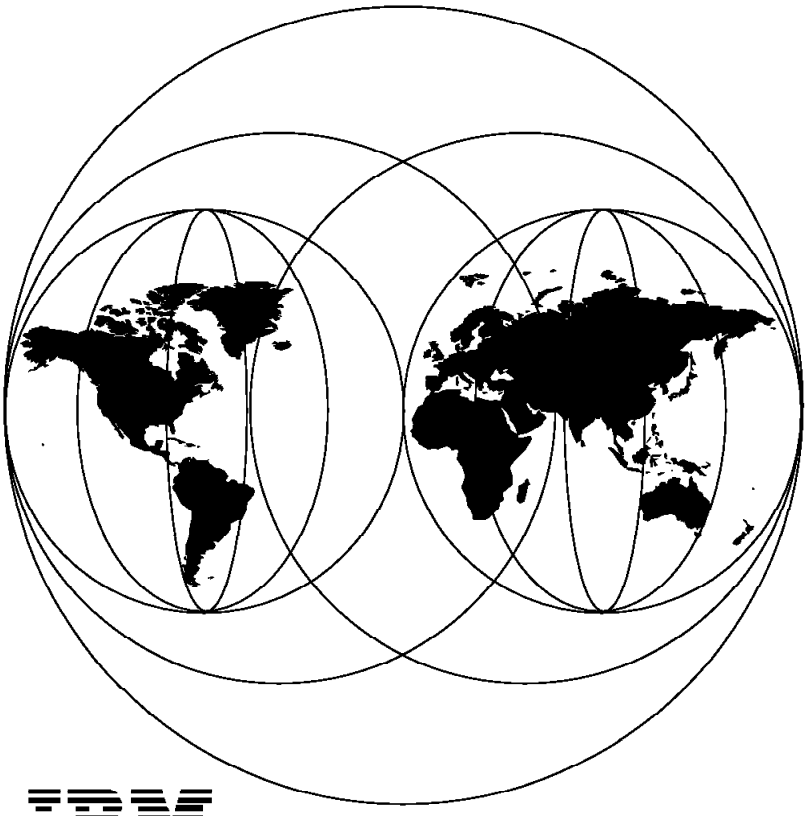
International Technical Support Organization

SG24-4530-00

LANDP/DOS and LANDP/2 Support for Financial Magnetic Stripe Readers/Encoders

January 1996



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International Technical Support Organization
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First Edition (January 1996)

This edition applies to:

- IBM LANDP for DOS, Version 3.0, Part Number 24H3912 in the United States of America, and Program Number 5622-693 in Europe, the Middle East and Africa
- IBM LANDP for OS/2, Version 3.0, Part Number 24H3919 in the United States of America, and Program Number 5622-694 in Europe, the Middle East and Africa

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Abstract

This publication describes the characteristics and installation procedures for the various financial magnetic stripe readers and encoders (4717, 4777, and 4778) that are supported by the LANDP family of products. It also describes how to access these devices through the LANDP common application programming interface.

This document was written for IBM field personnel and customers who will be implementing support for any of the IBM financial magnetic stripe readers and encoders. Some knowledge of the LANDP family of products is assumed.

(128 pages)

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Special Notices

This publication is intended to help IBM field personnel and customers that will be implementing LANDP/DOS or LANDP/2 support for the IBM financial magnetic stripe readers and encoders. The information in this publication is not intended as the specification of any programming interfaces that are provided by the LANDP family of products. See the PUBLICATIONS section of the IBM Programming Announcement for LANDP for DOS, Version 3.0 and LANDP for OS/2, Version 3.0 for more information about what publications are considered to be product documentation.

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Preface

This publication describes the characteristics and installation procedures for the various financial magnetic stripe readers and encoders (4717, 4777, and 4778) that are supported by the LANDP family of products. It also describes how to access these devices through the LANDP common application programming interface.

This document was written for IBM field personnel and customers who will be implementing support for any of the IBM financial magnetic stripe readers and encoders. Some knowledge of the LANDP family of products is assumed.

How This Document Is Organized

The document is organized as follows:

- Chapter 1, “Introduction”

  This chapter provides an overview of the LANDP family of products.

- Chapter 2, “Magnetic Stripe Concepts”

  This chapter provides an introduction to magnetic stripe concepts.

- Chapter 3, “4717 Magnetic Stripe Reader and Encoder”

  This chapter describes the various models of the 4717 magnetic stripe reader and encoder. The chapter also describes the installation process for the associated device drivers and how to access the device from LANDP/DOS or LANDP/2.

- Chapter 4, “4777 Magnetic Stripe Reader and Encoder”

  This chapter describes the various models of the 4777 magnetic stripe reader and encoder. The chapter also describes the installation process for the associated device drivers and how to access the device from LANDP/DOS or LANDP/2.

- Chapter 5, “4778 PIN Pad Magnetic Stripe Reader”

  This chapter describes the various models of the 4778 PIN-pad and magnetic stripe reader. The chapter also describes the installation process for the associated device drivers and how to access the device from LANDP/DOS or LANDP/2.

- Chapter 6, “Magnetic Stripe Reader/Encoder Test Cases”

  This chapter provides test cases that exercise the magnetic stripe read and encode functions using the LANDP system verification program.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *International Standard ISO 7811/1*
- *International Standard ISO 7811/2*
- *International Standard ISO 7811/3*

- *International Standard ISO 7811/4*
- *International Standard ISO 7811/5*
- *International Standard ISO 7810*
- *International Standard ISO 8484*
- *LANDP Family Servers and System Management*, SC33-1553
- *LANDP Family Introduction and Planning*, SC33-1550
- *LANDP Family Problem Determination*, SC33-1554
- *LANDP Family Installation and Customization*, SC33-1551
- *LANDP Family Programming Reference*, SC33-1552
- *4777 Magnetic Stripe Unit and 4778 PIN-Pad Magnetic Stripe Reader DOS Programming Guide*, SA34-2206
- *4777 Magnetic Stripe Unit and 4778 PIN-Pad Magnetic Stripe Reader OS/2 Programming Guide*, SA34-2205
- *4700 Financial I/O Devices Programming Guide for OS/2*, GC31-2661
- *4700 Financial I/O Planning Guide*, GC31-3762
- *4700 Financial I/O Devices Programming Guide*, GC31-3770

International Technical Support Organization Publications

- *LANDP/6000 Concepts and Guidelines*, GG24-4057
- *LANDP/DOS and LANDP/2 Concepts and Guidelines*, GG24-3924
- *Change Management and Data Distribution using NetView DM and LANDP RCMS*, GG24-3414

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Chapter 1. Introduction

If we think of the information revolution that is sweeping the business sector we cannot but appreciate the fact that the computing systems and architectures being put to use are on the forefront of technology.

The introduction and development of small powerful workstations and personal computers that allow users to request multiple, high performance operations from their desk tops is changing the way businesses use their computing systems. Using these workstations and personal computers, end users are producing new products and services for their customers that only a few years ago were inconceivable.

Looking back at IBM′s solutions for the finance industry′s branch and back office processing, from the 3600 system to the 4700 system to FBSS and now LANDP, the trends are the same as the trends in the business sector. These include:

- Decentralize common processing activities which may be distributed to more than one processor on the network, in order to perform joint tasks.
- Share common resources between all the components of a network, providing users with a single and integrated vision of all the resources present on the network, thus turning each workstation into part of a more versatile and powerful system.
- Include a number of different systems on the network. Traditionally in a network system, a host and a low-end workstation occupy the opposite ends of the spectrum. However, integration with many of IBM′s and other manufacturer′s intermediate systems is becoming a reality, making the term *open heterogeneous systems* not only a concept, but also a reality.
- At the same time, security and control remain the primary concern of business institutions and therefore they must be implemented through system management facilities accessible both from the host and selected peripheral workstations.

IBM′s Financial Branch System Services (FBSS) followed the advent of personal computers and the first local area networks. Originally, marketed as the IBM solution for the financial branch office, it has gradually replaced the 4700 family as a more versatile system that offers all the advantages of the local area network architecture, including the sharing of resources and the characterization of the workstation as programmable. The LANDP product family is an evolution of the FBSS product family.

LANDP defines and implements a *Distributed System Architecture* for a network of interconnected workstations which form an integrated system where common processing activities may be located in more than one workstation on the network in order to perform joint tasks. LANDP makes it possible to share resources and services between all the components of the network, thus providing users with a single, integrated view of all the resources on the network and making those resources available to any program. LANDP implements this transparency through the use of the client/server remote procedure call (RPC). Figure 1 on page 2 shows the flow of the LANDP remote procedure call process.

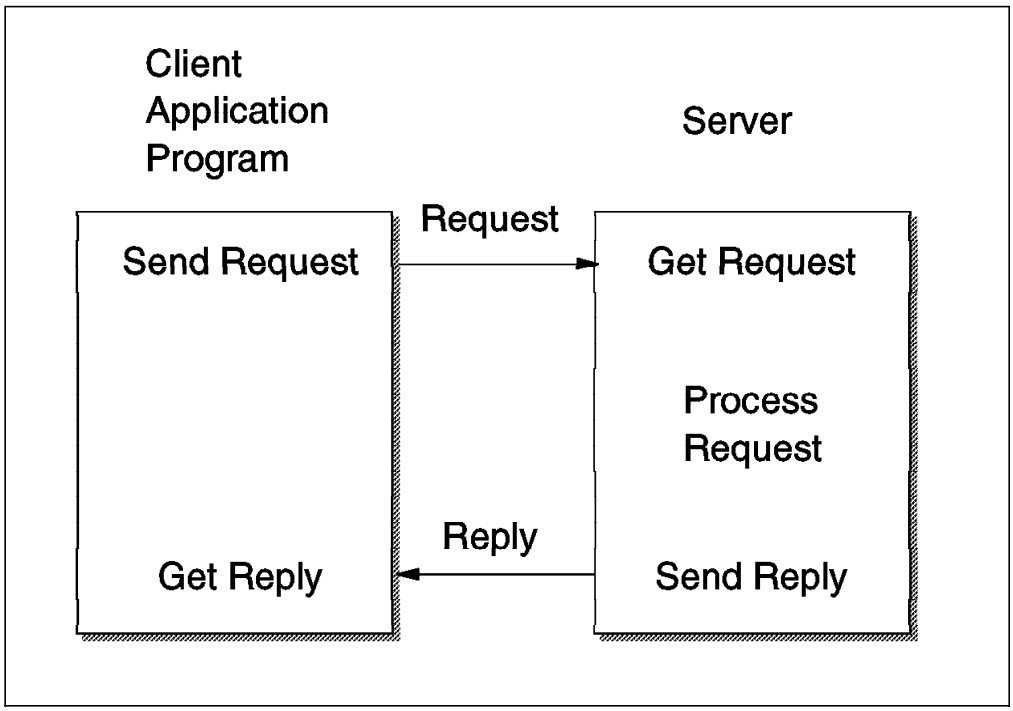

Figure 1. LANDP Remote Procedure Call Process

The remote procedure call allows the network to be perceived, not only by the end user, but also by the programmer, as a whole rather than as a collection of independent components. Distribution of applications, data, and functions can be achieved in a real distributed processing environment allowing applications to be efficiently developed and implemented.

The most important characteristic of this architecture is to make resource distribution transparent to the user by offering:

To the application programmer
A standardized interface for requesting local or remote resources such as, file servers, printers, devices, etc.

It avoids the need to program explicit communication operations for these resources. This enables application programs to access these resources wherever they are located, using the same operations and without knowledge of their location.

To the system manager
Flexibility and granularity by allowing incremental configuration changes, thus avoiding the total replacement of existing hardware when it has reached the limits of its capacity.

To the system programmer
An open system with the possibility to add new services without rebuilding the whole system.

Using the client/server mechanism means that even though each application program is executed on the user's workstation, it can use any LANDP resource available on the network. The workstations are integrated by the LANDP

support, enabling them to access the shared common resources provided by a set of servers.

LANDP configurations are flexible. LANDP does not require dedicated workstations for servers, but allows the configuration of an integrated workstation where the application program can coexist on the same machine with any server. This allows the organization to adapt network configurations to the conditions present in each site. The system structure provided is suitable for both small and large configurations and the system can be extended without disrupting operations.

Some of the benefits you would receive from using LANDP include:

- Hardware resources such as printers, fixed disks and directories, and wide area communication network connections that can be shared within a LAN, thus reducing hardware costs.
- Software and data resources and services can be shared within a LAN network.
- A consistent programming interface that allows the development of client applications in an expedient manner. This interface also hides the complexity of the native APIs provided with the resource or service to be shared.
- Workstations are interchangeable. One workstation can take over the duties of another, for example, in case of hardware malfunction.
- Transactions can be stored and maintained locally. Thus, more operational responsibility can be distributed.
- The workstation application programs can be designed to operate offline, so that service can be maintained when host communication is interrupted.
- The LANDP resources are pooled, so that each workstation can access a much larger number of devices compared to a stand-alone configuration.

1.1 LANDP Workgroup

The LANDP workgroup is a mixed network where the client application makes requests to servers independently of the network transmission protocol. A communications server can be included on the network making it possible to establish program-to-program communication from the network to a mainframe or any other connected LANDP network. This communications server acts as the network's wide area network gateway to the host.

1.1.1 LANDP Resource

Within the LANDP workgroup a resource name identifies a generic hardware or software service that can be shared by any component of the network by using the LANDP interface. As defined, resources can be either hardware or software. All defined resources (printers, files, communication facilities, etc.) can be accessed by client applications installed in each workstation.

The resource name is the logical name of the service. Client applications are coded to access each resource by its name and can request services of the named resources independently of where they are installed. The use of logical names for the resources, when combined with the ability to replicate servers with the same resource name, makes it possible to have multiple copies of the

same client application running in different processors of a network requesting the same resource name, but actually accessing different physical resources (servers).

1.1.2 LANDP Server

This brings us to the definition of the server, which has been a cause of confusion for those coming from a traditional data processing background. The confusion is due to the fact that with some older LAN products a server is considered to be hardware. It is seen as a machine dedicated to the role of service provider and therefore passive from a user's point of view.

With LANDP, a server is a program which can be installed and configured in more than one workstation on the LAN. A LANDP server is the specific program module that actually performs the services provided by the resource. A server workstation may also run client applications or other servers which request services from the server or from other servers residing in other workstations. In other words, with LANDP, servers are software, not hardware; moreover, every workstation on the network may be both a provider of services (server) and a requester of services (client). If a LANDP server is run on a dedicated workstation, it is often because of a decision made for security or management reasons.

Some of the servers included in the LANDP package are designed specifically to meet the needs of the financial industry, but because LANDP provides a cross industry client/server distributed processing environment, it offers a high number of services and options that even today are hard to find in any other single LAN-based product.

1.1.3 LANDP Common Application Programming Interface (API)

Besides offering a LAN-based client/server platform, LANDP is an application enabler, providing a common and consistent application programming interface (API) that is used by all LANDP resources. This API contains a set of functions which allows client applications to request services from resources transparently, without having to know where the server program resides on the network. Also, due to LANDP's architecture, users can easily write and access their own servers. LANDP provides a Connectivity Program Request Block (CPRB) which allows server and application programs to exchange requests and data. The CPRB is nothing other than a structure, which the LANDP components understand, where the client application writes:

- The name of the server to be accessed
- The server function to be requested
- The data required to process the request

The server program uses the CPRB to respond with either data and/or a return code. Your job stops here; LANDP does the rest as far as routing requests and replies within the LAN. So, when writing your own user server, all you need to understand is the LANDP common API and the function your server is to perform.

1.2 LANDP and Client/Server Computing

Organizations are finding it increasingly necessary to interact with other organizations both inside and outside their own enterprise. As a result, network operating systems will support an increasingly broad range of cross-system standards that allow interoperability between the network operating system of one vendor and that of another. The strategy will continue to be that of maximum usability and performance when interacting with products within the same network operating system, with minimum loss of functionality when operating across network operating systems. Individual network operating systems and previously stand-alone multi-user systems will thus be integrated into very large networks of distributed systems.

The underlying networks that support network operating systems will grow and become more heterogeneous as stand-alone networks are bridged and merged into larger networks.

System enablers will be developed for the major networking systems, much as enablers have been developed for conventional operating systems. Many of these enablers will provide callable services, which from an application′s perspective will be no different than the fundamental services of the operating system.

The need to be general purpose will force vendors to support a wide variety of distributed data formats and protocols.

Traditional mini and mainframe systems will also need to ensure that their existing data can be integrated with the data services of local network operating systems. This implies not only supporting formats and protocols and external data models, but also overcoming transmission delays through the use of large external data caches.

LANDP addresses business solutions by providing LAN distributed processing capabilities, wide area network (WAN) communications, emulation, security, data services and generic application servers. LANDP products provide the ability to design and develop distributed client/server applications for LANDP workgroups residing in a mixed (heterogeneous) operating system environment, including DOS, Windows, OS/2, AIX, and OS/400.

LANDP provides a common application programming interface (API) and an open design that integrates the supported operating systems into a common and consistent application platform. This platform provides the support to accommodate user-written servers and to write client applications independent of the underlying operating system. LANDP provides transparent access to the workgroup resources based on a distributed processing technology that defines the client and server roles and uses the client/server paradigm. Access is transparent for both client applications and server functions. The LANDP workgroup system appears to the client as a single system providing a set of services.

LANDP offers design flexibility, allowing user servers (application functions) to be implemented on the hardware/software platform that best suits the application function requirements, while making the functions available to all the LANDP workstations in the workgroup. Clients, servers, or a combination of both may reside in any workstation on the LANDP workgroup.

LANDP provides wide area communication servers that allow connection with other systems via both SNA and X.25. Moreover, LANDP/2 and LANDP/6000 provide LU_6.2 program-to-program communication (PPC) servers that enable a LANDP application to communicate with a partner application through an SNA LU_6.2 node. This expands the client/server mechanism beyond a LANDP workgroup to any other system or network that supports LU_6.2.

Finally, as part of IBM′s commitment to the open enterprise, LANDP provides interoperability with other client/server implementations, including distributed CICS and AIX′s implementation of the distributed computing environment (AIX DCE).

1.3 LANDP Architecture

The LANDP architecture is based on the following elements:

- Process supervisor
- Control point
- Client and server interfaces
- Servers
- Network transport layer

The LANDP architecture is illustrated in Figure 2.

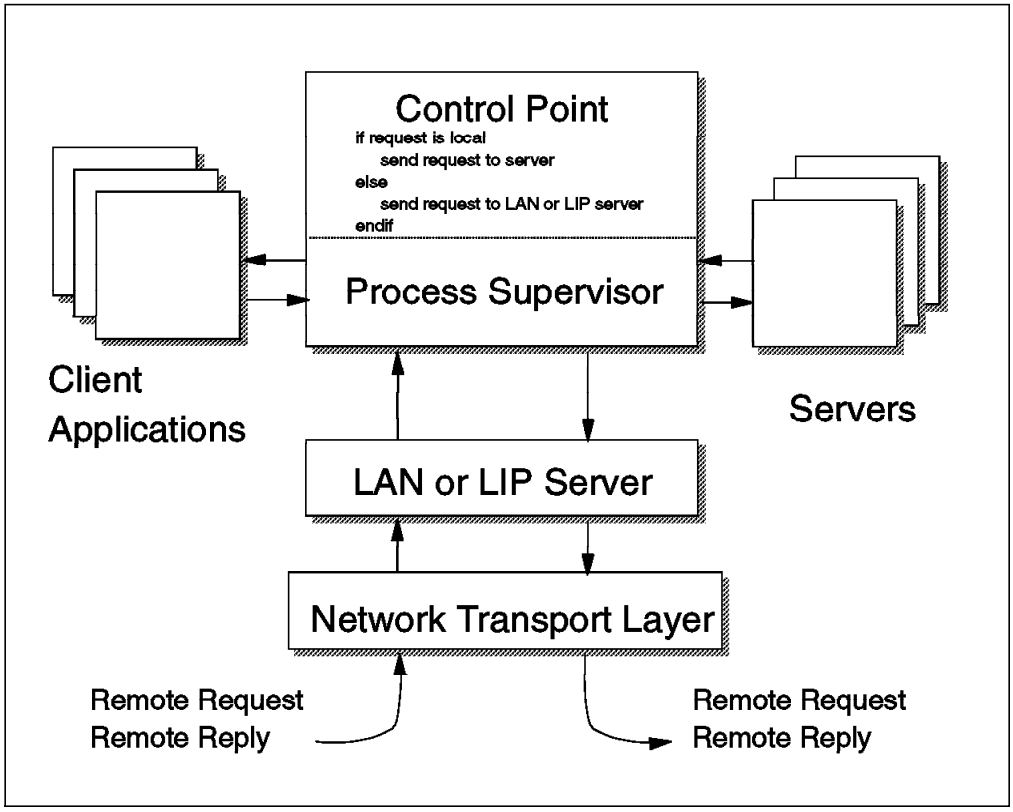

Figure 2. LANDP Architecture

1.3.1 Process Supervisor

The LANDP process supervisor, together with the LANDP control point, form the core of LANDP′s client/server support for distributed systems.

The process supervisor resides in the application execution environment and provides the interface support for applications and servers, relaying the request or reply to the control point. The process supervisor provides local/remote transparency for services to both application and server programs. It manages, in conjunction with the control point, requests by applications or servers for services provided by local or remote servers.

The process supervisor also performs the marshaling of the common API parameters into a structured request message. Marshaling is the process of taking the parameters, assembling them into a message suitable for transmission across the network and disassembling them on arrival. It does not, however, perform the actual transmission.

The same basic kernel is used for applications and servers, providing support in such a way that both entities can be mixed in the same processor. It provides the distributed system with many of the facilities included in a centralized operating system.

1.3.2 Control Point

The control point receives requests and replies from the process supervisor and determines the destination of the request or reply.

There are two logical types of requests/replies:

- Local requests/replies
- Remote requests/replies

Note: Requests can be issued with the NoWait option. With this option control is returned immediately to the client. The client can then request the reply information later in its processing.

Local Requests/Replies

Local requests/replies consist of:

- A request to a local server from a local client
- A request to a local server from a remote client
- A reply to a local client from a local server
- A reply to a local client from a remote server

For local requests/replies, security and tracing functions are performed and the request/reply is routed through the process supervisor to the local server or client.

Remote Requests/Replies

Remote requests/replies consist of:

- A request to a remote server from a local client
- A reply to a remote client from a local server

For remote requests/replies, the control point must locate the destination of the request/reply; in other words, it must know the processor network address where the appropriate resource server or client is located. To determine the processor network address, a binding operation must be performed; that is, a resource name must be translated to a processor network address.

To perform the binding operation the control point uses a client/server relationship directory that provides the client or server′s processor network address. This binding is not performed until execution time, so the application programmer does not have to worry about the actual location of the resources to be accessed.

Once the binding is performed, the request/reply is sent through the process supervisor and LAN or LIP server to the transport services layer for transmission to the remote processor.

Client/Server Relationship Directory

The client/server relationship directory is defined during the customization process of LANDP. An instance of this information is present in each workstation of the system and loaded during LANDP initialization.

The client/server relationship directory provides the relationship between client and server (which clients can access which servers). Servers can be replicated; many instances of the same server can be loaded in different processors on the network, but each client has a defined set of servers that it can access.

Several configurations can be customized by the customer for the same LAN, but only one can be active at a time. In this way LANDP provides a fixed configuration during execution, but the user can dynamically reconfigure the system just by reloading LANDP with another client/server relationship directory.

1.3.3 Client and Server Interfaces

A distributed system, like LANDP, consists of software components running on different computers on the network. Application programs may be clients of any service available on the network and server programs may themselves be clients of other server programs. Just as a conventional application program uses the procedure call to access services in subroutines, a distributed system uses the procedure call to access services in servers. The LANDP common application program interface (API) is modeled on the procedure call and the called procedure can either exist locally or remotely.

This common API provides a single and consistent method that application programs can use to invoke services on the network. This approach allows for the design and development of distributed programs because the developer does not have to be concerned with the communications mechanism. Application programs can make use of distributed services just by calling remote servers using their resource name, without knowing their location, thus allowing complete transparency in configurability and location of the resources.

Connectivity Programming Request Block (CPRB)

LANDP products use the Connectivity Programming Request Block (CPRB) as a control block describing the parameters sent in the request and returned in the reply. The CPRB is used by both the client and server processes, giving a consistent and coherent interface that can be invoked from most conventional programming languages used in the distributed processing environment.

The CPRB has a set of fixed general fields. These include:

- Destination (server) name
- Requested function code
- A pointer to the request parameter structure (PARMLIST)

  This structure contains the parameters sent to the server.
- A pointer to the request data structure (DATA)

  This structure contains the data sent to the server.
- A pointer to the reply parameter structure (PARMLIST)

  This structure contains the parameters returned from the server.
- A pointer to the reply data structure (DATA)

  This structure contains the data returned from the server.
- Lengths of all the parameter and data structures

The use of the parameter structures and data structures are defined entirely by the server. In this way, the fixed CPRB structure provides flexibility to the servers by allowing them to define their particular interface characteristics.

Request/Reply Processing

The basic interaction of requests and replies is described below. For application programs, LANDP provides the RMTREQ routine to request a LANDP service.

1. The client application program calls RMTREQ and passes the address of the CPRB as parameter.

   The CPRB fields must be initialized before the call, as well as the PARMLIST and DATA structures.

   Note: RMTREQ requests can be issued with the NoWait option. With this option control is returned immediately to the client. The client can then request the reply information later in its processing using the GETRPLY routine.
2. If the request is for a local server, the client's process supervisor and control point will determine which server the request is for and route it to the appropriate server.
3. If the request is for a remote server, the client's process supervisor and control point route the request to the appropriate remote server through the client's LAN or LIP server. The remote server's LAN or LIP server will receive the request and pass it on to the remote server's supervisor and control point. The supervisor and control point will determine which server the request is for and route it to the appropriate server.
4. The server calls the GETREQ to get the request.
5. The server processes the request and calls the RMTRPLY to send the reply.

6. If the reply is for a local client, the server's process supervisor and control point route the reply to the appropriate local client.
7. If the reply is for a remote client, the server's process supervisor and control point route the reply to the appropriate remote client through the server's LAN or LIP server. The remote client's LAN or LIP server will receive the reply and pass it on to the remote client's supervisor and control point. The supervisor and control point will determine which client the reply is for and route it to the appropriate client.
8. The client application obtains the reply by calling the GETRPLY routine.

   This is transparent to the application since the GETRPLY routine is included in RMTREQ.

Figure 3 shows the request/reply process between a client and a server.

