List of Abbreviations

CLI	Command Line Interface
BRD	Bosch Recording Device
TDA	Text Data Application
ATM	Automatic Teller Machine
POS	Point-Of-Sale

Table of Contents

1. Introduction

The ATM/POS Text Data protocol is a simple straight forward protocol and can be utilized by any device or application software in order to provide text data (ASCII data) to **B**osch **R**ecoding **D**evices (BRD) such as DivarClassic, Divar XF, Divar700 Series, Dibos, Bosch Recording Station and Bosch Video Management System. In these recording systems the text data issued will be recorded as text to related recorded camera footage. This allows users to quickly search and produce video evidence of particular calamities like theft, speeding or others events of interest according to the text data issued.
The ATM/POS Text Data protocol was first used in the so called DIVAR ATM/POS bridge. This device could transfer 4 serial text data channels from Point-Of-Sale (POS) printers or Automatic Teller Machines (ATM) over IP to the above mentioned recording systems. Today this device can be replaced by Text Data applications on PCs or even by any hardware device embedding the protocol in its firmware like Barcode readers, Speed Detectors, Automatic Number Plate Recognition devices etc.
For clarity in this document, we will use the wording "TDA" (**T**ext **D**ata **A**pplication) when referring to this text data generating group of devices for the explanation of the protocol.

The TDA communicates with the Bosch Recording Device (BRD) over IP. The TDA - BRD connection has to be initiated first. After initialisation the TDA can start to send the text data to the BRD. The association of which camera channel has to record the Text Data is always to be setup in the BRD.

2. BRD-TDA Communication

The BRD and the TDA communicate via IP using the TCP/IP protocol. The conversation between the BRD and the TDA takes place with the help of a simple ASCII readable command language called Command Line Interfaces (CLI). CLI commands start with either "ms" or "mr" indicating a message read (mr) or a message send (ms) command between the TDA and the BRD. (See the explanation later in this document)
The BRD will initiate the communication with the TDA. Once the initiation succeeds, connection will be established and declared "CONNECTED" between the TDA and the BRD.

The connection between the BRD and the TDA will be sustained and checked with the help of a "heart-beat" message.

2.1. Text Data Source

A BRD can have communication with as many TDAs as fit in the BRD. These maximum are:
1. BVMS - 16 or more TDAs
2. BRS and Dibos - 8 TDAs
3. Divar700/XF - 16 TDAs
4. DivarClassic -16 TDAs

In the BRD menu, a TDA is referred to as an ATM/POS bridge with it's own IP address and Text Data inputs (called sometimes Terminals or ports in CLI).
Each TDA can deliver text date from in principle up to 16 individual text data Terminals (ports) but in BRD only Terminal 1-4 are used for text data reception.

2.2. Sockets

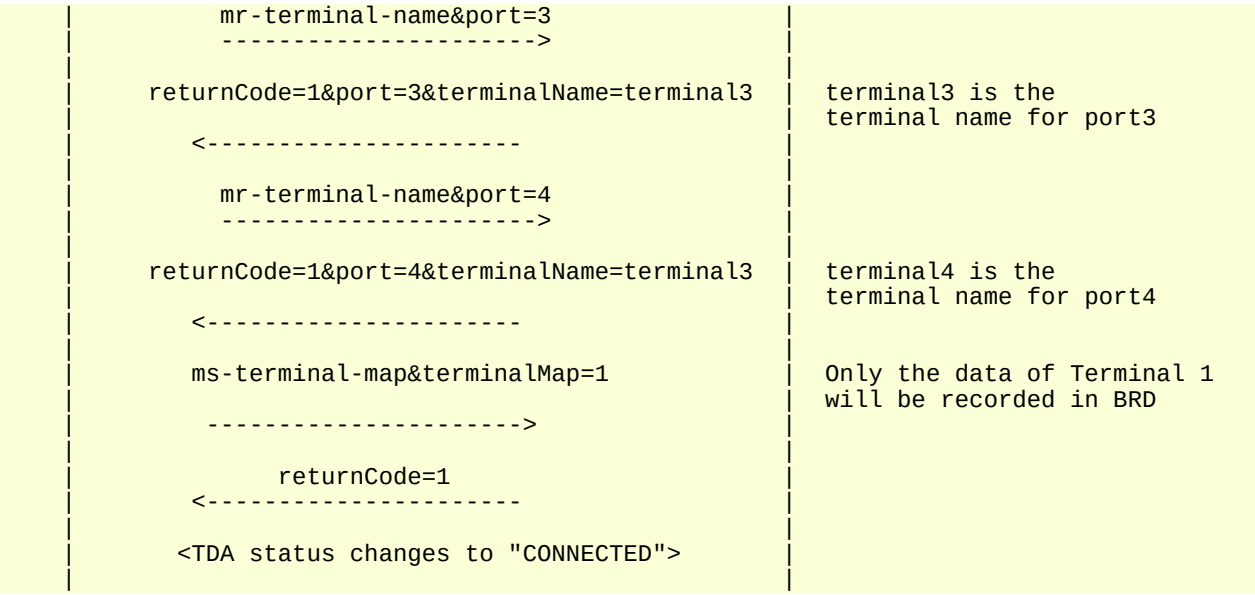
Communication between the TDA and BRD is based on socket connections with default ports 4200 and 4201. Prior to be able to receive ASCII data from the TDA, the BRD will first connect to the TDA. To do this the BRD will open a TCP socket to the TDA using port 4201 at the TDA side.
When the socket is opened the BRD will send the command **ms-bridge-connect&id ...** to the TDA. The TDA must answer within 1750 msec with a ReturnCode=1 otherwise the BRD will close the socket.The

