

DESTINY 6100 RS-232 Interface Specification

Release 5.0

For use with Destiny 6100
Rev 8.05 or higher software.

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1. Conventions of this Document

Text displayed on your PC uses a `monospaced` font, and variable text is in an *italic monospaced* font. Hexadecimal numbers are prefaced by '0x.'

2. General

This document is intended to describe the electrical and protocol specifications for the Apex RS-232 interface port provided on the Destiny 6100 security panel.

This interface is provided to allow home control systems to obtain status information from the security panel on a real-time basis. In addition, limited control of hardware devices present in the Destiny panel will be allowed from home control systems.

Connection to the port is via a plug-in adapter card, optionally available for the Destiny panel.

You can use any PC connected to the RS232 panel interface board to communicate with the panel. You can use any software capable of sending ASCII strings through your PC's COM ports. Contact Apex Technical Support concerning the availability of an RS-232 demo program.

3. Electrical/Mechanical Specifications

The panel interface board supports a full RS-232 interface in hardware. The pin-outs are jumper selectable DTE or DCE. This application uses only GND and the TXD, RXD, and DTR signals.

TXD and RXD are used in their normal context. The panel ignores all handshake lines when sending data, so connected equipment must be capable of receiving continuous 1200 baud data. Since the panel uses the same software UART for the onboard modem and the RS-232 port, the panel drives DTR false when uploading or downloading data. At these times the panel will not communicate through the RS-232 port.

Communication settings should be 1200 baud, 8 data bits, no parity, and one stop bit. Logic levels at the interface are standard RS-232. The interface is full duplex.

The interface board is provided with an RJ-45 connector. A female 9-pin D connector can be added in the field (not supported). When jumpered for DCE connections, a standard pin-to-pin male-to-female cable can be used to connect to an IBM PC serial port.

DTE vs. DCE selection

Hold the RS-232 interface board so that the RS-232 label is upright. At the right edge of the board, approximately centered between top and bottom, is a jumper labeled "J3." The 2 upper posts are for DTE and the two lower posts are for DCE. In most cases, DCE is appropriate.

4. Error Checking

This release is a “blind” protocol designed to be used when the data link is considered to be 100% reliable. Future release versions will contain error checking and retransmission.

5. Messages

With the exception of the message terminator, CR-LF, all characters are printable ASCII. C source for generating a well-formed message string is provided in Appendix A. Contact Apex Technical Support concerning the availability of an RS-232 demo program.

5.1. Packet Format

Data packets both from a PC to the panel and from the panel to a PC use the following format. **Note:** All hex values are entered in upper case only.

NNMSD...00CC(CR-LF)

Packet Length

NN 2 ASCII characters, length of packet including all characters but CR-LF at the end of the packet. Legal values are hex 00 to FF. Permissible characters are ASCII 0-9 and upper case A-F.

Message Type

M 1 ASCII character, message/packet type ID. These are upper and lower case alpha characters. Upper case is used for responses from and panel and lower case for commands to the panel. Allowed values are a-z and A-Z

Sub-Message Type

S ASCII character, sub-message/packet type. These are upper and lower case alpha characters. Upper case is used for responses from and panel and lower case for commands to the panel. Allowed values are a-z and A-Z .

Data

D... 0 or more ASCII characters of data associated with the command/packet type. Any printable ASCII character is permitted.

Reserved

00 Two ASCII characters, reserved for future development. The only currently legal character is 0 (numeric zero).

Checksum

CC 2 ASCII characters, 2-digit checksum. This is the hexadecimal two's complement of the modulo-256 sum of the ASCII values of all characters in the message excluding the checksum itself and the CR-LF terminator at the end of the message. Permissible characters are ASCII 0-9 and upper case A-F.

Terminator

(CR-LF) Message terminator. ASCII characters consisting of hexadecimal 0x0D and 0x0A.

5.2. Arm and Disarm Messages

You can use the PC to arm and disarm the panel and to query the panel's arming status.

