

MINIMAG RS-232

User's Manual



Agency Approved

Specifications for subpart B of part 15 of FCC rule for a Class A computing device.

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Section 1 INTRODUCTION

Description

The MiniMag™ compact magnetic stripe reader can read 1, 2, or 3 tracks of magnetic stripe information. In addition, it has full data editing capabilities. The data can be formatted with preamble/postamble and terminator characters to match the format expected by the host.

The MiniMag can be connected to a host computer via an RS-232 input port. When the reader is connected as an RS-232 device, a separate power module must be used.

Section 2 INSTALLATION

Host Connections

The MiniMag is connected to the host computer's RS-232 communications port. The cable has a DB-9 connector at one end, and is connected to the reader at the other end. (An adapter can be used to connect to a DB-25 RS-232 port.)

Data is transmitted to the host in an ASCII data format. The reader's output can be formatted with terminating characters and special preamble and/or postamble character strings to match the data format expected by the terminal.

The terminal must be configured to accept the data and to perform the appropriate processing. Care must be taken to ensure that the RS-232 parameters (baud rate, data bits, Start/Stop characters, parity, and handshaking method) match those expected by the terminal. Just transmitting the data to the serial port does not necessarily mean it will appear on the screen as if it were entered manually.

Use the MiniMag Configuration Utility Application to program the reader, and a communication program (such as Procomm or Hyperterminal) to display the data.

There is insufficient power available on a standard RS-232 serial port to power the MiniMag, so an external wall-mounted power module must be used. Connect the power cable from this unit to the power receptacle located on the DB-9 connector. Care must be taken to ensure the power module outputs +5 volts.

Section 3 CONFIGURATION

The MiniMag reader must be appropriately configured to your application. Configuration settings enable the reader to work with the host system.

These settings are programmed into the reader using the MiniMag Configuration Utility Program, or by sending Setup Commands from the host application to the reader. Once programmed, these configuration settings are stored in the reader's non-volatile memory (so they will not be affected by the cycling of power).

For instructions on how to use the MiniMag configuration Utility, see Appendix E.

Note: If you want to send setup commands to the MiniMag, you must make sure the communication parameters are always 9600, None, 8, 1. Before you make any settings, or try to get data to the host, check the connection cable, port, power and communication parameters.

Setup Commands Structure

Sending command:

<STX><S>[<FuncID><Len><FuncData>...]<ETX><Checksum>

Receiving command:

<STX><R>[<FuncID><Len><FuncData>...]<ETX><Checksum>

Where:

<STX> = 02h

<FuncID> is a one byte Function ID identifies the particular function or settings affected.

<Len> is a one byte length count for the following data block<FuncData>

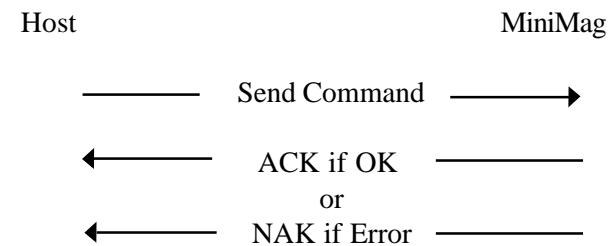
<FuncData> is the data block for the function.

<ETX> = 03h

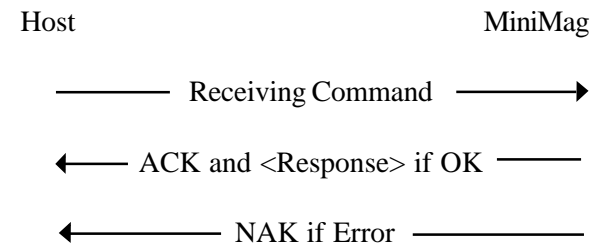
The overall Modulo 2 (Exclusive OR) sum (from <STX> to <Checksum>) should be zero.

Communication Protocol

Sending Command



Receiving Command



Communication Timing

The MiniMag takes time to process a command. During that processing time, it will not respond to a new command.

Although the typical delay for the reader to respond to a command is 0.1ms, the maximum delay for the reader to respond can be as much as 5ms. Caution must therefore be taken to maintain a minimum delay between two commands.

Use the following formula to calculate the delay:

$80\text{ms} + 10(\text{number of bytes in } \langle \text{FuncData} \rangle \text{ of the first command})\text{ms}$

NOTE: The maximum delay allowed between two characters in a command is 2ms.

