

On-Guard Output Description

Version 1.1

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The On-Guard system is currently capable of outputting data directly to a serial port and to a USB flash drive. The data is 7-bit ASCII with Carriage Return (CR) and Line Feed (LF) being the only control characters. Data is arranged in distinct lines (records), each terminated with a CR and LF. There are two types of record; Transaction Records and Information Records. Transaction records are for the activity at a site and Information records will give information about the site itself. Both record types are exactly the same for both the Serial and USB outputs. The data is in its present text form so that it can easily be used for diagnostic purposes without special software.

1. Records

1.1. Reading a Record

Data can be read on a character basis. This would then be done in the following manner:

- If the character read is not a CR or LF, it is added to a buffer in volatile memory (string).
- If the character read is CR or LF, the string collected will be processed and saved to non-volatile memory (disk file), then the string is cleared and more characters are read in until End-Of-File.
- CR and LF are read but not stored.
- If the character is '#' (ASCII 23H), all subsequent characters up to the terminating CR and LF form an Information string. All other records are Transaction records.

1.2. Transaction Records

1.2.1. Transaction Record Structure

Each transaction record contains a Date/Time element, an Event element and optionally details of the event. The event details are further broken up into more elements. An element here is defined as data separated by a comma. This is as follows:

YY/MM/DD, hhHmm, Event..., iButton, Route, PointData, ...CRLF

YY/MM/DD is the date in 2digit year, 2digit month and 2digit day format

hhHmm is the time with 2digit hour, **H** to indicate 24hr clock and 2 digit minute

Event is a variable length character string denoting the event. This string will not exceed 32 characters. See Appendix A.

iButton is a 12 character representation of the iButton. This element is optional.

Route is a 6 character string to indicate the route taken. This element is optional

PointData is of the form **Pn : hhHmm** where **Pn** indicates a point number (P1 to P16), **:** is a delimiter and **hhHmm** is the 24hr time the point is visited. This element is between 8 and 9 characters in length, depending on the point number. There can be up to sixteen of these elements depending on the number of points installed on the site. These elements are optional.

1.2.2. Processing the Transaction String

After being read, the volatile string is processed in the following manner, then stored in a transaction disk file:

- If the string is less than 14 characters (Date & Time), is discarded as invalid.
- If the first 8 characters of the string cannot be identified as a valid date, it is discarded as invalid.
- The first element (Date) is the first field (Date) of the disk record
- The next element (Time) is extracted from the string is the second field (Time) of the disk record
- The next element (Event) is extracted and is the third field (Event) of the disk record.

All further elements, if present, are optional, and will appear in the following order:

- If there is another element, it will be the iButton ID. It is extracted and will be the fourth field (iButton) of the disk record.
- If there is another element, it will be the Route ID. It is extracted and will be the fifth field (Route) of the disk record.
- If there are further elements, they will be Point Data. They can be extracted one by one and stored together, separated by spaces, as the sixth disk field (Points).
- Commas are used to delimit the elements. They are read, but not stored.

1.2.3. Typical Transaction Disk File

From the foregoing, it can be seen that the disk file to store transactions can have 6 fields as follows:

<u>Name</u>	<u>Size</u>
Date	8
Time	5
Event	32
iButton	12
Route	7
Points	160

1.3. Information Records

1.3.1. Information Record Structure

Information records are used to provide information about the site the data came from. Generally these records will precede the transaction records. An information record starts with the '#' character. There are two types of information record; Value Assignment and Notification.

1.3.2. Value Assignment Information Records

This record will contain the '=' character and no spaces. The format is:

#VariableName=Value

VariableName is the identification for the value. It is written with both capitals and lower case to make it more readable. See Appendix B.

Value is the value to be assigned. It could be ASCII digits or the letters Y and N for boolean values. See Appendix B.

1.3.3. Notification Information Records

This record will never have the '=' and can contain spaces.

Appendix B shows all the information records currently used. More can be added at a future date if required.

2. Serial Output

2.1. Serial Port

The On-Guard serial port is fixed at the following settings:

Baudrate	9600
Parity	None
Bits	8
Stop Bits	1
Flow Control	RTS/CTS

The flow control is optional, and can be enabled / disabled by the user.

2.2. Serial Formats

There are two serial formats; Streaming Output and Output-on-Demand. The selection between these formats is programmable by the user.

2.2.1. Streaming Output

Transaction records are transmitted immediately events occur. Information records for the site are transmitted once when the On-Guard system is booted, but can be re-transmitted anytime by sending the \$OD command to the On-Guard system.

