:07 cdmserver
nortel:/u/express/db/cdmst
Checking EXPRESS database divisions ...
Checking EXPRESS clients ...
#
```

Four daemons should appear in the running state. If the information above does not display, then express is not running. The express software may be started with the following command:

express_adm start

7 Begin the Express configuration by entering the following command:

express -u express

If the error “express: not found” appears, issue the command in step 5 above (. /etc/profile).

If the error

```
initializing display capabilities Terminal type “ansi” not
defined for user “express in the  EXPRESS database.DCIT
failed...EXPRESS terminating
```

appears, then the terminal type is not set up for your login session. The valid terminal types available for Express can be obtained with the following command:

ls_screens -u express?

Set the terminal type to a valid terminal type using the following command:

TERM=vt220;export TERM

8 The system displays the following screen:

```
Initializing display capabilities...
Retrieving database information for express.......

  ----------------EXPRESS Global Options--------------
                    Welcome  to  EXPRESS
 This first time that you run EXPRESS, you are asked to select initial
 values for global parameters and options.  You are also asked to
 characterize your planned usage of EXPRESS features.  EXPRESS
 will then make available just those tasks and displays you need to
 utilize these selected features.
 You may change this information later through Set Global Options.
                                 ========
                                 _  OK  _
                                 ========
```

9 Press <Enter> to display the following screen. This screen only appears the first time express is run.

```
  ---------------EXPRESS Global Options-------------
An EXPRESS domain is a single computer or a group of networked
computers on which EXPRESS is installed.  EXPRESS provides
central, domain-wide operation and administration.
Please enter the following domain identification.  This information
is attached to configuration backups and communication traces.
It is also the default SNA Node identification.
     Domain Name: [   ]
     Location:    [   ]
                               ==========
                               Continue
                               ==========
```

10 The Domain Name and Location are not required for a stand-alone configuration (they are required for a network configuration), but since the information will appear in traces, enter a meaningful name such as the name of this company for the domain name and press <Enter>.

11 The following screen appears:

```
   --------------EXPRESS Desktop Features----------------
Please select the features of the EXPRESS Integrated
Desktop that you plan to use.

Terminal Emulation   Other Services
[*] 3270 Display     [ ] Remote Job Entry
[ ] 3270 Printing    [ ] CPI-C Transaction Programs
[ ] 5250 Display

               ==========   -------------   ------------
               Continue      Options...     Security...
               ==========   -------------   ------------
```

12 Press Space to place an asterisk in the 3270 Display selection.

Press <Enter> to proceed to the next screen.

```
 ----------------EXPRESS Desktop Features--------------
Please select the following Server types that
EXPRESS Integrated Desktop will use.

[*] EXPRESS
[ ] Netware for SAA
[ ] Telnet Host

    ============           -----------
    _ Continue _           -  Back   -
    ============           -----------
```

13 Ensure the asterisk is in the EXPRESS selection and then press <Enter> to proceed to the following screen.

```
 ----------------EXPRESS Server Features--------------
Please select the features of the EXPRESS SNA Server
that you plan to use.

[ ] LU 6.2 - Needed for CPI-C, 5250, and IP/LU6.2
[ ] X.25 - Needed for QLLC, XLI, X.PAD, and IP/X.25
[ ] IP Router - Needed for IP/LU6.2 and IP/X.25

Please select the client types supported by the
EXPRESS SNA Server.

[*] EXPRESS
[ ] Telnet 3270/5250
[ ] Netware for SAA

                    ============
                    _ Continue _
                    ============
```

14 Make sure the asterisk is in the EXPRESS selection and press <Enter> to proceed to the next screen.

```
 [-]  File  Edit  Preferences  Window  Task  Help
------------------EXPRESS Manager-----------------
 Personal
  Status       1. Control and Administration
Menu:          2. Server Configuration
 <Esc><Ent     3. Desktop Configuration
Cancel:
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
```

Notes:

1 If any of the parameters which initially displayed need to be changed,they can be found under the Set Global Options menu selection of the Preferences menu item.

2 The layout of the EXPRESS Manager screen contains the function ofthe keys to the left of the vertical line, three selections to the right of the vertical line, and menu item selections along the top. The function keys which display to the left of the vertical line will vary depending on which terminal is being emulated during this configuration. The meanings of the function keys in the example above are:

- <Esc> then <Enter> = allow using the Menu
- <Ctrl+^> = cancel from selection chosen
- <Esc> then “q” = the <Alt key> (usually followed by another character)
  - — That is, if the O of OK is highlighted, OK can be selected by doing an <Alt/O>, which would be keystrokes <Esc> then q then O.
- <Esc> then “!” = obtain the UNIX shell (type exit to return)

Verifying that Express recognizes the hardware

15 To verify that the Express software recognizes the communications adapter, perform the following steps:

Select Server Configuration by pressing the number 2.

The following screen appears:

```
-----------------Server Configuration--------------
    I.D.    Description                 Status
      !     Define Communications
      ;     Define LU6.2
      ?     Define Users/Sessions
      &     Define Hardware
      /     Define Job Entry Stations
```

16 Select Define Hardware. The following screen appears:

```
 [-]  Profile  Edit  Display  Preferences  Task  Help
--------------Define Hardware---------------
 Personal  Type        Name       Description
  Status
Menu:      Config     Express    Default configuration for EXPRESS
<Esc><Ent  System     nortel     Computer System nortel
Cancel:     Adapter   nortel.tr       Token Ring Adapter
 <Ctrl>^     Port     nortel.tr       Token Ring Port
Alt Key:
```

The screen should display the Adapter line indicating that the adapter has been recognized. If the Adapter lines do not appear, then check the hardware configuration using express_adm admin and/or check the settings on the adapter itself.

17 Select the Profile menu item and then choose Exit to return to the Express Manager window.

18 To complete the configuration of the Express software requires the completion of the following configurations:

a. defining the Node

b. defining the Link—there must be a link for each line to the host

c. defining the Station

d. defining the LUs

g. defining the 3270 Users/Sessions

Defining the node

19 From the Express Manager window, select Server Configuration by pressing the number 2.

The following screen appears:

```
-----------------Server Configuration--------------
    I.D.    Description                 Status
      !     Define Communications
      ;     Define LU6.2
      ?     Define Users/Sessions
      &     Define Hardware
      /     Define Job Entry Stations
```

20 Select Define Communications. The following screen appears:

```
-----------------Select Display-----------------
 Please select the type of
Communications Profiles you wish to work with

<SNA>

----------
 Cancel
----------
```

21 Ensure SNA is displayed and press <Enter>.

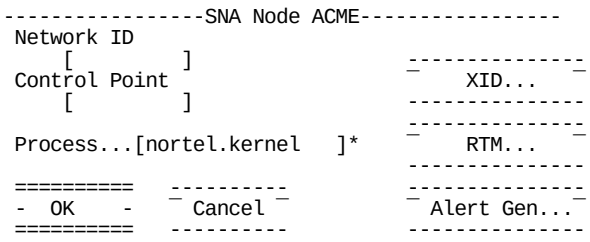
The following screen appears:

```
----------------- Insert New SNA Node -----------------
 Under Configuration Express
 Name.....[ACME           ]
 Description...[                          ]

==========   ----------
    OK        Cancel
==========   ----------
```

22 The Name and Description are copied from the Domain Name and Location of the initial screen which was completed. Although the Name is required and cannot contain spaces, it is only used to name this configuration. The description is not required, but it can be helpful to describe the type of configuration such as “3270 Token Ring configuration”.

Enter a Name and Description and press <Enter>.

The following screen appears:



23 Enter the Network ID. This parameter is obtained from the customer and is usually in the VTAM gen on the mainframe called NETID. This parameter identifies the IVR system and is assigned by the mainframe.

Enter the Control Point. This parameter is obtained from the customer although it can be any value if the IVR system is talking to VTAM on the mainframe. Express requires this parameter be completed. This parameter identifies the IVR system and is assigned by the mainframe.

The Process parameter is only required if the express database is being shared among other Application processors (of which IVR 2.0/S is not). Leave the information in this field which appears here.

The Response Time Monitoring (RTM) is a feature which Netview on the host can use. There is normally nothing to change here.

The Alert feature is another item which can send messages to Netview on the host. There is normally nothing to change here.

Select XID and the following screen appears:

```
---SNA Node ACME - XID---
 XID Format
 (*) Format 3
 ( ) Format 0

 XID Block...[E05 ]
 XID ID......[00000 ]

