PEL100XX Programmer's Manual

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FOREWORD

This manual provides the programming information for the VT TECH Prox-eLock Security Access Control Systems, which is manufactured by VT TECH Corporation, Simi Valley, California.

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1.0 Prox-eLock Overview

1.1 Serial and Network Communications

The PEL100XX series offers a variation communication interface options to PC for Database Management:

- Serial connection to PC via RS-232 interface: 19200,N,8,1 (XON/XOFF and CTS)
- Multi-drop Network connection to PC via RS-485 interface: 19200,N,8,1 (XON/XOFF) and supported up to 128 PEL devices
- TCP/IP Network connection to PC via Ethernet Network interface

In addition, PEL100XX also supports the time and attendance features. This option allows the system to keep track of all the transactional timestamp records.

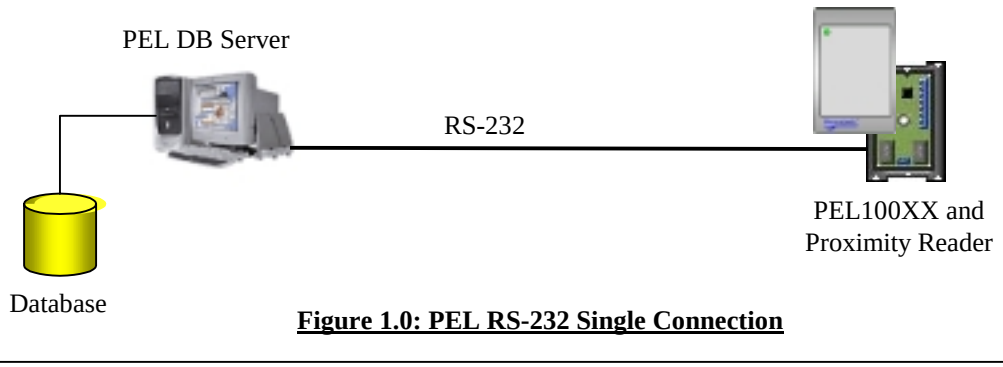


Figure 1.0: PEL RS-232 Single Connection

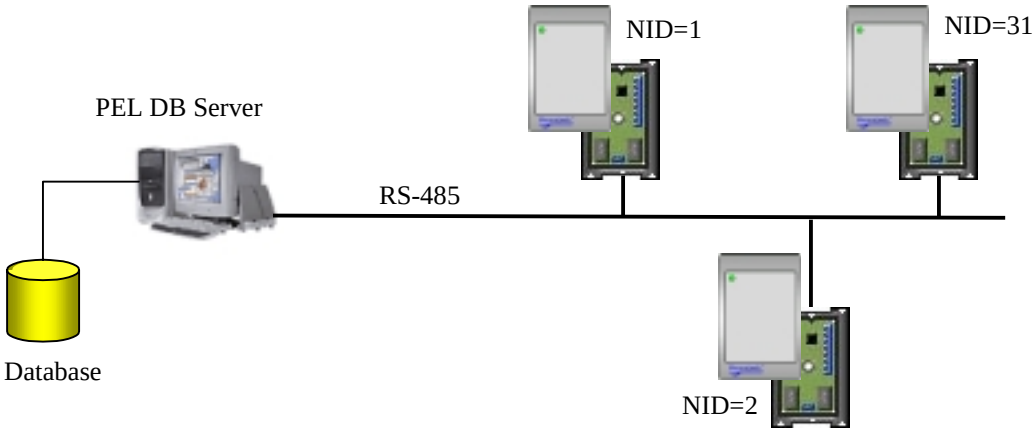


Figure 1.1: PEL RS-485 Network Connection

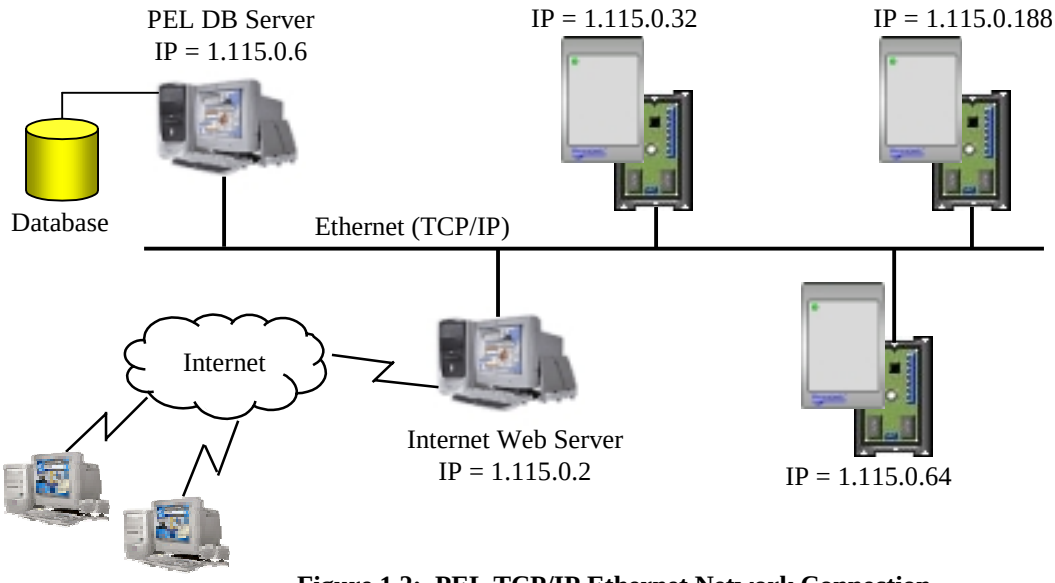


Figure 1.2: PEL TCP/IP Ethernet Network Connection

1.2 Prox-eLock Command Interface

The PEL100 series offers a simple command interface as providing the ease, flexibility and scalability of developing a complete database application: configuration, time and attendance, and security database management system.