Default Settings

The MiniMag reader is shipped from the factory with the default settings already programmed. In the following sections, the default settings are shown in **boldface**.

For a table of default settings, see Appendix A.

General Selections

This group of configuration settings define the basic operating parameters of the scanner.

Beep Volume

The beep volume can be adjusted to two different levels, or turned off entirely.

$\langle \text{STX} \rangle \langle \text{S} \rangle \langle 11\text{h} \rangle \langle 01\text{h} \rangle \langle \text{Beep Volume Settings} \rangle \langle \text{ETX} \rangle \langle \text{Checksum} \rangle$

Beep Volume Settings:

'0' for beep volume off

'1' for beep volume low

'2' for **beep volume high**

Change To Default Settings

$\langle \text{STX} \rangle \langle \text{S} \rangle \langle 18\text{h} \rangle \langle \text{ETX} \rangle \langle \text{Checksum} \rangle$

This command does not have any $\langle \text{FuncData} \rangle$. It returns all settings for all groups to their default values. Data Editing will be turned off, and the formulas will be retained.

MSR Reading Settings

Turn the MiniMag on or off. If the reader is disabled, no data will be sent out to the host.

<STX><S><1Ah><01h><MSR Reading Settings><ETX><Checksum>

MSR Reading Settings:

“0” MSR Reading Disabled
“1” **MSR Reading Enabled**

Decoding Method Settings

The MiniMag can support three kinds of decoded directions.

<STX><S><1Dh><01h><Decoding Method Settings><ETX><Checksum>

Decoding Method Settings:

“0” Raw Data Decoding in Both Directions
“1” **Decoding in Both Directions**
“2” Moving Stripe Along Head in Direction of Encoding
“3” Moving Stripe Along Head Against Direction of Encoding

With the bi-directional method, the user can swipe the card in either direction and still read the data encoded on the magnetic stripe. Otherwise, the card can only be swiped in one specified direction to read the card.

Review Settings

<STX><R><1Fh><ETX><Checksum>

This command does not have any <FuncData>. It activates the review settings command. MiniMag sends back an <ACK> and <Response>.

<Response> format:

The current setting data block is a collection of many function-setting blocks <FuncSETBLOCK> as follows:

<STX><FuncSETBLOCK1>...<FuncSETBLOCKn><ETX><Checksum>

Each function-setting block <FuncSETBLOCK> has the following format:

<FuncID><Len><FuncData>

Where:

<FuncID> is one byte identifying the setting(s) for the function.

<Len> is a one byte length count for the following function-setting block <FuncData>

<FuncData> is the current setting for this function. It has the same format as in the sending command for this function.

<FuncSETBLOCK> are in the order of their Function ID<FuncID>

Message Formatting Selections

Terminator Setting

Terminator characters are used to end a string of data in some applications.

```
<STX><S><21h><01h><Terminator Settings><ETX><Checksum>
```

```
<Terminator Settings>
```

```
‘0’ CR/LF  
‘1’ CR  
‘2’ LF  
‘3’ None
```

Preamble Setting

Characters can be added to the beginning of a string of data. These can be special characters for identifying a specific reading station, to format a message header expected by the receiving host, or any other character string. Up to nine ASCII characters can be defined.

```
<STX><S><D2h><Len><Pre-amble String><ETX><Checksum>
```

Where:

Len = the number of bytes of preamble string

Preamble String = {string length} {string}

NOTE: String length is one byte, maximum nine.

Postamble Setting

The postamble serves the same purpose as the preamble, except it is added to the end of the data string, after any terminator characters.

```
<STX><S><D3h><Len><postamble String><ETX><Checksum>
```

Where:

Len = the number of bytes of postamble string

Postamble String = {string length} {string}

NOTE: String length is one byte, maximum nine.

Magnetic Track Selections

Track Selection

There are up to three tracks of encoded data on a magnetic stripe. This option selects the tracks that will be read and decoded.

```
<STX><S><13h><01h><Track_Selection Settings><ETX>  
<Checksum>
```

```
<Track_Selection Settings>
```

“0” Any Track

“1” Track 1 Only

“2” Track 2 Only

“3” Track 1 & Track 2

“4” Track 3 Only

“5” Track 1 & Track 3

“6” Track 2 & Track 3

“7” All Three Tracks

Note: If any of the multiple tracks fails to read for any reason, no data for any track will be sent.

