Cellocator CFE
Product Overview

Cellocator Division
Pointer Telocation Ltd.

Proprietary and Confidential

Version 1.3

Revised and Updated: December 5, 2017

POINTER

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1 Introduction

1.1 Document Purpose

The purpose of this document is to describe the features and capabilities of the Cellocator CFE. It is intended for customers, customer support, and sales personnel.

1.2 Abbreviations

Abbreviation	Description
CFE	Communication and Features Expander
OTA	Over The Air
DTCO	Digital Tachograph

1.3 References

#	Reference	Description
1	CFE integration manual	
2		

1.4 Revision History

Version	Date	Description
1.0	05/04/2013	Initial document
1.1	17/04/2013	Updated picture has been added 20 pins connector table has been modified. specifications section has been modified
1.2	20/02/2015	Add certification to specifications section Add note 3 and 4 in the overview section
1.3	5/12/2017	Change enclosure

2 Cellocator CFE Description

2.1 Overview

The Cellocator Communication and Features Expander (CFE) is an extension device for the Cello unit, based on Cello Hw architecture and designed to increase the number of available inputs, outputs and serial communication ports.

The CFE supports four serial ports, six inputs and six outputs, providing overall support for three serial ports, 11 inputs and 12 outputs.

The CFE supports four serial interfaces, one of the ports (COM1) is assigned for communication with the Cello unit and three ports are used for external devices (such as a Garmin device). Each one of the three CFE serial ports can be configured to support one of the legacy serial protocols supported by Cello. The CFE supports up to three concurrent transparent channels.

The six additional inputs support all types of digital, analog and frequency counter inputs with the identical features and capabilities in the Cello native inputs.

The six additional outputs support OTA commands for permanent and temporary activation. Driver Behavior Violation Indications and Geo-Fence rule Violation Indications are also supported.

The CFE connects with the Cello unit via the serial port utilizing dedicated protocol, which communicate the information between the CFE serial ports and the Cello unit. In addition to the serial messages multiplexing, the protocol interchanges messages regarding the inputs and outputs of the CFE.

When the CFE is disconnected from the Cello unit it will retain the Cello legacy serial application protocol, enabling operations such as programming and FW upload using Cellocator legacy SW tools. A list of supported SW application serial commands is available.

Information for system integrators and service providers, who want to integrate the expand capabilities of the Cello and the CFE with their applications, is provided in *CFE integration Manual*.

Notes:

1. The CFE does not support Xon / Xoff flow control for its serial ports.
2. DTCO D8 support is optional upon request. Please call your sales personnel for more information
3. Pin 14 (doors) of the Cello unit should be connected to ground in order to allow data forwarding of CFE port programmed to transparent mode.
4. Pin 1 of the 30 pins connector should be connected to ground for supporting the power saving features (average and full hibernation).

2.2 System Narrative

The device supports three serial ports for external devices, six inputs and six outputs with similar capabilities and features as the Cello unit serial port, inputs and outputs. The CFE

receives commands, sends reports and maintains communication with the Cello unit via a serial link (RS232) connected to the Cello serial port.

The Cello protocol has been modified to include status reports and commands for the additional serial ports and I/Os. The PL has also been modified to include the additional serial ports and I/Os in the same way as the Cello native serial port and I/Os. The overall system (Cello with CFE) allows the usage of three serial ports, 11 input and 12 outputs in a similar way by the backend application.

2.3 System Features

- The communication link between the CFE and the Cello unit is continuously maintained and its status is reported to the backend application.
- The CFE supports the updating of its programmable parameters by the Cellocator Programmer via its serial port.
- The system (Cello unit and the CFE) supports updating the CFE programmable parameters OTA.
- The CFE supports updating its firmware by the Serial CSF STK Flasher via its serial port. FOTA updating is not supported.
- The CFE supports power saving features (average and full hibernation) based on the ignition status.

2.4 Interfaces

The device supports the following interfaces:

- Power 9-32V
- Serial interface for communication with the Cello unit
- Three serial interfaces for communication with an external device
- Six inputs and six outputs
- Regulated 5 volts (300 mA max)

2.5 Enclosure and Connectors

The device utilizes a special housing that provides 26 interface pins in two connectors (6 pins and 20 pins). The enclosure and connectors are shown in the image below.

2.6 Harnesses

The following Harnesses are provided to be used with the CFE:

The 711-00296 Cellocator CFE IO Cable supports the 6 pins connector (P2) of the CFE.

The 711-00292 Cellocator CFE Harness supports the 20 pins connector (P1) of the CFE.

The 711-00297 Cellocator CFE Flashing Cable supports programming the Cello and CFE via the CFE serial port.