Conventions,

[ ]	-	Optional parameter or data
< >	-	Mandatory parameter or data
{}	-	Data phase
|	-	Exclusive-Or option, only one can be selected
0xNN	-	Hex notation for NN hex value, e.g.: 0x1A hex is equivalent to 26 decimal
<ESC>	-	Escape character (0x1B)
<CR>	-	Carriage-return character (0x0D)
<LF>	-	Line-feed character (0x0A)
<EOL>	-	End-Of-Line is a combination of Carriage-return and a Line-feed (<CR> + <LF>)
<SP>	-	A Space character (0x20)
<ACK>	-	Positive command acknowledgement response character (0x06)
<NAK>	-	Negative command acknowledgement response character (0x15)
<ETX>	-	End of command response character (0x03)
P1...Pn	-	Command parameter 1 to N
{DI}	-	Data-In phase indicates where the data is to be transferred from PEL unit to host
{DO}	-	Data-Out phase indicates where the data is to be transferred from host to PEL unit
FC	-	Refers to Facility Code consists of 1 or 2-byte value
UIDC	-	Refers to User ID Code consists of 2-byte value.
Reserved	-	Reserved field and it should be set to 0

Every PEL command is terminated by an <EOL> (carriage return and a line feed). And PEL device will respond to a command by an <ACK> and <ETX> to indicate a command is successfully completed or a <NAK> and <ETX> to indicate a command is completed with error.

2.0 Basic Commands

2.1 Forced Echo Command (FE)

Syntax: FE< P1><EOL>{DI}

This command will echo back to host all the receive data from a given P1 data stream.