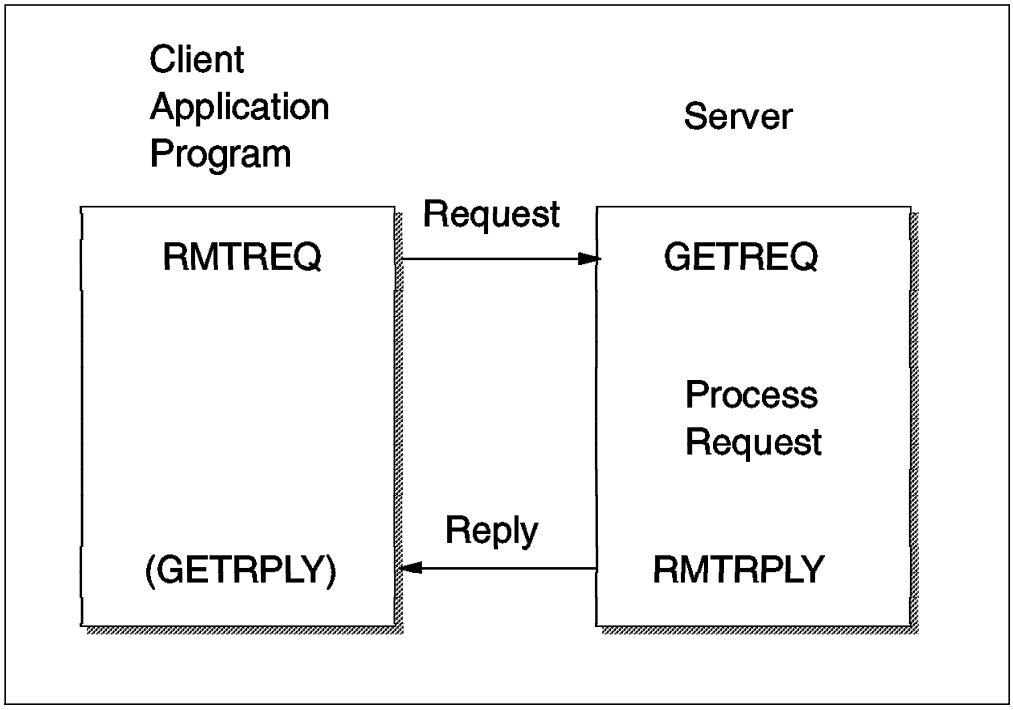

Figure 3. LANDP Request/Reply Processing

1.3.4 Servers

A LANDP server is a software resource that is able to receive requests for services, execute its procedure, and produce a reply. It is the program which actually processes the requested functions and it is usually a separate module from the application. The server can be local or remote with respect to the client, and loaded in a different address space or in a different physical system. Client programs access servers in the same manner that they access local subroutines, that is, through a procedure call. If the remote procedure is called without the NoWait option then the client program is suspended until the called procedure returns. The client can pass parameters and data to the remote server and the server can return a reply, including parameters and data.

The server has a life span that is independent of the client. The server runs continuously and waits for request messages, executes the appropriate

procedure, and returns the reply message. Each server, defined by a logical name, has a process supervisor associated with it.

Servers can be replicated in a network, so that several copies of a server can be running on different workstations depending on:

- System load distribution
- Performance
- Resource distribution

Different clients invoking the same service (using the same logical name) could actually be served by different instances of the same server loaded on different machines.

A LANDP server can also request services from other LANDP servers, using the same common API that clients use.

LANDP server types include:

Mono-resource server A server that provides the services of a unique resource.

Multi-resource server A server that provides the services of a group of resources. A special naming convention is used for this purpose. For instance, the server named SNA## provides the services of the resource names: SNA01, SNA02, etc.

Macro-server A server that can make requests to another server, therefore providing multiple services.

Server Structure

The typical server structure includes the following functions:

- Initialization
- Request processing loop
- Termination

Initialization does all initial processing required by the server and notifies the process supervisor about server size, entry point for requests, and errors at initialization.

The request processing loop obtains the requests from the queue, processes the request, and sends the replies.

Termination is executed when the server receives an ES function from the process supervisor and includes releasing all resources used by the server and terminating its execution.

The LANDP common API provides routines that allow servers to perform these functions. These routines are:

SRVINIT Used for initialization of the server upon loading.

GETREQ Used by the server to obtain the next request from the queue.

RMTRPLY Used by the server to pass a reply to the process supervisor/control point, which will send it to the client.

RMTREQ Used by the server to request services from another server.

GETRPLY Used by the server to obtain the reply from a request to another server.

RMTAREQ Used by the server to pass a reply associated with an asynchronous event to the process supervisor/control point, which will send it to the client.

In this way, the server can notify the client about the occurrence of an event without requiring the client to send a specific request to the server.

1.3.5 Network Transport Layer

LANDP uses either NetBIOS or TCP/IP for LAN-based peer-to-peer communications between LANDP workstations in a distributed LANDP workgroup.

LANDP provides the LAN server interface to the NetBIOS protocol and the LIP (LANDP Internet Protocol) server interface to TCP/IP. One of the parameters that you customize in a LANDP workgroup is the type of protocol that you will be using. Based on which protocol you choose, LANDP will configure the proper server.

Note: If you create a stand-alone workstation that contains both LANDP clients and servers, you do not require the LAN or LIP server.

NetBIOS

When LANDP is configured to use NetBIOS, a single NetBIOS session is established between each workstation defined in the LANDP workgroup. All the LANDP remote requests and replies are multiplexed through this session.

With LANDP, the NetBIOS sessions are opened when LANDP is loaded and remain open until LANDP is unloaded or the link is brought down. Keeping the NetBIOS sessions open allows LANDP to notify servers when client applications are connecting or disconnecting, in order to perform the initialization or cancellation tasks when required. This method offers all the advantages of a virtual circuit transport layer, where the overhead associated with session initialization only occurs when LANDP is loaded and not during the normal request/reply transmissions. This enables the client process to communicate with the server process with the minimum delay and ensures reliable transmission of messages over the virtual circuit.

Important

AIX supports NetBIOS only on token-ring.

TCP/IP

It is also possible to configure a LANDP workgroup to use TCP/IP. This allows the LANDP workstations to be connected to a TCP/IP network and also take advantage of the LANDP client/server mechanism.

LANDP uses the User Datagram Protocol (UDP) as its interface to the Internet Protocol (IP). Since UDP provides a connectionless environment, LANDP developed the LANDP Internet Protocol (LIP) to ensure reliable communications over UDP.

LIP uses socket programming to interface to UDP/IP. Basically, socket programming allows a process, like LANDP, to register itself with UDP/IP so that other TCP/IP-enabled workstations can access the process.

Important

AIX supports TCP/IP on both Ethernet and token-ring.

Chapter 2. Magnetic Stripe Concepts

Prior to discussing the various magnetic stripe readers and encoders, it is important to understand the magnetic stripe concepts. This chapter will describe the magnetic stripe concepts in general terms. Subsequent chapters on each device will describe their specific magnetic stripe capabilities and their relationship to each other.

2.1 Passbook Magnetic Stripes

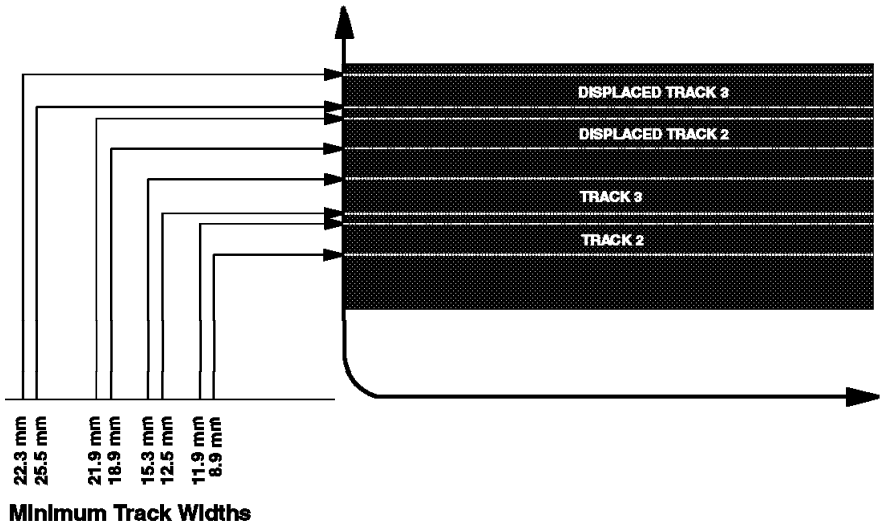

Figure 4. Passbook Magnetic Stripe

Figure 4 illustrates the locations of the tracks on a passbook magnetic stripe. The distances to the top and bottom edges of each track are from the bottom edge of the passbook and are used to define the minimum widths of each track.

Note: Passbook standards allow for tracks to be wider than the minimum width. The point to be made about this is that only one position or track on a passbook magnetic stripe will contain meaningful data. Encoding data on one track could overwrite data in an adjacent track due to the width of the encode heads used to write passbook magnetic stripes.

Terminology in some literature refers to the locations on the passbook magnetic stripe as a position or a track. Each position or track has a typical specification associated with it. Table 1 shows the relationship between the position and track references for each location on the passbook magnetic stripe and indicates the typical specification associated with each location.

Table 1 (Page 1 of 2). Passbook Magnetic Stripe Locations

Magnetic Position	Track Reference	Specification
1	TRACK 2	IBM

Table 1 (Page 2 of 2). Passbook Magnetic Stripe Locations		
Magnetic Position	**Track Reference**	**Specification**
2	TRACK 3	ISO/DIN
3	DISPLACED TRACK 2	IBM
4	DISPLACED TRACK 3	ISO/DIN

2.1.1 IBM Specification for Passbooks

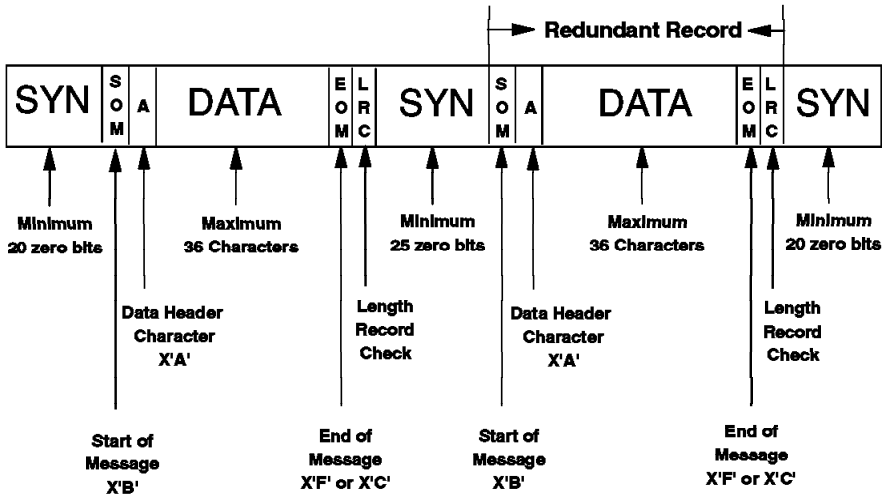

Figure 5. IBM Specification for Passbooks

Figure 5 illustrates the content of the data encoded on a passbook magnetic stripe according to the IBM specification. The IBM specification is typically used when encoding data on the passbook magnetic stripe track 2 (position 1) or displaced track 2 (position 3). Each character on the track consists of 5 bits (4 data bits and 1 odd parity bit). Table 2 defines the valid characters for the track.

Note: Only the four data bits are shown, the data encoded on the magnetic stripe would include a fifth parity bit for each character.

Table 2 (Page 1 of 2). IBM Specification Passbook Valid Character Set		
Character	**Hexadecimal Value**	**Binary Value (without parity bit)**
0	00	0000
1	01	0001
2	02	0010
3	03	0011
4	04	0100
5	05	0101
6	06	0110
7	07	0111

Table 2 (Page 2 of 2). IBM Specification Passbook Valid Character Set		
Character	**Hexadecimal Value**	**Binary Value (without parity bit)**
8	08	1000
9	09	1001
A (Data Header)	0A	1010
B (Start Of Message)	0B	1011
C (End Of Inquiry)	0C	1100
D (Field Separator)	0D	1101
E (Reserved)	0E	1110
F (End Of Message)	0F	1111

The specification allows for the encoding of a second copy (redundant record) of the data on track 2 in order to improve the reliability when reading the data. A redundant record is not supported in the displaced track 2 position.

The hardware automatically calculates and adds a Longitudinal Redundancy Check (LRC) digit to the encoded data. The digit is used to verify the validity of the data when it is read from the track.

IBM hardware which supports the encoding of passbook magnetic stripes automatically inserts a data header character (A) if an A is not the first data character being encoded. This is done to indicate the encoding of a non-ID badge and to comply with the compatibility requirements of previous magnetic devices. This limits the maximum number of characters which can be encoded on the track to 36.

The specification allows the encoding of an End of Message (F) character or an End of Inquiry (C) character following the data.

2.1.2 ISO/DIN Specification for Passbooks

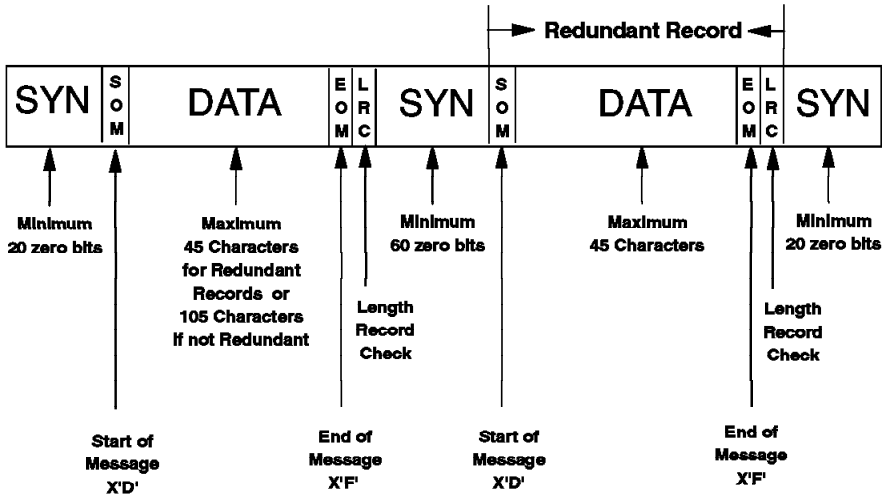

Figure 6. ISO/DIN Specification for Passbooks

Figure 6 illustrates the content of the data encoded on a passbook magnetic stripe according to the ISO/DIN specification. The ISO/DIN specification is typically used when encoding data on the passbook magnetic stripe track 3 (position 2) or displaced track 3 (position 4). Each character on the track consists of 5 bits (4 data bits and 1 odd parity bit). Table 3 defines the valid characters for the track.

Table 3 (Page 1 of 2). ISO/DIN Specification Passbook Valid Character Set

Character	Hexadecimal Value	Binary Value (without parity bit)
0	00	0000
1	01	0001
2	02	0010
3	03	0011
4	04	0100
5	05	0101
6	06	0110
7	07	0111
8	08	1000
9	09	1001
A (Reserved)	0A	1010
B (Reserved)	0B	1011
C (Reserved)	0C	1100
D (Start Of Message)	0D	1101
E (Field Separator)	0E	1110

Table 3 (Page 2 of 2). ISO/DIN Specification Passbook Valid Character Set		
Character	**Hexadecimal Value**	**Binary Value (without parity bit)**
F (End Of Message)	0F	1111

The ISO/DIN specification calls for a Start Of Message character D.

The specification also allows for the encoding of a second copy (redundant record) of the data on track 3 in order to improve the reliability when reading the data. Without a redundant record the maximum number of characters which can be encoded is 105. With a redundant record the maximum number of characters which can be encoded is 45. A redundant record is not supported in the displaced track 3 position.

The hardware automatically calculates and adds a Longitudinal Redundancy Check (LRC) digit to the encoded data. The digit is used to verify the validity of the data when it is read from the track.

2.2 Credit Card Magnetic Stripes

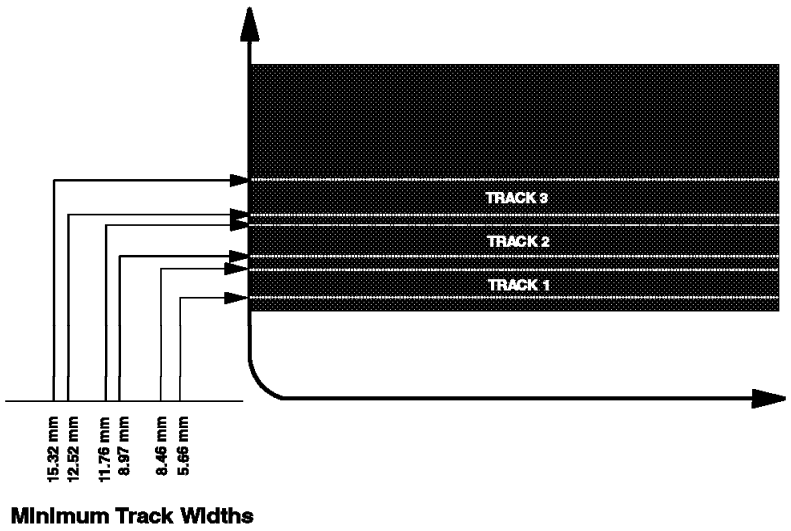

Figure 7. Credit Card Magnetic Stripes

Figure 7 illustrates the locations of the tracks on a credit card magnetic stripe. The distances to the top and bottom edges of each track are from the bottom edge of the credit card and are used to define the minimum widths of the tracks.

Note: The upper limits on the credit card tracks are more strict than in the passbook magnetic stripe tracks. For credit cards, track 1 can extend to 0.353 inches which is the minimum bottom edge of track 2. Track 2 can extend from 0.333 inches to 0.493 inches, which is from the minimum top edge of track 1 to the minimum bottom edge of track 3. Track 3 can extend from 0.463 inches which is the minimum top edge of track 2.

2.2.1 ISO/DIN Track 1 Specification for Credit Cards

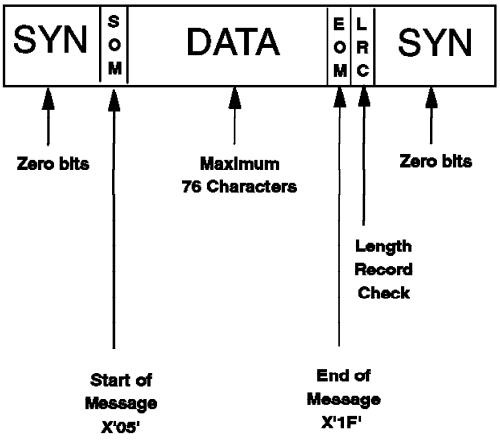

Figure 8. ISO/DIN Track 1 Specification for Credit Cards

Figure 8 illustrates the content of the data encoded on a credit card track 1 according to the ISO/DIN specification. Each character on the track consists of 7 bits (6 data bits and 1 parity bit). Table 4 defines the valid characters for the track.

Table 4 (Page 1 of 2). ISO/DIN Specification Track 1 Valid Character Set

Character	Hexadecimal Value	Binary Value (without parity bit)
Start Of Message	05	000101
0	10	010000
1	11	010001
2	12	010010
3	13	010011
4	14	010100
5	15	010101
6	16	010110
7	17	010111
8	18	011000
9	19	011001
End Of Message	1F	011111
A	21	100001
B	22	100010
C	23	100011
D	24	100100
E	25	100101
F	26	100110

Table 4 (Page 2 of 2). ISO/DIN Specification Track 1 Valid Character Set

Character	Hexadecimal Value	Binary Value (without parity bit)
G	27	100111
H	28	101000
I	29	101001
J	2A	101010
K	2B	101011
L	2C	101100
M	2D	101101
N	2E	101110
O	2F	101111
P	30	110000
Q	31	110001
R	32	110010
S	33	110011
T	34	110100
U	35	110101
V	36	110110
W	37	110111
X	38	111000
Y	39	111001
Z	3A	111010

Note: Uppercase alphabetic characters are supported, but lowercase alphabetic characters are not supported.

2.2.2 ISO/DIN Track 2 Specification for Credit Cards

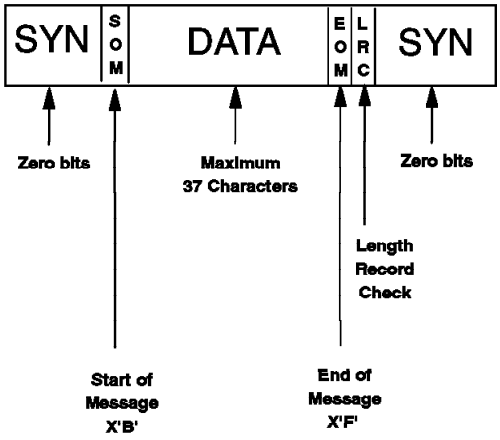

Figure 9. ISO/DIN Track 2 Specification for Credit Cards

Figure 9 illustrates the content of the data encoded on a credit card track 2 according to the ISO/DIN specification. Each character on the track consists of 5 bits (4 data bits and 1 parity bit). Table 5 defines the valid characters for the track.

Table 5. ISO/DIN Specification Track 2 Valid Character Set

Character	Hexadecimal Value	Binary Value (without parity bit)
0	00	0000
1	01	0001
2	02	0010
3	03	0011
4	04	0100
5	05	0101
6	06	0110
7	07	0111
8	08	1000
9	09	1001
A (Reserved)	0A	1010
B (Start Of Message)	0B	1011
C (Reserved)	0C	1100
D (Field Separator)	0D	1101
E (Reserved)	0E	1110
F (End Of Message)	0F	1111

2.2.3 ISO/DIN Track 3 Specification for Credit Cards

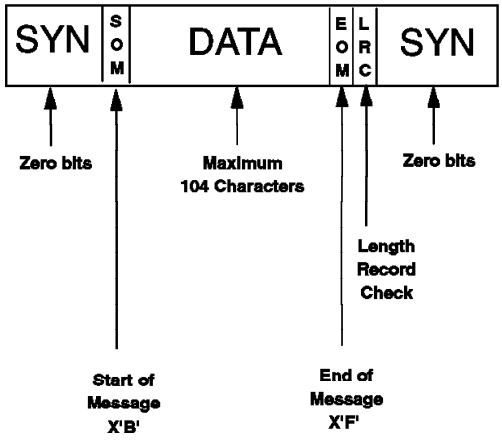

Figure 10. ISO/DIN Track 3 Specification for Credit Cards

Figure 10 illustrates the content of the data encoded on a credit card track 3 according to the ISO/DIN specification. Each character on the track consists of 5 bits (4 data bits and 1 parity bit). Table 6 defines the valid characters for the track.

Table 6. ISO/DIN Specification Track 3 Valid Character Set

Character	Hexadecimal Value	Binary Value (without parity bit)
0	00	0000
1	01	0001
2	02	0010
3	03	0011
4	04	0100
5	05	0101
6	06	0110
7	07	0111
8	08	1000
9	09	1001
A (Reserved)	0A	1010
B (Start Of Message)	0B	1011
C (Reserved)	0C	1100
D (Field Separator)	0D	1101
E (Reserved)	0E	1110
F (End Of Message)	0F	1111

2.3 Comparison of Magnetic Stripes

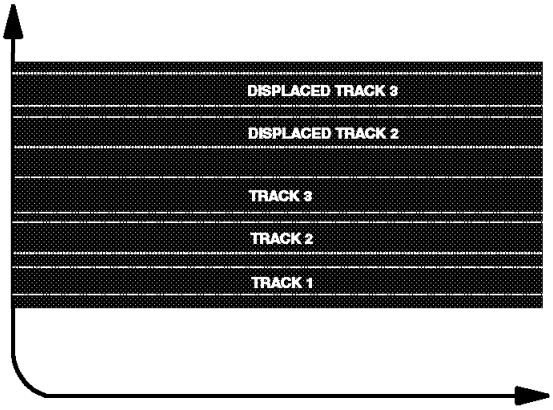

Figure 11. Comparison of Passbook and Credit Card Magnetic Stripes

Figure 11 illustrates all the track locations associated with passbooks and credit cards. Careful inspection of the previous figures which contain the passbook and credit card track locations reveal:

- Tracks 2 and 3 for passbooks are in the same location as tracks 2 and 3 for credit cards.
- Passbooks do not support track 1.
- Credit cards do not support displaced tracks.

2.3.1 Track Specifications

Table 7 contains information about the specifications for each track.

Table 7. Magnetic Stripe Track Specifications

Track	Bits Per Inch	Redundant Records Allowed	Start Of Message	End Of Message	Bits Per Char	Data Type	Data Parity
Track 1 (ISO Credit Card)	210	0	X'05'	X'1F'	7	Alpha/Numeric	Odd
Track 2 (ISO Credit Card)	75	0	X'B'	X'F'	5	Numeric	Odd
Track 2 (IBM Passbook)	210	1	X'B'	X'F' or X'C'	5	Numeric	Odd
Track 3 (ISO Credit Card)	210	0	X'B'	X'F'	5	Numeric	Odd
Track 3 (ISO Passbook)	210	1	X'D'	X'F'	5	Numeric	Odd

Notes:

1. Track 1 is only used for credit cards.
2. Track 2 at 75 bpi is used for credit cards.
3. Track 2 at 210 bpi is used for passbooks (IBM standard).
4. Displaced track 2 has the same specifications as track 2 at 210 bpi.
5. Displaced track 3 has the same specifications as passbook track 3.

Chapter 3. 4717 Magnetic Stripe Reader and Encoder

This chapter discusses the 4717 magnetic stripe reader and encoder and how LANDP supports it.

3.1 Hardware Description

The 4717 is a magnetic stripe unit that reads and encodes magnetic stripe documents that the operator manually passes through it.

You can attach the 4717 to the mouse port of your PS/2 or PS/ValuePoint. You can also attach the 4718 Personal Identification Number (PIN) Keypad or 4778 Personal Identification Number (PIN) Keypad Magnetic Stripe Reader to your workstation's mouse port along with the 4717 using a special feature Y cable.

The 4717 can also be attached to the 4704 Display Station or the 4700 PC Financial Input Option using the FC 8746 magnetic adapter. When connected to a 4704, the capabilities of the 4717 are limited to the read and write functions performed by the current 4704 magnetic devices.

The 4717 Magnetic Stripe Unit comes in four models:

Model 1 Reads track 1 and 2 on credit and ID cards on a single pass.

Model 2 Reads tracks 2 and 3 on credit cards, ID cards, and passbooks, and encodes passbooks on track 2 and 3.

Model 3 Reads and encodes track 1 and 2 of credit and ID cards.

Model 4 Reads track 2 and 3 on credit and ID cards and reads passbooks.

Table 8 explains the different types of characteristics of the 4717 models.