 ==========   ---------
 _   OK   _   _ Cancel_
 ==========   ---------
```

24 Ensure the XID Format is set to Format 3. Format 0 is an old format which is not normally used anymore unless the host is using old software.

The XID Block and XID ID together make up the XID. These parameters are obtained from the customer.

Complete the fields and press <Enter>.

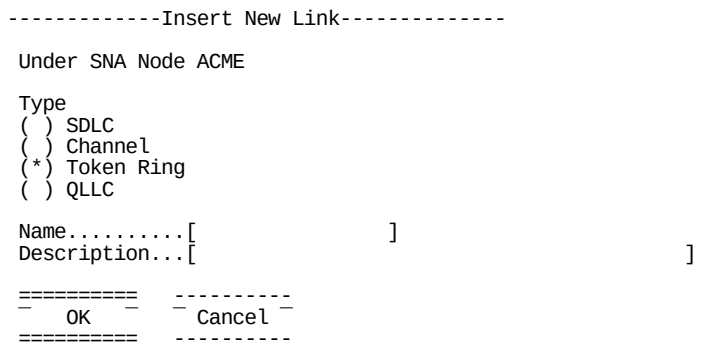
25 Place the cursor on OK and press <Enter>.

The following screen appears:

```
------------EXPRESS Tree Builder-
 If you wish to insert another profile,
 please select:

 For SNA Node ACME:
    <New Link...>

 For Configuration Express:
    <New SNA Node...>

    <End Insert>
```

Defining the link

26 Leave the cursor on New Link and press <Enter>. The following screen appears:



27 Make sure the asterisk is beside (*) Token Ring (use the arrow keys to move to new selections under Type and Space bar to place the asterisk next to the correct selection).

Tab to the Name and enter a meaningful name (no spaces allowed) which describes this configuration. This name is only used by the Express database.

Tab to the Description and enter a meaningful description. This name is only used by the Express database.

Press <Enter> and the following screen appears:

```
-------------- Token Ring Link TFNode --------------

 Node: ACME

 Local MAC Address
 ( ) Use Default
 (*) Assign Address       Address     [                ]

 Port                                  --------------
   [nortel.tr       ]*                 _  Mode...    _
                                       --------------
 [ ] Connection Network Link           --------------
                                       _  Class...   _
                                       --------------
                                       --------------
                                       _ Timers...   _
                                       --------------
 ==========   ----------               --------------
 _    OK    _  _ Cancel _              _ TG Char...  _
 ==========   ----------               --------------
```

Local MAC Address—this is the 12-digit hexadecimal address which will be used when communicating with the host. "Use Default" will cause the system to obtain the unique MAC address which is burned into each LAN board. "Assign Address" will require the entering of the MAC address on this screen. It is recommended that "Assign Address" be chosen if a MAC address can be obtained from the customer. The advantage of assigning the address on this screen is that if the Madge card is ever replaced, the MAC address does not have to be changed.

Port is the name given to the Madge adapter port.

28 Select the Mode and the following screen appears:

```
---------- Token Ring Link TRNode - Mode ----------

 Receive Window.....................[33  ]
 Transmit Window....................[33  ]
 Maximum Frame Size.................[3849  ]
 Number Frames For Acknowledgement....[1     ]
 Number Frames To Accept While Busy...[0     ]

 [ ] Dynamic Windowing Supported
 [*] Quit When Reach Retry Limit
 [ ] Send FRMR If Unsolicited Final Bit
 [*] Send FRMR If Bad Send Sequence Number
 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

29 Select the Receive and Transmit Window as specified by the host. This is the maximum frames which can be sent and received before acknowledgment.

Select the Maximum Frame Size as specified by the host. Frame size specifies the maximum number of bytes in the I-field of an I-frame which may be transmitted or received on this data link.

Press <Enter> to return to the previous screen.

30 Select Class and the following screen appears:

```
-----------Token Ring Link Trans5250 - Class---------

 Class of Service...[         ]

 ==========   ----------
 _    OK    _   Cancel _
 ==========   ----------
```

31 Enter a Class of Service, which is a name indicating the type of LU 6.2 conversations which should be carried on this link. When a conversation is allocated, the mode to be used might name a Class of Service. If there are multiple data links leading to the destination LUs node, Express will choose the data link which matches the Class of Service specified for the mode.