Track Separator Selection

This option allows the user to select the character to be used to separate data decoded by a multiple-track reader.

```
<STX><S><17h><01h><Track_Separator><ETX><Checksum>
```

<Track_Separator> is one ASCII Character. **The default value is CR.**

Start/End Sentinel And Track 2 Account Number Only

The MiniMag can be set to either send, or not send, the Start/End sentinel, and to send either the Track 2 account number only, or all the encoded data on Track 2. (The Track 2 account number setting doesn't affect the output of Track 1 and Track 3.)

<STX><S><19h><01h><SendOption><ETX><Checksum>

<Send Option>

- “0” Not send start/end sentinel and send all data on Track 2
- “1” **Send start/end sentinel and send all data on Track 2**
- “2” Not send start/end sentinel and send account number on Track 2
- “3” Send start/end sentinel and send account number on Track 2

Communication Parameter Selections

Baud Rate Setting

<STX><S><41h><01h>< Baud Rate Setting><ETX><Checksum>

<Baud Rate Setting>:

- “3” 2400 bps
- “4” 4800 bps
- “5” **9600 bps**
- “6” 19200 bps

Parity Setting

<STX><S><43h><01h>< Parity Setting><ETX><Checksum>

<Parity Setting>:

- “0” **None**
- “1” Even
- “2” Odd
- “3” Mark
- “4” Space

Data Bit Setting

<STX><S><42h><01h>< Data-Bit Setting><ETX><Checksum>

<Data-Bit Setting>:

- “0” **8 Bits**
- “1” 7 Bits

Handshaking Setting

<STX><S><44h><01h>< Handshaking
Setting><ETX><Checksum>

<Handshaking Setting>:

“0” X-On/X-Off
“1” RTS/CTS

Stop Bit Setting

<STX><S><45h><01h>< Stop-Bit Setting><ETX><Checksum>

<Stop-Bit Setting>:

“0” 1 Bit
“1” 2 Bits

X-on Character Setting

<STX><S><47h><01h>< X-On Character><ETX><Checksum>

<X-On Character> is the ASCII code for the desired X-On Character. **Default is DC1.**

X-off Character Setting

<STX><S><48h><01h>< X-Off Character><ETX><Checksum>

<X-Off Character> is the ASCII code for the desired X-Off Character. **Default is DC3.**

Output Format Selection

The MiniMag reader supports three different output formats. The first is ID TECH Format, the second is UIC RS-232 Format, and the third is Mag-Tek Format.

Data Formats

ID TECH Format:

Track1: <SS><T1 Data><ES><CR>

Track2: <SS><T2 Data><ES><CR>

Track3: <SS><T3 Data><ES><CR>

UIC RS-232 Format:

Dual Track:

Track1: <STX><SS><T1 Data><ES>[<LRC>]<DLE>

Track2: <STX><SS><T2 Data><ES>[<LRC>]<DLE>

Triple Track:

Track1: <STX><SS><T1 Data><ES>[<LRC>]<DLE>

Track2: <STX><SS><T2 Data><ES>[<LRC>]<DLE>

Track3: <STX><SS><T3 Data><ES>[<LRC>]<ETX>

Mag-Tek Format:

Track Data: [<STX>][<ESC>]<magnetic stripe data>
[<CR>][<ETX>]

Where:

STX = Start Text

ETX = End Text

SS = Start Sentinel

Track1 = % (ISO, AAMVA,CA-DMV)

Track2 = ; (ISO,AAMVA,CA-DMV)

Track3 = ; (ISO)

Track3 = % (AAMVA)

Track3 = ! (CA-DMV)

ES = End Sentinel

All Tracks = ? (ISO, AAMVA, CA-DMV)

LRC = Longitudinal Redundancy Character

DLE = Data Link Escape

Output Format Settings

<STX><15h><01h><Output Format Setting><ETX><Checksum>

Output Format Setting:

“0” **ID TECH Format**

“1” UIC Format

“2” Mag-Tek Format

Format Option Setting

<STX><16h><01h><Format Option Setting><ETX><Checksum>

Format Option Setting:

BIT	SETTING	BIT SET TO 1	BIT SET TO 0
0	Sending LRC in UIC Format	No	Yes
1	Buffer Mode in Mag-Tek Format	Yes	No
2	Command Mode in Mag-Tek Format	+/-	I/R
3	Sending STX in Mag-Tek Format	No	Yes
4	Sending ESC in Mag-Tek Format	No	Yes
5	Sending CR in Mag-Tek Format	No	Yes
6	Sending ETX in Mag-Tek Format	No	Yes

Section 4

DATA EDITING

The MiniMag has a data editing feature incorporated into its firmware. This feature allows the data read from the magnetic stripe to be sent to the host in the exact format expected by the host software, eliminating the need for modifications to the application software.

The data (that is, the input record from the magnetic stripe) can be divided up into a number of separate fields, according to established standards (such as ISO, ANSI, AAMVA, and CDL). The data in each of these fields can then be edited, and new fields can be defined using the Data Edit commands.

The edited data fields are then transmitted to the host in any order desired, regardless of their position on the original magnetic stripe.

Functions

The following editing functions can be performed:

Rearrange the Data: The fields within a track, created by established standards, can be transmitted to the host in any order desired, regardless of the order in which they occurred in the card track.

Insert Character Strings into the Output Data Record: Character strings can be defined and inserted at any place in the data output record.

Duplicate Fields: Fields within a track can be transmitted to the host as many times as desired, and in any order.

Select Output Fields: Fields within a track can be selected for output or not selected for output.

Fields

By separating the input data record into smaller blocks (called “fields”), each block can be edited individually. Additional fields can also be added to the record, allowing specific functions, such as carriage returns or keyboard function keys, to be inserted at any point. (The field standards for ISO Credit Cards, California driver’s licenses, and AAMVA driver’s licenses are listed in Appendix D.)

By separating the input data record into smaller blocks (fields), each block can then be treated individually. Additional fields can also be added to the record in any position, allowing specific functions, such as carriage returns. Fields are identified by a one-character ID starting with the character “a,” up to and including “z,” in the order they were created, allowing as many as 26 fields to be defined. These fields are then sent to the host in the order which the user specifies. For example, if the input data record is in the Credit Card Format for Track 2:

```
;1234567890123456=9912xxxxxx?c
```

```
Field ID |a|      b      |c| d |   e |f|g|
```

and your application software is looking for the data to be in the following format:

```
9912<CR>  
1234567890123456<CR>
```

then we must divide the data record into fields, select only those fields desired, reverse the order in which they are sent to the host, and create a new field <CR> and insert it after each field.

We do this by using the defined fields and adding a new field:

```
Field b = 1234567890123456
```

```
Field d = 9912
```

```
Field h = <CR>
```

```
and sending {Field d}{Field h}{Field b}{Field h}
```

Formulas

The set of instructions programmed into the MiniMag to edit data is referred to as the data editing “formula.” More than one formula (to a maximum of four) can be resident in the reader at one time. If more than one formula resides in memory, the reader will apply the first formula to the input data. If the data format matches the format (credit card, driver’s license, etc.) of the first formula, then it will apply the data editing functions and output the reformatted data to the host.

If the data does not match the criteria spelled out in the first formula, then the criteria of the second formula is applied. This process continues for each of the successive formulas until a match is found. If no matches are found to any of the formulas programmed into the reader, then either nothing will be transmitted to the host, or the unedited data record will be transmitted, according to the data editing matched flag, whether it is set or not.

The MiniMag supports four kinds of formulas for credit card, California driver’s license, AAMVA formats, as well as a customized format. The user can define all four, or only one at a time. However, the MiniMag can only keep one credit card, one California driver’s license, one AAMVA, and one customized format at a time.

Data Editing Setup Commands

The following commands are used to set the operating parameters of the Data Editing feature. These commands are designed for maximum flexibility, but some of the details can be complicated. We therefore suggest that the MiniMag Configuration Utility be used to set these commands.

Added Field

An output field is created containing the character string. Up to six fields can be defined. The maximum number of characters for each field is six.

Search Method

In working with a user-defined format that is not credit card, CA DMV, or AAMVA, the MiniMag will support any combination of the following five search methods:

Length Match: For a particular track, indicate the minimum and maximum number of characters acceptable for the data editing formula.