Table 8. 4717 Magnetic Stripe Readers/Encoders

Model	Read	Encode
001	Track 1: 210 bpi Track 2: 75 bpi	
002	Track 2: 75 or 210 bpi Track 3: 210 bpi	Track 2: 210 bpi Track 3: 210 bpi
003	Track 1: 210 bpi Track 2: 75 bpi	Track 1: 210 bpi Track 2: 75 bpi
004	Track 2: 75 or 210 bpi Track 3: 210 bpi	

Note: bpi= bits per inch

3.1.1 4717 Model 1 Reader

The 4717 Model 1 reads tracks 1 and 2 on credit and ID cards in a single pass. This model has two read heads that read data encoded on track 1 at 210 bpi, and track 2 at 75 bpi, in accordance with American National Standards Institute (ANSI) standards X4.16 - 1983 and International Standards Organization (ISO) standards 7810 and 7811/2-5.

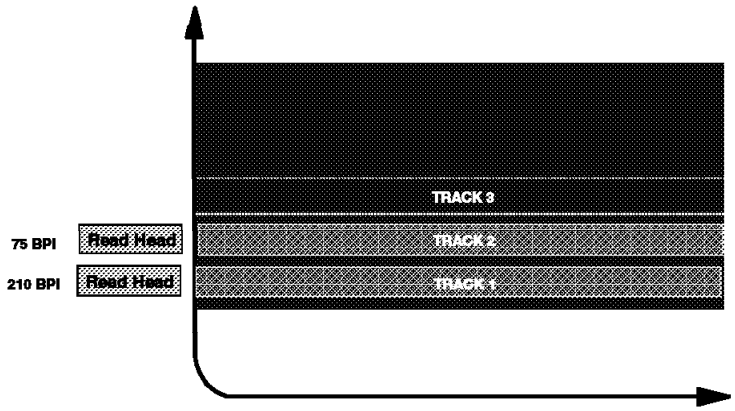

Figure 12. IBM 4717 Model 1 Reader

3.1.2 4717 Model 2 Reader/Encoder

The 4717 Model 2 reads tracks 2 and 3 on credit cards, ID cards, and passbooks and encodes passbooks with magnetic stripes. The Model 2 has two read heads that read data encoded on track 2 at 75 or 210 bpi, and track 3 at 210 bpi. It reads passbooks encoded by the 3604 magnetic-stripe reader/encoder, 4704 magnetic-stripe reader/encoder, or according to ISO 8484. It also has an encode head that encodes track 2 and 3 at 210 bpi. This model encodes passbooks as defined in the 4700 specifications or according to ISO 8484.

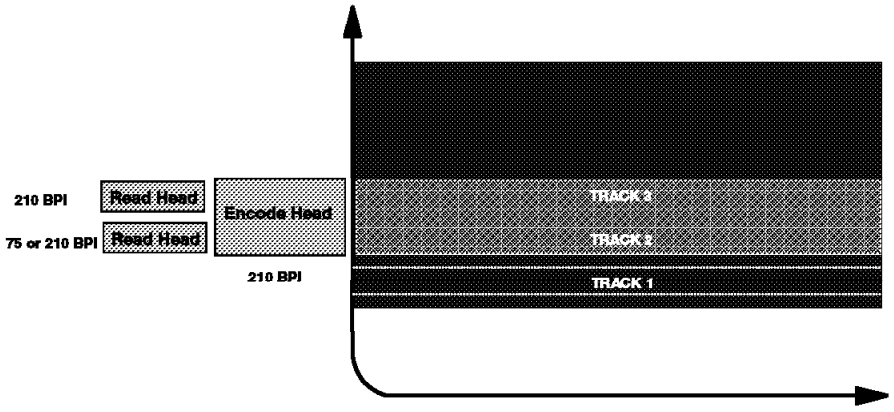

Figure 13. IBM 4717 Model 2 Reader/Encoder

3.1.3 4717 Model 3 Reader/Encoder

The 4717 Model 3 reads and encodes on track 1 and 2 of credit cards and ID cards. This model is ideally suited to administrative work area of financial institutions that create automated teller machine ID cards when an account is opened. The Model 3 has two read heads and two encode heads and it reads and encodes track 1 at 210 bpi and track 2 at 75 bpi as defined in ISO and ANSI specifications.

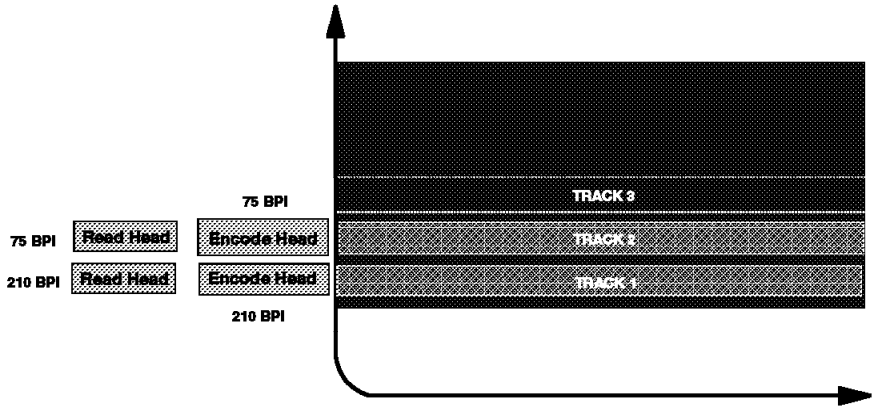

Figure 14. IBM 4717 Model 3 Reader/Encoder

3.1.4 4717 Model 4 Reader/Encoder

The 4717 Model 4 reads track 2 and 3 on credit cards and ID cards in a single pass. This model has two read heads and it reads data encoded on track 2 at 75 bpi, and track 3 at 210 bpi. In addition, this model reads passbooks encoded by the 3604, 4704, or according to ISO 8484.

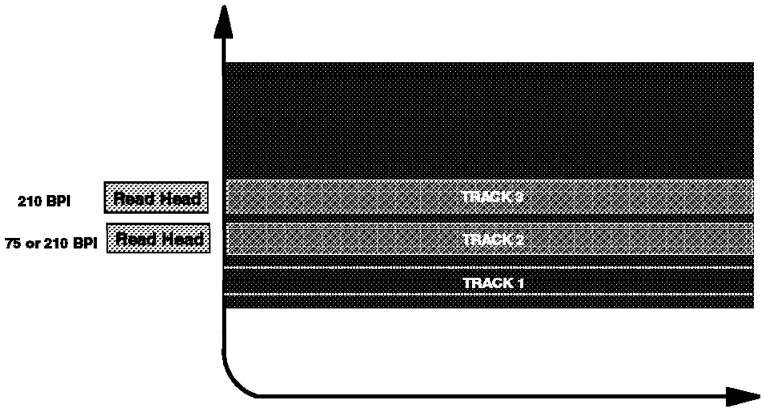

Figure 15. IBM 4717 Model 4 Reader

3.2 Configuring and Installing

This section will describe the required steps to install the IBM 4717 magnetic stripe readers and encoders.

Note: You should read the *4700 Financial I/O Planning Guide*, GC31-3762, publication for detailed information about planning considerations for your own environment.

3.2.1 DOS

The 4717 magnetic stripe reader/encoder connects to the mouse port of a workstation. Each workstation to which the 4717 device attaches needs to load the 4717 device driver in the CONFIG.SYS file.

Note: There is no installation program for the 4717 device drivers in DOS. As a result, you only need to copy the device driver from the 4700 financial I/O device drivers diskette for DOS to your workstation.

You will create a device loading statement for the 4717 that will need to be added to your CONFIG.SYS file.

Important

Use the device driver that comes with the 4777 if possible even though you are using a 4717. The 4777 device driver is a new device driver and is compatible with the 4717. Refer to Chapter 4, “4777 Magnetic Stripe Reader and Encoder” on page 37 for the new optional parameters that are available with the 4777 device driver.

Using the 4700 Financial I/O Device Drivers for DOS diskette the format of the statement is as follows:

```
DEVICE={d:}{path}device driver {options}
```

Note: Brackets {} indicate optional parameters.

The device statement parameters are defined as follows:

{d:} The disk or diskette drive identifier.

{path} The directory search sequence for the disk or diskette that contains the device driver file.

device driver
The file name of the device driver that is to be loaded.

{options} The optional parameters that suppress automatic error messages, prevent the setting and return of error codes through DOS, and let you reassign the designated Cancel key. At least one blank must precede the options list and there cannot be any blanks between the options.

The options can be specified as follows:

```
/X/Y/K:val
```

or

```
/X/Y/K:0;val
```

Where `val` is a 1 to 3 decimal number.

The description of the optional parameters is as follows:

/X When certain problems are detected by the power-on test or during the subsequent operation, the device driver automatically displays error messages. The /X option suppresses these automatic screen messages. This means that your application program, not the device driver, must display the messages.

/Y When an error is detected in a function call or the operation is canceled, an error bit and error code are returned to DOS. This invokes the INT 24H critical-error handler. If you do not have an INT 24H handler, the DOS ABORT/RETRY/IGNORE message appears on the screen. The /Y option suppresses the setting of the error bit and error codes return to DOS.

Note: The /Y option suppresses the return of all error statuses from the device driver to DOS, and the carry flag is not set. Your application program must issue a Read Status request to check the results of all operations.

/K Use the /K option to designate one of the keyboard keys as Cancel.

If the key you have designated as Cancel returns a standard ASCII code when you press it, use the /K:val form. The val represents the standard ASCII code.

If the key you have designated as Cancel returns an extended ASCII code when you press it, use the /K:0;val form. The val represents the extended ASCII code.

If you omit the /K option, the default Cancel key is the Esc key on your keyboard (val=27). This applies only to synchronous operation.

When the driver is in synchronous mode, all keystrokes other than the designated Cancel key are discarded. Therefore, if the driver is in synchronous mode, the keyboard will not be functional except to cancel the current magnetic stripe function request.

Using the 4700 Financial I/O for DOS Diskette

If you will be configuring the 4717 magnetic stripe reader/encoder device to attach to a workstation then the following device statement will need to exist in the workstation's CONFIG.SYS file:

```
DEVICE=C:\MSRE2DD.SYS
```

Notes:

1. You will also need to copy the 4717 MSRE2DD.SYS device driver to the EHCD300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation's diskette during the workstation generation process.
2. If available, you should use the MSRE2DD.SYS driver from the 4777/4778 DOS installation diskette, since it is a later version. It also provides more optional parameters. Refer to Chapter 4, "4777 Magnetic Stripe Reader and

Encoder" on page 37 for the new optional parameters that are available with the 4777 device driver.

3.2.2 OS/2

The 4717 magnetic stripe reader/encoder connects to the mouse port of a workstation. Each workstation to which the 4717 device attaches needs to load the device driver in the CONFIG.SYS file.

In the OS/2 environment, there is a configuration program associated with the 4717.

Note: Refer to Appendix A, "4700 Financial I/O Device Drivers for OS/2" on page 107, for a detailed explanation of device driver customization for OS/2.

The configuration program will create a device loading statement for the 4717 that will need to be added to your CONFIG.SYS file.

Important

Use the device driver that comes with the 4777 if possible even though you are using a 4717. The 4777 device driver is a new device driver and is compatible with the 4717. Refer to Chapter 4, "4777 Magnetic Stripe Reader and Encoder" on page 37 for the new optional parameters that are available with the 4777 device driver.

The format of the statement is as follows:

```
DEVICE={d:}{path}device driver {options}
```

Note: Brackets {} indicate optional parameters.

The device statement parameters are defined as follows:

{d:} The disk or diskette drive identifier.

{path} The directory search sequence for the disk or diskette that contains the device driver file.

device driver
The file name of the device driver that is to be loaded.

{options} The options can be specified as follows:

```
/M/P/W
```

The description of the optional parameters is as follows:

/M Indicates that a 4717 is attached. The device driver tests for a 4717. If the device driver does not find a 4717, it displays an error message. If it finds a 4717 and it passes the self-test, the application program can access the device driver.

If the device driver finds a 4717 and you do not specify the /M parameter, the device driver displays a specification error and the device driver is installed.

/P Indicates that a 4718 is attached. The device driver tests for a 4718. If the device driver does not find a 4718, it displays an error message. If it finds a 4718 and the

device passes the self-test, the application program can access the device driver.

If the device driver finds a 4718 and you do not specify the /P parameter, the device driver displays a specification error and the device driver is installed.

/W This option causes the device driver operation to pause after displaying installing messages. The device driver waits indefinitely; you must press Enter to continue. The device driver displays installation messages when it detects an error in the operational environment (such as an error in the device or an error in the options that are specified).

Note: If the device driver detects a *critical* error during initialization, the device driver might not load into storage or it might not establish communication with the application program.

Using the 4700 Financial I/O for OS/2 Diskette

If you will be configuring the 4717 magnetic stripe reader/encoder device to attach to a workstation then the following device statement will need to exist in the workstation's CONFIG.SYS file:

```
DEVICE=C:\FIOAUXDD.SYS /M
```

Notes:

1. You will also need to copy FIOAUXDD.SYS, FIO.MSG, FIOH.MSG, and MAGCALLS.DLL to the EHCO300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation's diskette during the workstation generation process.
2. If you require LANDP to access the 4717 device from the multiple virtual DOS machine (MVDM) of OS/2 then you will need the FIOAUXDD.SYS device driver and the LANDP/2 multiple virtual DOS machine relay driver (EHCVDMVD.SYS) in the CONFIG.SYS file.

   The EHCVDMVD.SYS device driver will establish the link between LANDP client applications running in the MVDM and the FIOAUXDD.SYS device driver through the LANDP/2 supervisor.
3. If available, you should use the FIOAUXDD.SYS driver from the 4777/4778 installation diskette, since it is a later version. It also provides more optional parameters. Refer to Chapter 4, "4777 Magnetic Stripe Reader and Encoder" on page 37 for the new optional parameters that are available with the 4777 device driver.

3.3 LANDP Customization

This section describes how to customize the 4717 magnetic stripe reader/encoder to work with LANDP.

Before you start your customization, make sure you have done the following:

1. Installed LANDP Version 3.0 and its fixes.

2. Copied the customized device drivers and other relevant files to the respective LANDP directories so that they will be available during the LANDP workstation configuration GETTING procedure. If not, copy the following:

DOS drivers

You should copy the following file to the LANDP EHCD300 subdirectory:

- MSRE2DD.SYS

OS/2 drivers

You should copy the following files to the LANDP EHCO300 subdirectory:

- FIOAUXDD.SYS
- MAGCALLS.DLL
- FIO.MSG
- FIOH.MSG

3.3.1 Magnetic Stripe Reader/Encoder (MSRE47##) Server

The LANDP magnetic stripe reader/encoder (MSRE47##) server enables the clients to access the magnetic stripe reader/encoder in a LANDP workgroup. This server provides the ability to share the device among the workstations in the workgroup.

A sample LANCONF.SPC is shown in Figure 16 on page 35. There are four workstations defined in Figure 16 on page 35:

Workstation AA

Workstation AA is an OS/2 workstation. This workstation contains the MSRE47## server and provides client services to itself and workstation BB.

Workstation BB

Workstation BB is a DOS workstation. This workstation receives client services for the MSRE47## server located in workstation AA.

Workstation CC

Workstation CC is an OS/2 workstation. This workstation contains the MSRE47## server and provides client services to itself (including MVDM-based applications).

Workstation DD

Workstation DD is a DOS workstation. This workstation contains the MSRE47## server and provides client services to itself.

```
/* Workgroup Definition. */
         LANCONF  GROUP=EHCCUS,
                  NAME=LANDPFD,
                  WSNAMES=(AA,BB,CC,DD)

/* ********************************************************************
/* Workgroup Definition for Station ID "AA" - OS/2 server/client
/* ********************************************************************
        LWSCONF   NAME=AA,
                  TYPE=OS/2,

        /* 4717 Magnetic Stripe Reader/Encoder server definition */
                  SERVER=(MSRE4701),
                  PAR&MSRE=(4717),

        /* 4717 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "BB" - DOS client
/* ********************************************************************
        LWSCONF   NAME=BB,
                  TYPE=DOS,

        /* 4717 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "CC" - OS/2 server, MVDM client
/* ********************************************************************
        LWSCONF   NAME=CC,
                  TYPE=OS/2,

        /* MVDM relay server definition */
                  SERVER=(EHCVDMGR,,),

        /* 4717 Magnetic Stripe Reader/Encoder server definition */
                  SERVER=(MSRE4702),
                  PAR&MSRE=(4717),

        /* 4717 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4702,CC)


/* ********************************************************************
/* Workgroup Definition for Station ID "DD" - DOS server/client
/* ********************************************************************
        LWSCONF   NAME=DD,
                  TYPE=DOS,

        /* 4717 Magnetic Stripe Reader/Encoder server definition */
                  SERVER=(MSRE4703),
                  PAR&MSRE=(4717),

        /* 4717 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4703,DD)
```

Figure 16. 4717 LANCONF.SPC File

SERVER=(MSRE47##)

This is the LANDP vector that is used to define the MSR/E server.

PAR&MSRE=(parm1,parm2)

Each MSR/E server requires a parameters vector to define the parameters associated with the MSR/E server. The MSR/E server parameters vector is defined as follows:

parm1 This parameter specifies the product attached to the workstation that provides the MSR/E device to be supported by the server.

The parameter is required. The parameter value can be:

4717 IBM 4717 Magnetic Stripe Reader/Encoder

4777 IBM 4777 Magnetic Stripe Reader/Encoder

4778 IBM 4778 PIN pad Magnetic Stripe Reader

parm2 This parameter specifies the COM port where the product that provides the MSR/E device will be attached.

The parameter applies only if either the 4777 or 4778 value was specified in parameter 1. The parameter value ranges from 1 to 4. The default COM port is **1**.

CLIENT=(MSRE47xx,parm1)

This is the LANDP vector that is used to define the MSR/E client.

xx is the session identifier.

parm1 This specifies the workstation that provides the service.

Chapter 4. 4777 Magnetic Stripe Reader and Encoder

This chapter discusses the 4777 magnetic stripe reader and encoder and how LANDP supports it.

4.1 Hardware Description

The 4777 is a magnetic stripe unit that reads and encodes magnetic stripe documents that the operator manually passes through it.

You can attach the 4777 to the serial port or the mouse port of an IBM PS/2 or PS/ValuePoint. You can also attach the 4718 Personal Identification Number (PIN) Keypad or the 4778 Personal Identification Number (PIN) Keypad Magnetic Stripe Reader to your workstation's mouse port along with the 4777 using a special Y connector. The 4777 and 4778 can also attach to the same serial port using a special Y connector.

The 4777 can also be attached to the 4704 Display Station.

The 4777 Magnetic Stripe Unit comes in four models.

Model 1 Reads track 1 and 2 on credit and ID cards on a single pass.

Model 2 Reads tracks 2 and 3 on credit cards, ID cards, and passbooks, and encodes passbooks on track 2 and 3.

Model 3 Reads and encodes track 1 and 2 of credit and ID cards.

Model 4 Reads track 2 and 3 on credit and ID cards and reads passbooks.

Table 9 explains the different types of characteristics of the 4777 models.

Table 9. 4777 Magnetic Stripe Readers/Encoders

Model	Read	Encode
001	Track 1: 75 or 210 bpi Track 2: 75 or 210 bpi	
002	Track 2: 75 or 210 bpi Track 3: 75 or 210 bpi	Track 2: 210 bpi Track 3: 210 bpi
003	Track 1: 75 or 210 bpi Track 2: 75 or 210 bpi	Track 1: 210 bpi Track 2: 75 bpi
004	Track 2: 75 or 210 bpi Track 3: 75 or 210 bpi	

Note: bpi = bits per inch

4777 Model 1 Reader

The 4777 Model 1 reads tracks 1 and 2 on credit and ID cards in a single pass. This model has two read heads and it reads data encoded on track 1 and 2 at 75 or 210 bpi, in accordance with American National Standards Institute (ANSI) standards X4.16 - 1983 and International Standards Organization (ISO) standards 7810 and 7811/2-5.

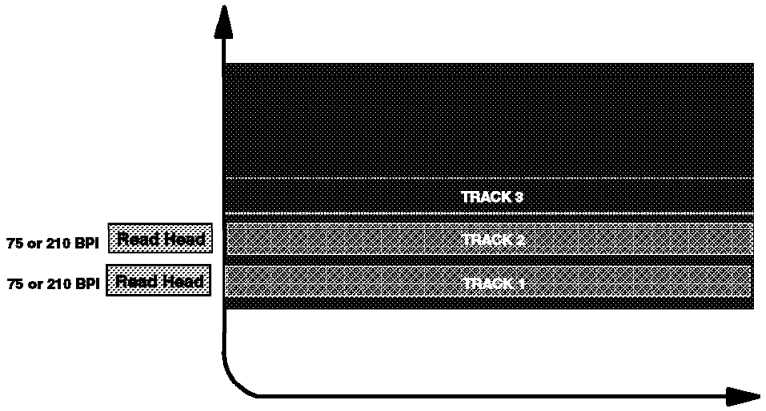

Figure 17. IBM 4777 Model 1 Reader

4777 Model 2 Reader/Encoder

The 4777 Model 2 reads tracks 2 and 3 on credit cards, ID cards, and passbooks and encodes passbooks with magnetic stripes. The Model 2 has two read heads that read data encoded on tracks 2 and 3 at 75 or 210 bpi. It reads passbooks encoded by the 3604 magnetic-stripe reader/encoder, 4704 magnetic-stripe reader/encoder, or according to ISO 8484. It also has an encode head that encodes track 2 and 3 at 210 bpi. This model encodes passbooks as defined in the 4700 specifications or according to ISO 8484.

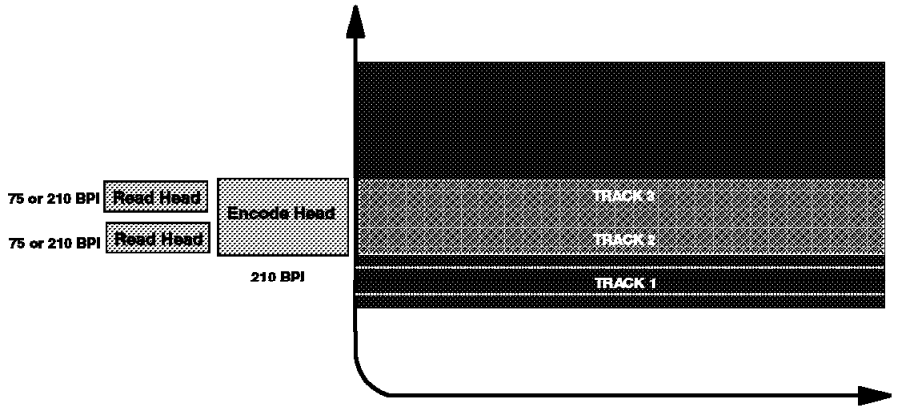

Figure 18. IBM 4777 Model 2 Reader/Encoder

4777 Model 3 Reader/Encoder

The 4777 Model 3 reads and encodes on track 1 and 2 of credit cards and ID cards. This model is ideally suited to administrative work area of financial institutions that create automated teller machine ID cards when an account is opened. The Model 3 has two read heads and two encode heads and it reads and encodes tracks 1 and 2 at 75 or 210 bpi as defined in ISO and ANSI specifications.

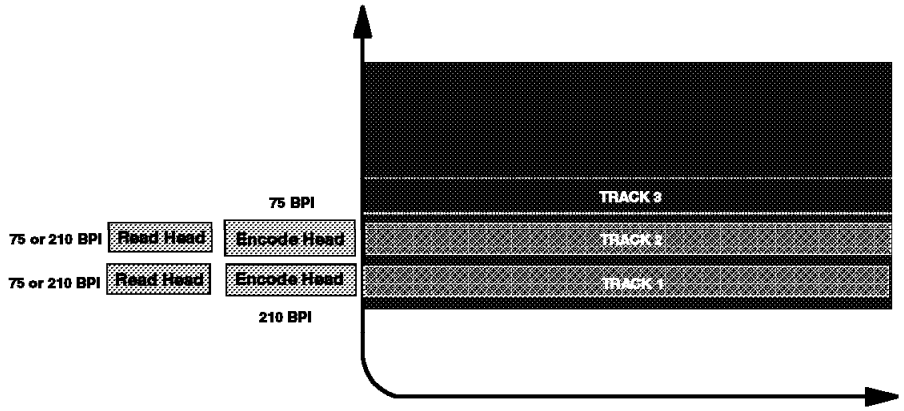

Figure 19. IBM 4777 Model 3 Reader/Encoder

4777 Model 4 Reader/Encoder

The 4777 Model 4 reads track 2 and 3 on credit cards and ID cards and reads passbooks in single pass. This model has 2 read heads and it reads data encoded on track 2 and 3 at 75 or 210 bpi. In addition, this model reads passbooks encoded by the 3604, 4704, or according to ISO 8484.

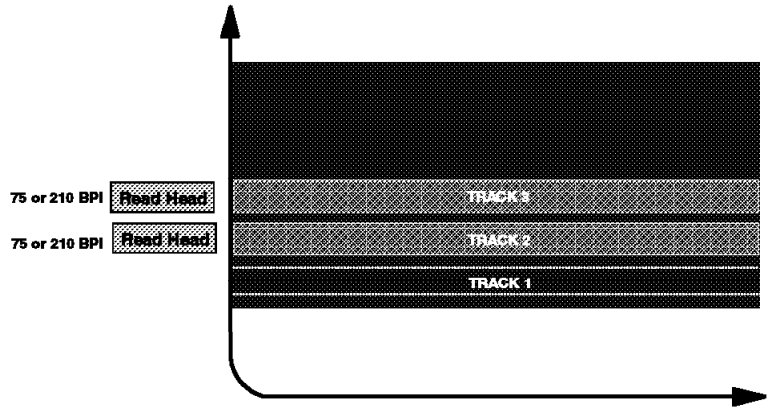

Figure 20. IBM 4777 Model 4 Reader

4.2 Configuring and Installing

This section will describe the required steps to install the IBM 4777 magnetic stripe readers and encoders.

Note: You should read either the *4777 Magnetic Stripe Unit and 4778 PIN-Pad Magnetic Stripe Reader DOS Programming Guide*, SA34-2206 publication or the *4777 Magnetic Stripe Unit and 4778 PIN-Pad Magnetic Stripe Reader OS/2 Programming Guide*, SA34-2205 publication for detailed information about planning considerations for your own environment.

4.2.1 DOS

The 4777 magnetic stripe reader/encoder can be connected to either the mouse port or a serial port of a workstation. Each workstation to which the 4777 device attaches needs to load the device driver in the CONFIG.SYS file.

Note: There is no installation program for the 4777 device drivers in DOS. As a result, you only need to copy the device driver from the 4777/4778 DOS device driver diskette to your workstation.

You will create a device loading statement for the 4777 that will need to be added to your CONFIG.SYS file.

Important

- The 4777 mouse port device driver also supports the 4717.
- The 4778 mouse port device driver also supports the 4718.

The format of this is as follows:

```
DEVICE={d:}{path}device driver {options}
```

Note: Brackets {} indicate optional parameters.