Press <Enter> to return to the previous screen.

32 Select Timers and the following screen appears:

```
------ Token Ring Link TFNode - Timers ------

 Timers (in seconds, immediate, or forever)
   REJ..............[2.0       ]*
   Remote Busy.....[10.0       ]*
   Inactivity.....[forever    ]*
   XID Negotiation...[forever    ]*
   Response.........[2.0       ]*
   Acknowledgement...[0.1       ]*

 Retries (value, none, or unlimited)
   XID Attempts......[40        ]*
   Response Limit....[30        ]*

 ==========   ----------
 _    OK    _   Cancel _
 ==========   ----------
```

33 Ensure the XID Negotiation and Inactivity timers are set to forever.

Press <Enter> after the parameters have been set. The previous screen appears.

34 Select TG Char and the following screen appears:

```
------- Token Ring Link TFNode - TG Characteristics -----

 Security                          Propagation Delay
 (*) Non Secure                    ( ) Minimum
 ( ) Public Switched Network       (*) Local Area Network
 ( ) Underground Cable             ( ) Telephone
 ( ) Secure Conduit                ( ) Packet Switched Network
 ( ) Guarded Conduit               ( ) Satellite
 ( ) Encrypted                     ( ) Maximum
 ( ) Guarded Radiation
                                                    User Defined
 Ring Speed      Cost Per Connect Time...[128 ]      1...[128 ]
 ( ) 4 Mbps      Cost Per Byte...........[128 ]      2...[128 ]
 (*) 16 Mbps                                        3...[128 ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

Ensure the Ring Speed is set at the correct speed. Place the cursor on OK and press <Enter> to return to the previous screen.

35 Place the cursor on OK and press <Enter> to complete the Link Definition.

The following screen appears:

```
------------------EXPRESS Tree Builder------------------
 If you wish to insert another profile,
 please select:

 For Token Ring Link ACME:
    <New Token Ring Station...>

 For SNA Node ACME:
    <New Link...>

    <Up a Level>

    <End Insert>
```

36 Press <Enter> with the cursor on New Token Ring Station. The following screen appears:

```
-------- Insert New Token Ring Station ----------

 Under Token Ring Link
 Name.........[ACME                    ]
 Description...[                                 ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

Defining the station

37 A station needs to be defined for every 254 sessions. In the Name field enter a meaningful name (no spaces allowed) which describes this configuration. This name is only used by the Express database.

Tab to the Description and enter a meaningful description. This name is only used by the Express database.

Press <Enter> and the following screen appears:

```
---------- Token Ring Station Transtation -------------

 Node: ACME
 Link: TFNode

 Connection Type        Local  SAP Value.....[04 ]
 (*) Host               Remote SAP Value.....[04 ]
 ( ) Peer-to-Peer       Local MAC Address.....123456789ABC
                        Remote MAC Address...[             ]

 Send XID               Remote Node Name
   Block...[E05 ]         Network ID......[NET      ]
   ID......[00000 ]       Control Point...[         ]

 [ ] Remote Node is Network Node            ---------------
                                            _     XID...    _
 [*] Restart connection if it fails         ---------------
 ==========   ----------                    ---------------
 _    OK    _  _ Cancel _                   _ Priority... _
 ==========   ----------                    ---------------
```

- Connection Type—be sure to change this to Host for 3270.
- Local and Remote SAP Value—obtain from the customer host.
- Local MAC Address—comes from what was entered for the Link.
- Remote MAC Address—obtain from the customer host.

Fill in Send XID Block and ID from the customer host.

Fill in the Network ID and Control Point from the customer host. Make sure an asterisk [ ] is NOT next to Remote Node is Network Node.

Make sure an asterisk [*] is next to Restart connection if it fails.

