

Cellocator™ Handsfree Product Overview



Cellocator Division
Pointer Telocation Ltd.

Proprietary and Confidential

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POINTER



Cellocator™ Handsfree Product Overview



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1 Introduction

1.1 Scope and Purpose

The purpose of this document is to describe the features and capabilities of the Cellocator Handsfree solution. It includes a description and technical specifications of the Handsfree module, microphone and speaker, which comprise the Handsfree Kit, as well as installation instructions.

This document also briefly describes how to program the parameters of the voice features.

The document is intended for TSP or IT integrators who want to operate the voice capabilities of the unit. It is intended to provide all the required information for customers, customer support, and sales personnel.

1.2 Abbreviations

Abbreviation	Description
TSP	Telematics Service Provider
IT	Information Technology
HF	Handsfree
CC	Control Center

1.3 References

All the reference documents listed in the following table can be downloaded from the Knowledge Base section of the Cellocator website (www.Cellocator.com).

#	Reference	Description
1.	CelloFamily Hardware Installation Guide	
2.	Harness Selection Wizard	
3.	Cellocator Handsfree Release Notes	

1.4 Revision History

Version	Date	Description
1.0	07/06/2015	Initial version
1.1	07/02/2016	Add note regarding Microphone max volume in section 5.1. Add support from FW33x in section 2.1. Add technical specifications in section 4



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2 Solution Overview

2.1 Overview

The 712-20032 Cellocator Handsfree Kit provides the hardware components which enable the voice capabilities and features of the Cello family units. The Handsfree Kit allows the driver to communicate with assistance representatives, and Control Center (CC) operators to follow developments in the driver cabin in the event that one of the buttons designated for this function was pressed.

The Handsfree device allows for full duplex voice connectivity via microphone and speaker (the speaker volume can be adjusted by the driver). The user may initiate, answer and disconnect calls via a service button (the destination of a call initiated hands-free is a predefined number). The user can also initiate a panic call to a predefined number (CC) using the panic button.

The Handsfree module also supports silent monitoring in which the CC can listen in on the driver and to developments in the cabin with the speaker muted. An LED indicates the status of the call.

The Cellocator unit disconnects when the other party hangs up and may be programmed to answer automatically.

The Kit is comprised of an HF module, speaker and microphone.

The 712-20032 Cellocator Handsfree is supported by all variants of the Cello GNSS family with FW 33x or above, and is also fully supported by the 711-00337 Cello full harness.

the Handsfree solution can be connected to the Cello Evaluation kit by using the 711-00330 Simulator Harness or a newer one.

2.2 How does it work?

The Cellocator unit controls the transmission of voice from the vehicle to the GSM network, and vice versa. It converts the analog electronic signal used for the speaker and microphone to the GSM standard and vice versa.

The Cellocator unit controls the voice characteristics like ringer volume, speaker volume and microphone gain, and the unit is also responsible for echo canceling, which is essential in full-duplex communication.

The analog signals are transferred to / from the Handsfree module via the Cello harness.

The analog signals are further filtered and amplified by the harness module.

The voice circuits of the Handsfree module and the Cello unit are optimally matched, providing best voice volume and quality.

The speaker and microphone are connected to the Handsfree module via their cables.



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Notes:

- The use of materials mentioned in this document, and their proper installation in accordance with the instructions specified herein, is crucial in achieving the suitable voice quality. Specifically, the specified shielded harnesses must be used.
- Initiating a call via the call service button might take up to 10 seconds before the appropriate telephone network tones are heard.
- Initiating a call via the distress button might take some time before the appropriate telephone network tones are heard. In order to shorten this interval, the number of distress messages which are normally sent before call initiation should be kept to the minimum.
- 712-20032 Cellocator Handsfree Kit components (HF module and speaker) cannot replace the 712-20016 Cellocator Handsfree Kit components, and vice versa.

2.3 Highlights

This section includes the main features and highlights of the Cellocator Handsfree Kit.

- ◆ Optimum matching of the Handsfree module and the Cello unit voice circuits ensures excellent voice volume and quality.
- ◆ Built-in noise suppression provides excellent vehicle noise immunity.
- ◆ 10W, 4 Ohm speaker.
- ◆ Omni-directional microphone with -42dB sensitivity and 48 dB signal-to-noise-ratio (SNR).
- ◆ Supported by the 711-00337 Cello Full Harness.
- ◆ Matching connectors for easy installation.

2.4 Product Description

2.4.1 Handsfree Kit Components

The 712-20032 Cellocator Handsfree kit includes a handsfree module, speaker and microphone. The items are listed in Table 1 below.