The device statement parameters are defined as follows:

{d:} The disk or diskette drive identifier.

{path} The directory search sequence for the disk or diskette that contains the device driver file.

device driver
The file name of the device driver that is to be loaded.

{options} The optional parameters that suppress automatic error messages, prevent the setting and return of error codes through DOS, and let you reassign the designated Cancel key. At least one blank must precede the options list and there cannot be any blanks between the options.

The options can be specified as follows:

```
/X/Y/Cx/M/K:val
```

or

```
/X/Y/Cx/M/K:0;val
```

Where `val` is a 1 to 3 decimal number.

The description of the optional parameters is as follows:

/X When certain problems are detected by the power-on test or during the subsequent operation, the device driver automatically displays error messages. The /X option suppresses these automatic screen messages. This means that your application program, not the device driver, must display the messages.

/Y When an error is detected in a function call or the operation is canceled, an error bit and error code are returned to DOS. This invokes the INT 24H critical-error handler. If you do not have an INT 24H handler, the DOS ABORT/RETRY/IGNORE message appears on the screen.

The /Y option suppresses the setting of the error bit and error codes return to DOS.

Note: The /Y option suppresses the return of all error statuses from the device driver to DOS, and the carry flag is not set. Your application program must issue a Read Status request to check the results of all operations.

/Cx This option only applies when the 4777 and/or the 4778 is attached to a serial port. The x specifies the serial port to which the 4777/4778 is attached. The default serial port is 1 (for COM1).

/M This option allows you to attach a 4778 Model 1 or Model 3 to your workstation and use the magnetic stripe reader portion of the 4778 as if it were a 4717 or 4777. This allows you to replace a combination 4717 and 4718 with a single 4778 and not rewrite your application program that controls the magnetic stripe reader.

Note: Refer to Chapter 5, "4778 PIN Pad Magnetic Stripe Reader" on page 49 for information about the 4778.

/K Use the /K option to designate one of the keyboard keys as Cancel.

If the key you have designated as Cancel returns a standard ASCII code when you press it, use the `/K:val` form. The `val` represents the standard ASCII code.

If the key you have designated as Cancel returns an extended ASCII code when you press it, use the `/K:0;val` form. The `val` represents the extended ASCII code.

If you omit the /K option, the default Cancel key is the Esc key on your keyboard (val=27). This applies only to synchronous operation.

When the driver is in synchronous mode, all keystrokes other than the designated Cancel key are discarded. Therefore, if the driver is in synchronous mode, the keyboard will not be functional except to cancel the current magnetic stripe function request.

Attaching a 4777 to a Mouse Port

If you will be configuring the 4777 magnetic stripe reader/encoder device to attach to the mouse port of a workstation then the following device statement will need to exist in the workstation's CONFIG.SYS file:

```
DEVICE=C:\MSRE2DD.SYS
```

Note: You will also need to copy the 4777 MSRE2DD.SYS device driver to the EHCD300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation's diskette during the workstation generation process.

Attaching a 4777 to a Serial Port

If you will be configuring the 4777 magnetic stripe reader/encoder device to attach to a serial port of a workstation then the following device statement will need to exist in the workstation's CONFIG.SYS file for each serially attached 4777:

```
DEVICE=C:\IBM4777.SYS /M/Cx
```

Where x specifies the serial port to which the 4777 is attached.

Note: You will also need to copy the 4777 IBM4777.SYS device driver to the EHCD300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation's diskette during the workstation generation process.

4.2.2 OS/2

The 4777 magnetic stripe reader/encoder connects to either the mouse port or a serial port of a workstation. Each workstation to which the 4777 device attaches needs to load the device driver in the CONFIG.SYS file.

In the OS/2 environment, there is a configuration program associated with the 4777.

Note: Refer to Appendix B, "4777/4778 Device Driver Customization for OS/2" on page 115, for a detailed explanation of device driver customization for OS/2.

The configuration program will create a device loading statement for the 4777 that will need to be added to your CONFIG.SYS file.

Important

The 4777/4778 mouse port device driver also supports the 4717 and 4718.

The format of the statement is as follows:

```
DEVICE={d:}{path}device driver {options}
```

Note: Brackets {} indicate optional parameters.

The device statement parameters are defined as follows:

{d:} The disk or diskette drive identifier.

{path} The directory search sequence for the disk or diskette that contains the device driver file.

device driver
The file name of the device driver that is to be loaded.

{options} The options can be specified as follows:

```
/M/P/Cx/S/W/I
```

Notes:

1. Optional parameters /P and /I are mutually exclusive.
2. Optional parameters /S and /M are mutually exclusive.

The description of the optional parameters is as follows:

/M Indicates that a 4717 or 4777 MSR/E is attached. The device driver tests for a 4717 or 4777. If the device driver does not find a 4717 or 4777, it displays an error message. If it finds a 4717 or 4777 and it passes the self-test, the application program can access the device driver.

If the device driver finds a 4717 or 4777 and you do not specify the /M parameter, the device driver displays a specification error and the device driver is installed.

/P Indicates that a 4718 or 4778 PIN pad device is attached. The device driver tests for a 4718 or 4778.

Important

If you use the /P option with a 4778 attached to a mouse port then only the PIN pad portion of the 4778 will be enabled. For 4778 Models 1 or 3 attached to a mouse port, you can enable the magnetic stripe reader by using the /I option instead of the /P option.

If you want the 4778 magnetic stripe reader to *replace* a 4717 or 4777 then use the /S option instead.

If the device driver does not find a 4718 or a 4778, it displays an error message. If it finds a 4718 or 4778 and the device passes the self-test, the application program can access the device driver.

If the device driver finds a 4718 or 4778 and you do not specify the /P parameter, the device driver displays a specification error and the device driver is installed.

Note: Refer to Chapter 5, “4778 PIN Pad Magnetic Stripe Reader” on page 49 for information about the 4778.

/Cx This option only applies when the 4777 and/or 4778 is attached to a serial port. The x specifies the serial port to which the 4777/4778 is attached. The default serial port is 1 (for COM1).

/S This option allows you to attach a 4778 Model 1 or Model 3 to your workstation and use the magnetic stripe reader portion of the 4778 as if it were a 4717 or 4777. This allows you to replace a combination 4717 and 4718 with a single 4778 and not rewrite your application program that controls the magnetic stripe reader.

Note: Refer to Chapter 5, “4778 PIN Pad Magnetic Stripe Reader” on page 49 for information about the 4778.

/I This option only applies when the 4778 Model 1 or Model 3 is attached to the mouse port. The device driver tests for a 4778. It will enable both the PIN pad portion and magnetic stripe reader portion of the 4778.

Important

In this case, the magnetic stripe reader programming interface is different than the 4717 or 4777 programming interface. If you want the 4778 magnetic stripe reader to *replace* a 4717 or 4777 then use the /S option instead of the /I option.

If the device driver does not find a 4778, it displays an error message. If it finds a 4778 and the device passes the self-test, the application program can access the device driver.

If the device driver finds a 4778 and you do not specify the /I parameter, the device driver displays a specification error and the device driver is installed.

Note: Refer to Chapter 5, "4778 PIN Pad Magnetic Stripe Reader" on page 49 for information about the 4778.

/W This option causes the device driver operation to pause after displaying installing messages. The device driver waits indefinitely; you must press Enter to continue. The device driver displays installation messages when it detects an error in the operational environment (such as an error in the device or an error in the options that are specified).

Note: If the device driver detects a *critical* error during initialization, the device driver might not load into storage or it might not establish communication with the application program.

Attaching a 4777 to a Mouse Port

If you will be configuring the 4777 magnetic stripe reader/encoder device to attach to a workstation then the following device statement will need to exist in the workstation's CONFIG.SYS file:

```
DEVICE=C:\FIOAUXDD.SYS /M
```

Notes:

1. You will also need to copy FIOAUXDD.SYS, FIO.MSG, FIOH.MSG, and MAGCALLS.DLL to the EHCO300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation's diskette during the workstation generation process.
2. If you require LANDP to access the 4777 device from the multiple virtual DOS machine (MVDM) of OS/2 then you will need the FIOAUXDD.SYS device driver and the LANDP/2 multiple virtual DOS machine relay driver (EHCVDMVD.SYS) in the CONFIG.SYS file.

   The EHCVDMVD.SYS device driver will establish the link between LANDP client applications running in the MVDM and the FIOAUXDD.SYS device driver through the LANDP/2 supervisor.

Attaching a 4777 to a Serial Port

If you will be configuring the 4777 magnetic stripe reader/encoder device to attach to a serial port of a workstation then the following device statement will need to exist in the workstation's CONFIG.SYS file for each serially attached 4777:

```
DEVICE=C:\FIOSERDD.SYS /Cx
```

Where x specifies the serial port to which the 4777 is attached.

Notes:

1. You will also need to copy FIOSERDD.SYS, FIO.MSG, FIOH.MSG, and MAGCALLS.DLL to the EHCO300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation's diskette during the workstation generation process.
2. If you require LANDP to access the 4777 device from the multiple virtual DOS machine (MVDM) of OS/2 then you will need the FIOSERDD.SYS device driver and the LANDP/2 multiple virtual DOS machine relay driver (EHCVDMVD.SYS) in the CONFIG.SYS file.

   The EHCVDMVD.SYS device driver will establish the link between LANDP client applications running in the MVDM and the FIOAUXDD.SYS device driver through the LANDP/2 supervisor.

4.3 LANDP Customization

This section describes how to customize the 4777 magnetic stripe reader/encoder to work with LANDP.

Before you start your customization, make sure you have done the following:

1. Installed LANDP Version 3.0 and its fixes.
2. Copied the customized device drivers and other relevant files to the respective LANDP directories so that they will be available during the LANDP workstation configuration GETTING procedure. If not, copy the following:

   DOS drivers

   You should copy the following file to the LANDP EHCD300 subdirectory:

   - MSRE2DD.SYS for mouse attachment
   - IBM4777.SYS for serial attachment

   OS/2 drivers

   You should copy the following files to the LANDP EHCO300 subdirectory:

   - FIOAUXDD.SYS for mouse attachment
   - FIOSERDD.SYS for serial attachment
   - MAGCALLS.DLL
   - FIO.MSG
   - FIOH.MSG

Important

Support for the 4777 is provided in LANDP/DOS Version 3, LANDP/2 Version 3, and LANDP/6000 Version 2.1.

4.3.1 Magnetic Stripe Reader/Encoder (MSRE47##) Server

The LANDP magnetic stripe reader/encoder (MSRE47##) server enables the clients to access the magnetic stripe reader/encoder in a LANDP workgroup. This server provides the ability to share the device among the workstations in the workgroup.

A sample LANCONF.SPC is shown in Figure 21 on page 47. There are four workstations defined in Figure 21 on page 47:

Workstation AA

Workstation AA is an OS/2 workstation. This workstation contains the MSRE47## server and provides client services to itself and workstation BB.

Workstation BB

Workstation BB is a DOS workstation. This workstation receives client services for the MSRE47## server located in workstation AA.

Workstation CC

Workstation CC is an OS/2 workstation. This workstation contains the MSRE47## server and provides client services to itself (including MVDM-based applications).

Workstation DD

Workstation DD is a DOS workstation. This workstation contains the MSRE47## server and provides client services to itself.

```
/* Workgroup Definition. */
         LANCONF  GROUP=EHCCUS,
                  NAME=LANDPFD,
                  WSNAMES=(AA,BB,CC,DD)

/* ********************************************************************
/* Workgroup Definition for Station ID "AA" - OS/2 server/client
/* ********************************************************************
        LWSCONF   NAME=AA,
                  TYPE=OS/2,

        /* 4777 Magnetic Stripe Reader/Encoder server definition */
                  SERVER=(MSRE4701),
                  PAR&MSRE=(4777,1),

        /* 4777 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "BB" - DOS client
/* ********************************************************************
        LWSCONF   NAME=BB,
                  TYPE=DOS,

        /* 4777 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "CC" - OS/2 server, MVDM client
/* ********************************************************************
        LWSCONF   NAME=CC,
                  TYPE=OS/2,

        /* MVDM relay server definition */
                  SERVER=(EHCVDMGR,,),

        /* 4777 Magnetic Stripe Reader/Encoder server definition */
                  SERVER=(MSRE4702),
                  PAR&MSRE=(4777),

        /* 4777 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4702,CC)


/* ********************************************************************
/* Workgroup Definition for Station ID "DD" - DOS server/client
/* ********************************************************************
        LWSCONF   NAME=DD,
                  TYPE=DOS,

        /* 4777 Magnetic Stripe Reader/Encoder server definition */
                  SERVER=(MSRE4703),
                  PAR&MSRE=(4777),

        /* 4777 Magnetic Stripe Reader/Encoder client definition */
                  CLIENT=(MSRE4703,DD)
```

Figure 21. 4777 LANCONF.SPC File

SERVER=(MSRE47##)

This is the LANDP vector that is used to define the MSR/E server.

PAR&MSRE=(parm1,parm2)

Each MSR/E server requires a parameters vector to define the parameters associated with the MSR/E server. The MSR/E server parameters vector is defined as follows:

parm1 This parameter specifies the product attached to the workstation that provides the MSR/E device to be supported by the server.

The parameter is required. The parameter value can be:

4717 IBM 4717 Magnetic Stripe Reader/Encoder

4777 IBM 4777 Magnetic Stripe Reader/Encoder

4778 IBM 4778 PIN pad Magnetic Stripe Reader

parm2 This parameter specifies the COM port where the product that provides the MSR/E device will be attached.

The parameter applies only if either the 4777 or 4778 value was specified in parameter 1. The parameter value ranges from 1 to 4. The default COM port is **1**.

CLIENT=(MSRE47xx,parm1)

This is the LANDP vector that is used to define the MSR/E client.

xx is the session identifier.

parm1 This specifies the workstation that provides the service.

Chapter 5. 4778 PIN Pad Magnetic Stripe Reader

This chapter discusses the 4778 PIN pad magnetic stripe reader and how LANDP supports it.

5.1 Hardware Description

The 4778 is a PIN pad magnetic stripe reader that provides support for entering personal identification numbers (PINs). These PINs are encrypted using single-length or double-length encryption keys based on the Data Encryption Standard (DES) algorithm. Encryption support also extends to the ability to generate or verify message authentication codes (MACs). The 4778 also provides a 16-character display. The Models 1 and 3 also have an integrated magnetic stripe reader that reads magnetic stripe documents that the operator manually passes through it.

You can attach the 4778 to the serial port or the mouse port of an IBM PS/2 or PS/ValuePoint. You can also attach the 4717 or the 4777 magnetic strip readers/encoders to your workstation's mouse port along with the 4778 using a special Y connector. The 4777 and 4778 can also attach to the same serial port using a special Y connector.

The 4778 can also be attached to the 4704 Display Station.

The 4778 PIN pad magnetic stripe reader comes in three models.

Model 1 12-key PIN pad that also reads tracks 1 and 2 on credit and ID cards on a single pass.

Model 2 12-key PIN pad.

Model 3 12-key PIN pad that also reads tracks 1, 2, and 3 on credit and ID cards on a single pass.

Table 10 explains the different types of characteristics of the 4778 models.

Table 10. 4778 PIN Pad Magnetic Stripe Readers

Model	Read	PIN Support
001	Track 1: 75 or 210 bpi Track 2: 75 or 210 bpi	12-Key PIN Pad with 16-character display
002		12-Key PIN Pad with 16-character display
003	Track 1: 75 or 210 bpi Track 2: 75 or 210 bpi Track 3: 75 or 210 bpi	12-Key PIN Pad with 16-character display

Note: bpi = bits per inch

4778 Model 1 PIN Pad Magnetic Stripe Reader

The 4778 Model 1 reads tracks 1 and 2 on credit and ID cards in a single pass. This model has two read heads and it reads data encoded on track 1 and 2 at 75 or 210 bpi, in accordance with American National Standards Institute (ANSI) standards X4.16 - 1983 and International Standards Organization (ISO) standards 7810 and 7811/2-5.

The 12-key PIN pad is used to enter personal identification numbers (PINs) for validating transactions. The 4778 PIN pad support uses the Data Encryption Standard (DES) algorithm to encrypt the PIN information in accordance with the American National Standards Institute (ANSI) X9.8, IBM 3624 keyboard display, or IBM 4704 keyboard display formats.

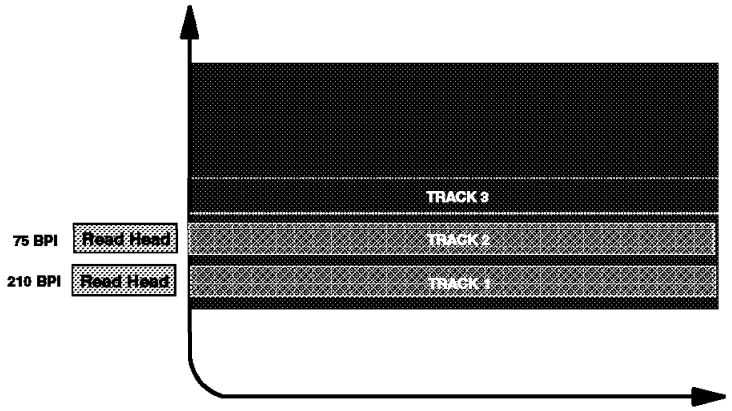

Figure 22. IBM 4778 Model 1 Reader

4778 Model 2 PIN Pad

The 4778 Model 2 is only a PIN pad device. The 12-key PIN pad is used to enter personal identification numbers (PINs) for validating transactions. The 4778 PIN pad support uses the Data Encryption Standard (DES) algorithm to encrypt the PIN information in accordance with the American National Standards Institute (ANSI) X9.8, IBM 3624 keyboard display, or IBM 4704 keyboard display formats.

4778 Model 3 PIN Pad Magnetic Stripe Reader

The 4778 Model 3 reads tracks 1, 2, and 3 on credit and ID cards in a single pass. This model has three read heads and it reads data encoded on track 1, 2, and 3 at 75 or 210 bpi, in accordance with American National Standards Institute (ANSI) standards X4.16 - 1983 and International Standards Organization (ISO) standards 7810 and 7811/2-5.

The 12-key PIN pad is used to enter personal identification numbers (PINs) for validating transactions. The 4778 PIN pad support uses the Data Encryption Standard (DES) algorithm to encrypt the PIN information in accordance with the American National Standards Institute (ANSI) X9.8, IBM 3624 keyboard display, or IBM 4704 keyboard display formats.

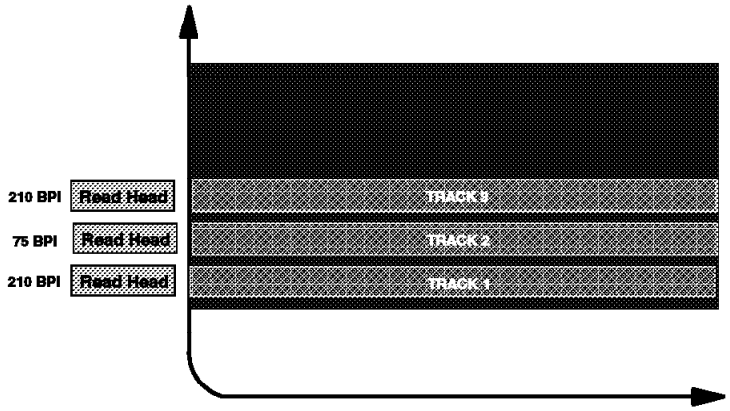

Figure 23. IBM 4778 Model 3 Reader

5.2 Configuring and Installing

This section will describe the required steps to install the IBM 4778 PIN pad magnetic stripe readers.

Note: You should read either the *4777 Magnetic Stripe Unit and 4778 PIN-Pad Magnetic Stripe Reader DOS Programming Guide*, SA34-2206 publication or the *4777 Magnetic Stripe Unit and 4778 PIN-Pad Magnetic Stripe Reader OS/2 Programming Guide*, SA34-2205 publication for detailed information about planning considerations for your own environment.

Important

The 4778 is a follow-on product to the 4718. If you are familiar with the 4718 you know that it is only a PIN pad device and requires a PIN pad device driver. The 4778 Models 1 and 3 also include a magnetic stripe reader. As a result, the Models 1 and 3 will require two device drivers, one to manage the PIN pad portion of the 4778 (similar to the 4718 device driver) and one to manage the magnetic stripe reader portion of the 4778.

The 4778 magnetic stripe reader can operate in one of the following two modes:

- Native 4778 MSR mode
- 4717/4777 Emulation Mode

As described in more detail later in this section, the device driver that you will load will depend on which mode you require.

5.2.1 DOS

The 4778 PIN pad magnetic stripe reader can be connected to either the mouse port or a serial port of a workstation. Each workstation to which the 4778 device attaches needs to load the associated device drivers in the CONFIG.SYS file.

Note: There is no installation program for the 4778 device drivers in DOS. As a result, you only need to copy the device drivers from the 4777/4778 DOS device driver diskette to your workstation.

You will create device loading statements for the 4778 that will need to be added to your CONFIG.SYS file.

Important

- The 4777 mouse port device driver also supports the 4717.
- The 4778 mouse port device driver also supports the 4718.

The format of this is as follows:

```
DEVICE={d:}{path}device driver {options}
```

Note: Brackets {} indicate optional parameters.

The device statement parameters are defined as follows:

{d:} The disk or diskette drive identifier.

{path} The directory search sequence for the disk or diskette that contains the device driver file.

device driver
The file name of the device driver that is to be loaded.

{options} The optional parameters that suppress automatic error messages, prevent the setting and return of error codes through DOS, and let you reassign the designated Cancel key. At least one blank must precede the options list and there cannot be any blanks between the options.

The options can be specified as follows:

```
/X/Y/Cx/K:val
```

or

```
/X/Y/Cx/K:0;val
```

Where `val` is a 1 to 3 decimal number.

The description of the optional parameters is as follows:

/X When certain problems are detected by the power-on test or during the subsequent operation, the device driver automatically displays error messages. The /X option suppresses these automatic screen messages. This means that your application program, not the device driver, must display the messages.

/Y When an error is detected in a function call or the operation is canceled, an error bit and error code are returned to DOS. This invokes the INT 24H critical-error handler. If you do not have an INT 24H handler, the DOS ABORT/RETRY/IGNORE message appears on the screen. The /Y option suppresses the setting of the error bit and error codes return to DOS.

Note: The /Y option suppresses the return of all error statuses from the device driver to DOS, and the carry flag is not set. Your application program must issue a Read Status request to check the results of all operations.

/Cx This option only applies when the 4778 and/or the 4777 is attached to a serial port. The x specifies the serial port to which the 4777/4778 is attached. The default serial port is 1 (for COM1).

/K Use the /K option to designate one of the keyboard keys as Cancel.

If the key you have designated as Cancel returns a standard ASCII code when you press it, use the /K:val form. The val represents the standard ASCII code.

If the key you have designated as Cancel returns an extended ASCII code when you press it, use the /K:0;val form. The val represents the extended ASCII code.

If you omit the /K option, the default Cancel key is the Esc key on your keyboard (val=27). This applies only to synchronous operation.

When the driver is in synchronous mode, all keystrokes other than the designated Cancel key are discarded. Therefore, if the driver is in synchronous mode, the keyboard will not be functional except to cancel the current magnetic stripe function request.

Attaching a 4778 to a Mouse Port

If you will be configuring the 4778 PIN pad magnetic stripe reader device to attach to the mouse port of a workstation then one or more of the following device statements will need to exist in the workstation′s CONFIG.SYS file.

In order to use the PIN pad portion of the 4778 the following device driver statement is required:

```
DEVICE=C:\PIN2DD.SYS
```

In order to use the Model 1 or model 3 magnetic stripe reader portion of the 4778 in native mode the following device driver statement is required:

```
DEVICE=C:\MSR2DD.SYS
```

In order to use the Model 1 or model 3 magnetic stripe reader portion of the 4778 in 4717/4777 emulation mode, thus replacing a 4717 or 4777 magnetic stripe reader, the following device driver statement is required:

```
DEVICE=C:\MSRE2DD.SYS /M
```

Notes:

1. Refer to Chapter 4, “4777 Magnetic Stripe Reader and Encoder” on page 37 for information about the MSRE2DD.SYS device driver.
2. You will also need to copy the 4778 PIN2DD.SYS and MSR2DD.SYS device drivers, as well as the 4777 MSRE2DD.SYS device driver, to the EHCD300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation′s diskette during the workstation generation process.

Attaching a 4778 to a Serial Port

If you will be configuring the 4778 PIN pad magnetic stripe reader device to attach to a serial port of a workstation then one or more of the following device statements will need to exist in the workstation's CONFIG.SYS file.

In order to use the PIN pad portion of the 4778 the following device driver statement is required:

```
DEVICE=C:\IBM4778P.SYS /Cx
```

Where x specifies the serial port to which the 4778 is attached.

In order to use the Model 1 or model 3 magnetic stripe reader portion of the 4778 in native mode the following device driver statement is required:

```
DEVICE=C:\IBM4778M.SYS /Cx
```

Where x specifies the serial port to which the 4778 is attached.

In order to use the Model 1 or model 3 magnetic stripe reader portion of the 4778 in 4717/4777 emulation mode, thus replacing a 4717 or 4777 magnetic stripe reader, the following device driver statement is required:

```
DEVICE=C:\IBM4777.SYS /Cx/M
```

Where x specifies the serial port to which the 4778 is attached.

Notes:

1. Refer to Chapter 4, "4777 Magnetic Stripe Reader and Encoder" on page 37 for information about the IBM4777.SYS device driver.
2. You will also need to copy the 4778 IBM4778P.SYS and IBM4778M.SYS device drivers, as well as the 4777 IBM4777.SYS device driver, to the EHCD300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation's diskette during the workstation generation process.

5.2.2 OS/2

The 4778 PIN pad magnetic stripe reader connects to either the mouse port or a serial port of a workstation. Each workstation to which the 4778 device attaches needs to load the associated device drivers in the CONFIG.SYS file.

In the OS/2 environment, there is a configuration program associated with the 4778.

Note: Refer to Appendix B, "4777/4778 Device Driver Customization for OS/2" on page 115, for a detailed explanation of device driver customization for OS/2.

The configuration program will create a device loading statements for the 4778 that will need to be added to your CONFIG.SYS file.

Important

The 4777/4778 mouse port device driver also supports the 4717 and 4718.

The format of the statement is as follows:

```
DEVICE={d:}{path}device driver {options}
```

Note: Brackets {} indicate optional parameters.

The device statement parameters are defined as follows:

{d:} The disk or diskette drive identifier.

{path} The directory search sequence for the disk or diskette that contains the device driver file.

device driver
The file name of the device driver that is to be loaded.

{options} The options can be specified as follows:

```
/M/P/Cx/S/W/I
```

Notes:

1. Optional parameters /P and /I are mutually exclusive.
2. Optional parameters /S and /M are mutually exclusive.
3. Optional parameters /S and /I are mutually exclusive.

