

# Diamond 650 Access Control Card Reader specifications

## Firmware v5

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### Overview

The access control reader, referred to as the 'reader' or 'controller' hereafter is intended to function at the point of access to admit or deny entry to personnel on the basis of the smartcard presented or PIN number entered.

The unit may be operated in a variety of different modes, most significant of these being:

- Online – details of cards swiped are passed back to a central PC, and the lock is disengaged only on instruction from the PC. This mode of operation uses the card serial number (CSN) embedded in all Mifare cards at the time of manufacture.
- Offline – details of permissible cards are loaded into the unit, and the PC is not then required to be part of the access control loop. This mode of operation requires siCard formatted cards.

### Communication

The controller communicates using RS232 at 9600 baud, no parity, 8 data bits and 1 stop bit. No flow control or handshaking is employed.

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## Command structure

Each command from the PC to the controller should be formed as follows:

STX	LEN	CMD	DEST	DATA1-N	CSUM	ETX
0x02						0x03

STX is the start of packet indicator.

LEN is the number of bytes in the command, covering CMD, DEST and all DATA bytes. STX, LEN itself, CSUM and ETX are excluded from the count. The minimum value of LEN is therefore 2.

CMD is the command byte.

DEST is the controller ID of the target device. Use zero to target all controllers.

DATA1-N are the data bytes relevant to the CMD in question. There may be no data bytes.

CSUM is a byte calculated by XORing (exclusive-or) all LEN, DEST and DATA bytes together.

ETX is the end of packet indicator.

A typical packet of data, in this case setting the buzzer duration, would look like this:

STX	LEN	CMD	DEST	DATA1	CSUM	ETX
0x02	0x03	0x41 'A' 65	0x00	0x05	0x47 71	0x03

—— LEN = 3 bytes →  
— CSUM = 3 xor 65 xor 0 xor 5 →

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### Response structure

Each response message from the controller to the PC should be formed as follows:

STX	LEN	MSG	SRC	DATA1-N	CSUM	ETX
0x02						0x03

STX is the start of packet indicator.

LEN is the number of bytes in the message, covering MSG, SRC and all DATA bytes. STX, LEN itself, CSUM and ETX are excluded from the count. The minimum value of LEN is therefore 2.

MSG is the message byte (equivalent to the command byte).

SRC is the controller ID of the device.

DATA1-N are the data bytes relevant to the MSG in question. There may be no data bytes.

CSUM is a byte calculated by XORing (exclusive-or) all LEN, SRC and DATA bytes together.

ETX is the end of packet indicator.

A typical message, in this case a response to a successful setting of the buzzer duration, would look like this:

STX	LEN	CMD	DEST	CSUM	ETX
0x02	0x02	0x00	0x01	0x03	0x03

— LEN = 2 bytes →  
— CSUM = 2 xor 0 xor 1 →

### NOTES:

In response to a command, you will receive a message and an echo of the original command.

The internal timing of the controllers is not particularly accurate. Where timing is critical check that the delay or interval in question matches expectations and adjust via software where necessary.

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### Command set overview

CMD	Description	Data bytes	Parameter 1	Parameter 2
A	Set audible tone (buzzer) time	1	1 byte duration 0 – 255, 0.1sec units	
C	Add card number to Card Acceptance List (siCard only)	2	2 bytes siCard number	
D	Set maximum door open time	1	1 byte duration 0 – 255, 0.1sec units	
E	Energy saving mode, if enabled turns RF field off when not in use	1	1 byte 0 = energy saving off 1 = energy saving on	
I	Read controller ID	0		
L	Set lock disengage period	1	1 byte duration 0 – 255, 0.1sec units	
M	Set operation mode	1	1 byte 0=normal 1=any card unlocks door 2=door unlocked 3=use Card Acceptance List  bit 2 set suppresses door-forced warning	
O	Open the door (disengage the lock)	0		
P	Set PIN number	3	1 byte 0 – 13 denotes which PIN to set (max 14 PINs at any time)	2 bytes PIN in BCD format eg 0x12, 0x34 denotes a PIN of 1234
R	Remove card number from Card Acceptance List (siCard only)	2	2 bytes siCard number	
S	Set lowest card number to expect for Card Acceptance List (siCard only)	2	2 bytes siCard number	
T	Set controller ID	2	2 bytes controller ID to set	
X	Set keys (siCard only)	10	2 bytes of Customer ID	8 bytes of key

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### Response and other message codes overview

MSG	Description	Data bytes	Notes
0	Success	0	
5	Failed, no key space left	0	
11	Failed, attempt to set PIN > 13	0	
22	Standard card detected	?	Card Serial Number returned, 4 bytes for Mifare 1K & 4K cards.
23	Error state removed	0	All previous warning states were removed
24	Fire alarm input detected	0	
25			
26	Door forced warning	0	
27	Valid PIN entered	2	The PIN entered is returned
28	Door open alert	0	Door is being held open for longer than the permissible time
29	Attempt to use invalid siCard	4	siCard only, 4 bytes of card data are returned
30	Use of valid siCard	4	siCard only, 4 bytes of card data are returned
31	Reboot	2	Firmware version and status byte are returned