38 Place the cursor on XID and press <Enter> to display the screen below:

```
------ Token Ring Station Transtation - XID ------

 XID Format       Role
 (*) Format 3     ( ) Secondary
 ( ) Format 0     ( ) Primary
                  (*) Negotiable

 [ ] Verify Adjacent Node Identity


 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

Ensure the XID Format is set to Format 3. Format 0 is an old format which is not normally used anymore unless the host is using old software. Make sure Role is set to match what the customer host requires.

- Secondary—the local station is the secondary link station on this link.
- Primary—the local station is the primary link station on this link.
- Negotiable—the role of the local station will be negotiated at connect time.

Complete the fields and press <Enter> to return to the previous screen.

39 Place the cursor on OK and press <Enter>.

40 Press <Enter> and the following screen appears:

```
-----------------EXPRESS Tree Builder-------------

 If you wish to insert another profile,
 please select:

 For Token Ring Station Transtation:
    <New Logical Unit...>

 For Token Ring Link TFNode:
    <New Token Ring Station...>

    <Up a Level>

    <End Insert>
```

Defining the logical units

41 Leave the cursor on New Logical Unit and press <Enter>. The following screen appears.

```
---------------  Insert New Logical Unit -----------------

 Under SDLC Station 3270Stn

 Type
 (*) 3270 Display Pool
 ( ) 3270 Printer
 ( ) Local LU 6.2
 ( ) RJE LU Pool
 ( ) LU Type 0

 Name.........[LU2               ]
 Description...[                                        ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

42 Make sure the asterisk is next to 3270 Display Pool. Tab down to Name and Description and provide a descriptive name. Include in the name or description which LU this is, for example, LU2 (the first LU will be address 2).

Press <Enter> and the following screen appears:

```
-------- 3270 Display Pool 3270pool ---------

 Node:    Nortel
 Link:    IBMainframe
 Station: 3270Stn

 LU Addresses
   [2                       ]

 ==========   ----------       --------------
 _    OK    _  _ Cancel _       _  Setup...   _
 ==========   ----------       --------------
```

43 For the IVR system, one LU address will be defined for each separate session. Express software has the capability to specify all addresses on one LU, but the Meridian IVR software won't function when configured in this way.

The first address must start with 2, the next one 3, etc. Zero (0) and 1 are reserved.

Type a 2 in the LU Addresses field and press <Enter>. The following screen appears:

```
-----------------EXPRESS Tree Builder-------------

 If you wish to insert another profile,
 please select:

 For Token Ring Station TRStation:
    <New Logical Unit...>

    <Up a Level>

    <End Insert>
```

44 Continue selecting New Logical Unit until all Logical Units have been defined. When all LUs have been created, tab to End Insert and press <Enter>. The following screen appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
  ---------- Define Communications - SNA -------------
 Personal  Type        Name      Description
 Status
Menu:      Config      Express    Default configuration for EXPRESS
<Esc><Ent   Node          ACME    TR loc test
Cancel:      Indep. LUs   6.2 LUs Using All Stations
 <Ctrl>^       LU         ACME    Control Point LU
Alt Key:     Link         ACME    3270 SDLC
 <Esc>q       Station     TR      3270 station
ShellEsc:      LU         LU2
Task: !        LU         LU3
Search:        LU         LU4
 Down          LU         LU5
```

45 Select Profile and then Exit from the menu. The following screen appears:

```
 [-]  File  Edit  Preferences  Window  Task  Help
------------------EXPRESS Manager------------------
 Personal
  Status       1. Control and Administration
Menu:          2. Server Configuration
 <Esc><Ent     3. Desktop Configuration
Cancel:
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
User:
```

Defining the 3270 users/sessions

46 Select 2. Server Configuration and press <Enter>. The following screen appears:

```
-----------------Server Configuration--------------
    I.D.    Description                 Status
      !     Define Communications
      ;     Define LU6.2
      ?     Define Users/Sessions
      &     Define Hardware
      /     Define Job Entry Stations
```

47 Select Define Users/Sessions. The following menu appears:

```
---------- Select Display -------------

Please select the type of
profiles you wish to work with

<Users>
<Terminal Emulation Services>

----------
¯ Cancel ¯
----------
```

48 Select Users. The following menu appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
------- Define Users/Sessions - Users ----------
 Personal  Type         Name             Description
  Status
Menu:      All Users    All        Configuration: Express
<Esc><Ent   Group       sysadm     System Administrators Group
Cancel:      User       express    Default user of EXPRESS
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
Task: ;
 Down
```