For Arm and Disarm messages the data field *DDDDDD* consists of the two digit User Number (01-32) followed by the 4 digit User Code (for RS-232 controlled panels *always* use 4 digit arm/disarm codes.).

Arming the panel with zones open will initiate "force arming" regardless of whether force arming is enabled or disabled in the panel.

You can use the PC to request the arming status of the system by sending an Arming Status Request. The Panel will respond with an Arming Status Report.

Arm to Away

0EaaDDDDDD00CC(CR-LF)

Example: User 2, User Code 2345, sending Arm to Away : 0Eaa0223450039(CR-LF).

Arm to Home

0EahDDDDDD00CC(CR-LF)

Example: User 3, User Code 7898, sending Arm to Away : 0Eah037898001F(CR-LF).

Disarm

0EadDDDDDD00CC(CR-LF)

Example: User 1, User Code 1000, sending Disarm : 0Ead0110000044(CR-LF)

Arming Status Request

08as0064(CR-LF)

The panel responds to this message with an Arming Status message

Arming Status Report

10ASDDDDDDDD00CC(CR-LF)

The panel sends this message in response to a Status Request

The 8-character data field represents the arming status of partitions 1-8. Each partition field can contain one of the following values:

- A Armed to Away
- H Armed to Home
- D Disarmed

If partitioning is not used or not available, all 8 data fields will contain the same value. Fields for partitions not assigned to a User will display 'D.'

Example: With 6 partitions assigned, partitions 1-4 Armed to Home, partitions 5-6 not assigned, and partitions 7-8 Armed to Away, the message is

10ASHHHDDAA0081 (CR-LF)

5.3. Zone Status Messages

You can use your PC to query the panel concerning the status (open, closed, trouble, alert, bypassed) of all zones, and to request the partition assignment of all zones. The panel will respond with a Zone Status or Zone Partition Status message for all 96 zones. In addition, the panel can be programmed to send System Notification Messages concerning zone status. (*See* Notification Messages, section 5.6)

Zone Status Request

08zs004B (CR-LF)

The panel responds with a Zone Status Report.

Note: This message should be sent only when an initial connection is made with the panel. It is not intended to be used as a 'polling' command. The panel can be programmed to send System Notification Messages concerning zone status.

Zone Status Report

68ZSD...00CC (CR-LF)

The panel sends this message in response to a Zone Status Request.

The data portion of this message is 96 characters long, one character for each zone in order. Each character is the *sum* of all applicable status values, expressed in hexadecimal using ASCII characters 0-9 and A-F.

Status Values

- 0 Closed
- 1 Open
- 2 Trouble
- 4 Alert
- 8 Bypassed

Example: a Zone Status Report for a system in which Zone 1 is Open, Zone 2 is Open, in Trouble, and Bypassed, and the rest Closed, would begin 68ZS1B00....

Zone Partition Request

08zp004E (CR-LF)

Panel responds with a Zone Partition Report

Zone Partition Report

68ZPD...00CC(CR-LF)

The panel sends this message in response to a Zone Partition Request.

The data portion of this message is 96 characters long, one character for each zone in order. The value will be from 0-8, with 0 meaning no partition assignment.

Example: a Zone Partition Report for a system in which Zone 1 is assigned to Partition 2. Zone 2 is assigned to no partition, and Zone 3 is assigned to Partition 8, would begin 68ZP208....

5.4. System Word Messages

In all system word messages, the Data field is a 1-referenced 3-digit decimal number corresponding to the number of the desired word.

Speak Word at Inside and Outside Speakers

0BsoDDD00CC(CR-LF)

Speak Word at Insider Speaker

0BsiDDD00CC(CR-LF)

Speak Word Inside Speaker at Alert Volume

0BsaDDD00CC(CR-LF)

Speak Word at Local Phone

0BslDDD00CC(CR-LF)

Speak Word at Remote Phone

0BsrDDD00CC(CR-LF)

Example: Speak Word 123 at Inside Speaker is 0Bsi12300BC(CR-LF)

5.5. Control Channel Messages

You can use your PC to send an on or off command to a control channel. The control channel programming determines which outputs are controlled and what action occurs.