The description of the optional parameters is as follows:

/M Indicates that a 4717 or 4777 MSR/E is attached. The device driver tests for a 4717 or 4777. If the device driver does not find a 4717 or 4777, it displays an error message. If it finds a 4717 or 4777 and it passes the self-test, the application program can access the device driver.

If the device driver finds a 4717 or 4777 and you do not specify the /M parameter, the device driver displays a specification error and the device driver is installed.

Note: Refer to Chapter 4, “4777 Magnetic Stripe Reader and Encoder” on page 37 for information about the 4777.

/P Indicates that a 4718 or 4778 PIN pad device is attached. The device driver tests for a 4718 or 4778.

Important

If you use the /P option with a 4778 attached to a mouse port then only the PIN pad portion of the 4778 will be enabled. For 4778 Models 1 or 3 attached to a mouse port, you can enable the magnetic stripe reader in native mode by using the /I option instead of the /P option.

If you want the 4778 magnetic stripe reader to operate in 4717/4777 emulation mode, thus replacing a 4717 or 4777, then use the /S option instead.

If the device driver does not find a 4718 or a 4778, it displays an error message. If it finds a 4718 or 4778 and the device passes the self-test, the application program can access the device driver.

If the device driver finds a 4718 or 4778 and you do not specify the /P parameter, the device driver displays a specification error and the device driver is installed.

/Cx This option only applies when the 4778 and/or 4777 is attached to a serial port. The x specifies the serial port to which the 4777/4778 is attached. The default serial port is 1 (for COM1).

/S This option allows you to attach a 4778 model 1 or model 3 to your workstation and use the magnetic stripe reader portion of the 4778 to emulate a 4717 or 4777. This allows you to replace a combination 4717 and 4718 with a single 4778 and not rewrite your application program that controls the magnetic stripe reader.

Note: Refer to Chapter 4, "4777 Magnetic Stripe Reader and Encoder" on page 37 for information about the 4777.

/I This option only applies when the 4778 model 1 or model 3 is attached to the mouse port. The device driver tests for a 4778. It will enable both the PIN pad portion and magnetic stripe reader portion of the 4778.

Important

In this case, the magnetic stripe reader will operate in native mode interface which is different than the 4717 or 4777 operating interface. If you want the 4778 magnetic stripe reader to *replace* a 4717 or 4777 then use the /S option instead of the /I option.

If the device driver does not find a 4778, it displays an error message. If it finds a 4778 and the device passes the self-test, the application program can access the device driver.

If the device driver finds a 4778 and you do not specify the /I parameter, the device driver displays a specification error and the device driver is installed.

Note: Refer to Chapter 4, "4777 Magnetic Stripe Reader and Encoder" on page 37 for information about the 4777.

/W This option causes the device driver operation to pause after displaying installing messages. The device driver waits indefinitely; you must press Enter to continue. The device driver displays installation messages when it detects an error in the operational environment (such as an error in the device or an error in the options that are specified).

Note: If the device driver detects a *critical* error during initialization, the device driver might not load into storage or it might not establish communication with the application program.

Attaching a 4778 to a Mouse Port

If you will be configuring the 4778 PIN pad magnetic stripe reader device to attach to the mouse port of a workstation then the following device statement will need to exist in the workstation′s CONFIG.SYS file:

```
DEVICE=C:\FIOAUXDD.SYS
```

In order to use the PIN pad portion of the 4778, the /P optional parameter for the FIOAUXDD.SYS device driver statement is required:

```
DEVICE=C:\FIOAUXDD.SYS /P
```

In order to use the model 1 or model 3 magnetic stripe reader portion of the 4778 in native mode, the /I optional parameter for the FIOAUXDD.SYS device driver statement is required:

```
DEVICE=C:\FIOAUXDD.SYS /I
```

Note: The /I parameter also implies the /P parameter, so the /P parameter is no longer required.

In order to use the model 1 or model 3 magnetic stripe reader portion of the 4778 in 4717/4777 emulation mode, thus replacing a 4717 or 4777 magnetic stripe reader, the /S optional parameter for the FIOAUXDD.SYS device driver statement is required:

```
DEVICE=C:\FIOAUXDD.SYS /S/P
```

Note: The /S parameter does not imply the /P parameter, so the /P parameter is still required.

Notes:

1. You will also need to copy FIOAUXDD.SYS, FIO.MSG, FIOH.MSG, PINCALLS.DLL, PINMSR.DLL, and MAGCALLS.DLL to the EHCO300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation′s diskette during the workstation generation process.
2. If you require LANDP to access the 4778 device from the multiple virtual DOS machine (MVDM) of OS/2 then you will need the FIOAUXDD.SYS device driver and the LANDP/2 multiple virtual DOS machine relay driver (EHCVDMVD.SYS) in the CONFIG.SYS file.

   The EHCVDMVD.SYS device driver will establish the link between LANDP client applications running in the MVDM and the FIOAUXDD.SYS device driver through the LANDP/2 supervisor.

Attaching a 4778 to a Serial Port

If you will be configuring the 4778 PIN pad magnetic stripe reader device to attach to a serial port of a workstation then the following device statement will need to exist in the workstation′s CONFIG.SYS file:

```
DEVICE=C:\FIOSERDD.SYS /Cx
```

Where x specifies the serial port to which the 4778 is attached.

In order to use the PIN pad portion of the 4778 and the the model 1 or model 3 magnetic stripe reader portion of the 4778 in native mode the /P optional parameter for the FIOSERDD.SYS device driver statement is required:

```
DEVICE=C:\FIOSERDD.SYS /Cx/P
```

In order to use the model 1 or model 3 magnetic stripe reader portion of the 4778 in 4717/4777 emulation mode, thus replacing a 4717 or 4777 magnetic stripe reader, the /S optional parameter for the FIOSERDD.SYS device driver statement is required:

```
DEVICE=C:\FIOSERDD.SYS /Cx/S/P
```

Note: The /S parameter does not imply the /P parameter, so the /P parameter is still required.

Notes:

1. You will also need to copy FIOSERDD.SYS, FIO.MSG, FIOH.MSG, PINCALLS.DLL, PINMSR.DLL, and MAGCALLS.DLL to the EHCO300 subdirectory of your LANDP customization workstation to ensure that the device driver is copied onto the correct LANDP workstation′s diskette during the workstation generation process.
2. If you require LANDP to access the 4778 device from the multiple virtual DOS machine (MVDM) of OS/2 then you will need the FIOSERDD.SYS device driver and the LANDP/2 multiple virtual DOS machine relay driver (EHCVDMVD.SYS) in the CONFIG.SYS file.

   The EHCVDMVD.SYS device driver will establish the link between LANDP client applications running in the MVDM and the FIOSERDD.SYS device driver through the LANDP/2 supervisor.

5.3 LANDP Customization

This section describes how to customize the magnetic stripe reader portion of the 4778 models 1 and 3 to work with LANDP.

Before you start your customization, make sure you have done the following:

1. Installed LANDP Version 3.0 and its fixes.
2. Copied the customized device drivers and other relevant files to the respective LANDP directories so that they will be available during the LANDP workstation configuration GETTING procedure. If not, copy the following:

   DOS drivers

   You should copy the following file to the LANDP EHCD300 subdirectory:

   - PIN2DD.SYS for Pin pad support when mouse attached
   - MSR2DD.SYS for native 4778 MSR support when mouse attached
   - MSRE2DD.SYS for 4717/4777 MSR emulation support when mouse attached
   - IBM4778P.SYS for Pin pad support when serial attached
   - IBM4778M.SYS for native 4778 MSR support when serial attached
   - IBM4777.SYS for 4717/4777 MSR emulation support when serial attached

   OS/2 drivers

   You should copy the following files to the LANDP EHCO300 subdirectory:

- FIOAUXDD.SYS for mouse attachment
- FIOSERDD.SYS for serial attachment
- PINCALLS.DLL
- MAGCALLS.DLL if supporting the magnetic stripe reader portion of the 4778 in 4717/4777 emulation mode
- PINMSR.DLL if supporting the magnetic stripe reader portion of the 4778 in native mode
- FIO.MSG
- FIOH.MSG

The LANDP server that will be used to communicate with the magnetic stripe reader portion of the 4778 depends on which mode (native or 4717/4777 emulation) has been implemented. In 4717/4777 emulation mode, LANDP will use the MSRE47## server to communicate with the magnetic stripe reader portion of the 4778. In native mode, LANDP will use the PINP47## server to communicate with the magnetic stripe reader portion of the 4778.

Important

Support for the 4778 is provided in LANDP/DOS Version 3, LANDP/2 Version 3, and LANDP/6000 Version 2.1.

5.3.1 Magnetic Stripe Reader/Encoder (MSRE47##) Server

The LANDP magnetic stripe reader/encoder (MSRE47##) server enables the clients to access the magnetic stripe reader portion of the 4778 in 4717/4777 emulation mode in a LANDP workgroup. This server provides the ability to share the device among the workstations in the workgroup.

A sample LANCONF.SPC is shown in Figure 24 on page 60. There are four workstations defined in Figure 24 on page 60:

Workstation AA
Workstation AA is an OS/2 workstation. This workstation contains the MSRE47## server and provides client services to itself and workstation BB.

Workstation BB
Workstation BB is a DOS workstation. This workstation receives client services for the MSRE47## server located in workstation AA.

Workstation CC
Workstation CC is an OS/2 workstation. This workstation contains the MSRE47## server and provides client services to itself (including MVDM-based applications).

Workstation DD
Workstation DD is a DOS workstation. This workstation contains the MSRE47## server and provides client services to itself.

```
/* Workgroup Definition. */
         LANCONF  GROUP=EHCCUS,
                  NAME=LANDPFD,
                  WSNAMES=(AA,BB,CC,DD)

/* ********************************************************************
/* Workgroup Definition for Station ID "AA" - OS/2 server/client
/* ********************************************************************
        LWSCONF   NAME=AA,
                  TYPE=OS/2,

        /* 4778 Magnetic Stripe Reader server definition */
                  SERVER=(MSRE4701),
                  PAR&MSRE=(4778,1),

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(MSRE4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "BB" - DOS client
/* ********************************************************************
        LWSCONF   NAME=BB,
                  TYPE=DOS,

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(MSRE4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "CC" - OS/2 server, MVDM client
/* ********************************************************************
        LWSCONF   NAME=CC,
                  TYPE=OS/2,

        /* MVDM relay server definition */
                  SERVER=(EHCVDMGR,,),

        /* 4778 Magnetic Stripe Reader server definition */
                  SERVER=(MSRE4702),
                  PAR&MSRE=(4778),

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(MSRE4702,CC)


/* ********************************************************************
/* Workgroup Definition for Station ID "DD" - DOS server/client
/* ********************************************************************
        LWSCONF   NAME=DD,
                  TYPE=DOS,

        /* 4778 Magnetic Stripe Reader server definition */
                  SERVER=(MSRE4703),
                  PAR&MSRE=(4778),

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(MSRE4703,DD)
```

Figure 24. 4778 LANCONF.SPC File

SERVER=(MSRE47##)

This is the LANDP vector that is used to define the MSR/E server.

PAR&MSRE=(parm1,parm2)

Each MSR/E server requires a parameters vector to define the parameters associated with the MSR/E server. The MSR/E server parameters vector is defined as follows:

parm1 This parameter specifies the product attached to the workstation that provides the MSR/E device to be supported by the server.

The parameter is required. The parameter value can be:

4717 IBM 4717 Magnetic Stripe Reader/Encoder

4777 IBM 4777 Magnetic Stripe Reader/Encoder

4778 IBM 4778 PIN pad Magnetic Stripe Reader

parm2 This parameter specifies the COM port where the product that provides the MSR/E device will be attached.

The parameter applies only if either the 4777 or 4778 value was specified in parameter 1. The parameter value ranges from 1 to 4. The default COM port is **1**.

CLIENT=(MSRE47xx,parm1)

This is the LANDP vector that is used to define the MSR/E client.

xx is the session identifier.

parm1 This specifies the workstation that provides the service.

5.3.2 PIN Pad (PINP47##) Server

The LANDP PIN pad (PINP47##) server enables the clients to access the magnetic stripe reader portion of the 4778 in native mode in a LANDP workgroup. This server provides the ability to share the device among the workstations in the workgroup.

A sample LANCONF.SPC is shown in Figure 25 on page 62. There are four workstations defined in Figure 25 on page 62:

Workstation AA

Workstation AA is an OS/2 workstation. This workstation contains the PINP47## server and provides client services to itself and workstation BB.

Workstation BB

Workstation BB is a DOS workstation. This workstation receives client services for the PINP47## server located in workstation AA.

Workstation CC

Workstation CC is an OS/2 workstation. This workstation contains the PINP47## server and provides client services to itself (including MVDM-based applications).

Workstation DD

Workstation DD is a DOS workstation. This workstation contains the PINP47## server and provides client services to itself.

```
/* Workgroup Definition. */
         LANCONF  GROUP=EHCCUS,
                  NAME=LANDPFD,
                  WSNAMES=(AA,BB,CC,DD)

/* ********************************************************************
/* Workgroup Definition for Station ID "AA" - OS/2 server/client
/* ********************************************************************
        LWSCONF   NAME=AA,
                  TYPE=OS/2,

        /* 4778 Magnetic Stripe Reader server definition */
                  SERVER=(PINP4701),
                  PAR&PINP=(4778,1,Y),

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(PINP4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "BB" - DOS client
/* ********************************************************************
        LWSCONF   NAME=BB,
                  TYPE=DOS,

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(PINP4701,AA)

/* ********************************************************************
/* Workgroup Definition for Station ID "CC" - OS/2 server, MVDM client
/* ********************************************************************
        LWSCONF   NAME=CC,
                  TYPE=OS/2,

        /* MVDM relay server definition */
                  SERVER=(EHCVDMGR,,),

        /* 4778 Magnetic Stripe Reader server definition */
                  SERVER=(PINP4702),
                  PAR&PINP=(4778,,Y),

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(PINP4702,CC)


/* ********************************************************************
/* Workgroup Definition for Station ID "DD" - DOS server/client
/* ********************************************************************
        LWSCONF   NAME=DD,
                  TYPE=DOS,

        /* 4778 Magnetic Stripe Reader server definition */
                  SERVER=(PINP4703),
                  PAR&PINP=(4778,,Y),

        /* 4778 Magnetic Stripe Reader client definition */
                  CLIENT=(PINP4703,DD)
```

Figure 25. 4778 LANCONF.SPC File

SERVER=(PINP47##)

This is the LANDP vector that is used to define the PIN pad server.

PAR&PINP=(parm1,parm2,parm3)

Each PIN pad server requires a parameters vector to define the parameters associated with the PIN pad server. The PIN pad server parameters vector is defined as follows:

parm1 This parameter specifies the product attached to the workstation that provides the PIN pad device to be supported by the server.

The parameter is required. The parameter value can be:

4718 IBM 4718 PIN pad

4778 IBM 4778 PIN pad Magnetic Stripe Reader

parm2 This parameter specifies the COM port where the product that provides the PIN pad device will be attached.

The parameter applies only if the 4778 value was specified in parameter 1. The parameter value ranges from 1 to 4. The default COM port is **1**.

parm3 This parameter specifies whether the magnetic stripe reader portion of the 4778 will be used in native mode.

The parameter applies only if the 4778 value was specified in parameter 1. The parameter value can be Y (yes) or N (no). The default is **Y**.

CLIENT=(PINP47xx,parm1)

This is the LANDP vector that is used to define the PIN pad client.

xx is the session identifier.

parm1 This specifies the workstation that provides the service.

Chapter 6. Magnetic Stripe Reader/Encoder Test Cases

This chapter provides test cases associated with using the 4717, 4777, or 4778 magnetic stripe reader and encoder functions in a LANDP workgroup.

Since there are two LANDP servers that provide magnetic stripe read and encode support (MSRE47## and PINP47##) we provide test cases using each.

In order to test your LANDP configuration, LANDP provides a program called SVPCPRB.EXE (System Verification Program). You will find this program available in both the EHCO300 or EHCD300 directories. If your workstation where the MSR/E device is attached is an OS/2 workstation then you should use the program which is in the LANDP customization workstation's EHCO300 directory. If the workstation is a DOS workstation then you should use the program in the LANDP customization workstation's EHCD300 directory.

Prior to running SVPCPRB to test your LANDP configuration do the following:

- Check the CONFIG.ADD file in each LANDP workstation configuration diskette and add the specified changes associated with the MSR/E device to the CONFIG.SYS file of the workstation where the MSR/E device is attached.
- Execute the AUTOFBSS.BAT (if DOS) or AUTOFBSS.CMD (if OS/2) command file that is located on the LANDP workstation diskette to load LANDP.

6.1 MSRE47## Test Cases

Once you have started SVPCPRB then you can execute the following LANDP functions:

IN Initialize LANDP

OP Open the MSRE47## server

EC Get read/encode capabilities

DV Set the MSR/E device parameters

WR Write data to the MSR/E device

CH Check Write status

AR Arm the MSR/E device to read

RD Read data from the MSR/E device

CL Close the MSRE47## server

EJ Disconnect client

The SVPCPRB screens associated with each of the functions are presented on the following pages.

6.1.1 The Initialize (IN) Function

This function enables a LANDP client application to connect to LANDP services and must be the first function request issued.

If the client is successfully initialized then you should see the LANDP workstation ID appear in the PC Identifier field. Also, both the Router Return Code and Server Return Code should be set to **OK**.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: IN    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: SPV                         Router Return Code: ..OK
       Request Parameter Length: 0              Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 6
       Reply Parameter Length: 0                Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   0.00
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
________________
Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 26. System Verification Program Screen for the IN Function

6.1.2 The Open (OP) Function

This function opens the MSRE47## server. In the Server name field you should enter the correct session identification name. In this screen, you will see the server identification name is **MSRE4701**.

If the server is successfully opened then you should see both the Router Return Code and Server Return Code set to **OK**.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: OP    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 11
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   1.35
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 27. System Verification Program Screen for the OP Function

6.1.3 The Get Read/Encode Capabilities (EC) Function

This function retrieves the MSR/E error counters and provides information about the read and encode capabilities of the attached MSR/E.

Note: Make sure you specify the Reply Data Length as 24 to ensure you get the read and encode capability information.

After processing the function request, the Reply Data Area will contain data. Since this data is unreadable hexadecimal data you will need to press the **F6** key to convert the fields to hexadecimal. Figure 28 presents the results for a 4717 or 4777 Model 3 after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: EC    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 24
       Reply Data Length: 24                    Elapsed time (secs.):   0.00
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
00000000000000000000000000000000000000000000000000060006_____________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________
Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = HEX   Insert OFF
```

Figure 28. System Verification Program Screen for the EC Function for Model 3

The read and encode capabilities are in decimal offset position 20 of the Reply Data Area. For the 4717/4777 Model 3, the read capabilities are described by the value 0006 and the encode capabilities are described by the value 0006. In both cases the low order nibble (half a byte) is used to determine the capabilities.

Table 11 on page 69 explains the values for a 4717/4777 Model 3.

Table 11. 4717/4777 Model 3 Read/Encode Characteristics			
	Low Order Nibble	**Binary Value**	**Description**
Read Capabilities	6	0110	• Bit0 = 0 = Unable to read track3 • Bit1 = 1 = Able to read track2 • Bit2 = 1 = Able to read track1 • Bit3 = 0 = Asynchronous mode
Encode Capabilities	6	0110	• Bit0 = 0 = Unable to encode track3 • Bit1 = 1 = Able to encode track2 • Bit2 = 1 = Able to encode track1 • Bit3 = 0 = Reserved

For the 4717/4777/4778 Model 1 the value would be 00060000. Table 12 explains the values for a 4717/4777/4778 Model 1.

Table 12. 4717/4777/4778 Model 1 Read/Encode Characteristics			
	Low Order Nibble	**Binary Value**	**Description**
Read Capabilities	6	0110	• Bit0 = 0 = Unable to read track3 • Bit1 = 1 = Able to read track2 • Bit2 = 1 = Able to read track1 • Bit3 = 0 = Asynchronous mode
Encode Capabilities	0	0000	• Bit0 = 0 = Unable to encode track3 • Bit1 = 0 = Unable to encode track2 • Bit2 = 0 = Unable to encode track1 • Bit3 = 0 = Reserved

For the 4717/4777 Model 2 the value would be 00030003. Table 13 explains the values for a 4717/4777 Model 2.

Table 13. 4717/4777 Model 2 Read/Encode Characteristics			
	Low Order Nibble	**Binary Value**	**Description**
Read Capabilities	3	0011	• Bit0 = 1 = Able to read track3 • Bit1 = 1 = Able to read track2 • Bit2 = 0 = Unable to read track1 • Bit3 = 0 = Asynchronous mode
Encode Capabilities	3	0011	• Bit0 = 1 = Able to encode track3 • Bit1 = 1 = Able to encode track2 • Bit2 = 0 = Unable to encode track1 • Bit3 = 0 = Reserved

For the 4717/4777 Model 4 the value would be 00030000. Table 14 on page 70 explains the values for a 4717/4777 model 4.

Table 14. 4717/4777 Model 4 Read/Encode Characteristics

	Low Order Nibble	Binary Value	Description
Read Capabilities	3	0011	• Bit0 = 1 = Able to read track3 • Bit1 = 1 = Able to read track2 • Bit2 = 0 = Unable to read track1 • Bit3 = 0 = Asynchronous mode
Encode Capabilities	0	0000	• Bit0 = 0 = Unable to encode track3 • Bit1 = 0 = Unable to encode track2 • Bit2 = 0 = Unable to encode track1 • Bit3 = 0 = Reserved

For the 4778 Model 3 the value would be 00070000. Table 15 explains the values for a 4778 model 3.

Table 15. 4778 Model 3 Read/Encode Characteristics

	Low Order Nibble	Binary Value	Description
Read Capabilities	7	0111	• Bit0 = 1 = Able to read track3 • Bit1 = 1 = Able to read track2 • Bit2 = 1 = Able to read track1 • Bit3 = 0 = Asynchronous mode
Encode Capabilities	0	0000	• Bit0 = 0 = Unable to encode track3 • Bit1 = 0 = Unable to encode track2 • Bit2 = 0 = Unable to encode track1 • Bit3 = 0 = Reserved

6.1.4 The Device Parameter (DV) Function

This function loads or retrieves MSR/E device parameters. You may use this function to select the track(s) to read or encode and to specify the characteristics of the tracks (parity, bits per character, start-of-message characters, end-of-message characters, etc.).

Note: Make sure you specify the Reply Data Length as 25.

In our example we specify an **R** at offset 0 of the Request Parameter Area in order to retrieve the existing device parameters.

After processing the function request, the Reply Data Area will contain data. Since this data is unreadable hexadecimal data you will need to press the **F6** key to convert the fields to hexadecimal. Figure 29 presents the results for a 4717 Model 3 after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: DV    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 25
       Reply Data Length: 25                    Elapsed time (secs.):   0.04
Request Parameter Area:
R_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
________________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
22020705051F1F000A02050B0D0F0C000602050B0D0F0C853C_____________________
_____________________________________________________________________________
_____________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  22         F7 = Reply -> Request              Hex-Ch = HEX   Insert OFF
```

Figure 29. System Verification Program Screen for the DV Function for 4717/4777 Model 3

The hexadecimal value in offset 0 of the Reply Data Area specifies the tracks that are enabled for read or encode. The low order nibble of the byte specifies the track(s) that will be encoded on an ensuing write function. The high order nibble of the byte specifies the track(s) that will be read on an ensuing read function. Table 16 on page 72 describes the purpose of each bit in the byte.

Table 16. Track Selection Bit Definitions	
Bit Number	**Purpose**
Bit 0	Encode track 3
Bit 1	Encode track 2
Bit 2	Encode track 1
Bit 3	Reserved
Bit 4	Read track 3
Bit 5	Read track 2
Bit 6	Read track 1
Bit 7	Reserved

Since the 4717/4777/4778 Model 1 can only read tracks 1 and 2 then the possible values for the byte are:

01000000 Read track 1.

00100000 Read track 2.

01100000 Read tracks 1 and 2.

Since the 4717/4777 Model 4 can only read tracks 2 and 3 then the possible values for the byte are:

00100000 Read track 2.

00010000 Read track 3.

00110000 Read tracks 2 and 3.

Since the 4778 Model 3 can read tracks 1, 2, and 3 then the possible values for the byte are:

01000000 Read track 1.

00100000 Read track 2.

00010000 Read track 3.

00110000 Read tracks 1 and 2.

01100000 Read tracks 1 and 3.

01010000 Read tracks 2 and 3.

01110000 Read tracks 1, 2, and 3.

Both the 4717/4777 Model 2 and 4717/4777 Model 3 are readers and encoders so the combinations become more complex.

Since the 4717/4777 Model 3 can read and encode tracks 1 and 2 then the possible values for the byte consist of a combination of the read nibble values and the encode nibble values.

The possible values for the read nibble are:

0100 Read track 1.

0010 Read track 2.

0110 Read tracks 1 and 2.

The possible values for the encode nibble are:

0100 Encode track 1.

0010 Encode track 2.

0110 Encode tracks 1 and 2.

Since the 4717/4777 Model 2 can read and encode tracks 2 and 3 then the possible values for the byte consist of a combination of the read nibble values and the encode nibble values.

The possible values for the read nibble are:

0010 Read track 2.

0001 Read track 3.

0011 Read tracks 2 and 3.

The possible values for the encode nibble are:

0010 Encode track 2.

0001 Encode track 3.

0011 Encode tracks 2 and 3.

The rest of the Reply Data Area describes the characteristics associated with each of the tracks. For a 4717/4777/4778 Model 1 the default track characteristics are:

Track 1 Characteristics 020705051F1F000A

Track 2 Characteristics 02050B0D0F0C853C

For a 4717/4777 Model 2 the default track characteristics are:

Track 2 Characteristics 02050B0D0F0C853C

Track 3 Characteristics 02050B0D0F0C853C

For a 4717/4777 Model 3 the default track characteristics are:

Track 1 Characteristics 020705051F1F000A

Track 2 Characteristics 02050B0D0F0C0006

For a 4717/4777 model 4 the default track characteristics are:

Track 2 Characteristics 02050B0D0F0C853C

Track 3 Characteristics 02050B0D0F0C853C

For a 4778 model 3 the default track characteristics are:

Track 1 Characteristics 020705051F1F000A

Track 2 Characteristics 02050B0D0F0C853C

Track 3 Characteristics 02050B0D0F0C853C

The format of the track characteristics data is the same for each track. Refer to Table 17 on page 74 for a description of these values.