String Match: For a particular track, indicate a specific string of characters, as well as the character position at which that string must begin, in order to be acceptable to the data editing formula.

Search Before: For a particular track, the MiniMag will create a data field which contains all characters that come before the specified occurrence of a given character sequence. (For example, the second occurrence of the character sequence ABC.)

Search Between: For a particular track, the MiniMag will create a data field which contains all characters that come between the specified occurrence of one sequence of characters and another.

Search After: For a particular track, the MiniMag will create a data field that contains the specified number of characters that come after the specified occurrence of a given character sequence. (An offset of a given number of character positions can also be indicated.)

Send Sequence

Sends out the field in a user-defined order.

Data Edit Setting

<STX><S><1Bh><01h>< Data Edit Setting><ETX><Checksum>

<Data Edit Setting>:

“0” **Disable data edit.**

“1” Enable data edit, do not send data that does not match the data edit formulas.

“3” Enable data edit, send data that does not match the data edit formulas “as is.”

Data Edit Added Field Setting

<STX><S><FAh><Len>< Added Field><ETX><Checksum>

Where:

<Added Field> is [string1] ... [stringn], n <= 6

stringn = {string_len}{string}, string_len <= 6

{string} is always six bytes. If a string is less than six characters long, you must pad the end with hex 0 (ASCII: Null).

Data Edit Send Command Setting

<STX><S><FCh><Len>< Send_Command><ETX><Checksum>

Where:

<Send_Command> is [ccsmd] [dmvsmd][aamvasmd] [flexsmd]
ccsmd = {field_len}{Hex E0}{field}{{field}...} {Hex FF} default is {Hex 00}{Hex FF}

dmvsmd = {field_len}{Hex E1}{field}[[{field}...]{Hex FF} default is {Hex 00}{Hex FF}

aamvasmd = {field_len}{Hex E2}{field}[[{field}...]{Hex FF} default is {Hex 00}{Hex FF}

flexsmd = {field_len}{Hex E3}{field}[[{field}...]{Hex FF} default is {Hex 00}{Hex FF}

field_len is the number of bytes from {Hex Ex} to the {field} before {Hex FF}.

field is a one byte field identifier. The highest three bits are used to identify the track_no, and the lowest five bits are used to identify a unique field_no.

bit7	bit6	bit5	track_no
0	0	0	Added Field
0	0	1	track1
0	1	0	track2
0	1	1	track3
1	x	x	Reserved

Data Edit Flexible Field Setting

<STX><S><FBh><Len><Flexible_Field><ETX><Checksum>

Where:

<Flexible_Field> is [length_match][string_match][search_before][search_between][search_after]...

length_match = {hex F0}{track_no}{minimum length}{maximum length}

string_match = {hex F1}{track_no}{offset}{string_len}{string}

search_before = {hex F2}{track_no|field_no}{times}{string_len}{string}

search_between = {hex F3}{track_no|field_no}{times1}{string1_len}{string1}{times2}{string2_len}{string2}

search_after = {hex F4}{track_no|field_no}{times1}{offset}{length2}{length1}{string1}

track_no = High three bits of the byte, 001*****|010*****|011*****

field_no = Low five bits of the byte, ***00000~***11111

Length Match and String Match: These restrictive rules are used to define the kinds of cards to be read. They can be used to limit your reader to only some kinds of cards, or to restrict the transmission of data from other cards. The offset of String Match is from the start of data for a particular track.

For example, if Track 1 is selected, with the minimum length set at 10, and the maximum length also set at 10, only cards with 10 characters on Track 1 will be read. Or, if Track 3 is selected, with the offset set at 10, and the string equaling “symbol,” only cards with the string “symbol,” offset 10 characters from the start of Track 3, will be read.

Search Before, Search Between, and Search After: These rules help define a new flexible field. With Search Before, all the data in the new generated field comes before the specified string, after the specified number of times, for the specified track. For example, a new field can be defined in which the data is from the start to the second separator ^ in Track 1.

With Search Between, all the data in the new generated field comes between the two specified strings for the specified track. For example, a new field can be defined in which the data comes between the first searched separator ^ and the first searched \$.

With Search After, all the data in the new generated field starts from the specified offset, after the specified strings, after the specified number of times, for the specified track. For example, a new field can be defined in which the data starts after a 10 character offset after the first searched separator ^.