Name/Part Number	Description	Picture
Speaker PN: AR0268	10W speaker, installed in the vehicle cabin and connected to the Handsfree module.	
Microphone PN: AR0189	Omni-directional microphone with -42 db sensitivity. Complete with 1.5 meter cable, it should be installed in the vehicle cabin and connected to the Handsfree module.	
Cellocator™ Handsfree module PN: 715-50300	The Handsfree module allows for full duplex voice communication; it supports voice electronic module and is connected to the microphone, speaker and the Cello unit (via the Cello harness).	
Cello Full Installation Harness PN: 711-00337	Optional harness that incorporates shielded voice wires for reducing the vehicle electrical noise, connectors for matching the Handsfree kit, and provides all the necessary connections between the Handsfree kit and the Cello unit.	

Table 1: Cellocator Handsfree Kit Components

2.4.2 Handsfree Module

The HF module relays voice between the microphone, the speaker and the Cellocator unit utilizing an electronic circuit, including filters and amplifier. The voice circuits of the Handsfree module and the Cello unit are optimally matched ensuring the best voice volume and quality.

The HF module provides a 10 pin connector for connection to the Cello unit and the speaker and a 3.5 mm stereo jack for connection with the microphone. Refer to the *Connection Table* section for more details.



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2.4.3 Handsfree Speaker

A 4 Ohm, 10W speaker is used. The speaker connects to the HF module, via the Cello harness, by means of a 1.80-meter cable and a two-pin connector. It is provided with a rotating bracket and two screws for easy installation.

2.4.4 Handsfree Microphone

The microphone is an omni-directional Electret Condenser Microphone with -42dB sensitivity and 48 dB signal-to-noise-ratio (SNR). The microphone is connected to the HF module by means of a 2.5-meter cable with a standard stereo connector. The microphone is provided with a clipper for easy mounting on the driver’s sun visor.

2.4.5 711-00337 Cello Full Installation Harness

The HF Module is connected to the Cellocator unit's power and voice outputs by means of the handsfree thread of the harness. The handsfree thread incorporates shielded voice wires for reducing the vehicle electrical noise, a 10 pin connector for the handsfree module and a 2 pin connector for the speaker. The harness provides the power to the HF module using the ignition switch in order to save vehicle battery when the vehicle is parking.

2.4.6 Connection Table

The following table specifies the connections for the HF module.

Handsfree Module			Connected to			
Connector name	Pin no.	Pin description	Device	Connector name	Pin no.	Pin description
P1 - 10 pins connector	1	Analog GND	Cellocator unit	20 pin connector	19	Audio GND
	2	Analog GND	Not connected			
	3	Audio In (-)	Cellocator unit	20 pin connector	9	Audio Out
	4	GND	Cellocator unit	20 pin connector	19	Audio GND
	5	PGND	Not connected			
	6	MIC OUT (+)	Cellocator unit	20 pin connector	10	Audio In
	7	AGND	Not connected			
	8	Audio Out (+)	Speaker	Speaker connector	1	Audio Positive
	9	Audio Out (-)	Speaker	Speaker connector	2	Audio Negative
	10	Power In	Cellocator unit	20 pin connector	4	Ignition

Table 2: Connection Table

3 Installation

CAUTION: To avoid possible bodily injury, or damage to the vehicle, the installer must be a certified technician who has been qualified to install the system.

3.1 Safety Instructions

- ◆ Do not mount the device in a possible impact zone in the passenger area or in airbag unfolding area. A device pushed by an inflating airbag may cause serious injury.
- ◆ Do not attempt to operate a defective product. If you find a defect, please contact Cellocator Customer Support.
- ◆ Attempts to repair the system by unqualified personnel can be dangerous. Only qualified staff should be authorized to carry out inspections.

3.2 Installation Overview

The recommended location for the Handsfree components is shown in the following illustrations.