Table 17. Track Characteristics

Reply Data Area Offset	Description
1	Data parity and longitudinal redundancy check (LRC) parity: **Value** **Description** **X′**00′ Odd data parity, odd LRC parity **X′**01′ Even data parity, even LRC parity **X′**02′ Odd data parity, even LRC parity **X′**03′ Even data parity, odd LRC parity
2	Bits per character (including parity bit): **Value** **Description** **X′**05′ 5 bits per character **X′**06′ 6 bits per character **X′**07′ 7 bits per character **X′**08′ 8 bits per character
3	Primary start-of-message (PSOM) character. This is used on the read to determine the start-of-message.
4	Alternate start-of-message (ASOM) character. This is used on the read to determine the start-of-message.
5	Primary end-of-message (PEOM) character. This is used on the read to determine the end-of-message.
6	Alternate end-of-message (AEOM) character. This is used on the read to determine the end-of-message.
7	Encoding format control: • If bit 7 is 1 then there will be a redundant record. • Bits 0 through 6 are the number of synchronization bits between the redundant records.
8	Number of synchronization bits prior to the first record.

Changing Track Characteristics

If you need to change any of the track characteristics or specify that different tracks be read or encoded then do the following:

1. While you are in hexadecimal mode, press the **F7** key to move the data from the Reply Data Area to the Request Data Area.
2. Change the desired bytes in the Request Data Area.
3. Delete the R in the Request Parameter Area and press Enter.

Important

Be very careful if you change any of a track′s characteristics, since the track will no longer conform to the ISO/DIN or IBM standards described in Table 7 on page 24.

6.1.5 The Write (WR) Function For the 4717/4777 Model 2

The 4717/4777 model 2 is primarily used with passbooks because it can encode tracks 2 or 3, but only has one encode head. As a result, you can:

- Encode track 2
- Encode track 3
- Encode both tracks 2 and 3 with the same value

If you try to encode different values on track 2 and track 3 then chances are that only the value that is encoded last will be available to be read.

In our test case we will encode the number 123 on track 2. The hexadecimal format of these numbers is X'010203'.

Since we are encoding a passbook on track 2 we should conform to the IBM specification for passbooks as described in 2.1.1, "IBM Specification for Passbooks" on page 16. This means that the start-of-message character is X'0B' and the end-of-message character is X'0F'. Also, to conform to the IBM standard, there needs to be a data header character of X'0A' prior to the data. Thus, the hexadecimal format of the data to be written is X'0B0A0102030F'.

Prior to writing the data we need to ensure that the MSR/E device parameters are correct using the DV function. The device parameters should be:

22020705051F1F000A**0205**0B0D0F0C**85**3C02050B0D0F0C853C

Where:

X'22' Signifies that track 2 will be enabled for read and encode.

X'02' Signifies odd data parity for track 2.

X'05' Signifies 5 bits per character for track 2.

X'85' Signifies redundant records for track 2.

Important

You can write almost anything to the magnetic stripe that you want. In fact, you can define your own format and standards for the tracks. Just make sure that the device parameters are set correctly for the format and standard you are using, since the problem will be reading the data on the stripe if it does not correspond to the MSR/E device parameters.

The write function will make the green indicator on the device flash until the passbook or credit card has been successfully encoded.

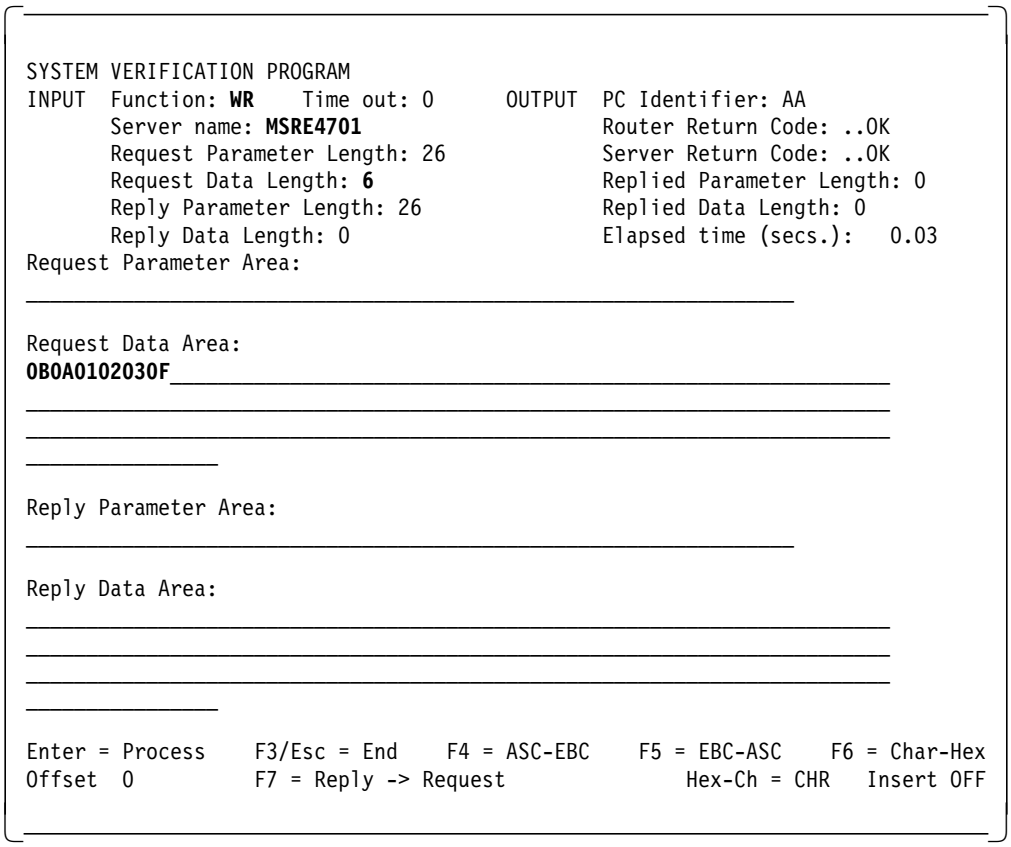

Figure 30. System Verification Program Screen for the WR Function for the 4717/4777 Model 2

6.1.6 The Write (WR) Function For the 4717/4777 Model 3

The 4717/4777 model 3 is primarily used with credit cards because it can encode tracks 1 and 2, and has two encoding heads. As a result, you can:

- Encode track 1
- Encode track 2
- Encode both tracks 1 and 2

You can encode different values on tracks 1 and 2 since there is an encoding head for each track.

In our test case we will encode the characters STEVE123 on track 1 and the number 123 on track 2. The hexadecimal format of STEVE123 on track 1 is X'3334253625111213' and the hexadecimal format of 123 on track 2 is X'010203'.

Since we are encoding a credit card we should conform to the ISO/DIN specifications for credit cards described in Chapter 2, "Magnetic Stripe Concepts" on page 15. For track 1 data this means that the start-of-message character is X'05' and the end-of-message character is X'1F'. For track 2 data this means that the start-of-message character is X'0B' and the end-of-message character is X'0F'. Also, since we will be encoding both track 1 and track 2 at the same time we will need to specify the length of each track's data. Thus, the hexadecimal format of the data to be written is X'0A05333425362511121 31F050B0102030F'.

Prior to writing the data we need to ensure that the MSR/E device parameters are correct using the DV function. The device parameters should be:

66020705051F1F**00**0A**0205**0B0D0F0C**00**0602050B0D0F0C853C

Where:

X'66' Signifies that tracks 1 and 2 will be enabled for read and encode.

X'02' Signifies odd data parity for track 1.

X'07' Signifies 7 bits per character for track 1.

X'00' Signifies no redundant records for track 1.

X'02' Signifies odd data parity for track 2.

X'05' Signifies 5 bits per character for track 2.

X'00' Signifies no redundant records for track 2.

Important

You can write almost anything to the magnetic stripe that you want. In fact, you can define your own format and standards for the tracks. Just make sure that the device parameters are set correctly for the format and standard you are using, since the problem will be reading the data on the stripe if it does not correspond to the MSR/E device parameters.

The write function will make the green indicator on the device flash until the passbook or credit card has been successfully encoded.

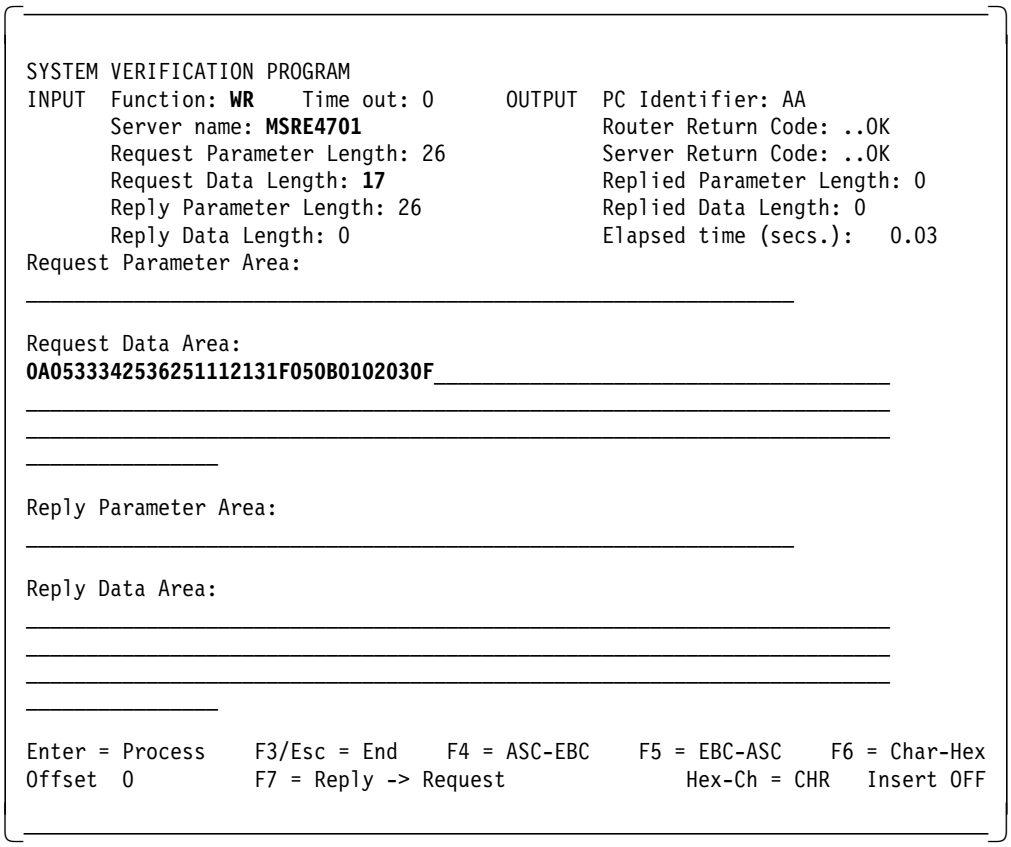

Figure 31. System Verification Program Screen for the WR Function for the 4717/4777 Model 3

6.1.7 The Check Status (CH) Function

After issuing a write function request you are required to check for a successful completion of the write by using the check status (CH) function. A return code of zero (OK) indicates that the write function completed successfully. A return code of P8 indicates that the write function is still in progress.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: CH    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   0.03
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = HEX   Insert OFF
```

Figure 32. System Verification Program Screen for the CH Function

6.1.8 The Arm Device (AR) Function

This function arms the MSR/E for reading. It will turn on the green indicator on the device and return the control to the application program. Once the green light is turned on you may swipe the passbook or the credit card through the MSR.

Prior to arming the device for a read we need to ensure that the MSR device parameters are correct using the DV function.

Also, we need to decide whether the format of the returned data should be in 4704 compatibility mode or not.

When you arm an MSR for reading you will need to specify the format of the data that will be passed to the client application. There are two types of formats:

4704 compatibility mode

The data returned for 4704 compatibility mode will consist of:

1. A one byte length field (excluding the X'00' byte).
2. A header byte of the value X'0E'.
3. A flag byte which indicates which track the data is from and whether there are multiple tracks read.
   - Bits 0 and 1
     - **00** Track 1 data
     - **01** Track 2 data
     - **10** Track 3 data
     - **11** Reserved
   - Bits 2 and 3
     - **00** Reserved
     - **01** Last record read
     - **10** First record read
     - **11** Only record read
4. The data read from the track (including the start-of-message and end-of-message indicators).
5. A terminating byte of the value X'00'.

If you read multiple tracks in a single read then the data will consist of:

1. A one byte length field for the first track read (excluding the X'00' byte).
2. A header byte of the value X'0E'.
3. A flag byte which indicates which track the data is from and whether there are multiple tracks read.
4. The data read from the first track (including the start-of-message and end-of-message indicators).
5. A one byte length field for the second track read (excluding the X'00' byte).
6. A header byte of the value X'0E'.

7. A flag byte which indicates which track the data is from and whether there are multiple tracks read.
8. The data read from the second track (including the start-of-message and end-of-message indicators).
9. A terminating byte of the value X'00'.

Non-4704 compatibility mode

The data returned for non-4704 compatibility mode will consist of:

1. A one byte length field (excluding the X'00' byte).
2. The data read from the track (including the start-of-message and end-of-message indicators).
3. A terminating byte of the value X'00'.

If you read multiple tracks in a single read then the data will consist of:

1. A one byte length field for the first track read (excluding the X'00' byte).
2. The data read from the first track (including the start-of-message and end-of-message indicators).
3. A one byte length field for the second track read (excluding the X'00' byte).
4. The data read from the second track (including the start-of-message and end-of-message indicators).
5. A terminating byte of the value X'00'.

To enable 4704 compatibility mode specify a **C** at offset 0 of the Request Parameter Area.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: AR    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   1.47
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
________________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = HEX   Insert OFF
```

Figure 33. System Verification Program Screen for the AR Function

6.1.9 The Read (RD) Function For Passbooks

The 4717/4777 models 2 and 4 are primarily used with passbooks because they can read tracks 2 and 3. As a result, you can either:

- Read track 2
- Read track 3
- Read both tracks 2 and 3

  This might require swiping the passbook through the MSR twice.

This function reads data from the MSR buffer and formats the data based on the 4704 compatibility mode indicator that was specified in the arm (AR) function and places the formatted data into the Reply Data Area.

Reading the data previously written to the passbook's track 2, Figure 34 presents the non-4704 compatibility mode results after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: RD    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 8
       Reply Data Length: 100                   Elapsed time (secs.):   0.03
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
________________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
060B0A0102010F00_____________________________________________________
_____________________________________________________________________
_____________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 34. RD Function for Passbooks in Non-4704 Compatibility Mode

Where:

06 Length of data (excluding X'00')

0B Start-of-message character

0A Data header character

010203 Characters 123

0F End-of-message character

00 Terminating character

Reading the data previously written to the passbook's track 2, Figure 35 presents the 4704 compatibility mode results after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: RD    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 10
       Reply Data Length: 100                   Elapsed time (secs.):   0.03
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
080E0D0B0A0102010F00_________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 35. RD Function for Passbooks in 4704 Compatibility Mode

Where:

08 Length of data (excluding X'00')

0E 4704 compatibility mode header character

0D Binary 00001101, where 11 signifies only record read and 01 signifies track 2 data read

0B Start-of-message character

0A Data header character

010203 Characters 123

0F End-of-message character

00 Terminating character

6.1.10 The Read (RD) Function For Credit Cards

The 4717/4777 models 1 and 3 and the 4778 models 1 and 3 are primarily used with credit cards because they can read tracks 1 and 2. As a result, you can either:

- Read track 1
- Read track 2
- Read both tracks 1 and 2 with one swipe

Note: The 4778 model 3 can also read track 3.

This function reads data from the MSR buffer and formats the data based on the 4704 compatibility mode indicator that was specified in the arm (AR) function and places the formatted data into the Reply Data Area.

Reading the data previously written to the credit card's tracks 1 and 2, Figure 36 presents the non-4704 compatibility mode results after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: RD    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 18
       Reply Data Length: 100                   Elapsed time (secs.):   0.03
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
0A05333425362511121 31F050B0102030F00_____________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 36. RD Function for Credit Cards in Non-4704 Compatibility Mode

Where:

0A Length of first track data (excluding X'00')

05 Start-of-message character

3334253625111212
Characters STEVE123

1F End-of-message character

05 Length of second track data (excluding X'00')

0B Start-of-message character

010203 Characters 123

0F End-of-message character

00 Terminating character

Reading the data previously written to the credit card's tracks 1 and 2, Figure 37 presents the 4704 compatibility mode results after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: RD    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 22
       Reply Data Length: 100                   Elapsed time (secs.):   0.03
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
0C0E080533342536251112131F070E050B0102030F00_____________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 37. RD Function for Credit Cards in 4704 Compatibility Mode

Where:

0C Length of first track data (excluding X'00')

0E 4704 compatibility mode header character

08 Binary 00001000, where 10 signifies first record read and 00 signifies track 1 data read

05 Start-of-message character

3334253625111212
Characters STEVE123

1F End-of-message character

07 Length of second track data (excluding X'00')

0E	4704 compatibility mode header character
05	Binary 00000101, where 01 signifies last record read and 01 signifies track 2 data read
0B	Start-of-message character
010203	Characters 123
0F	End-of-message character
00	Terminating character

6.1.11 The Close (CL) Function

This function closes the MSRE47## server. If you do not perform this function then the other clients that share this server will not be able to open the server.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: CL    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: MSRE4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 11
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   0.12
Request Parameter Area:
____________________________________________________________

Request Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________

Reply Parameter Area:
____________________________________________________________

Reply Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 38. System Verification Program Screen for the CL Function

6.1.12 The End Application Program (EJ) Function

This function allows a LANDP client application to disconnect from the LANDP services.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: CL    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: SPV                         Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 11
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   0.12
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 39. System Verification Program Screen for the EJ Function

6.2 PINP47## Test Cases

Once you have started SVPCPRB then you can execute the following LANDP functions:

IN Initialize LANDP

OP Open the PINP47## server

EC Get read/encode capabilities

DV Set the MSR device parameters

AR Arm the MSR device to read

RD Read data from the MSR device

CL Close the PINP47## server

EJ Disconnect client

The SVPCPRB screens associated with each of the functions are presented on the following pages.

6.2.1 The Initialize (IN) Function

This function enables a LANDP client application to connect to LANDP services and must be the first function request issued.

If the client is successfully initialized then you should see the LANDP workstation ID appear in the PC Identifier field. Also, both the Router Return Code and Server Return Code should be set to **OK**.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: IN    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: SPV                         Router Return Code: ..OK
       Request Parameter Length: 0              Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 6
       Reply Parameter Length: 0                Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   0.00
Request Parameter Area:
____________________________________________________________

Request Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________
Reply Parameter Area:
____________________________________________________________

Reply Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 40. System Verification Program Screen for the IN Function

6.2.2 The Open (OP) Function

This function opens the PINP47## server. In the Server name field you should enter the correct session identification name. In this screen, you will see the server identification name is **PINP4701**.

If the server is successfully opened then you should see both the Router Return Code and Server Return Code set to **OK**.

Since the PINP47## server controls the 4778 PIN Pad component and the 4778 magnetic stripe component, the server must be told which session to open. Offset 0 in the Request Data Area is set to **S** to cause the MSR session to be opened.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: OP    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: PINP4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 11
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   1.35
Request Parameter Area:
S_______________________________________________________________

Request Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________

Reply Parameter Area:
_____________________________________________________________________

Reply Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 41. System Verification Program Screen for the OP Function

6.2.3 The Get Read/Encode Capabilities (EC) Function

This function retrieves the MSR error counters and provides information about the read and encode capabilities of the attached MSR.

Note: Make sure you specify the Reply Data Length as 24 to ensure you get the read and encode capability information.

After processing the function request, the Reply Data Area will contain data. Since this data is unreadable hexadecimal data you will need to press the **F6** key to convert the fields to hexadecimal. Figure 42 presents the results for a 4778 model 3 after pressing the **F6** key to convert the fields to hexadecimal.

```
INPUT  Function: EC    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: PINP4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 24
       Reply Data Length: 24                    Elapsed time (secs.):   0.00
Request Parameter Area:
_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
________________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
00000000000000000000000000000000000000000000000070000_____________________
_____________________________________________________________________________
_____________________________________________________________________________
________________
Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = HEX   Insert OFF
```

Figure 42. System Verification Program Screen for the EC Function For 4778 Model 3

The read and encode capabilities are in decimal offset position 20 of the Reply Data Area. For the 4778 model 3, the read capabilities are described by the value 0007 and the encode capabilities are described by the value 0000. In both cases the low order nibble (half a byte) is used to determine the capabilities. Table 18 on page 94 explains the values for a 4778 model 3.

Table 18. 4778 Model 3 Read/Encode Characteristics

	Low Order Nibble	Binary Value	Description
Read Capabilities	7	0111	• Bit0 = 1 = Able to read track3 • Bit1 = 1 = Able to read track2 • Bit2 = 1 = Able to read track1 • Bit3 = 0 = Asynchronous mode
Encode Capabilities	0	0000	• Bit0 = 0 = Unable to encode track3 • Bit1 = 0 = Unable to encode track2 • Bit2 = 0 = Unable to encode track1 • Bit3 = 0 = Reserved

For the 4778 model 1 the value would be 00060000. Table 19 explains the values for a 4778 model 1.

Table 19. 4778 Model 1 Read/Encode Characteristics

	Low Order Nibble	Binary Value	Description
Read Capabilities	6	0110	• Bit0 = 0 = Unable to read track3 • Bit1 = 1 = Able to read track2 • Bit2 = 1 = Able to read track1 • Bit3 = 0 = Asynchronous mode
Encode Capabilities	0	0000	• Bit0 = 0 = Unable to encode track3 • Bit1 = 0 = Unable to encode track2 • Bit2 = 0 = Unable to encode track1 • Bit3 = 0 = Reserved

6.2.4 The Device Parameter (DV) Function

This function loads or retrieves MSR device parameters. You may use this function to select the track(s) to read and to specify the characteristics of the tracks (parity, bits per character, start-of-message characters, end-of-message characters, etc.).

Note: Make sure you specify the Reply Data Length as 25.

In our example we specify an **R** at offset 0 of the Request Parameter Area in order to retrieve the existing device parameters.

After processing the function request, the Reply Data Area will contain data. Since this data is unreadable hexadecimal data you will need to press the **F6** key to convert the fields to hexadecimal. Figure 43 presents the results for a 4778 model 3 after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: DV    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: PINP4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 25
       Reply Data Length: 25                    Elapsed time (secs.):   0.04
Request Parameter Area:
R_______________________________________________________________

Request Data Area:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
________________

Reply Parameter Area:
_____________________________________________________________