P1 - Binary data stream
DI - Binary data stream is to be received by host. It should be exactly the same as P1

e.g.: FE HELLO PEL<EOL>

HELLO PEL<EOL> ; PEL unit echoes back the "HELLO PEL" string

2.2 Firmware Inquiry Command (FI)

Syntax: FI<EOL>{DI}

This command will report the current firmware version.

e.g.: FI<EOL>

PEL-100 Ver 2.00.09 (GP32)<EOL> ; PEL unit reports the firmware version string
VT TECH Corp. (c) 2001<EOL> ;

2.3 Firmware Reset Command (FR)

Syntax: FR<EOL>{DI}

This command will cause a PEL unit to reset and report the current firmware version

2.4 PEL Device Select / Deselect ID Command (FS / FD)

Syntax: FS< P1><EOL>
FD<P1><EOL>

This command will select and de-select to a specific given PEL device ID as begin and end of communication link between host and a PEL. It is suggested a minimum of 10 seconds timed-out on this command response and exceed 3 retries before declaring the device is communication failure.

P1 - PEL device ID in hex string from (0x00-0xFF). The device ID 0 is used as a broad cast ID that allows any connected PEL unit to respond to commands.

e.g.:

```
FS 0A<EOL>          ; select PEL device ID=0x0A (10)
. . . . .           ; other PEL commands
FD 0A<EOL>          ; deselect PEL device ID=0x0A (10)
```

2.5 Get / Set Base Date and Time Command (DT)

Syntax: DT[P1]<EOL>{DI}

This command will set and/or report based date and time of a PEL device. The default manufacture settings is 01/01/2001 12:00:00. This command is mainly used to support the transactional timestamp so remember to update the time and date after polling the transactional timestamp record or before disconnecting to the communication link.

P1 - Optional Date and Time (24hrs) parameters to be set in the format of
MM/DD/YYYY hh:mm:ss SO
Where SO is the elapsed time in seconds (or time offset)

e.g.:

DT<EOL>	; report current date and time
01/01/2001 12:00:00 008712<EOL>	; manufacture default date and time
. . . . .	; other PEL commands
DT 07/28/2001 14:25:36<EOL>	; set new date and time
07/28/2001 14:25:36 000008<EOL>	; report the settings of new date and time

3.0 Cardholder Commands

The PEL unit handles up to 2000 cardholder records and there is 8 bytes/record in the following format,

	7	6	5	4	3	2	1	0
0						SUPB	PINB	ENRB
1	PIN (MSB)							
2	PIN (LSB)							
3	Reserved							
4	FC (MSB)							
5	FC (LSB)							
6	UIDC (MSB)							
7	UIDC (LSB)							

Figure 3.0 - Cardholder Structure

where,

SUPB - Supervisor bit, set to 1 to enable the supervisor access level (higher security control level compare to normal user, that means when this bit is reset)

PINB - Personal Identification Number bit, set to 1 to allow the PIN pad to be used in conjunction with card. Normally this bit should be off unless the PIN pad device is installed.

ENDB - Enrolled bit, set to 1 indicates this enrolled card is active to access the door entry.

PIN - Personal Identification Number consists of 2-byte value. It is used as a password in conjunction with card. This should be set to 0 if there is no PIN pad device is installed.

FC - Facility Code consists of 1 or 2-byte value. Only 1-byte value will be used on the 26-bit Wiegand format and 2-byte value will be used on 34-bit Wiegand format.

UIDC - User IDentification Code consists of 2-byte value that represents an employee or a member of a specific facility.

If all bytes are 0x00's or 0xFF then it indicates no more cardholder records in the cardholder data buffer.

3.1 Add Cardholder Command (CA)

Syntax: CA<P1><EOL>

This command will add (or enroll) a single cardholder into a PEL unit. This command will be ignore if FC and UIDC already existed.