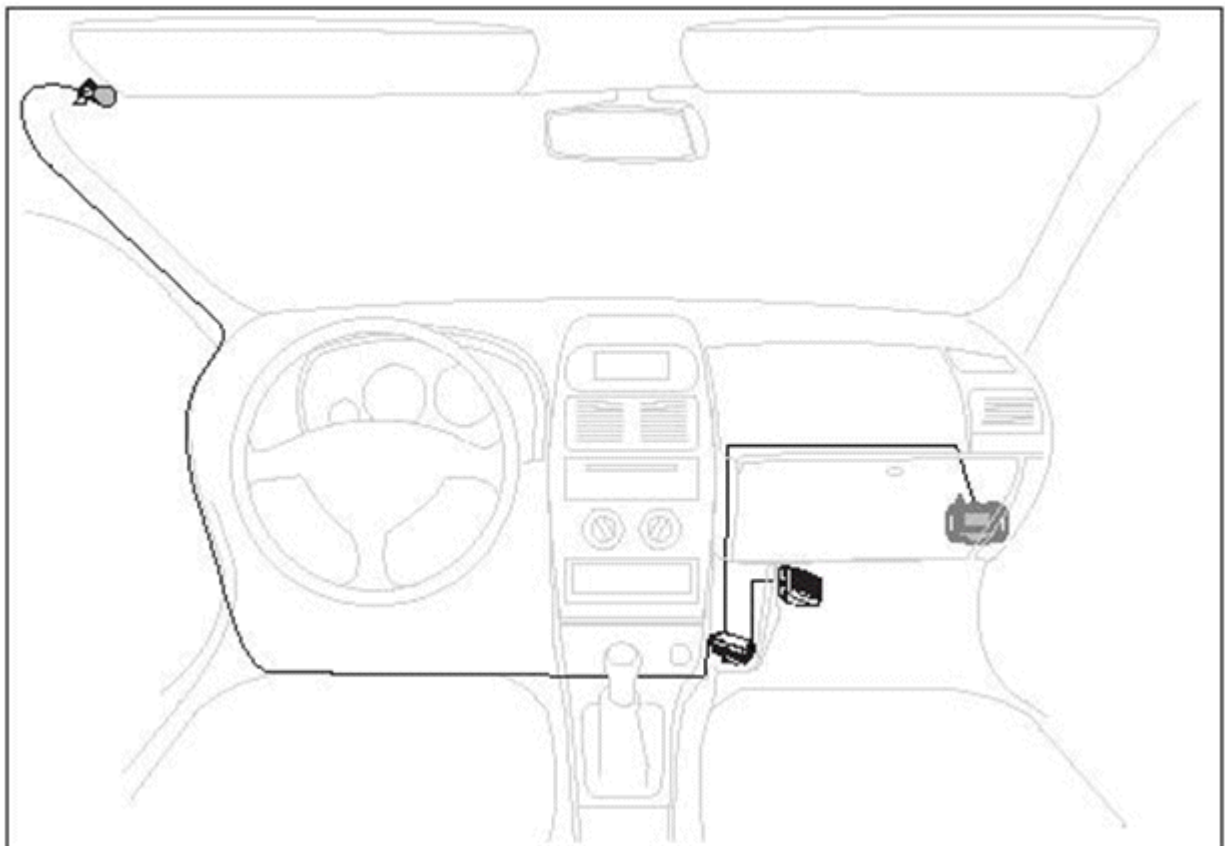


Figure 1: Recommended Layout

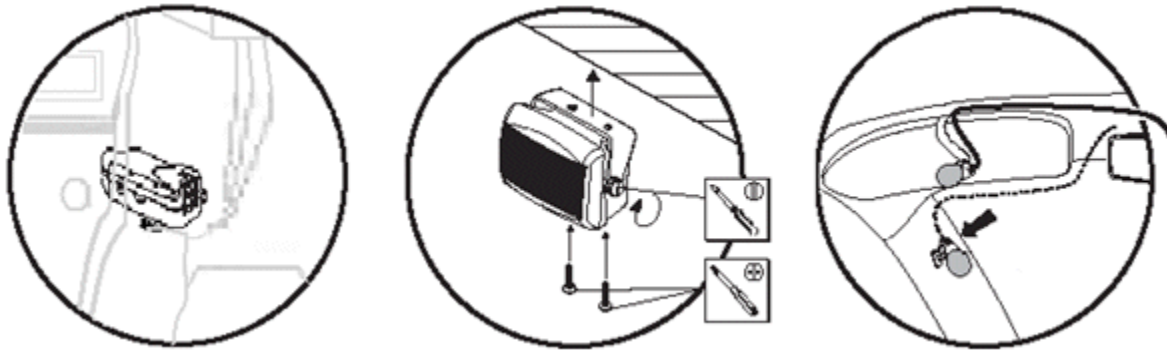


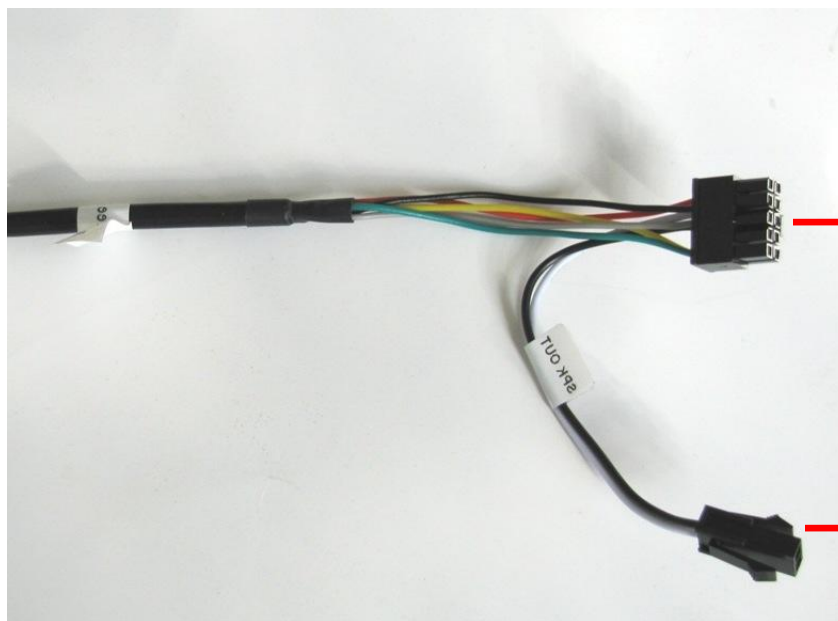
Figure 2: Recommended Location for Components

The HF module should be placed behind the Cellocator unit or at the side of the center console. The HF module can be attached to the vehicle using screws, Velcro, an adhesive pad, or a plastic restraint.

The speaker should be mounted at least 50cm away from the microphone and should not be pointed in the direction of the microphone. It should preferably be placed out of sight, in the upper part of the front passenger's foot space, and secured with screws.

The microphone can be installed using its clipper, Velcro or an adhesive pad on the door pillar or on the driver's sun visor.

The connection of the HF module and the speaker to the Cello harness are shown in the picture below.



Harness Handsfree connector should be plugged into the 10 pin connector of the HF module

Harness SPK OUT connector should be plugged into the speaker connector

Figure 3: Connecting the HF Module

The microphone should be connected to the HF module by plugging its stereo plug to the appropriate stereo jack of the HF module.



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3.3 Installation Tips