Reply Data Area:
20020705051F1F000A02050B0D0F0C853C02050B0D0F0C853C_____________________
_____________________________________________________________________
_____________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  22         F7 = Reply -> Request              Hex-Ch = HEX   Insert OFF
```

Figure 43. System Verification Program Screen for the DV Function for 4778 Model 3

The hexadecimal value in offset 0 of the Reply Data Area specifies the tracks that are enabled for read or encode. The low order nibble of the byte specifies the track(s) that will be encoded on an ensuing write function. The high order nibble of the byte specifies the track(s) that will be read on an ensuing read function. Table 20 on page 96 describes the purpose of each bit in the byte.

Table 20. Track Selection Bit Definitions

Bit Number	Purpose
Bit 0	Encode track 3
Bit 1	Encode track 2
Bit 2	Encode track 1
Bit 3	Reserved
Bit 4	Read track 3
Bit 5	Read track 2
Bit 6	Read track 1
Bit 7	Reserved

Since the 4778 model 1 can only read tracks 1 and 2 then the possible values for the byte are:

01000000 Read track 1.

00100000 Read track 2.

01100000 Read tracks 1 and 2.

Since the 4778 model 3 can read tracks 1, 2, and 3 then the possible values for the byte are:

01000000 Read track 1.

00100000 Read track 2.

00010000 Read track 3.

00110000 Read tracks 1 and 2.

01100000 Read tracks 1 and 3.

01010000 Read tracks 2 and 3.

01110000 Read tracks 1, 2, and 3.

The rest of the Reply Data Area describes the characteristics associated with each of the tracks. For a 4778 model 1 the default track characteristics are:

Track 1 Characteristics 020705051F1F000A

Track 2 Characteristics 02050B0D0F0C853C

For a 4778 model 3 the default track characteristics are:

Track 1 Characteristics 020705051F1F000A

Track 2 Characteristics 02050B0D0F0C853C

Track 3 Characteristics 02050B0D0F0C853C

The format of the track characteristics data is the same for each track. Refer to Table 21 on page 97 for a description of these values.

Table 21. Track Characteristics

Reply Data Area Offset	Description
1	Data parity and longitudinal redundancy check (LRC) parity: **Value** **Description** **X′**00′ Odd data parity, odd LRC parity **X′**01′ Even data parity, even LRC parity **X′**02′ Odd data parity, even LRC parity **X′**03′ Even data parity, odd LRC parity
2	Bits per character (including parity bit): **Value** **Description** **X′**05′ 5 bits per character **X′**06′ 6 bits per character **X′**07′ 7 bits per character **X′**08′ 8 bits per character
3	Primary start-of-message (PSOM) character. This is used on the read to determine the start-of-message.
4	Alternate start-of-message (ASOM) character. This is used on the read to determine the start-of-message.
5	Primary end-of-message (PEOM) character. This is used on the read to determine the end-of-message.
6	Alternate end-of-message (AEOM) character. This is used on the read to determine the end-of-message.
7	Encoding format control: • If bit 7 is 1 then there will be a redundant record. • Bits 0 through 6 are the number of synchronization bits between the redundant records.
8	Number of synchronization bits prior to the first record.

Changing Track Characteristics

If you need to change any of the track characteristics or specify that different tracks be read or encoded then do the following:

1. While you are in hexadecimal mode, press the **F7** key to move the data from the Reply Data Area to the Request Data Area.
2. Change the desired bytes in the Request Data Area.
3. Delete the R in the Request Parameter Area and press Enter.

Important

Be very careful if you change any of a track′s characteristics, since the track will no longer conform to the ISO/DIN or IBM standards described in Table 7 on page 24.

6.2.5 The Arm Device (AR) Function

This function arms the MSR for reading. It will turn on the arrow on the display that points to the green indicator on the device and return the control to the application program. Once the green indicator is turned on you may swipe the credit card through the MSR.

Prior to arming the device for a read we need to ensure that the MSR device parameters are correct using the DV function.

Also, we need to decide whether the format of the returned data should be in 4704 compatibility mode or not.

When you arm an MSR for reading you will need to specify the format of the data that will be passed to the client application. There are two types of formats:

4704 compatibility mode

The data returned for 4704 compatibility mode will consist of:

1. A one byte length field (excluding the X'00' byte).
2. A header byte of the value X'0E'.
3. A flag byte which indicates which track the data is from and whether there are multiple tracks read.
   - Bits 0 and 1
     - **00** Track 1 data
     - **01** Track 2 data
     - **10** Track 3 data
     - **11** Reserved
   - Bits 2 and 3
     - **00** Reserved
     - **01** Last record read
     - **10** First record read
     - **11** Only record read
4. The data read from the track (including the start-of-message and end-of-message indicators).
5. A terminating byte of the value X'00'.

If you read multiple tracks in a single read then the data will consist of:

1. A one byte length field for the first track read (excluding the X'00' byte).
2. A header byte of the value X'0E'.
3. A flag byte which indicates which track the data is from and whether there are multiple tracks read.
4. The data read from the first track (including the start-of-message and end-of-message indicators).
5. A one byte length field for the second track read (excluding the X'00' byte).
6. A header byte of the value X'0E'.

7. A flag byte which indicates which track the data is from and whether there are multiple tracks read.
8. The data read from the second track (including the start-of-message and end-of-message indicators).
9. A terminating byte of the value X'00'.

Non-4704 compatibility mode

The data returned for non-4704 compatibility mode will consist of:

1. A one byte length field (excluding the X'00' byte).
2. The data read from the track (including the start-of-message and end-of-message indicators).
3. A terminating byte of the value X'00'.

If you read multiple tracks in a single read then the data will consist of:

1. A one byte length field for the first track read (excluding the X'00' byte).
2. The data read from the first track (including the start-of-message and end-of-message indicators).
3. A one byte length field for the second track read (excluding the X'00' byte).
4. The data read from the second track (including the start-of-message and end-of-message indicators).
5. A terminating byte of the value X'00'.

To enable 4704 compatibility mode specify a **C** at offset 1 of the Request Parameter Area.

Since the PINP47## server controls the 4778 PIN Pad component and the 4778 magnetic stripe component, the server must be told which session to arm. Offset 0 in the Request Data Area is set to **S** to cause the MSR session to be armed.

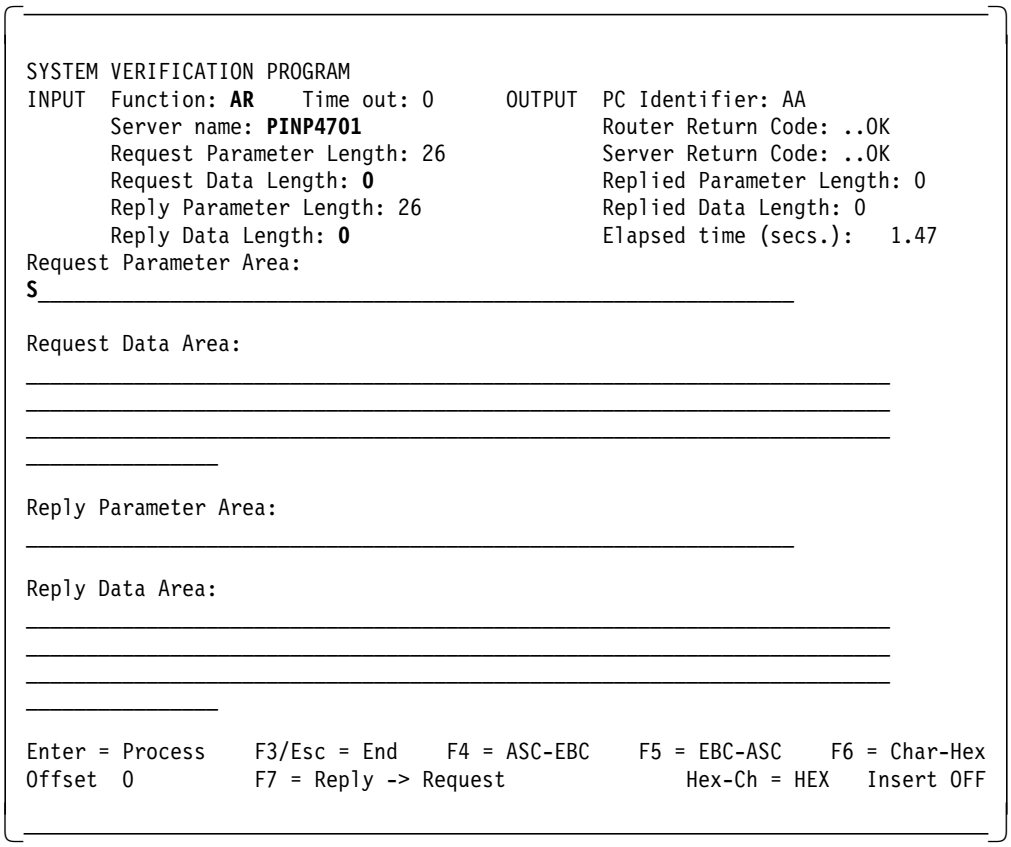

Figure 44. System Verification Program Screen for the AR Function

6.2.6 The Read (RD) Function For Credit Cards

The 4778 models 1 and 3 are primarily used with credit cards because they can read tracks 1 and 2. As a result, you can either:

- Read track 1
- Read track 2
- Read both tracks 1 and 2 with one swipe

Note: The 4778 model 3 can also read track 3.

This function reads data from the MSR buffer and formats the data based on the 4704 compatibility mode indicator that was specified in the arm (AR) function and places the formatted data into the Reply Data Area.

Since the PINP47## server controls the 4778 PIN Pad component and the 4778 magnetic stripe component, the server must be told which session to read. Offset 0 in the Request Data Area is set to **S** to cause the MSR session to be read.

Reading the data previously written to the credit card's tracks 1 and 2, Figure 45 presents the non-4704 compatibility mode results after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: RD    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: PINP4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 18
       Reply Data Length: 100                   Elapsed time (secs.):   0.03
Request Parameter Area:
S_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Reply Parameter Area:
S_____________________________________________________________

Reply Data Area:
0A0533342536251112131F050B0102030F00_____________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_______________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 45. RD Function for Credit Cards in Non-4704 Compatibility Mode

Where:

0A Length of first track data (excluding X'00')

05 Start-of-message character

3334253625111212
Characters STEVE123

1F End-of-message character

05 Length of second track data (excluding X'00')

0B Start-of-message character

010203 Characters 123

0F End-of-message character

00 Terminating character

Reading the data previously written to the credit cards's tracks 1 and 2, Figure 46 presents the 4704 compatibility mode results after pressing the **F6** key to convert the fields to hexadecimal.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: RD    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: PINP4701                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 0
       Reply Parameter Length: 26               Replied Data Length: 22
       Reply Data Length: 100                   Elapsed time (secs.):   0.03
Request Parameter Area:
S_____________________________________________________________

Request Data Area:
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
________________

Reply Parameter Area:
S_____________________________________________________________

Reply Data Area:
0C0E080533342536251112131F070E050B0102030F00_____________________________
_____________________________________________________________________________
_____________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 46. RD Function for Credit Cards in 4704 Compatibility Mode

Where:

0C Length of first track data (excluding X'00')

0E 4704 compatibility mode header character

08 Binary 00001000, where 10 signifies first record read and 00 signifies track 1 data read

05 Start-of-message character

3334253625111212

Characters STEVE123

1F End-of-message character

07 Length of second track data (excluding X'00')

0E 4704 compatibility mode header character

05 Binary 00000101, where 01 signifies last record read and 01 signifies track 2 data read

0B Start-of-message character

010203 Characters 123

0F End-of-message character

00 Terminating character

6.2.7 The Close (CL) Function

This function closes the PINP47## server. If you do not perform this function then the other clients that share this server will not be able to open the server.

Since the PINP47## server controls the 4778 PIN Pad component and the 4778 magnetic stripe component, the server must be told which session to close. Offset 0 in the Request Data Area is set to **S** to cause the MSR session to be closed.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: CL    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: PINP47O1                    Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 11
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   0.12
Request Parameter Area:
S_______________________________________________________________

Request Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________

Reply Parameter Area:
_______________________________________________________________

Reply Data Area:
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 47. System Verification Program Screen for the CL Function

6.2.8 The End Application Program (EJ) Function

This function allows a LANDP client application to disconnect from the LANDP services.

```
SYSTEM VERIFICATION PROGRAM
INPUT  Function: CL    Time out: 0      OUTPUT  PC Identifier: AA
       Server name: SPV                         Router Return Code: ..OK
       Request Parameter Length: 26             Server Return Code: ..OK
       Request Data Length: 0                   Replied Parameter Length: 11
       Reply Parameter Length: 26               Replied Data Length: 0
       Reply Data Length: 0                     Elapsed time (secs.):   0.12
Request Parameter Area:
____________________________________________________________

Request Data Area:
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
________________

Reply Parameter Area:
____________________________________________________________

Reply Data Area:
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
________________

Enter = Process    F3/Esc = End    F4 = ASC-EBC    F5 = EBC-ASC    F6 = Char-Hex
Offset  0          F7 = Reply -> Request              Hex-Ch = CHR   Insert OFF
```

Figure 48. System Verification Program Screen for the EJ Function

Appendix A. 4700 Financial I/O Device Drivers for OS/2

All IBM financial devices are shipped with a set of diskettes that are to be used when the device is installed. This appendix will describe how to install these various type of financial devices for use in OS/2 and in the OS/2 multiple virtual DOS machine (MVDM) using the 4700 Financial I/O Device Drivers for OS/2 diskette.

- 4712 financial printer
- 4722 financial printer
- 4009 financial printer (emulating a 4722 printer)
- 9055 model 2 financial printer (emulating a 4722 printer)
- 4717 Magnetic Stripe Reader/Encoder (MSR/E)
- 4718 Personal Identification Number (PIN) Pad

Note: Make sure you have the latest level of the device driver diskette.

All financial devices can be used in one of the following two manners:

Locally attached devices
In this manner the devices will only be available to applications that execute in the same workstation where the device is attached.

Network attached devices
In this manner the devices will be available to applications that execute:

- Locally, in the same workstation where the device is attached
- Remotely, in other workstations that are network connected to the workstation where the device are attached

In order for a remote application to access a device there must be some type of network enabling software that will provide a mechanism for the request from the application to be transported across the network to the device. LANDP provides this ability.

With LANDP a network attached device can be:

Pooled The network device will provide services to all LANDP clients in the network.

Shared (only for financial printers)
The network printer will provide services to two LANDP clients in the network through the use of the Start 1 and Start 2 keys on the printer.

In order to install the various 4700 device drivers for OS/2:

1. Insert the 4700 Financial I/O diskette for OS/2 into the A: drive and type the following from an OS/2 window:

   ```
   A:\FINSTALL
   ```

   Note: It is recommended that you read the README.DOC file prior to installation. All the current changes and the fixes that are to be applied are explained in this file.

   Figure 49 on page 108 will then be presented.

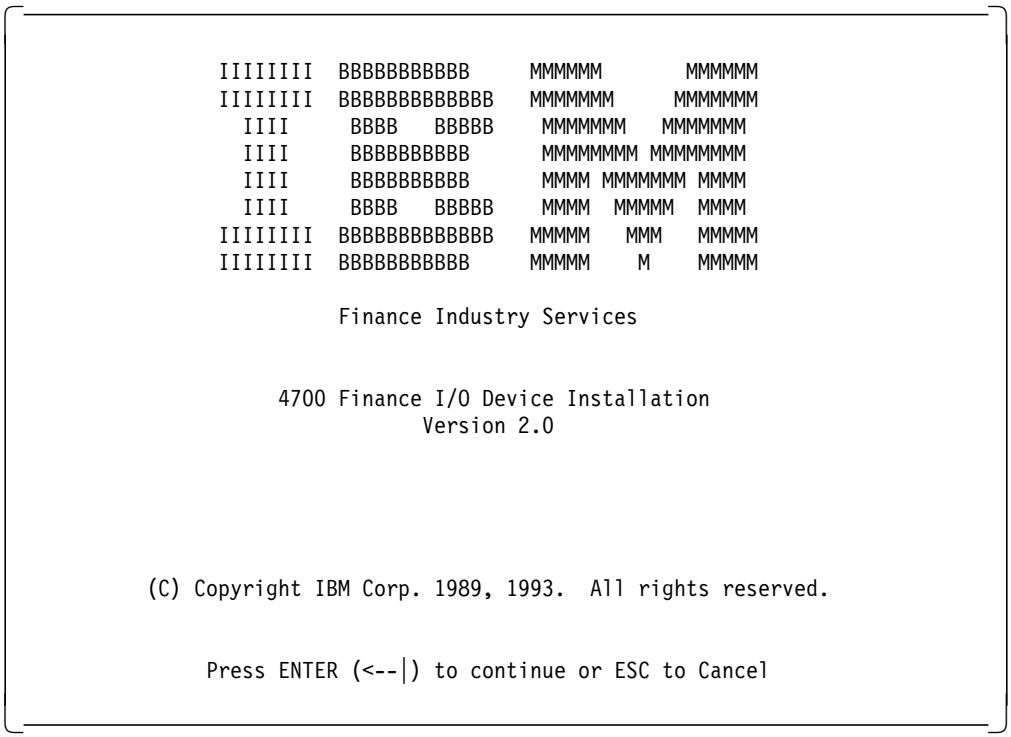

Figure 49. OS/2 Device Driver Installation

2. Press Enter and Figure 50 will be presented.

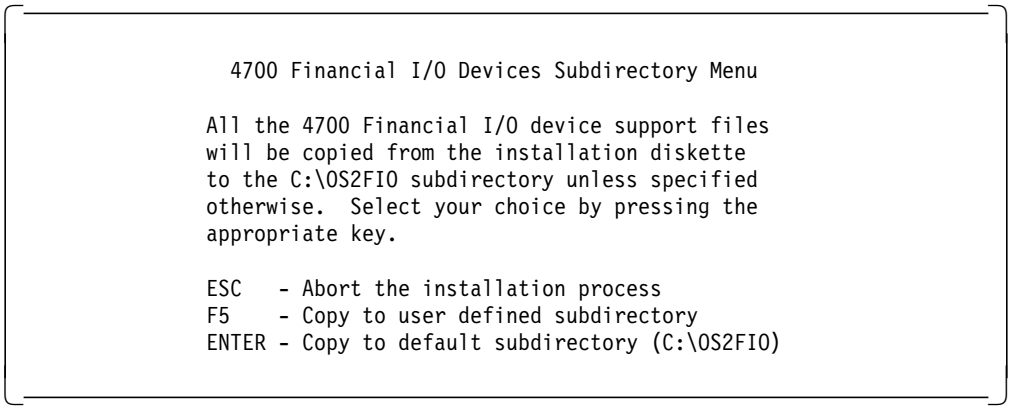

Figure 50. 4700 Financial I/O Devices Subdirectory Menu

As shown in Figure 50, all device driver files are copied to the specified directory. The default subdirectory is C:\OS2FIO. By pressing **F5** you can change the default directory.

3. Press Enter and Figure 51 on page 109 will be presented.

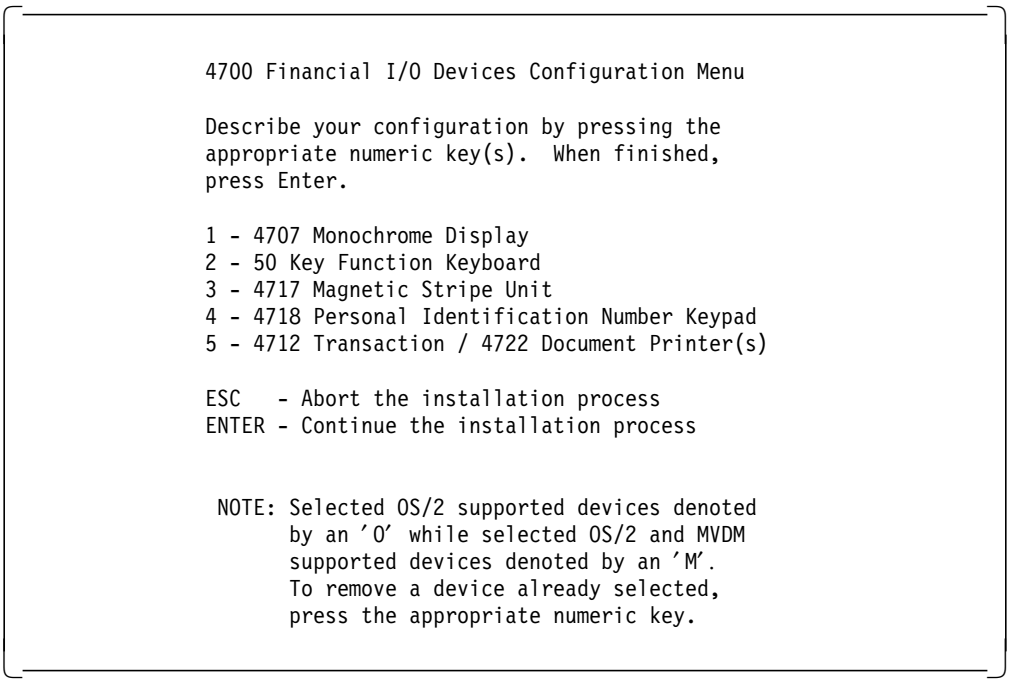

Figure 51. 4700 Financial I/O Devices Configuration Menu

As shown in Figure 51, you need to select the desired option:

1 Installation of 4707 Displays

2 Installation of 50 Key Function Keyboard

3 Installation of 4717 Magnetic Stripe Unit

4 Installation of 4718 Personal Identification Number Keypad

5 Installation of 4712 Transaction/4722 Document Printer(s)

Notes:

a. This option will be used with the 4009 or 9055 model 2 financial printers also.

b. A maximum of eight serially attached printers can be supported by OS/2.

c. A maximum of four serially attached printers can be supported by the OS/2 MVDM.

After selecting the desired option press Enter to continue.

A.1 Installing the 4717 Driver

The following steps describe the installation process for the magnetic stripe reader/encoder:

1. Assuming that you selected option **3** on Figure 51 then Figure 52 on page 110 will be presented.

```
                4717 Magnetic Stripe Support Menu

              Select the support desired by pressing the
              appropriate numeric key(s).  When finished,
              press Enter.

            * 1 - OS/2 Support
            * 2 - MVDM Support

              ESC   - Abort the installation process
              ENTER - Continue the installation process


                NOTE: Support active denoted by an '*'.
                      To de-activate support, press the
                      appropriate numeric key.
```

Figure 52. 4717 Magnetic Stripe Support Menu

As shown in Figure 52, you need to select the desired option:

1 4717 device driver will only support OS/2-based applications.

2 4717 device driver will support both OS/2 and MVDM-based applications.

The customization program will determine which device drivers to install based on the option you chose.

2. After selecting the desired option press Enter and Figure 53 will be re-displayed.

```
                4700 Financial I/O Devices Configuration Menu

              Describe your configuration by pressing the
              appropriate numeric key(s).  When finished,
              press Enter.

              1 - 4707 Monochrome Display
              2 - 50 Key Function Keyboard
              3 - 4717 Magnetic Stripe Unit
            M 4 - 4718 Personal Identification Number Keypad
              5 - 4712 Transaction / 4722 Document Printer(s)

              ESC   - Abort the installation process
              ENTER - Continue the installation process


               NOTE: Selected OS/2 supported devices denoted
                     by an 'O' while selected OS/2 and MVDM
                     supported devices denoted by an 'M'.
                     To remove a device already selected,
                     press the appropriate numeric key.
```

Figure 53. 4700 Financial I/O Device Configuration Menu

One of the following indicators will be next to the option you chose:

O Only the OS/2 device driver support will be installed.

M Both the OS/2 and MVDM device driver support will be installed.

3. Press Enter and Figure 54 on page 111 will be displayed.

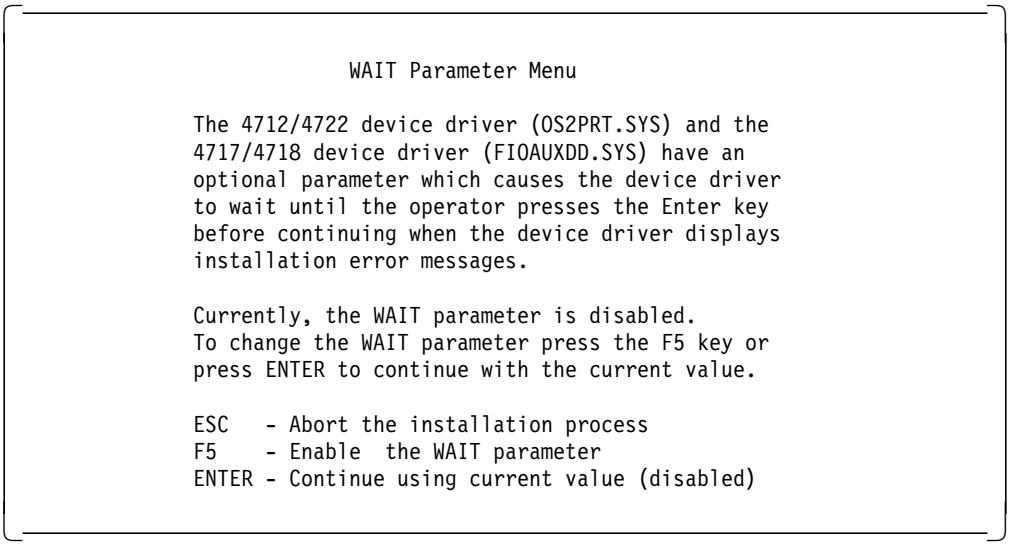

Figure 54. Wait Parameter Menu

This screen is used to determine whether the /W optional parameter should be placed on the OS/2 device driver loader statement. The /W parameter causes the device driver operation to pause if an installation error is encountered. The default is that the /W option is not enabled.

Use the F5 key to Enable or Disable this function.

4. Press Enter and Figure 55 will be displayed if you chose to install the MVDM device driver support.

   Note: If you did not choose to install the MVDM support then Figure 59 on page 113 will be displayed.

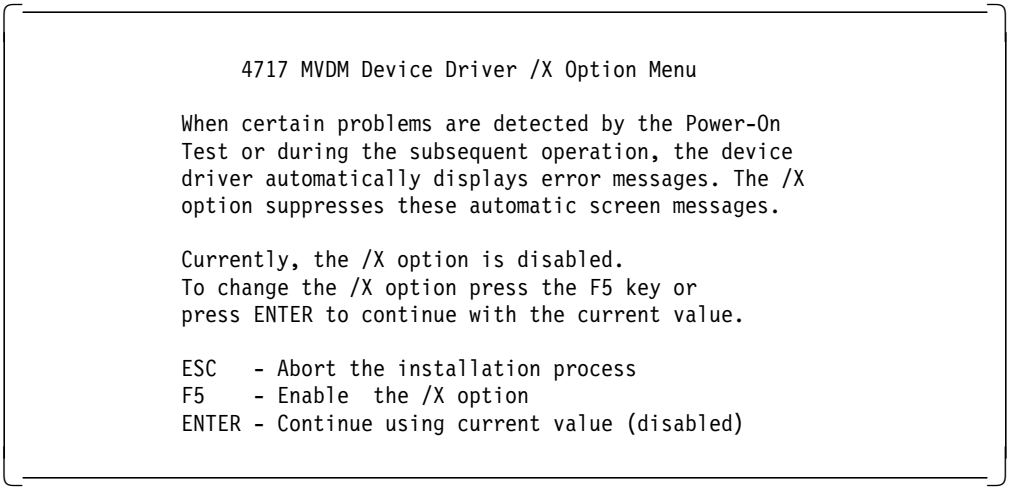

Figure 55. 4717 MVDM Device Driver /X Option Menu

This screen is used to determine whether the /X optional parameter should be placed on the MVDM device driver loader statement. The /X parameter causes the device driver to suppress certain power-on test error messages. The default is that the /X option is not enabled.

Use the F5 key to Enable or Disable this function.

5. Press Enter and Figure 56 on page 112 will be displayed.

```
                    4717 MVDM Device Driver /Y Option Menu

              When an error is detected in a function call or
              the operation is cancelled, the device driver
              returns an error bit and error code to DOS. This
              invokes the INT 24H critical-error handler.
              If you do not have an INT 24H handler, the DOS
              ABORT/RETRY/IGNORE message appears on the screen.
              The /Y option suppresses the setting of the error
              bit and error codes returned to DOS.

              Currently, the /Y option is disabled.
              To change the /Y option press the F5 key or
              press ENTER to continue with the current value.

              ESC   - Abort the installation process
              F5    - Enable  the /Y option
              ENTER - Continue using current value (disabled)
```

Figure 56. 4717 MVDM Device Driver /Y Option Menu

This screen is used to determine whether the /Y optional parameter should be placed on the MVDM device driver loader statement. The /Y parameter causes the device driver to suppress the return of all error statuses to DOS. The default is that the /Y option is not enabled.

Use the F5 key to Enable or Disable this function.

6. Press Enter and Figure 57 will be displayed.

```
                    4717 MVDM Device Driver /K Option Menu

              You use the /K option to designate one of the
              keyboard keys as cancel. If you omit the /K
              option, the default Cancel key is the Esc key on
              your keyboard (val = 027). This applies only to
              synchronous operation.

              Currently, the /K option is 027.
              To change the /K option press the F5 key or
              press ENTER to continue with the current value.

              ESC   - Abort the installation process
              F5    - Enter new value for Cancel key
              ENTER - Continue using current value (027)
```

Figure 57. 4717 MVDM Device Driver /K Option Menu

This screen is used to determine whether the /K optional parameter should be placed on the MVDM device driver loader statement. The /K parameter specifies the Cancel key that will cancel an MSR/E operation. The default is that the Esc key will cancel the MSR/E operation.

Use the F5 key to change the Cancel key.

7. Press Enter and Figure 58 on page 113 will be displayed.

```
                4717 MVDM Device Driver /Z Option Menu

          The /Z option postpones any DOS Open error codes
          if the 4717 device is currently controlled by
          another MVDM session or by an OS/2 session. This
          lets you see a pop-up error message, then switch
          to the owning session and issue a CLOSE function
          to release the 4717 device. Otherwise, the Open
          error is passed to the application.

          Currently, the /Z parameter is disabled.
          To change the /Z parameter press the F5 key or
          press ENTER to continue with the current value.

          ESC   - Abort the installation process
          F5    - Enable  the /Z parameter
          ENTER - Continue using current value (disabled)
```

Figure 58. 4717 MVDM Device Driver /Z Option Menu

This screen is used to determine whether the /Z optional parameter should be placed on the MVDM device driver loader statement. The /Z parameter allows you to see any MSR/E DOS open error codes when the MSR/E is owned by another MVDM session. The default is that the /Z option is not enabled.

Use the F5 key to Enable or Disable this function.

8. Press Enter and Figure 59 will be displayed.

```
                      CONFIG.SYS Backup Menu 1

          The installation process requires modification
          of the CONFIG.SYS file.  The default backup
          file for the CONFIG.SYS file is CONFIG.BAK.
          The CONFIG.BAK file already exists.  Select
          your choice by pressing the appropriate key.