The data portion of the channel on and off commands is a 2-digit, 1-referenced decimal number corresponding to the number of the desired control channel

You can also query the panel concerning control channel status with a Control Channel Status Request. The panel will respond with a Control Channel Status Report.

Control Channel On

0AcnDD00CC(CR-LF)

Control Channel off

0AcfDD00CC(CR-LF)

Example: turn on Control Channel 1: 0Acf0105(CR-LF)

Control Channel Status Request

08cs0062(CR-LF)

The panel will respond with a Control Channel Status Report for all 56 control channels.

Control Channel Status Report

40CSD...00CC(CR-LF)

The panel sends this message in response to a Control Channel Status Request.

The data portion of this message is 56 characters long, one character for each control channel in order. The value will be U (unprogrammed), 0 (Off), 1 (On), or 2-7 (dim-levels 1-6).

Example: With control channel 1 Off, channel 2 On, channel3 unprogrammed, and channel 4 Off, the message would begin 40CS01U0... .

5.6. Notification Messages

The panel can be programmed to send notification messages through the RS-232 port when certain events occur. The two basic categories are System Event Notifications and Keystroke Notifications.

System Event Notifications

14NQDDDDDDDDDDDD00CC(CR-LF)

See the “Communicator Report Options section of your installation manual determine how to program the panel to send System Event Notification messages through the RS-232 port.

The 12-character data field of this message is divided into six 2-character sub-fields:

- *TT* Event Type 0x00 – 0x30 (see *Table 5.6.1*)
- *ZZ* Zone or User Number 00 – 95 (0 –referenced: Zone or User1 is 00)
- *MM* Minutes 00 - 59
- *HH* Hours 00 – 23
- *DD* Day 01 - 31
- *XX* Month 01 - 12

System Notification Messages are reported in real time. Data in the *TT* position will be one of the reports in *Table 5.6.1*. Reports of type 00 through 0D are activations that cause the system to generate an alarm. If the zone is an input with an open and close state (keypad activations do not), the Activation Event report will be preceded by an Open or Close report. A bypassed zone will still send Open and Close reports.

Table 5.6.1: System Notification Report Types (TT)					
Code	Type	Code	Type	Code	Type
00	Exterior Instant	11	Zone trouble	22	Zone unbyypass
01	Exterior Delay 1	12	Zone trouble rest.	23	Day zone trouble
02	Exterior Delay 2	13	Fuse trouble	24	Day zone trouble restore
03	Interior Instant	14	Fuse trouble restore	25	Up/Download attempt
04	Interior Delay 1	15	Phone line restore	26	Program mode entered
05	Interior Delay 2	16	Disarm	27	Fail to disarm
06	Fire	17	Disarm after activate	28	Fail to arm
07	Panic	18	Arm	29	HWB416 trouble
08	Silent	19	Arm with zones open	2A	HWB416 trouble restore
09	Emergency	1A	Ctrl low battery	2B	Zone open
0A	Follower	1B	Ctrl battery restore	2C	Zone restore (close)
0B	Aux type 1 or 2	1C	AC Fail	2D	Zone Tamper
0C	Duress	1D	AC restore	2E	Zone Tamper Restore
0D	Duress not Armed	1E	User Communicator test	2F	Radio Fail
0E	Zone restore after Activ.	1F	Auto Communicator test	30	Radio Restore
0F	Transmitter low bat	20	Cancel alert		
10	Trans. low bat rest.	21	Zone bypass		

Example: Zone 14 Open at 10:23 AM on February 21 is 14NQ2B14231021020038.

Keystroke Notification

0BNKDDD00CC(CR-LF)

Available only in Remote System Mode, which effectively disconnects keypads from the system and sends keystrokes to a device (a PC or home automation system) programmed to respond to keypad inputs. Encoded keystrokes are echoed through the RS232 port.

The first character of the 3-character data field indicates the source of the keystroke (K = System Keypad, L = Local Phone, R = Remote Phone). The second and third characters encode the keystroke. See *Table 5.6.2* for possible values and their meanings.