- ◆ The Cellocator unit and the HF module should not be installed close together to prevent noise caused by GSM transmission.
- ◆ It is recommended to connect the power of the HF module to the ignition switch allowing complete disconnection from power during parking without any current consumption. If the HF module is powered from the main vehicle's battery, it will also consume power during parking.

4 Technical Specifications

4.1 The Microphone



Figure 4: Microphone

Item	Min	Standard	Max	Unit
Sensitivity	-44	-42	-40	dB
Impedance			2.2	kΩ
Directivity	Omni-directional			
Current Consumption			400	μA
Operation Voltage Range	1.0	2.0	10	V
S/N Ratio	58			dB
Decreasing Voltage Characteristic			-3	dB
Max Input Sound Level			114	dB
RoHS	compliant			
Operating temperature range	-20		70	°C
Storage temperature range	-40		85	°C
Cable length	1.5 meter			
Connector type	3.5 mm stereo plug			
Wires material	PVC			
Microphone housing material	ABS			

Table 3: Microphone Specifications

4.2 The Speaker



Figure 5: Speaker

4.2.1 Specifications

Parameter	Value
Input Power	Nominal - 10W; Maximum - 15W
IMPEDANCE	4Ω ± 15% At (800Hz)
RESONANT FREQUENCY	380 ± 20%HZ At (1V)
SENSITIVITY	82 ± 3db (1W / 1M) Power average at [600 800 1000 1200Hz]
RoHS	compliant
Operating temperature range	-30°C to +85°C
Storage temperature range	-40°C to +85°C
WEIGHT	300 g
Cable length	180 cm
2 pin connector	CP35-0250010