P1 - Cardholder hex data stream, each byte is separated by a space character.

e.g.:

```
CA 01 00 00 00 00 82 02 03<EOL>      ; enroll a normal cardholder
                                     ;     FC=0x82 (130),  UIDC=0x0203 (1027)
CA 05 00 00 00 00 82 02 06<EOL>      ; enroll a supervisor cardholder
                                     ;     FC=0x82 (130),  UIDC=0x0206 (1030)
```

3.2 Modify Cardholder Command (CM)

Syntax: CM<P1><EOL>

This command will modify the content of a cardholder from a PEL unit. This command will be ignored if FC and UIDC do not existed.
P1 - Cardholder hex data stream, each byte is separated by a space character.

e.g.:

```
CM 0016:  00 00 00 00 00 82 02 03<EOL>     ; de-activate this cardholder
                                           ;     record number=0x16 (22)
                                           ;     FC=0x82 (130),   UIDC=0x0203 (1027)
CM 0017:  00 00 00 00 82 02 06<EOL>        ; change the access level from supervisor to a normal
                                           ; cardholder.
                                           ;     record number=0x17 (23)
                                           ;     FC=0x82 (130),   UIDC=0x0206 (1030)
```

3.3 Cardholder Inquiry Command (CI)

Syntax: CI<EOL>{DI}

This command will report the current cardholder buffer status from a PEL unit.
D I - Cardholder Inquiry data stream is to be reported in hex string format.

e.g.:

```
CI<EOL>                                    ; report Cardholder Inquiry data
007D,0177<EOL>                             ; cardholder data inquiry responds from PEL unit
                                           ;     0x007D (125) cardholder records are used
                                           ;     0x0177 (375) cardholder records are available
```

3.4 Verify Cardholder Command (CV)

Syntax: CV<EOL>{DI}

This command will wait for a card is read then report it as a cardholder record to host. If the card does not exist in the PEL unit then the 1st byte of the cardholder record will be zeroed out. Host can abort this process by sending out an <ESC> character. This command can be used for the online enrollment.
DI - Cardholder hex data stream, each byte is separated by a space character.

e.g.:

```
CV<EOL>                                    ; verify cardholder
                                           ; user presents a card to a reader for the verification
00 00 00 00 00 82 02 03<EOL>               ; a card is read but it is not enrolled
                                           ;     FC=0x82 (130),  UIDC=0x0203 (1027)
CV<EOL>                                    ; verify cardholder again
                                           ; user presents another card to a reader
01 00 00 00 00 82 02 06<EOL>               ; a card is read and it is enrolled
                                           ;     FC=0x82 (130),  UIDC=0x0203 (1030)
```

3.5 Read Cardholder Buffer Command (CR)

Syntax: CR[P1,P2]<EOL>{DI}

This command will read number of cardholder records from a PEL unit.
P1 - Starting cardholder record number, in hex string format (default to 1)
P2 - Number of cardholder records to be read, in hex string format (default to all)
DI - Cardholder records data stream is to be reported to host in hex string format. Each cardholder record is included with a record number.

e.g.:

```
CR 0015,0004<EOL>                          ; read 4 cardholder records from
                                           ; record number=0x15 (21)
                                           ; receiving data to host
0015: 01 00 00 00 00 82 02 02<EOL>         ; user cardholder
0016: 00 00 00 00 00 82 02 03<EOL>         ; this cardholder record is de-activated
0017: 01 00 00 00 00 82 02 06<EOL>         ; user cardholder
0018: 05 00 00 00 00 82 02 07<EOL>         ; supervisor cardholder
```

3.6 Write Cardholder Buffer Command (CW)

Syntax: CW[P1,P2]<EOL>{DO}

This command will write a number of cardholder records into a PEL unit. If all bytes in a cardholder record are x00's or 0xFF's then it will be treated as a last cardholder record in the buffer.
P1 - Starting cardholder record number, in hex string format (default to 1)
P2 - Number of cardholder records to be read, in hex string format (default to all)
DO - Cardholder records data stream is to be sent to PEL unit in hex string format.

e.g.:

```
CW 000F,0003<EOL>                          ; write 3 cardholder records from
                                           ; record number=0x0F (15)
                                           ; sending data to PEL unit
01 00 00 00 00 82 02 10<EOL>               ; user cardholder
05 00 00 00 00 82 02 11<EOL>               ; supervisor cardholder
01 00 00 00 00 82 02 12<EOL>               ; user cardholder
```