socket is closed by the BRD once the reply from the TDA is received. The port for the reply is random and originates from socket initialization when the socket was opened by the BRD.
The BRD will now proceed in the same way opening a new socket and sending the command **mr-max-nr-ports**. Again the TDA must respond within 1750 msec. The socket is closed again by the BRD automatically once the reply from the TDA is received. This process continues till a connected status is reached.
When an CONNECTED status is achieved, the TDA can sent asynchronous **ms-bridge-message&port..** packets every time the TDA has some ASCII data available for the BRD.
This is done by the TDA by opening a socket to the BRD using port 4200 on the BRD side (BRD is programmed to receive data at port 4200 by default !). After the socket connection is established the TDA sends the message with data and expects an answer (like ReturnCode=1) within 750 msec from the BRD.
The socket is closed by the TDA this time automatically once the reply from the BRD is received.
The process is repeated at every pos data transfer to the BRD.
Note: It is recommended to use other port sets than 4200/4201 for each different TDA-BRD communication when multiple TDAs send their data to the same BRD. Port sets can be used as available.

2.3. Communication connection status

As soon as a TDA is configured to a BRD, the BRD will start to find the TDA on the network.
Initially the TDAs which are added to the BRD will have the state 'COMMUNICATION FAILED' in the BRD. The BRD will try to connect to these TDAs as mentioned before. When the BRD gets the first reply for the initial connection request message, the BRD will assign the state of the TDA to the 'CONNECTING' state. The BRD will then get required details about the configuration of the TDA. At the end of a successful initialisation cycle the communication status of the TDA will then be set to 'CONNECTED'.

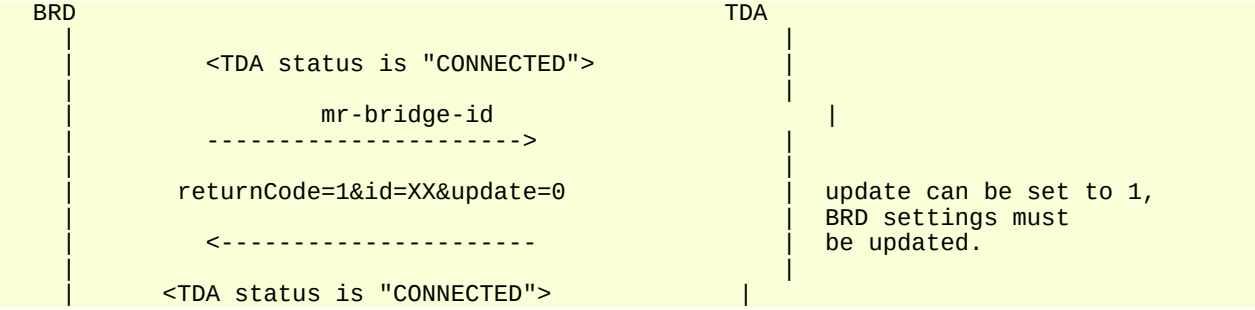
The entire initialisation cycle runs as follows (left column= BRD , right column=TDA):



Note: The TDA should handle unexpected exceptions to this initialisation process in an adequate way, like no BRD answers, unexpected answers etc. which could even lead to a restart of the init process.

2.4. Keep-alive

When the communication status is 'CONNECTED', a heartbeat message, **mr-bridge-id**, is sent every 5 seconds by the BRD. This message is used to keep track of the TDA communication status. If the TDA does not respond, the communication status will be set to 'COMMUNICATION FAILED' after 3 retries. Similarly the TDA also waits for the heartbeat message for a maximum period of 15 seconds. If no heartbeat message is received during that period, then the status of the host will be set to 'DISCONNECTED' state. If a heartbeat message is received after that period, the TDA will set the update flag in the reply to 1, which indicates that the connection needs to be re-established. The re-establishment of connection has to then start from the **mr-bridge-connect** message as mentioned above.