49 Move the cursor to highlight the User line which reads “Default user of EXPRESS”.

From the pull down menu select Profile and then New. The following screen appears:

```
--------------- Insert New Session -----------------

 Under User express

 Session Type
 (*) 3270 Display
 ( ) 3270 Printer
 ( ) 5250
 ( ) Local

 ID.............[a ]
 Description...[                                        ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

Session Type—place an asterisk next to 3270 Display

ID—for the first session enter an “a”. Subsequent sessions will be “b”, “c”, etc. up to session ID “h” for the first user.

50 Press <Enter> and the following screen appears:

```
------------------- 3270 Session a ---------------------

 Defined for User express
 Type: Display

 [*] Displayable task
 [ ] Graphics Supported

                                      ---------------
 LU/Host.....[LU2                   ]* _ Printing... -
 Language....[US                    ]* ---------------
 Long Name   [          ]              ---------------
 Model       [2 ]*                     _ Initself... _
                                       ---------------
 ==========   ----------               ---------------
 _    OK    _  _ Cancel _              _  EHLLAPI...  _
 ==========   ----------               ---------------
```

51 Press <Enter> and the following screen appears:

```
------------------EXPRESS Tree Builder-----------------

 If you wish to insert another profile,
 please select:

 For User express
    <New Session...>

    <Up a Level>

    <End Insert>
```

52 Continue selecting New Session and create session b, then c, etc., until eight sessions have been created. ONLY EIGHT SESSIONS SHOULD BE CREATED PER USER. More sessions will require another user.

When eight sessions have been created, select End Insert and the following screen appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
------- Define Users/Sessions - Users ----------
 Personal  Type         Name              Description
  Status
Menu:      All Users    All        Configuration: Express
<Esc><Ent   Group       sysadm     System Administrators Group
Cancel:      User       express    Default user of EXPRESS
 <Ctrl>^      Session   a          session a
Alt Key:      Session   b          session b
 <Esc>q       Session   c          session c
ShellEsc:     Session   d          session d
 <Esc>!       Session   e          session e
Task: ;       Session   f          session f
 Down         Session   g          session g
              Session   h          session h
```

53 If more than eight sessions need to be configured, add a new user of “expressa” by performing the following steps:

a. Place the cursor on the “Group” line.

b. Select Profile from the menu.

c. Select New from the Profile menu.

The following screen appears:

```
----- Group User sysadm -----

 Insert New
   <Session>
   <User>

        ----------
        _ Cancel _
        ----------
```

d. Place the cursor on User and press <Enter>. The following screen appears:

```
------------------- Insert New User --------------------

 Under User Group sysadm

 Name........[               ]
 Full Name...[                                      ]

 ==========   ----------
 _    OK    _  _ Cancel _
 ==========   ----------
```

e. Enter a name of expressa for the second user which will support the next eight sessions, expressb for the third user which will support the next eight sessions, etc. Press <Enter>. The following screen appears:

```
----------------- User expressa ----------------------
 Group: sysadm
            Supervisory Tasks
 ----------------------------------------
+  Control Communications & Diagnostics
+  Display Log
+  Display Trace
+  Administer Configurations
+  Administer Log
+  Define Communications
+  Define LU 6.2
   Customize Messages
+  Define Users/Sessions
 ----------------------------------------
  '+': defined for       ---------------------
    Group or All Users   _ Session Support... _
                         ---------------------
 ==========   ----------      ----------------
 _    OK    _  _ Cancel _      _ Password...  _
 ==========   ----------      ----------------
```

f. Press <Enter> to accept all the Supervisory Tasks. The following menu appears:

```
------------------EXPRESS Tree Builder-----------------
 If you wish to insert another profile,
 please select:

 For User expressa
    <New Session...>

 For User Group sysadm:
   <New Session...>
   <New User...>

    <Up a Level>

    <End Insert>
```

g. With the cursor on New Session, press <Enter> to create a new session for the new express user.

```
--------------- Insert New Session -----------------
 Under User expressa

 Session Type
 (*) 3270 Display
 ( ) 3270 Printer
 ( ) 5250
 ( ) Local

 ID.............[i ]
 Description...[                                    ]

 ==========   ----------
 _   OK   _   _ Cancel _
 ==========   ----------
```

Session Type—place an asterisk next to 3270 ID—for the first session of the second user enter an “i”. Subsequent sessions of the second user will be “j”, “k”, etc. up to session ID “p” for the second user. For the third user, use ID q, r, s, etc. User IDs may also be uppercase letters.