3.7 Clear Cardholder Buffer Command (CC)

Syntax: CC<EOL>

This command will clear the cardholder buffer from a PEL unit. All the cardholder records will be cleared.

e.g.:

```
CC<EOL>                                    ; clear Cardholder buffer
```

4.0 Transactional Timestamp Record Commands

The PEL unit handles up to 4000 transaction timestamp records and there is 8 bytes/record in the following format,

	7	6	5	4	3	2	1	0
0	HUB					SLB	ADB	AGB
1	SECTS (MSB)							
2	SECTS (MID)							
3	SECTS (LSB)							
4	FC (MSB)							
5	FC (LSB)							
6	UIDC (MSB)							
7	UIDC (LSB)							

Figure 4.0 – Transactional Timestamp Structure

Where,

HUB - Host Update Bit indicates this record updated by host.
SLB - Supervisor Locked mode Bit indicates whether the PEL device is locked/unlocked by a supervisor.
ADB - Access Denied Bit indicates a denial of access entry. It bases on the SLB or a card is not enrolled or a bad card which cannot be read or an invalid given PIN.
AGB - Access Granted Bit indicates a grant of access entry.
SECTS - Timestamp is a 3-byte offset in seconds (max 16777215 seconds or 194.18 days). This offset is reference to the last updated values of date and time via DT command or the host can also obtain that via the DT command without sending the parameter.
FC - Facility Code consists of 1 or 2 byte value. Only 1-byte value will be used on the 26-bit Wiegand format and 2-byte value will be used on 34-bit Wiegand format.
UIDC - User IDentification Code consists of 2-byte value that represents a the employeeo r member of a specific facility.

If all bytes are 0x00's or 0xFF then it indicates no more transactional timestamp records.

4.1 Add Transactional Timestamp Record Command (TA)

Syntax: TA<P1><EOL>

This command will add a transactional timestamp record to a PEL device.
P1 - The hex data stream represents for a transactional timestamp record. Each byte is separated by a space character.

e.g.:

```
TA 81 00 07 08 00 82 02 03<EOL>      ; Transactional timestamp record
                                     ;     SECTS = 0x0708 (1800 seconds or 30 minutes)
                                     ;     FC=0x82 (130),  UIDC=0x0203 (1027)
```

4.2 Modify Transactional Timestamp Record Command (TM)

Syntax: TM<P1><EOL>

This command will modify a transactional timestamp record to a PEL device. This command will be ignored if FC and UIDC do not existed.

P1 - The hex data stream represents for a transactional timestamp record. Each byte is separated by a space character.

e.g.:

```
TM 80 00 07 08 00 82 02 04<EOL>      ; Transactional timestamp record
                                     ;    SECTS = 0x0708 (1800 seconds or 30 minutes)
                                     ;    FC=0x82 (130), UIDC=0x0204 (1028)
```

4.3 Transactional Timestamp Record Inquiry Command (TI)

Syntax: TI<EOL>{DI}

This command will report the current transactional record buffer status from a PEL unit.

DI - Transactional timestamp inquiry data stream is to be reported in hex string format.

e.g.:

```
TI<EOL>                              ; report Cardholder Inquiry data
007F,0F21<EOL>                       ; cardholder data inquiry responds from PEL unit
                                     ;    0x007F (127) transactional records are used
                                     ;    0x0F21 (3873) transactional records are available
```

4.4 Verify Transactional Timestamp Record Command (TV)

Syntax: TV<EOL>{DI}

This command will wait for a card is read then report it as a transactional record to host. If the card does not exist in the PEL unit then the ADB bit will be set on a 1st byte of transactional timestamp record will be zeroed out. Host can abort this process by sending out an <ESC> character. This command can be used for the online enrollment.

