

# Matrix Display Guide

Cobalt Cube<sup>®</sup>



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# 1 Introduction

The instructions detailed in this document will allow you to set up and evaluate the Matrix Display app on the Cobalt Cube®, as long as it has been flashed with a VNC Automotive production system image.

This document covers the following use cases:

- **Matrix Display:** provision of control of a matrix display message board, which communicates with the Standby® Traffic Commander. The app emulates and extends the configurability of the Traffic Commander handset.

## 2 Matrix Display

### 2.1 Introduction

The Matrix Display application is designed to work with the Traffic Commander Programmable LED Matrix Display hardware and firmware from Standby RSG. It communicates directly with the Traffic Commander hardware via a USB-serial interface instructing what message text to display.

On application start, the software reads the message configuration from a configuration file on the Cobalt Cube. If no configuration file is provided a default configuration file is created.

### 2.2 Additional hardware requirements

Apart from the Cobalt Cube, the following hardware is required:

- Standby Traffic Commander display.
- Standby Matrix Display RS232 Adaptor.
- USB-serial RS232 interface.

The application will work with the following USB-serial interfaces:

- Prolific PL2303
- Silabs CP2102 and all other CP210x
- Qinheng CH340, CH341A, CH9102

We recommend the use of a Prolific PL2303 USB-serial interface.

### 2.3 Connectivity instructions

Prior to connecting the Traffic Commander hardware, the protocol used by it must be changed from CAN to UART over CAN. The Traffic Commander Matrix Editor software supplied by Standby is used to do this. This software can be found under the Links tab of the Traffic Commander product page on the Standby website.

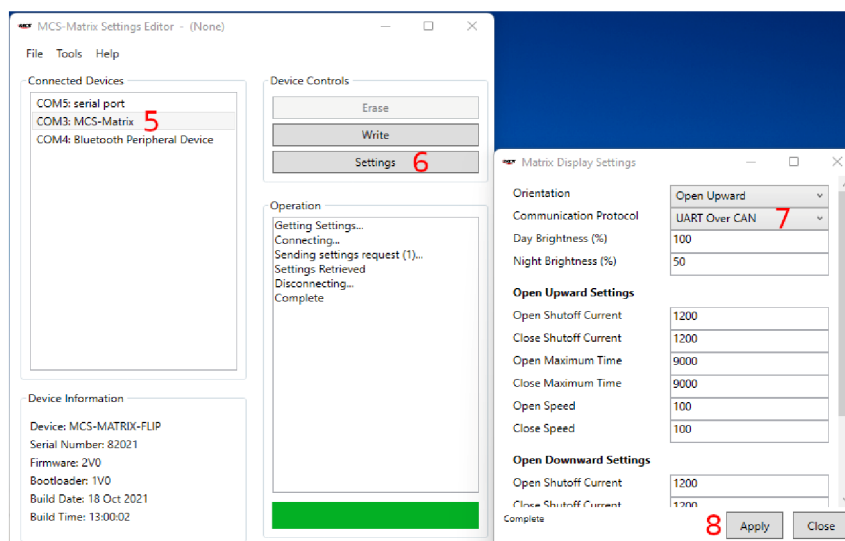


Figure 1: Configuration options in the Traffic Commander Matrix Editor

1. Download and install the software on a Windows PC.
2. Ensure the Traffic Commander is powered off.
3. Connect the Traffic Commander to the Windows PC via USB. The USB Mini-B port can be found on the side of the Traffic Commander.
4. Run the software.
5. Choose the connected device.
6. Select Settings.
7. Choose UART over CAN as the Communication Protocol.
8. Select Apply.

The diagram in Figure 4 shows the connections between the Cobalt Cube, Traffic Commander Matrix Display, and IVI system screen.

1. Connect the Traffic Commander to the Matrix Display RS232 Adaptor
2. Connect the 9 pin RS232 Adaptor to the USB-serial interface.
3. Connect the USB-serial interface to the Cobalt Cube using the Host port.
4. Connect the Cobalt Cube to the IVI screen, via the USB OTG port on the Cobalt Cube. A USB-A to USB-C cable is required for this connection.

If multiple USB devices are connected to the Cobalt Cube (e.g., the MCS controller) a USB hub can be used to expand the number of connections to the USB Host port.

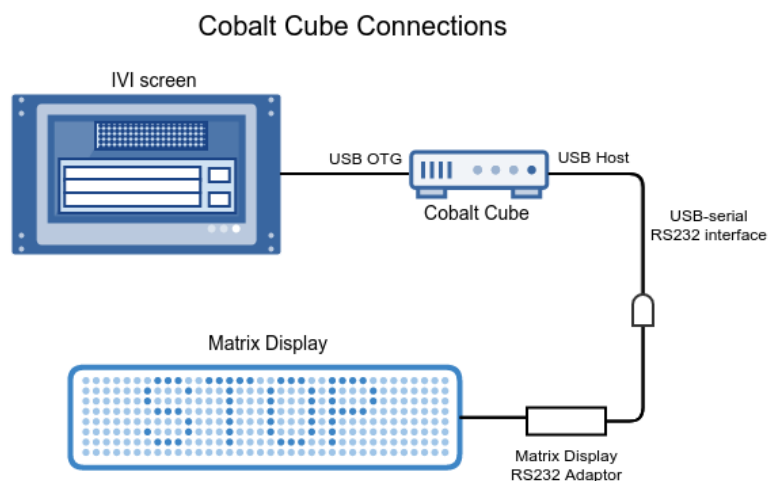


Figure 2: Connectivity diagram for the Matrix Display

## 2.4 Working with the Matrix Display app

The Matrix Display application can be run by tapping the “Matrix Display” application icon from the Cobalt Cube app launcher screen, which appears on the IVI screen. The screen in Figure 3 will be shown.