Table 5.6.2: Keypad Button Codes							
Code	Key	Code	Key	Code	Key	Code	Key
0x01	1	0x07	7	0x12	Status	0x0C	7-9, 9-F1
0x02	2	0x08	8	0x13	Monitor	0x0E	1-7
0x03	3	0x09	9	0x14	F1	0x11	2-8
0x04	4	0x00	0	0x15	F2	0x0F	3-9
0x05	5	0x0A	A	0x0D	1-3, 3-Status		
0x06	6	0x0B	H	0x10	4-6, 6-Monitor		

5.7. Bus Commands

You can use your PC to send bus commands. These are currently restricted to keystrokes from a keypad to the panel, but the message is formatted in such a way as to allow future systems to simulate a message from any device on the bus to any other device on the bus.

`12zkDDDDDDDDDD00CC(CR-LF)`

The 10-character data field is divided into 5 subfields:

- 10 Destination address 0x10(panel)
- SS Source address 0x30 - 0x37 (keypads 1-8)
- 00 Command 0x00 (send a keystroke)
- KK Keystroke See *Table 5.6.2*
- KK Keystroke repeated

5.8. Location Messages and Programming

You can use your PC to request the value stored at a programmed location in the panel. You may also use your PC to set the value at a location. However, writing invalid data to the system can jeopardize the integrity of the system. Please contact Apex with any programming questions. The system DOES NOT provide error checking for valid programming information. USE THIS FEATURE WITH EXTREME CAUTION AND AT YOUR OWN RISK!

Location Read

`0ElrDDDDDD00CC(CR-LF)`

The panel will respond with a Location Contents message.

The 6-character data field `DDDDDD` consists of 2 characters (0x00-0x20) indicating the number of bytes to read and 4 characters (0x0000-0x1B80) indicating the starting location in system memory.

Example: To request the 8 bytes of system memory starting at location 0x0240, enter `0Elr080240001F`

Location Contents

`NNLRDDDDDD...00CC(CR-LF)`

The panel sends this variable length message in response to a Location Read message.

The variable-length data field begins with 2 characters(0x00-0x20) indicating the number of bytes read and 4 characters (0x0000-0x1B80) indicating the starting location in system memory, followed by the data in memory at 2 characters per byte.

Set Location

`NNlsDDDDDD...00CC(CR-LF)`

This command should be used with EXTREME CAUTION. Writing invalid data to the system can jeopardize the integrity of the system. Please contact Apex with any programming questions. The system DOES NOT provide error checking for valid

programming information. USE THIS FEATURE WITH EXTREME CAUTION AND AT YOUR OWN RISK!

The variable-length data field begins with 2 characters(0x00-0x20) indicating the number of bytes to write and 4 characters (0x0000-0x1B80) indicating the starting location in system memory, followed by the data to write at 2 characters per byte.

Appendix A: C Source for Command String Generator

```
#include <stdio.h>
#include <math.h>
#include <stdlib.h>
#include <string.h>

void main( )
{
    char inString[255],outString[261], buffer[3] ;
    unsigned char checksum;
    int i;

    printf("Enter a command string: \n");
    gets(inString);

    //blank input quits program
    while (strlen(inString) )
    {
        checksum = 0;
        //get length of input string
        sprintf(outString,"%02X",strlen(inString)+ 6);
        //insert length at beginning of dstring
        strcat(outString, inString);
        //put '00' spacers at end of string
        strcat(outString, "00");
        i = 0;
        //sum ascii values of characters in expanded string
        while (outString[i])
        {
            checksum += outString[i++];
        }
        //twos complement
        checksum = ~(checksum) + 1;
        sprintf(buffer,"%02X",checksum);
        //append to string
        strcat(outString,buffer);

        printf("%s\n", outString);

        printf("Enter a command string: \n");
        gets(inString);
    } ;
    exit(0);
}
```

As an example of using this code, to get the checksum for the Arm to Away command, user 01, user code 1234, you would enter the string "aa011234" followed by the ENTER key. The program should return "0Eaa011234003E." To quit the program, just press ENTER at the prompt.