          ESC   - Abort the installation process
          F5    - Copy to user defined backup file
          ENTER - Copy to default backup file (CONFIG.BAK)
```

Figure 59. CONFIG.SYS Backup Menu

Once you have specified all the optional parameters associated with the OS/2 device driver and, if you have requested it, the MVDM device driver, the installation program will update the CONFIG.SYS file for this workstation. If a backup copy of the CONFIG.SYS file already exists then the program will allow you to specify whether the CONFIG.BAK file for this workstation should be overwritten.

The installation program will then copy the files to the specified directory and modify the CONFIG.SYS file.

Appendix B. 4777/4778 Device Driver Customization for OS/2

All IBM financial devices are shipped with a set of diskettes that are to be used when the device is installed. This appendix will describe how to install the 4777/4778 financial devices for use in OS/2 and in the OS/2 multiple virtual DOS machine (MVDM) using the 4777/4778 Device Drivers for OS/2 diskette.

Note: Make sure you have the latest level of the device driver diskette.

All financial devices can be used in one of the follwoing two manners:

Locally attached devices
In this manner the devices will only be available to applications that execute in the same workstation where the device is attached.

Network attached devices
In this manner the devices will be available to applications that execute:

- Locally, in the same workstation where the device is attached
- Remotely, in other workstations that are network connected to the workstation where the device are attached

In order for a remote application to access a device there must be some type of network enabling software that will provide a mechanism for the request from the application to be transported across the network to the device. LANDP provides this ability.

With LANDP a network attached device can be:

Pooled The network device will provide services to all LANDP clients in the network.

Shared (only for financial printers)
The network printer will provide services to two LANDP clients in the network through the use of the Start 1 and Start 2 keys on the printer.

In order to install the 4777/4778 device drivers for OS/2:

1. Insert the 4777/4778 Device Driver diskette for OS/2 into the A: drive and type the following from an OS/2 window:

   ```
   A:\FINSTALL
   ```

   Note: It is recommended that you read the README.DOC file prior to installation. All the current changes and the fixes that are to be applied are explained in this file.

   Figure 60 on page 116 will then be presented.

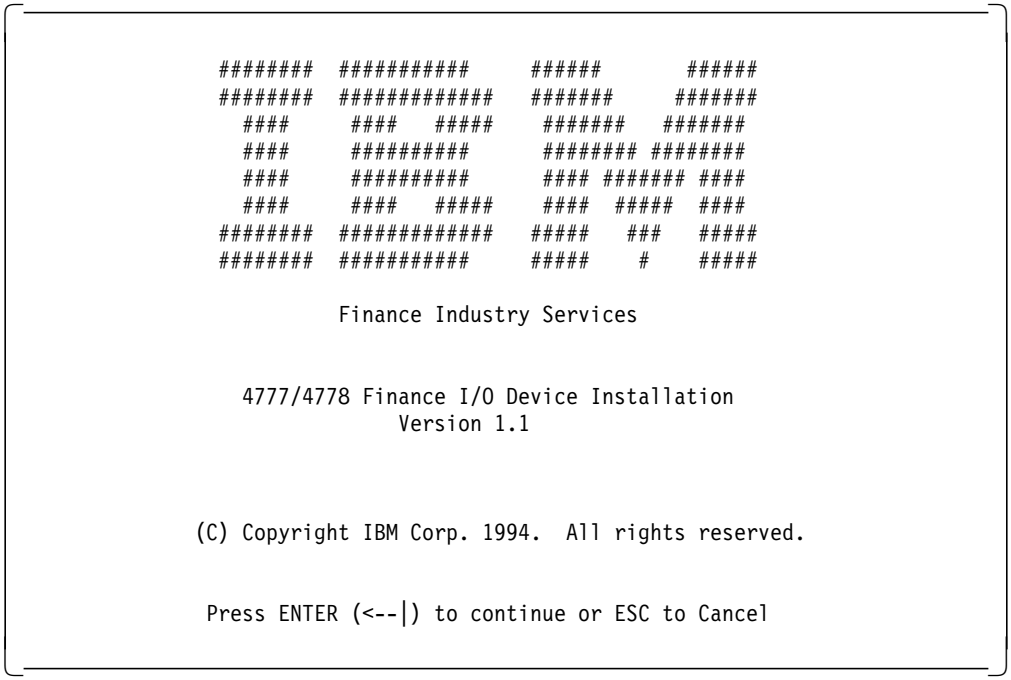

Figure 60. 4777 OS/2 Device Driver Installation

2. Press Enter and Figure 61 will be presented.

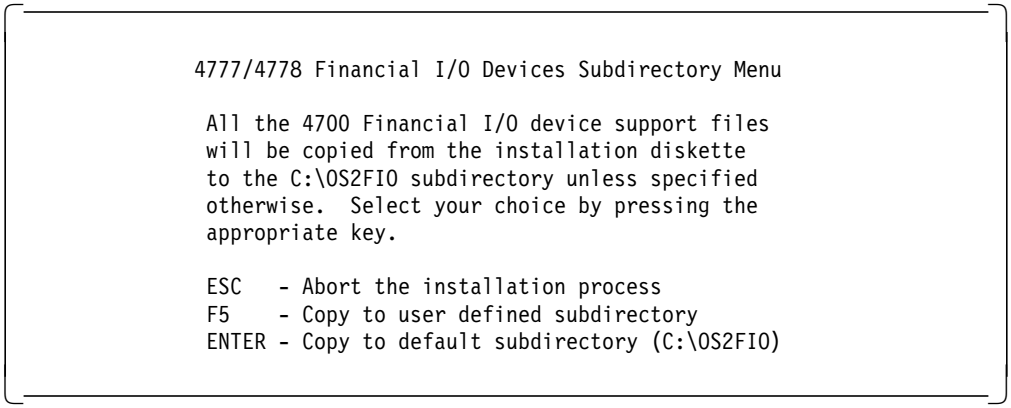

Figure 61. 4777/4778 Financial I/O Devices Subdirectory Menu

As shown in Figure 61, all device driver files are copied to the specified directory. The default subdirectory is C:\OS2FIO. By pressing **F5** you can change the default directory.

3. Press Enter and Figure 62 on page 117 will be presented.

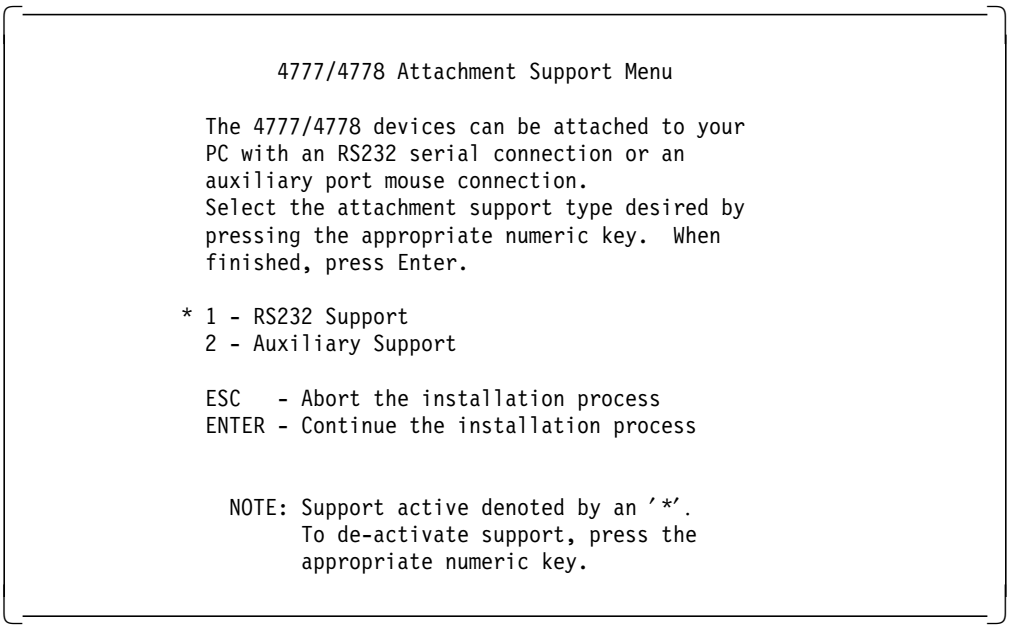

Figure 62. 4777/4778 Attachment Support Menu

As shown in Figure 62, the 4777 or 4778 devices can be either connected to a serial (RS232) port or to the mouse (auxiliary) port of the workstation.

4. Select the desired option and press Enter.

B.1 Installing the Driver Using RS232 Support

1. Assuming that you selected option **1** on Figure 62 then Figure 63 will be presented.

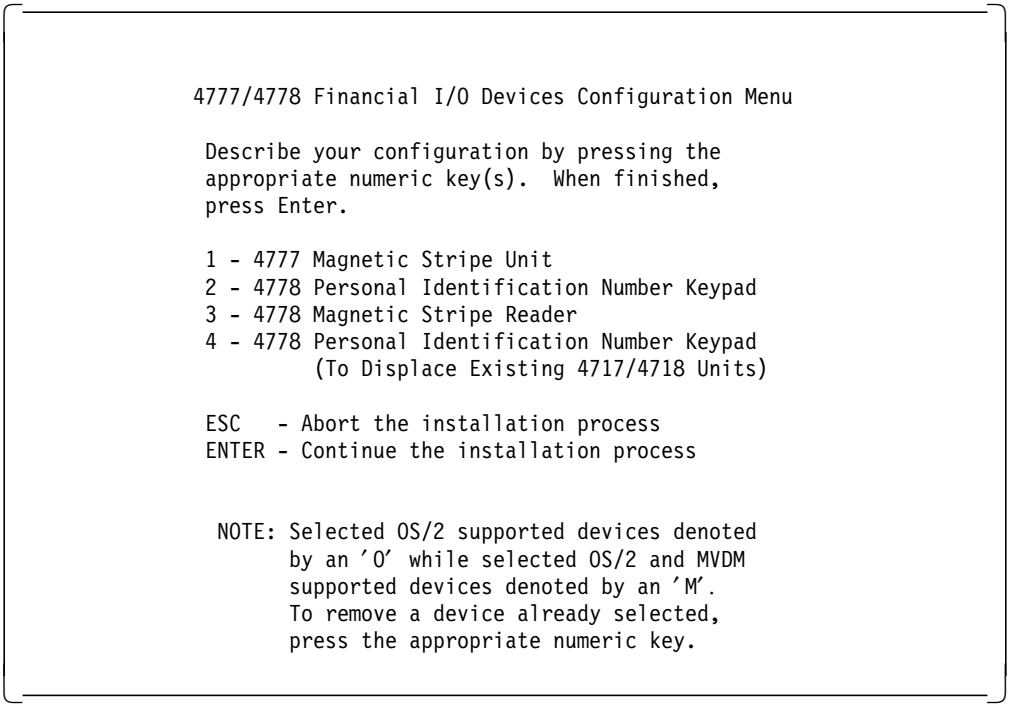

Figure 63. 4777/4778 Financial I/O Devices Configuration Menu

As shown in Figure 63, you need to select the desired option:

1 Installation of 4777 magnetic stripe reader/encoder.

Note: Choosing this option will put the /M optional parameter on the device driver loading statement.

2 Installation of 4778 model 2 PIN pad.

Note: Choosing this option will put the /P optional parameter on the device driver loading statement.

3 Installation of 4778 model 1 or 3 when the MSR portion will be used in native mode.

Note: Choosing this option will put the /P optional parameter on the device driver loading statement.

4 Installation of 4778 model 1 or 3 when the MSR portion will be used in 4717/4777 emulation mode.

Note: Choosing this option will put the /P/S optional parameters on the device driver loading statement.

2. After selecting the desired option press Enter and a menu like Figure 64 will be displayed.

```
                4717/77 Magnetic Stripe Unit Support Menu

          Select the support desired by pressing the
          appropriate numeric key(s).  When finished,
          press Enter.

          1 - OS/2 Support
          2 - MVDM Support

          ESC   - Abort the installation process
          ENTER - Continue the installation process


            NOTE: Support active denoted by an '*'.
                  To de-activate support, press the
                  appropriate numeric key.
```

Figure 64. OS/2 and MVDM Support Menu

As shown in Figure 64, you need to select the desired option:

1 Device driver will only support OS/2-based applications.

2 Device driver will support both OS/2 and MVDM-based applications.

The customization program will determine which device drivers to install based on the option you chose.

3. After selecting the desired option press Enter and Figure 65 on page 119 will be re-displayed.

```
          4777/4778 Financial I/O Devices Configuration Menu

           Describe your configuration by pressing the
           appropriate numeric key(s).  When finished,
           press Enter.

         M 1 - 4777 Magnetic Stripe Unit
           2 - 4778 Personal Identification Number Keypad
           3 - 4778 Magnetic Stripe Reader
           4 - 4778 Personal Identification Number Keypad
                    (To Displace Existing 4717/4718 Units)

           ESC   - Abort the installation process
           ENTER - Continue the installation process


            NOTE: Selected OS/2 supported devices denoted
                  by an 'O' while selected OS/2 and MVDM
                  supported devices denoted by an 'M'.
                  To remove a device already selected,
                  press the appropriate numeric key.
```

Figure 65. 4777/4778 Financial I/O Devices Configuration Menu

One of the following indicators will be next to the option you chose:

O Only the OS/2 device driver support will be installed.

M Both the OS/2 and MVDM device driver support will be installed.

4. Press Enter and Figure 66 will be displayed.

```
               4777/4778 Device Driver COM Port Menu

          The current COM port is COM1. To change the
          COM port press the appropriate numeric key or
          press ENTER to continue with the current value.


          1 - COM1
          2 - COM2
          3 - COM3
          4 - COM4

          ESC   - Abort the installation process
          ENTER - Continue using current value (COM1)
```

Figure 66. 4777/4778 Device Driver COM Port Menu

As shown in Figure 66, you should select the COM port where the device is going to be connected.

Note: This option will put the proper x value in the /Cx optional parameter on the device driver loading statement.

5. After selecting the desired option press Enter and Figure 67 on page 120 will be displayed.

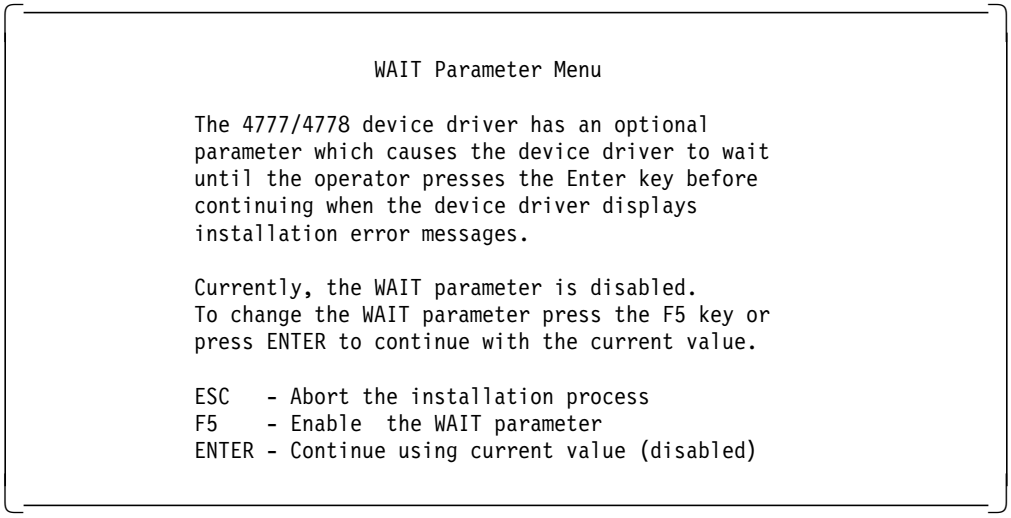

Figure 67. WAIT Parameter Menu

This screen is used to determine whether the /W optional parameter should be placed on the OS/2 device driver loader statement. The /W parameter causes the device driver operation to pause if an installation error is encountered. The default is that the /W option is not enabled.

Use the F5 key to Enable or Disable this function.

6. Press Enter and Figure 72 on page 123 will be displayed if you chose to install the MVDM device driver support.

   Note: If you did not choose to install the MVDM support then Figure 76 on page 125 will be displayed.

B.2 Installing the Driver Using Auxiliary Support

1. Assuming that you selected option **2** on Figure 62 on page 117 then Figure 68 on page 121 will be presented.

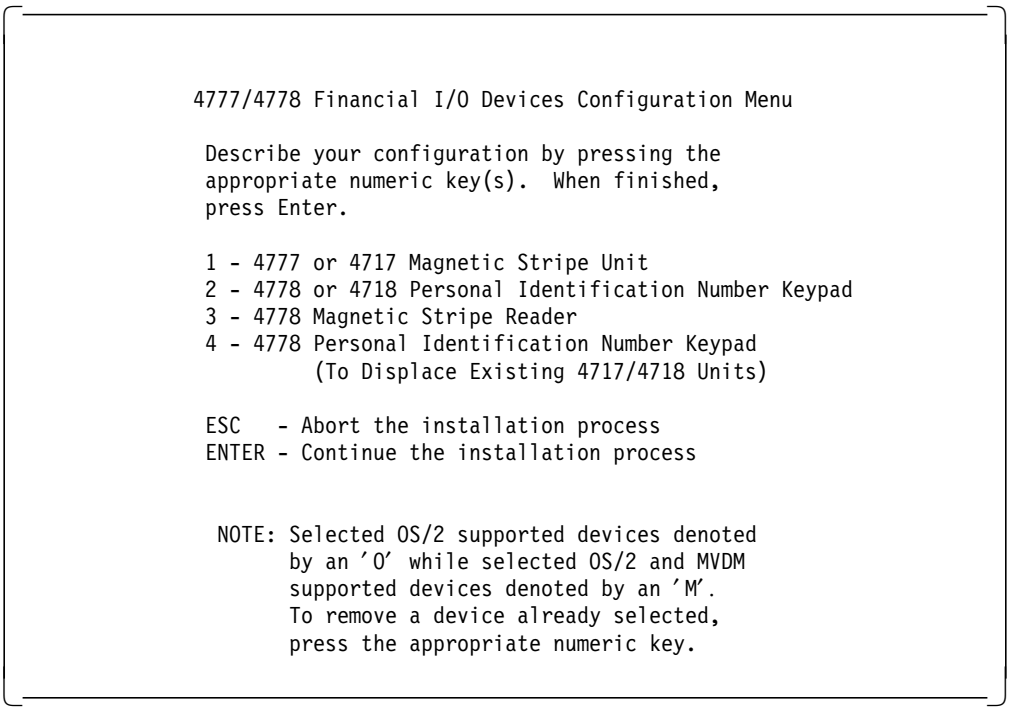

Figure 68. 4777/4778 Financial I/O Devices Configuration Menu

As shown in Figure 68, you need to select the desired option:

1 Installation of 4777 or 4717 magnetic stripe reader/encoder.

Note: Choosing this option will put the /M optional parameter on the device driver loading statement.

2 Installation of 4778 model 2 or 4718 PIN pad.

Note: When you choose this option you will need to specify whether a 4718 or 4778 will be attached to the mouse port. Choosing a 4718 will put the /P optional parameter on the device driver loading statement. Choosing a 4778 will put the /I optional parameter on the device driver loading statement.

3 Installation of 4778 model 1 or 3 when the MSR portion will be used in native mode.

Note: Choosing this option will put the /P optional parameter on the device driver loading statement.

4 Installation of 4778 model 1 or 3 when the MSR portion will be used in 4717/4777 emulation mode.

Note: Choosing this option will put the /P/S optional parameter on the device driver loading statement.

2. After selecting the desired option press Enter and Figure 69 on page 122 will be displayed.

```
                4717/77 Magnetic Stripe Unit Support Menu

              Select the support desired by pressing the
              appropriate numeric key(s).  When finished,
              press Enter.

              1 - OS/2 Support
              2 - MVDM Support

              ESC   - Abort the installation process
              ENTER - Continue the installation process


                NOTE: Support active denoted by an '*'.
                      To de-activate support, press the
                      appropriate numeric key.
```

Figure 69. OS/2 and MVDM Support Menu

As shown in Figure 69, you need to select the desired option:

1 Device driver will only support OS/2-based applications.

2 Device driver will support both OS/2 and MVDM-based applications.

The customization program will determine which device drivers to install based on the option you chose.

3. After selecting the desired option press Enter and Figure 70 will be re-displayed.

```
            4777/4778 Financial I/O Devices Configuration Menu

             Describe your configuration by pressing the
             appropriate numeric key(s).  When finished,
             press Enter.

             1 - 4777 or 4717 Magnetic Stripe Unit
             2 - 4778 or 4718 Personal Identification Number Keypad
           M 3 - 4778 Magnetic Stripe Reader
             4 - 4778 Personal Identification Number Keypad
                      (To Displace Existing 4717/4718 Units)

             ESC   - Abort the installation process
             ENTER - Continue the installation process


              NOTE: Selected OS/2 supported devices denoted
                    by an 'O' while selected OS/2 and MVDM
                    supported devices denoted by an 'M'.
                    To remove a device already selected,
                    press the appropriate numeric key.
```

Figure 70. 4777/4778 Financial I/O Devices Configuration Menu

One of the following indicators will be next to the option you chose:

O Only the OS/2 device driver support will be installed.

M Both the OS/2 and MVDM device driver support will be installed.

4. Press Enter and Figure 71 will be displayed.

```
                        WAIT Parameter Menu

              The 4777/4778 device driver has an optional
              parameter which causes the device driver to wait
              until the operator presses the Enter key before
              continuing when the device driver displays
              installation error messages.

              Currently, the WAIT parameter is disabled.
              To change the WAIT parameter press the F5 key or
              press ENTER to continue with the current value.

              ESC   - Abort the installation process
              F5    - Enable  the WAIT parameter
              ENTER - Continue using current value (disabled)
```

Figure 71. WAIT Parameter Menu

This screen is used to determine whether the /W optional parameter should be placed on the OS/2 device driver loader statement. The /W parameter causes the device driver operation to pause if an installation error is encountered. The default is that the /W option is not enabled.

Use the F5 key to Enable or Disable this function.

5. Press Enter and Figure 72 will be displayed if you chose to install the MVDM device driver support.

Note: If you did not choose to install the MVDM support then Figure 76 on page 125 will be displayed.

B.3 MVDM Driver Options

1. Assuming that you chose MVDM support then Figure 72 will be presented.

```
                    MVDM Device Driver /X Option Menu

             When certain problems are detected by the Power-On
             Test or during the subsequent operation, the device
             driver automatically displays error messages. The /X
             option suppresses these automatic screen messages.

             Currently, the /X option is disabled.
             To change the /X option press the F5 key or
             press ENTER to continue with the current value.

             ESC   - Abort the installation process
             F5    - Enable  the /X option
             ENTER - Continue using current value (disabled)
```

Figure 72. MVDM Device Driver /X Option Menu

This screen is used to determine whether the /X optional parameter should be placed on the MVDM device driver loader statement. The /X parameter causes the device driver to suppress certain power-on test error messages. The default is that the /X option is not enabled.

Use the F5 key to Enable or Disable this function.

2. Press Enter and Figure 73 will be displayed.

```
                MVDM Device Driver /Y Option Menu

              When an error is detected in a function call or
              the operation is cancelled, the device driver
              returns an error bit and error code to DOS. This
              invokes the INT 24H critical-error handler.
              If you do not have an INT 24H handler, the DOS
              ABORT/RETRY/IGNORE message appears on the screen.
              The /Y option suppresses the setting of the error
              bit and error codes returned to DOS.

              Currently, the /Y option is disabled.
              To change the /Y option press the F5 key or
              press ENTER to continue with the current value.

              ESC   - Abort the installation process
              F5    - Enable  the /Y option
              ENTER - Continue using current value (disabled)
```

Figure 73. MVDM Device Driver /Y Option Menu

This screen is used to determine whether the /Y optional parameter should be placed on the MVDM device driver loader statement. The /Y parameter causes the device driver to suppress the return of all error statuses to DOS. The default is that the /Y option is not enabled.

Use the F5 key to Enable or Disable this function.

3. Press Enter and Figure 74 will be displayed.

```
                MVDM Device Driver /K Option Menu

              You use the /K option to designate one of the
              keyboard keys as cancel. If you omit the /K
              option, the default Cancel key is the Esc key on
              your keyboard (val = 027). This applies only to
              synchronous operation.

              Currently, the /K option is 027.
              To change the /K option press the F5 key or
              press ENTER to continue with the current value.

              ESC   - Abort the installation process
              F5    - Enter new value for Cancel key
              ENTER - Continue using current value (027)
```

Figure 74. MVDM Device Driver /K Option Menu

This screen is used to determine whether the /K optional parameter should be placed on the MVDM device driver loader statement. The /K parameter specifies the Cancel key that will cancel an MSR/E operation. The default is that the Esc key will cancel the MSR/E operation.

Use the F5 key to change the Cancel key.

4. Press Enter and Figure 75 will be displayed.

```
                MVDM Device Driver /Z Option Menu

            The /Z option postpones any DOS Open error codes
            if the MVDM device is currently controlled
            by another MVDM session or by an OS/2 session.
            This lets you see a pop-up error message, then
            switch to the owning session and issue a CLOSE
            function to release the MVDM device.
            Otherwise, the Open error is passed to the
            application.

            Currently, the /Z parameter is disabled.
            To change the /Z parameter press the F5 key or
            press ENTER to continue with the current value.

            ESC   - Abort the installation process
            F5    - Enable  the /Z parameter
            ENTER - Continue using current value (disabled)
```

Figure 75. MVDM Device Driver /Z Option Menu

This screen is used to determine whether the /Z optional parameter should be placed on the MVDM device driver loader statement. The /Z parameter allows you to see any MSR/E DOS open error codes when the MSR/E is owned by another MVDM session. The default is that the /Z option is not enabled.

Use the F5 key to Enable or Disable this function.

5. Press Enter and Figure 76 will be displayed.

```
                      CONFIG.SYS Backup Menu 1

            The installation process requires modification
            of the CONFIG.SYS file.  The default backup
            file for the CONFIG.SYS file is CONFIG.BAK.
            The CONFIG.BAK file already exists.  Select
            your choice by pressing the appropriate key.

            ESC   - Abort the installation process
            F5    - Copy to user defined backup file
            ENTER - Copy to default backup file (CONFIG.BAK)
```

Figure 76. CONFIG.SYS Backup Menu 1

Once you have specified all the optional parameters associated with the OS/2 device driver and, if you have requested it, the MVDM device driver, the installation program will update the CONFIG.SYS file for this workstation.

If a backup copy of the CONFIG.SYS file already exists then the program will allow you to specify whether the CONFIG.BAK file for this workstation should be overwritten.

The installation program will then copy the files to the specified directory and modify the CONFIG.SYS file.

Index

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ITSO Technical Bulletin Evaluation RED000

International Technical Support Organization
LANDP/DOS and LANDP/2 Support for
Financial Magnetic Stripe Readers/Encoders
January 1996

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