h. Press <Enter> and the following screen appears:

```
------------------- 3270 Session i --------------------

 Defined for User expressa
 Type: Display

 [*] Displayable task
 [ ] Graphics Supported
                                        ---------------
 LU/Host.....[LU10                   ]* Printing... -
 Language....[US                     ]* ---------------
 Long Name   [         ]                ---------------
 Model       [2 ]*                      Initself...
                                        ---------------
 ==========   ----------                ---------------
     OK       Cancel                     EHLLAPI...
 ==========   ----------                ---------------
```

i. Press <Enter> and the following screen appears:

```
-------------------EXPRESS Tree Builder------------------

 If you wish to insert another profile,
 please select:

 For User expressa
    <New Session...>

    <Up a Level>

    <End Insert>
```

j. Continue selecting New Session and create session j, then k, etc., until eight sessions have been created. ONLY EIGHT SESSIONS SHOULD BE CREATED PER USER. More sessions will require another user.

When eight sessions have been created, select End Insert and the following screen appears:

```
[-]  Profile  Edit  Display  Preferences  Task  Help
------- Define Users/Sessions - Users ----------
 Personal  Type         Name              Description
  Status
Menu:      All Users    All        Configuration: Express
<Esc><Ent   Group       sysadm     System Administrators Group
Cancel:      User       express    Default user of EXPRESS
 <Ctrl>^      Session   a          session a
Alt Key:      Session   b          session b
 <Esc>q       Session   c          session c
ShellEsc:     Session   d          session d
 <Esc>!       Session   e          session e
Task: ;       Session   f          session f
 Down         Session   g          session g
              Session   h          session h
             User       expressa    Expressa user
              Session   i          session i
              Session   j          session j
```

After the configuration is completed, exit the Express Manager by choosing Exit from the Profile pull down menu.

Proceed to "Testing 3270 and 5250 host communications" on page B-53.

Testing 3270 and 5250 host communications

1 After the Express software is configured, issue the following commands to restart Express:

express_adm stop(stop the interface)

express_adm start(start the interface)

express_adm check(check that daemons are running)

express -u express(start Express)

The following menu appears:

```
 [-]  File  Edit  Preferences  Window  Task  Help
------------------EXPRESS Manager-----------------
 Personal
  Status       1. Interactive Sessions
Menu:          2. Control and Administration
 <Esc><Ent     3. Server Configuration
Cancel:        4. Desktop Configuration
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
User:
```

2 Select Control and Administration. The following menu appears:

```
------------ Control and Administration --------------
      I.D.    Description                          Status

        @     Control Communications & Diagnostics
        $     Display Log
        *     Display Trace
        '     Administer Configurations
        -     Administer Log
```

3 Select Control Communications & Diagnostics. The following screen appears:

```
------- Select Display --------

 Please select the type of
 objects you wish to work with

 <Link, Station>
 <Interactive Session>
 <LU 6.2 Session>

 ----------
 _ Cancel _
 ----------
```

4 Select Link, Station and the following screen appears:

```
[-]  Control  Edit  Display  Preferences  Task  Help
--- Control Communications & Diagnostics - Links, Stations -----
 Personal  Type         Name         Status       Description
  Status
Menu:      Config       Express                   Default configuration
<Esc><Ent   Node        ACME     Enabled      ACME
Cancel:      Indep. LUs 6.2 LUs Using All Stations
 <Ctrl>^       LU       Nortel       Inactive     Control Point LU
Alt Key:     Link       ACME Inactive     5250 SDLC
 <Esc>q       Station   TR           Inactive     5250 station
ShellEsc:
 <Esc>!
Task: @
Search:
 Down
```

5 By selecting Activate from the Control pull down menu and moving the cursor to each line, activate the following lines if they do not show Enabled:

- Node
- Control Point LU - ONLY FOR 5250 - always configured by Express
- LU - Control Point LU - ONLY FOR 5250 - always configured by Express
- Link
- Station

The following confirmation screen appears:

```
---------------- Confirm Activate -----------------

 Activate SDLC Link ACME?

 ============   ------------
 _ Activate _   _   Cancel   _
 ============   ------------
```

The Control Point LU line only has to activated for 5250. Activate the Node, the Link, and the Station.