Times, Times1, and Times2: Times and Times1 define how many times a specified string is searched from the start of data on a specific track. Times2 defines how many times a specified string is searched from the rest of the data on a specific track after the first string has been searched.

Track No. and Field No.: The Track Number (3 bits) and the Field Number (5 bits) are always in one byte.

NOTE: The field definitions for common magnetic card formats are listed in Appendix D.

Section 5 OPERATION

The MiniMag reader is easy to operate. Just follow these simple steps:

1. Make sure the reader is properly cabled and is receiving sufficient power. (See Section 5, Troubleshooting, if there is a cabling or power problem.)
2. To read a card, slide the card, in either direction, through the reader slot, with the magnetic stripe facing the magnetic head (LED side).
3. While swiping the card through the reader, the LED will go off.
4. Once the entire magnetic stripe has been read, the LED indicator will light up as green to signal a “good read.” If a good read is not obtained, the LED indicator will light up as red.
5. A beep will also sound to indicate a good read on each track. If all three tracks have been read successfully, the reader will beep three times.

Section 6 TROUBLESHOOTING

The MiniMag reader is easy to install and use. Most problems encountered can be attributed to:

- Incorrect Interface Cabling
- Incorrect Configuration Setup
- Bad Magnetic Stripe Quality

General Procedures

The troubleshooting process can be simplified by following these simple diagnostic procedures.

1. The unit should emit one long beep when power is first applied. If it does not, then the unit is not receiving power.
2. Once it has been confirmed that the unit is correctly powered, try swiping a credit card. The LED will go off while decoding, then light green to indicate a “good read,” or red to indicate a “bad read.”
3. Once the unit has indicated a “good read,” then proceed to check the interface cabling connections.

Appendix A. Default Settings

The MiniMag reader is shipped from the factory with the following default settings already programmed:

Magnetic Track Basic Data Format

Track 1: <SS1><T₁ Data><ES><CR>*

Track 2: <SS2><T₂ Data><ES><CR>*

Track 3: <SS3><T₃ Data><ES><CR><LF>*

where: SS1(start sentinel track 1) = %
 SS2(start sentinel track 2) = ;
 SS3(start sentinel track 3) = ; for ISO, ! for CDL,
 % for AAMVA
 ES(end sentinel all tracks) = ?
 CR = Carriage Return
 LF = Line Feed

Definitions

Start or End Sentinel: Characters in encoding format which come before the first data character (start) and after the last data character (end), indicating the beginning and end, respectively, of data.

Track Separator: A designated character which separates data tracks.

Terminator: A designated character which comes at the end of the last track of data, to separate card reads.

LRC: Check character, following end sentinel.

CDL: Old California Drivers License format.

**Note: The <CR> commands shown above for Tracks 1 & 2 and Tracks 2 & 3 denote the default character for this position, the Track Separator position. The <CR><LF> command shown for Track 3 denotes the default character for this position, the Terminator position.*

Default Setting Table

Setting	Default
Beep Volume	High
MSR Reading	Enable
Decoding Method	Both Swiping Direction
Terminator Settings	CR
Preamble Settings	None
Postamble Settings	None
Track_Selected Settings	Any Track
Track_Selected Settings	CR
Sentinel and T2 Account No.	Send Sentinels and all T2 data
Baud Rate Setting	9600 bps
Parity Setting	None
Data-Bit Setting	8
Handshaking Setting	X-On/X-off
Stop-Bit Setting	1
X-On Character Setting	DC1 (Hex 11)
X-Off Character Setting	DC3 (Hex 13)
Data Edit Setting	Disabled

Appendix B. Function Code Table

Character	Keystroke	Character	Keystroke
F1	\f1	End	\end
F2	\f2	Right	\right
F3	\f3	Left	\left
F4	\f4	Up	\up
F5	\f5	Down	\down
F6	\f6	PgUp	\pgup
F7	\f7	PgDn	\pgdn
F8	\f8	Tab	\tab
F9	\f9	Back Tab	\btab
F10	\f10	Esc	\esc
F11	\f11	Enter	\enter
F12	\f12	CR	\cr
Ins	\ins	LF	\lf
Home	\home	Backspace	\bs

To input the “\” character, type it twice. For example, typing ab\\cd in a preamble string will result in ab\cd as the preamble.