Figure 3: Matrix Display app

The list of messages in the centre will not appear until a connection has been made to the Traffic Commander device.

Pressing a message will instruct the Traffic Commander to display the message. The message button will turn green while waiting for the Traffic Commander to confirm the messages is being displayed. The message button will turn blue on confirmation. A visual representation of the message is also displayed.

A “toast” message informs the user when the Traffic Commander is opening, closing, or if there is a connection problem.

The message list can be scrolled by using either a swipe gesture or using the arrows. A long press on the up or down arrow will jump to the start or end of the message list respectively.

Exiting the app (e.g., using the back arrow) does not close the app. It will continue to communicate with the Traffic Commander to make sure the message continues to be displayed.

To stop the display of a message, press the Stop button.

If the messages do not appear in the application, then the Cobalt Cube is attempting to find the Traffic Commander hardware. The following “Serial Error” will appear if the Cobalt Cube cannot find the Traffic Commander.

In this case, check the USB Host port has the USB-serial interface cable plugged in and tap “RETRY”. Tapping “QUIT” exits to the Cobalt Cube app launcher screen.

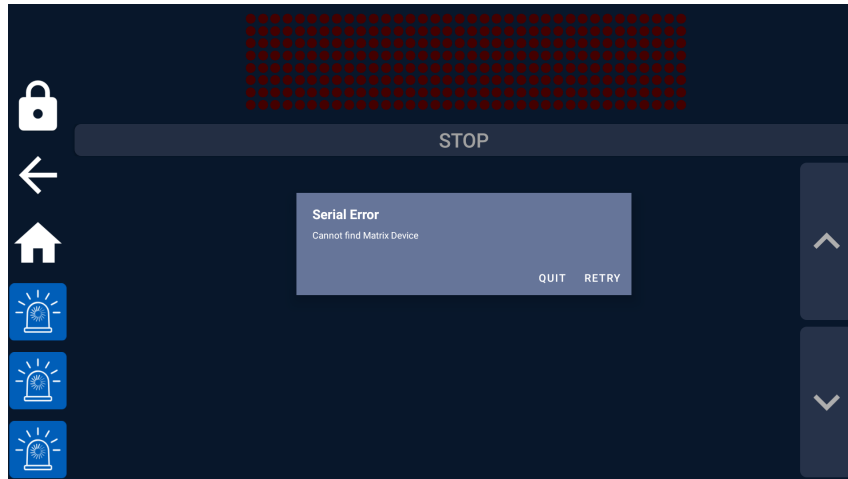


Figure 4: Serial error due to a loss of connection

## 2.5 Configuring the Matrix Display app

There is a configuration file for the Matrix Display messages in `/sdcard/vnc/matrixdisplay/`. The directory for the configuration will be created upon the launch of the main app. The file is called `messages.config`. A new default file will be created if none is found.

The file can be copied to a USB drive for editing using Notepad on a Windows PC. The file browser app on the Cobalt Cube can be used to copy this file.

On the Cobalt Cube, select the “File Explorer” option in the “Setting up the home screen” menu (See section 2.5.6 of the Getting Started Guide). This will add the file browser application to the home screen.

**Note:** When you have finished, remember to remove any custom filters or deselect apps to hide any apps that are not suitable for use whilst driving.

When copying a new `messages.config` file to the Cobalt Cube it may be necessary to delete the old one before copying the new one. Once the configuration file has been copied across to the Cobalt Cube, the app must be restarted in order for the new configuration file to be read, this can be done by clicking the back key in the navigation bar or force stopping the app via the settings app.

The file is an XML file with the following structure:

```
<messages>
<message name="20 MPH">
...
</message>
<message name="ACCIDENT AHEAD">
...
</message>
...
</messages>
```

The name of the message is the text that appears on the message button in the application. Each message consists of one or more sub-messages:

```
...
<message name="KEEP BACK">
  <subMessage>
    <text>KEEP</text>
    <displayTime>700</displayTime>
  </subMessage>
  <subMessage>
    <text>BACK</text>
    <displayTime>700</displayTime>
  </subMessage>
</message>
...
```

Each sub-message contains details of the text that will appear on the Traffic Commander. Where there is more than one sub-message a display time in milliseconds is provided. Scrolling messages are defined as follows:

```
...
<message name="FOLLOW ME">
  <subMessage>
    <text>FOLLOW ME</text>
    <scroll>
      <scrollDirection>3</scrollDirection>
      <scrollPeriod>70</scrollPeriod>
      <scrollSetting>1</scrollSetting>
      <scrollHorizontalSpace>5</scrollHorizontalSpace>
      <scrollVerticalSpace>1</scrollVerticalSpace>
    </scroll>
  </subMessage>
</message>
...
```

The scroll period is the speed of scrolling in milliseconds. The horizontal space is the gap between each loop of the message.

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