2.7 CFE Connector / Harness Description

2.7.1 *20 pins Connector / Harness Description*

Connector		Harness	
Pin number	**Function**	**Wire / length / caption**	**Termination connector**
1	In1	Jacket, **"Main Power & GPIn1/Ignition"** or **"Ignition",** 150 cm, 20#	N/A
2	Main Power		N/A
3	N/A	N/A	N/A
4	N/A	N/A	
5	GND	Jacket, **"Main Power & GPIn1/Ignition",** 150 cm, 20#	N/A
6	COM 1 (Cello) TX	Jacket, 30cm, 22#, shielded "**Cello COM 1**",	RJ45 (F)
7	COM 1 (Cello) RX		
8	COM 3 TX	Jacket, 30cm, 22# shielded **"COM3 / MDT"**	RJ45 (M)
9	COM 3 RX		
10	COM 4TX	Jacket, 30cm, 22# shielded **"COM4"**	DB9 (M)
11	COM 4 RX		
12	COM 5 TX	Jacket, 30cm, 22# shielded **"COM5"**	DB9 (M)
13	COM 5 RX		
14	Out 1	22#, 30cm, **White**	N/A
15	Out 2	22#, 30cm, **Yellow**	N/A

Connector		Harness	
Pin number	**Function**	**Wire / length / caption**	**Termination connector**
16	Out 3	22#, 30cm, **Green**	N/A
17	Input 2	22#, Shielded, 30cm, **"GPIn 2"**	N/A
18	Input 3	22#, Shielded, 30cm, **"GPIn 3"**	N/A
19	GND		N/A
20	V out	22#, free wire or Jacket ,30cm, **"Orange"**	N/A

2.7.2 *6 pins Connector (P2) / Harness*

Connector		Harness	
Pin number	**Function**	**Wire / length / Color**	**Termination connector**
1	Out 6	22#, 30cm, Pink	N/A
2	Input 4	22#, 30cm, Brown	N/A
3	Out 5	22#, 30cm, Blue	N/A
4	Input 5	22#, 30cm, White/Green	N/A
5	Out 4	22#, 30cm, Gray	N/A
6	Input 6	22#, 30cm, Violet	N/A

3 CFE Technical Specifications

Interfaces	
Inputs	6 General purpose inputs supporting: 1) Discrete Dry 2) Discrete Wet 3) Analog 0-2.5V 4) Analog 0-30V 5) Frequency **Discrete Dry** – configurable threshold to decide logical high and low states. **Discrete wet** - configurable threshold to decide logical high and low states. **Analog inputs with variable resolution** - 8 bits & 0-2.5V: resolution 20mV, accuracy ±30mV; 8 bits & 0-30V: 100mV, accuracy ±100mV 12 bits & 0-2.5V: resolution 3mV, worst case accuracy <10mV; max 20mV. 12bits & 0-30V: resolution 8mV,worst case accuracy <40mV **Frequency counters - Configurable resolution;** Up to 5kHz input signal; Signal level (3V < Vin ≤ 30V); Accuracy ±2%
Outputs	6 general purpose open drain outputs (250mA max) with assignable functionality
COM1 (RS232) Port	8 bit; 1 Stop Bit; No Parity baud rate – 460800 bps CFE Connected to Cello: 1 – CFE to Cello communication protocol. CFE in Standalone mode: 1 - CFE Cellocator Serial Protocol 2 - CFE Configuration 3 - CFE Firmware upgrade
COM3, COM4, COM5 (RS232) port	Selectable baud rate (9600 to 460800 bps) True RS232 levels 8 bit; 1 Stop Bit; No Parity configurable protocol: 1. CFE Cellocator Serial Protocol 2. Garmin 3. PSP

	4. Transparent Mode applications: 1. CFE and Cello Configuration 2. Cello Firmware upgrade Data Forwarding throughput of 3 ports communicating with remote server - 3.7 Kbps
Vout	5 Volts regulated power supply (300 mA max) output with over current protection.
Connectors	20pin Molex, Automotive 6 pin Molex, Automotive
Mounting	Tie-wraps and/or two sided adhesive tape
Power	
Input Voltage	9-32VDC
Average Current consumption	Normal (assuming 0.5 Sec polling): 10.3mA Hibernation (UART On, assuming 0.5 Sec polling) **:** 1.5mA Hibernation (UART Off) : 1.4mA
Vehicle environment immunity	
Immunity	Compliant with ISO 7637 test level #4 (in accordance with e-mark directive)
Environment	
Temp, operating	-40°C to +85°C
Temp, storage	-40°C to +85°C
Humidity	95% non condensing
Protection	IP40
Vibration, Impact	ISO 16750
Certifications	
CE	CE EMC- EN55022; EN55024 CE Safety - EN60950 1:2006, A11:2009, A1:2010, A12:2011, AC:2011
Dimensions & Weight	
Dimensions	98x71x27mm
Weight	70gr