Appendix C. Non-printable ASCII Characters

Character	Keystroke
NULL	\nul
SOH	\soh
STX	\stx
ETX	\etx
EOT	\eot
ENQ	\enq
ACK	\ack
BEL	\bel
BS	\bs
HT	\ht
LF	\lf
VT	\vt
FF	\ff
CR	\cr
SO	\so
SI	\si
DLE	\dle
DC1	\dc1
DC2	\dc2
DC3	\dc3
DC4	\dc4
NAK	\nak
SYN	\syn
ETB	\etb
CAN	\can
EM	\em
SUB	\sub
ESC	\esc
FS	\fs
GS	\gs
RS	\rs
US	\us

Appendix D. Magnetic Stripe Standard Data Formats

International Standards Organization (ISO) Credit Card Format

Track 1

Field ID Character	Contents	Length
a	Start Sentinel	1
b	Format Code "B"	1
c	Account Number	13 or 16
d	Separator "^"	1
e	Cardholder Name	variable
f	Separator "^"	1
g	Expiration date	4
h	Optional Discretionary data	variable
i	End Sentinel	1
j	Linear Redundancy Check (LRC) Character	1

Track 2

a	Start Sentinel	1
b	Account Number	13 or 16
c	Separator "="	1
d	Expiration date "YYMM"	4
e	Optional discretionary data	variable
f	End Sentinel	1
g	Linear Redundancy Check (LRC) Character	1

California Driver's License Format

Track 1

a	Start Sentinel	1
b	Format Code Type:	1
	C = Commercial	
	S = Salesperson	
	D = Driver	
	I = Identification	
	R = Senior Citizen	
c	Name Line 1	29
d	Name Line 2	29
e	Address Line 1	29
f	City	13
g	End Sentinel	1
h	Linear Redundancy Check (LRC) Character	1

Track 2

a	Start Sentinel	1
b	Identification Number	
	ANSI User ID	6
	DL/ID Alpha Translated	2
	7 position DL/ID number	7
	Check Digit	1
c	Field Separator “=”	1
d	Expiration Date	4
e	Field Separator “=”	1
f	Discretionary Data, 8 position birthdate	8
g	End Sentinel	1
h	Linear Redundancy Check (LRC) Character	1

Track 3

a	Start Sentinel	1
b	Class	4
c	Endorsements	4
d	State Code	2
e	Zip Code	9
f	Sex	1
g	Hair	3
h	Eyes	3
i	Height	3
j	Weight	3
k	Restrictions	10
l	Issue Date	8
m	Office	3
n	Employee ID	2
o	LRE ID	2
p	Fee Due Year	4
q	Address Line 2	29
r	Reserved Space	10
s	End Sentinel	1
t	Linear Redundancy Check (LRC) Character	1

AAMVA Driver's License Format

Track 1

a	Start Sentinel	1
b	State or Province	2
c	City	13
d	Name	35
e	Address	29
f	End Sentinel	1
g	Linear Redundancy Check (LRC) Character	1

Track 2

a	Start Sentinel	1
b	ANSI User Code	1
c	ANSI User ID	5
d	Jurisdiction ID/DL	14
e	Expiration date	4
f	Birthdate	8
g	Remainder of Jurisdiction ID/DL	5
h	End Sentinel	1
i	Linear Redundancy Check (LRC) Character	1

Track 3

a	Start Sentinel	1
b	Template Version #	1
c	Security Version #	1
d	Postal Code	11
e	Class	2
f	Restrictions	10
g	Endorsements	4
h	Sex	1
i	Height	3
j	Weight	3
k	Hair Color	3
l	Eye Color	3
m	ID #	10
n	Reserved Space	16
o	Error Correction	6
p	Security	5
q	End Sentinel	1
r	Linear Redundancy Check (LRC) Character	1

Appendix E. Minimag Configuration Utility

Introduction

The MiniMag Configuration Utility is a Windows-based program that makes it easy to configure the reader.

Operation

To install the MiniMag Configuration Utility, please follow these steps:

1. Run Windows 95/98 or Windows NT.
2. Run SETUP from the MiniMag Configuration Utility Disk.
3. Follow the instructions on your screen. The setup program will prompt you when installation is complete.

To run the MiniMag Configuration Utility, please follow these steps:

1. Open the START menu on the desktop.
2. Point to the PROGRAM menu.
3. Point to MINIMAG CONFIGURATION UTILITY.
4. Click the MINIMAG CONFIG icon.