2.2.2. Output-On-Demand

Nothing is transmitted until the On-Guard system receives the \$OD command. Data is then transmitted with first the Value Assignment Information records being sent, then all available Transaction records before terminating with the Notification Information Record "Download Complete".

3. USB Flash Drive Files

When a USB flash drive is plugged into the optional flash drive interface, all available data is downloaded to the drive, and the internal buffer of the On-Guard system cleared. If the drive is left in the On-Guard system, no additional downloads will take place, but any data generated will be stored until the drive is re-inserted into the system. Note that the drive will always be formatted with MSDOS FAT32.

3.1. Directories

The On-Guard system will create a directory, if it does not already exist, in the root directory of the flash drive for its own data. The name of this directory is derived from the site number programmed into the On-Guard system. The directory name format is

Snnnn

where:

S stands for Site

nnnn is the site number with leading zeroes

Since MSDOS allows 512 root directory entries, this means a maximum of 512 sites can be stored on one flash drive.

3.2. Directory Files

The site directory will contain the following files:

HEADER.TXT

T001.TXT

to

Tnnn.TXT

HEADER.TXT

The On-Guard system will look in its site directory for this file, and create it if it does not exist. This file will contain all Value Assignment information records.

Tnnn.TXT

These files contain the Transaction records. The first download will be written to T001.TXT, the second download to T002.TXT if T001.TXT has not yet been deleted, etc. Once transaction files have been deleted, the numbering starts again from 001. This allows a maximum number of 999 downloads before the data must be read by the On-Guard management system. If, of course, only one download was done (expected for most cases), then there would only be the one transaction file T001.TXT.

3.3 Notes

- It is recommended that once the data for a site has been read, the entire directory for the site is removed, so that all data on the drive is always the latest.
- The reason for having separate header files and transaction files for each download is because the usb flash drive APIs are not capable of supporting file append.

APPENDIX A

Events

Fire Alert

Inspector Arrive

Inspector Depart

Mains Fail

Mains Restore
Panic Alert
Patrol Complete
Patrol not Finished
Patrol not Started
Point Missed
Start Patrol
System Off
System On
Tamper Alert
Unsolicited iButton
Wrong Route

APPENDIX B

Value Assignment Information Records

<i>#Site=nnnn</i>	where nnnn is the site number with leading zeroes
<i>#RoutesUsed=X</i>	where X = Y for yes or N for no
<i>#RouteX=i,j, ... k</i>	where X = A,B,C or D; and i, j, ... k are whatever points are used
<i>#Points=nn</i>	where nn are the total number of points for the site, no leading zeroes
<i>#InterPointDelay=nnn</i>	where nnn is in minutes, no leading zeroes
<i>#PatrolInterval=nnn</i>	where nnn is in minutes, no leading zeroes
<i>#MaximumPatrolDuration=nnn</i>	where nnn is in minutes, no leading zeroes

Notification Information Records

<i>#Download Complete</i>	only used with serial Output-On-Demand output
<i>#Internal buffer error - buffer reset</i>	internal On-Guard error, transaction data lost

APPENDIX C

\$OD command

The three characters *\$OD* followed by *CR* and *LF* are transmitted to the On-Guard system to get it to transmit whatever data it has in store.

APPENDIX D

Sample Data

```
#Site=0006
#RoutesUsed=Y
#RouteA=1,2
#RouteB=3,4,5
#RouteC=
#RouteD=
#Points=5
#InterPointDelay=0
#PatrolInterval=60
#MaximumPatrolDuration=40
```

06/04/25,18H00,System On
06/04/25,18H00,Start Patrol
06/04/25,18H30,Patrol Complete,00000063990B,Route A,P1:18H15,P2:18H35
06/04/25,19H00,Start Patrol
06/04/25,19H35,Patrol Complete,00000063990B,Route B,P3:19H10,P4:19H21,P5:19H32
06/04/25,19H45,Tamper Alert
#Download Complete

Note:

- From the Information records, only two routes are used - Route A and Route B
- Route A uses 2 points (1 and 2)
- Route B uses 3 points (3, 4 and 5)
- The total number of points for the system is 5 (1, 2, 3, 4 and 5)
- This sample would be exactly as obtained from the serial port with Output-On-Demand. For the USB files, the Value Assignment information records would be in HEADER.TXT and the Transaction records in T001.TXT. '#Download Complete' would not appear at all (it is the only record that is not universal).