DI - Transactional timestamp record in hex data stream. Each byte is separated by a space character.

e.g.:

```
TV<EOL>                              ; verify transactional timestamp.
                                     ; user presents a card to a reader for the verification

01 00 00 FA 00 82 02 03<EOL>         ; stamped the time of a card is read
                                     ;    SECTS=0xFA (250 seconds)
                                     ;    FC=0x82 (130), UIDC=0x0203 (1027)

TV<EOL>                              ; stamped the time of a card is read
                                     ; user presents another card to a reader

01 00 00 FF 00 82 02 06<EOL>         ; a card is read and it is enrolled
                                     ;    SECTS=0xFF (255 seconds)
                                     ;    FC=0x82 (130), UIDC=0x0203 (1030)
```

4.5 Read Transactional Timestamp Buffer Command (TR)

Syntax: TR[P1,P2]<EOL>{DI}

This command will read number of transactional timestamp records from a PEL unit.
P1 - Starting record number, in hex string format (default to 1)
P2 - Number of records to be read, in hex string format (default to all)
DI - Transactional timestamp data stream is to be reported to host in hex string format. Each transactional timestamp record is included with a record number.

e.g.:

```
TR 001,0004<EOL>                          ; read 4 transactional time stamp records from
                                          ; record number=0x01 (01)
                                          ; receiving data to host
0001: 01 00 02 1100 82 02 02<EOL>         ;
0002: 01 00 02 12 00 82 02 03<EOL>        ;
0003: 01 00 02 14 00 82 02 06<EOL>        ;
0004: 02 00 02 24 00 82 02 07<EOL>        ;
```

4.6 Write Transactional Timestamp Buffer Command (TW)

Syntax: TW[P1,P2]<EOL>{DO}

This command will write a number of transactional timestamp records into a PEL unit. Ifa ll bytes in the record are x00's or 0xFF's then it will be treated as a last transactional timestamp record in the buffer.
P1 - Starting record number, in hex string format (default to 1)
P2 - Number of records to be read, in hex string format (default to all)
DO - Transactional timestamp data stream is to be sent to PEL unit in hex string format.

e.g.:

```
TW 001E,0003<EOL>                         ; write 3 transactional timestamp records from
                                          ; record number=0x01E (30)
                                          ; sending data to PEL unit
82 00 00 00 00 82 02 10<EOL>              ;
85 00 00 00 00 82 02 11<EOL>              ;
81 00 00 00 00 82 02 12<EOL>              ;
```

4.7 Clear Transactional Timestamp Buffer Command (TC)

Syntax: TC<EOL>

This command will clear the transactional timestamp buffer from a PEL unit. All the transactional timestamp records will be cleared.

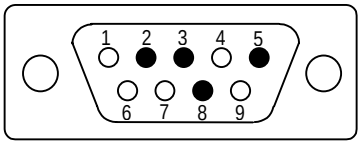
e.g.:

```
TC<EOL>                                   ; clear Cardholder buffer
```

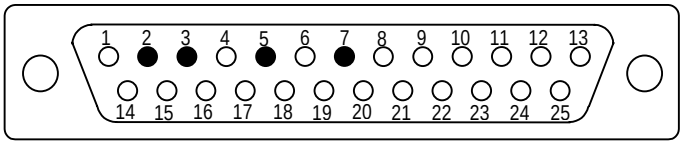
Appendix – A

A-1 Serial Communication Interfaces to Host or PC

Baud rate: 9600, 19200, 38400 baud. The default is set to 9600 baud.
Handshake: CTS or XON/XOFF.
Parity: None
Data Bit: 8
Stop Bit: 1



PC DB-9F connector



PC DB-25F connector

DB-9F PIN	DB-25F PIN	Abbreviation	PEL device
1	8	/CD	N/C
2	3	/RD	Connects to TxD
3	2	/TD	Connects to RxD
4	20	/DTR	N/C
5	7	GND	Connects to GND
6	6	/DSR	N/C
7	4	/RTS	N/C
8	5	/CTS	Connects to /RTS
9	22	/RI	N/C

Prox-eLock to PC connection

A-2 Command Handshake