Use the MiniMag Configuration Utility as follows:

1. To create a file with new settings, open the FILE menu and click on NEW.
2. To open a file with existing settings, open the FILE menu and click on OPEN.
3. To see the current settings of a MiniMag reader, open the FILE menu and click on RECEIVE.
4. To save settings to a disk file, go to the MINIMAG CONFIGURATION PROPERTIES dialog box and click on SAVE CONFIG.
5. To send settings to a MiniMag reader, go to the MINIMAG CONFIGURATION PROPERTIES dialog box and click on TO MINIMAG.

Commands

FILE menu commands

NEW - Creates a new configuration file.

OPEN - Opens an existing configuration file.

RECEIVE - Sends the current settings of a MiniMag reader to the host.

EXIT - Exits the MiniMag Configuration Utility.

VIEW menu commands

TOOLBAR - Shows or hides the toolbar.

STATUS BAR - Shows or hides the status bar.

HELP menu commands

HELP TOPICS - Offers you an index to topics on which you can get help.

ABOUT - Displays the version number of this application.

INDEX - Use this command to display the opening screen of HELP. From the opening screen, you can jump to step-by-step instructions for using the MiniMag Configuration Utility, as well as access important reference information.

CONTEXT HELP - Use the “Context Help” command to obtain help on any aspect of the MiniMag Configuration Utility. The **HELP** topic will be shown for the item you clicked.

USING HELP - Use this command to learn how to use **HELP**.

FILE OPEN dialog box

The following four options allow you to specify which file to open:

1. **FILE NAME** - Type or select the file name you want to open. This box lists files, with the extension you select, in the **LIST FILES OF TYPE** box.
2. **LIST FILES OF TYPE** - Select the type of file you want to open.
3. **DRIVES** - Select the drive in which the MiniMag Configuration Utility stores the file that you want to open.
4. **DIRECTORIES** - Select the directory in which the MiniMag Configuration Utility stores the file that you want to open.

SIZE command (in the SYSTEM menu)

Use this command to display a four-headed arrow you can use to size the active window with the arrow keys. After the pointer changes to the four-headed arrow:

1. Press one of the **DIRECTION** keys (left, right, up, or down arrow key) to move the pointer to the border you want to move.
2. Press a **DIRECTION** key to move the border.
3. Press **ENTER** when the window is the size you want.

Note: This command is unavailable if you maximize the window.

MOVE command (in the Control menu)

Use this command to display a four-headed arrow you can use to move the active window or dialog box with the arrow keys.

Note: This command is unavailable if you maximize the window.

MINIMIZE command (in the application control menu)

Use this command to reduce the MiniMag Configuration Utility window to an icon.

MAXIMIZE command (in the system menu)

Use this command to enlarge the active window to fill the available space.

CLOSE command (in the control menu)

Use this command to close the MiniMag Configuration Utility.

Note: Double-clicking a control menu box is the same as choosing the “Close” command.

RESTORE command (in the control menu)

Use this command to return the active window to the size and position it had before you chose the “Maximize” or “Minimize” command.

SAVE button (MiniMag Configuration Utility properties)

Use this button to save the active configuration file to its current name and directory. When you save a file for the first time, the MiniMag Configuration Utility displays the “Save As” dialog box so you can name your file.

SEND button (MiniMag Configuration Utility properties)

Use this button to send all current selected settings to the MiniMag reader.

DEFAULT ALL button (MiniMag Configuration Utility properties)

Use this button to set all configuration settings at their default values.

FILE SAVE AS dialog box

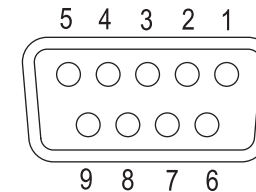
The following three options allow you to specify the name and location of the file you are about to save:

1. **FILE NAME** - Type a new file name to save a file under a different name. The MiniMag Configuration Utility adds the extension you specify in the **SAVE FILE AS TYPE** box.
2. **DRIVES** - Select the drive in which you want to store the document.
3. **DIRECTORIES** - Select the directory in which you want to store the document.

Appendix F. Pin Out Information

DB9 Female Connector

Pin No.	Signal
2	TXD
3	RXD
5	GVD
7	CTS
8	RTS



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