Table 4: Speaker Specifications



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4.2.2 Mechanical Diagram

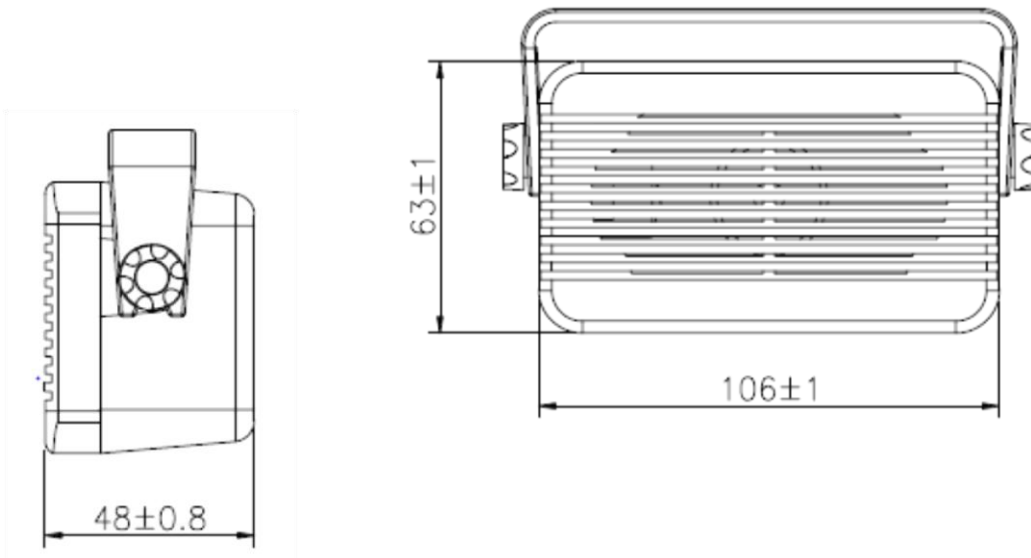


Figure 6: Speaker Mechanical Diagram

4.3 The Handsfree Module



Figure 7: Handsfree Module

Parameter	Value
Supply voltage	9 to 32 Volts DC
Supply current	Off: 0 Amp Standby: 13 mA Ringin: 200 mA Conversation (Max): 175 mA Conversation (Average) 30 mA
Audio Frequency range	300-4.5kHz
Average Speaker gain	50
Clamping Voltage	48.4v
Reverse Polarity Peak	600V
Peak Pulse POWER Dissipation ob 10/100 microsec wave form –	1500 W
Operating temperature range	-30°C to +70°C
Storage temperature range	-40°C to +85°C
Dimensions	111.3 x 58 X 23 mm
weight	80 g
Standards compliance	UL94-V0, RoHS
Housing material	POLYLAC® PA-765
Connector 10 pins	Cvilux CP35_10_P_1_H_0_0



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Parameter	Value
Microphone connector	3.5 mm stereo socket

Table 5: Handsfree Module Specifications



5 Integration Description

5.1 Cellocator Unit Programming

The voice feature parameters can be programmed via the Voice Call settings screen of the Cellocator Programmer, as shown below.

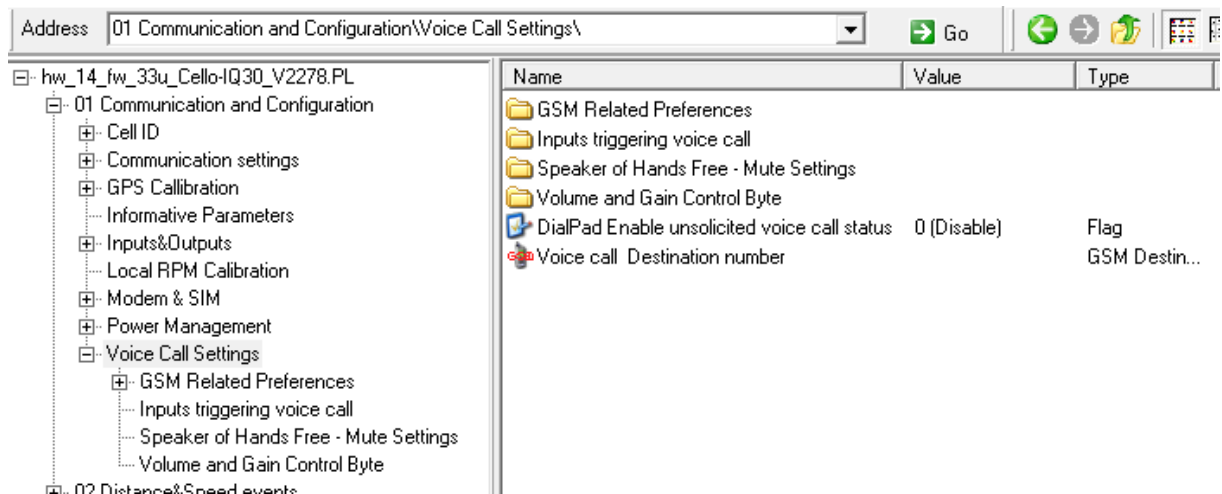


Figure 8: Programming Voice Call Setting

Note: The maximum Mic volume for Cello 2G (GE910-V3 modem) is 2. Setting the value to 3 reduces the volume instead of increasing it.

Please review the *Voice Call Setting* section in the [Cellocator Cello Programming Manual](#) for information regarding the voice feature programming.