6 Press <Enter> with the cursor on Activate. The screen will display "Operation in Progress" and finally change to "Successful completion". Press <Enter> with the cursor on Close to close this window.

```
============= Activate SDLC Link ACME =============_

 Successful completion

              ---------
              _ Close _
              ---------
```

7 The Status should change to Enabled if a successful activation occurs. Continue changing the status on each line which is Inactive. If the Link becomes enabled, enable the station also. When the Station become enabled, this means a successful SNRM or SABME has been passed between the host and the IVR system.

If the Status does not change to Enabled, check the Express Log. The Express Log can be obtained by choosing Display Log from the following menu:

```
----------- Control and Administration ---------------
      I.D.    Description                Status

        @     Control Communications & Diagnostics
        $     Display Log
        *     Display Trace
        '     Administer Configurations
        -     Administer Log
```

The Log solves most of the problems by providing information on where the problem is occurring.

Note: To modify an item in configuration requires that the item be Deactivated in the Control and Communications screen.

8 Once the Status's have become Enabled, an interactive session can be displayed by first returning to the following menu:

```
 [-]  File  Edit  Preferences  Window  Task  Help
-------------------EXPRESS Manager------------------
 Personal
  Status       1. Interactive Sessions
Menu:          2. Control and Administration
 <Esc><Ent     3. Server Configuration
Cancel:        4. Desktop Configuration
 <Ctrl>^
Alt Key:
 <Esc>q
ShellEsc:
 <Esc>!
User:
```

9 Select Interactive Sessions. The following menu appears listing all the Sessions which were configured:

```
----------------- Interactive Sessions ------------------
      I.D.    Description                          Status

        a     session a
        b     session b
        c     session c
```

10 Place the cursor on the first session line and press <Enter>. The system attempts to bring up a terminal session from the host. A screen similar to the following should appear with a status line along the bottom:

```
 [-]  File  Edit  Preferences  Window  Task  Help
--------------------- Session a ----------------------
```

3270 Session Status messages and meanings can be found in Chapter 4 of the *Express Terminal Emulator User's Guide*.

5250 Session Status messages can include:

- X—System waiting
- Start—5250 session activation in progress (CPI-C allocation in progress)
- Active—5250 session activated

Communications Check Codes (for example, COMM505) meanings can be found in Appendix C of the *Express Terminal Emulator User's Guide.*

Glossary

3270
Protocol used for information transfer and presentation across the IBM product line.

3278
Class of IBM display terminals used with IBM hosts.

AID
Attention identifier; the key that interrupts the operation of the host to process the current terminal input.

application
With respect to IVR, an application is a program that controls the activity on one or more telephone trunks connected to the AP. With respect to a host computer, it is any type of program that carries out a task.

application developer
A person who creates IVR applications.

application processor
A computer or workstation running IVR.

branch
A pathway between cells in an IVR application.

call flow
A diagram of an application.

caller
A person whose phone call is received or originated by an IVR application.

cell

The basic element of an IVR application. Each cell performs an action—like playing a prompt to a caller. Each cell has a set of branches to other cells. After the cell performs its action, it determines which branch the application should follow to the next cell.

channel

A telephone trunk within a cluster of APs.

COMA cell

IVR cell that cancels a transaction with a 3270 host.

COMI cell

IVR cell that sends input to a 3270 host via the TRS process.

COMO cell

IVR cell that receives output from a 3270 host via the TRS process.

emulation

Imitating a computer or computer system with a combination of hardware and software. Allows programs written for one computer to be run on another.

host

A networked computer that provides applications and services to other networked computers. In this guide, a host is an IBM computer that supports the 3270 communication protocol.

node

A grouping composed of an application processor connected to one or more AP's.

prompt

A voice recording that helps lead a caller through an application.

session

A connection to a host as defined in the trs.conf file, representing a terminal connection.

SNA
Systems Network Architecture. An IBM protocol that defines how IBM computers (and any other computer that uses the SNA protocol) transmit and receive data. This protocol is also used by many other computer hardware and software manufacturers.

system administrator
A person who is responsible for configuring the AP, installing and running IVR applications, managing prompts, and running reports.

templates
ASCII files used by the TRS process to manage the 3270 terminal session.

transaction
The function performed by a set of action and screen template files when executed by TRS.

TRS
Terminal Resource Server. IVR process that manages the assignment of the available terminal resources on the application processor.

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