2.5. Camera Updates

Whenever there is a change in the camera assignment in the BRD for a particular TDA terminal which is in the 'CONNECTED' state, the BRD will send an ms-terminal-map message. The ms-terminal-map message will inform the TDA the terminal to which the cameras have been assigned.

3. BRD-TDA interface command descriptions

3.1. BRD Initiated Messages

3.1.1. MS-BRIDGE-CONNECT

MS-BRIDGE-CONNECT&id=<id>&name=<richTextString>
TDA Reply: returnCode=<bool>

The BRD will send this message to the TDA for establishing connection with the TDA. If a connection is accepted, the TDA will register this id, together with the IP address of the BRD. The name can be used for displaying purposes.

<id>
Range 0...15, represents the identification label of TDA

<richTextString>
A rich-text string using the language settings of the BRD
The maximum size is 48 bytes (16 characters) excluding the null character.

3.1.2. MR-MAX-NR-PORTS

MR-MAX-NR-PORTS
TDA reply: returnCode=<bool> [&maxNrPorts=<maxNrPorts>]

The BRD requests for the maximum number of available ports in a TDA.

<maxNrPorts>
Integer with range 1…16

3.1.3. MR-PORT-MAP

MR-PORT-MAP
TDA reply: returnCode=<bool>[&portMap=<portMap>]

This message is sent by the BRD to know the map of the active ports in the TDA. The TDA replies with an active portMap of the TDA. The map contains the enabled communication ports that are being used for recording.

<portMap>
Range 0...65535 (0xFFFF) where each bit position represents a port. An enabled bit (1) indicates an active port and a disabled bit (0) indicates an inactive port.

PORT#	BIT#	DEC	HEX	IN#	BIT#	DEC	HEX
1	0	1	0001	9	8	256	0100
2	1	2	0002	10	9	512	0200
3	2	4	0004	11	10	1024	0400
4	3	8	0008	12	11	2048	0800
5	4	16	0010	13	12	4096	1000
6	5	32	0020	14	13	8192	2000
7	6	64	0040	15	14	16384	4000
8	7	128	0080	16	15	32768	8000

3.1.4. MR-TERMINAL-NAME

MR-TERMINAL-NAME&port=<port>
TDA reply: returnCode=<bool> [&port=<port>][&terminalName=<string>]

The BRD sends this request to know the terminal name, being defined for a port.

<port>
Integer with range 1...4 (as indicated a BRD only uses 4 ports of the TDA)

<string>:
ASCII, null terminated text string, with a maximum length of 16 characters.

3.1.5. MS-TERMINAL-MAP

MS-TERMINAL-MAP&terminalMap=<terminalMap>
TDA reply: returnCode=<bool>

The BRD sends this message to set the terminal map to the TDA for recording. Only the data for the ports that are set to active in the terminalMap will be forwarded for recording in the BRD

<terminalMap>
Range 0...65535 (0xFFFF) where each bit position represents a port. An enabled bit (1) indicates an active port and a disabled bit (0) indicates an inactive port.

PORT#	BIT#	DEC	HEX	PORT#	BIT#	DEC	HEX
1	0	1	0001	9	8	256	0100
2	1	2	0002	10	9	512	0200
3	2	4	0004	11	10	1024	0400
4	3	8	0008	12	11	2048	0800
5	4	16	0010	13	12	4096	1000
6	5	32	0020	14	13	8192	2000
7	6	64	0040	15	14	16384	4000
8	7	128	0080	16	15	32768	8000

3.1.6. MR-BRIDGE-ID

MR-BRIDGE-ID
TDA reply: returnCode=<bool> [&id=<id>][&update=<bool>]

This is the keep-alive message from the BRD to the TDA. If the update value is set to true (1), the BRD must reconnect to the TDA, the TDA can use this flag to force a reconfiguration of the BRD settings.

3.2. TDA Initiated Messages

3.2.1. MS-BRIDGE-MESSAGE

MS-BRIDGE-MESSAGE&port=<port>&messageLength=<int>&data=<data>
BRD reply: returnCode=<bool>

The TDA sends this message when the TDA has some data for the BRD to record. The data is in text format. The maximum message size a BRD can handle is 7K. The TDA forwards the next **ms-bridge-message** with the data, after the TDA has received and processed the BRD reply. There should be a minimum of 200 ms between two ms-bridge-message commands.

<port>
Integer with range 1...16

<messageLength>
An integer with range 0...7K
The messageLength value determines the size of the data token value.

<data>
The data is **not** null terminated, The CR/LF or LF/CR will be included in the content. The CR/LF or LF/CR can be used for line-breaks in the display of the BRD. The TDA may provide text according to language settings (codepages) as supported by the BRD installed language capabilities. BRDs support various codepages like 1250 (Central Europe), 1252 (Latin I) and many more. Please consult the BRD capabilities.