



USER GUIDE

M-001-192-03-USG-05-EN

TITAN COMMANDER HMI100

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1. Document History

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04A	2025/05/13	Added ENACOM warning - Draft A	B. Roodt	J. Wuth
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2. Distribution

Name	Company	Role
Any employee	Epiroc Digital Safety Solutions South Africa Pty Ltd	Originator
Digital Solution Division (DSD)	Epiroc	Discretionary distribution

3. Approval

Name	Title	Date	Sign
H. du Plessis	Engineering Manager		

4. Scope

This document is a user's guide (USG) that describes the function of the Titan Commander HMI100.

5. Intellectual Property Notice

The information in this document contains intellectual property developed and owned by Epiroc Digital Safety Solutions South Africa Pty Ltd is confidential, privileged, and only for the information of the intended recipient and may not be used, published, or redistributed without the prior written consent of Epiroc Digital Safety Solutions South Africa Pty Ltd.

6. Manufacturer details

Manufacturer details	
Name	Epiroc Digital Safety Solutions South Africa Pty Ltd
Address	Unit 1 Agnone Park, 53 Adriana Crescent, Centurion, 0157, South Africa
Phone Number	+27 12 661 4828

Table 1: Manufacturer details

7. Certification details

Certification details	
FCC ID	2BPRY-19203V3
IC ID	32678-19203V3

Table 2: Certification details

7.1 Declaration of Conformity in accordance with Directive 2014/53/EU

M-001-192-03 (Titan Commander HMI100) complies with the essential requirements and other relevant provisions of Directive 2014/53/EU, when used for its intended purpose.

The following marking applies to M-001-192-03 (Titan Commander HMI100):



Figure 1: CE mark

7.2 Declaration of Conformity in accordance with 47 CFR part 15

M-001-192-03 (Titan Commander HMI100) complies with the essential requirements and other relevant provisions of 47 CFR part 15, when used for its intended purpose.

The following marking applies to M-001-192-03 (Titan Commander HMI100):



Figure 2: FCC mark

8. Specification of accessories

Specification of accessories	
Unit	M-001-192-03
Includes	Titan Pulse800 module
Excludes	External antennas RF cables PDS tags Mounting bracket Cable kit

Table 3: Specification of accessories

Table 8 provides the communication specifications of the Titan Pulse800 module.

Parameter	Modulation/Format	
USB 2.0	480 Mbps	USB 2.0
Ethernet	100 Mbps	IEEE 802.3
Wi-Fi	2.4 / 5 GHz	IEEE 802.11 a/b/g/n
Bluetooth	2.4 GHz	BLE v4.2
GNSS	4 concurrent GNSS	BeiDou, GPS / QZSS, Galileo, GLONASS
Cellular	LTE / GSM	B5 /B7 / B12

Table 8: Communication specifications

9. Acronyms and abbreviations

The following abbreviations are used freely within the document. Some disambiguation is provided where the terms have specific meanings within the Titan product range.

Abbreviation	Description	Disambiguation
AI	Artificial Intelligence	
CAN	Controller Area Network	
FDCAN	Flexible data-rate CAN	
EMESRT	Earth Moving Equipment Safety Round Table	
GNSS	Global Navigation Satellite System	
HMI100	Human Machine Interface	Referring specifically to the Titan Commander HMI100
ISO	International Standards Organisation	
LCD	Liquid Crystal Display	
LED	Light Emitting Diode	
LF	Low Frequency	Referring specifically to 125kHz electromagnetic fields.
RGB	Red, Green, Blue	
RWM	Read Write Module	This is a configuration tool supplied by Epiroc
TOF	Time of Flight	
UWB	Ultra-Wide Band	
CAS	Collision Avoidance System	
CxD	Collision Warning/Avoidance Device	The CAS system as part of the full CPS.

Table 4: Abbreviations

10. Introduction

The Titan Commander HMI100 forms part of Epiroc's 4th generation Collision Avoidance/Awareness System (CxD). It can be incorporated into the Collision Prevention System for a variety of machines, in surface and underground operation.

This document intends to guide the user in the standard usage of the HMI100. This is not an operational user manual to guide a machine operator in operational conditions – rather, it is a document describing the usage of the HMI100 at a lower level.

11. Physical overview

The HMI100 serves as the user interface of the CAS system. It is a single device, containing an LCD screen, buttons to interact with, a license card reader and a speaker for audible feedback.

Two LEDs are provided to show the unit and licensing status as well as an ambient light sensor to detect the environmental lighting conditions.



Figure 3: Commander HMI100

Table 5 provides the descriptions of the areas marked 1 - 4 in Figure 3.

Feature	Description
1	License card status LED
2	System status LED
3	License card slot
4	Fingerprint reader

Table 5: HMI100 functional layout

11.1 System connections

To connect the HMI100 to the Titan CxD system, various cable connections are provided. The position of these connections are shown below in Figure 4.



Figure 4: HMI100 cable connections

Table 6 provides the legend to the connectors labelled 1 - 6 in Figure 4.

Connector nr.	Description
1	Debug connector (SWD + UART)
2	Ethernet connector
3	Unused
4	Gateway CAN bus connector
5	Power connector
6	USB-C connector

Table 6: Commander HMI100 cable connections

12. Image and audio configuration

This section provides instructions on how to upload audio and images to the Commander HMI100.

12.1 Accessing the onboard flash storage

The Commander HMI100 can enumerate its flash storage for both the internal configuration storage as well as the log storage as FAT32 storage devices that can be read by a PC in the same manner as any USB memory stick.

This allows the user to easily update unit configurations and edit audio files and images.

To protect configurations from unauthorised access, the storage is only available to users with an authorised license card. The license card must be authorised with the required access level.

The following steps will be required to access the storage on the Commander HMI100.

1. Present an authorised license card with sufficient access level (the License card status LED on the Commander HMI will Turn Green when the card has been successfully processed (refer to Table 8)).
2. Press button 3 (second button from the bottom, refer to Figure 3).
3. The unit should now go into USB Transfer mode and storage should now be accessible by a PC.
4. Connect a USB Cable from a PC to the Commander HMI100.
5. Open a file explorer on the PC and select "QSPI Disk 1" to access configuration files.

12.2 File/Folder Structure

The file path is vitally important to the correct operation of the Titan Commander CAS. The following file path/ folder structure should always be used.

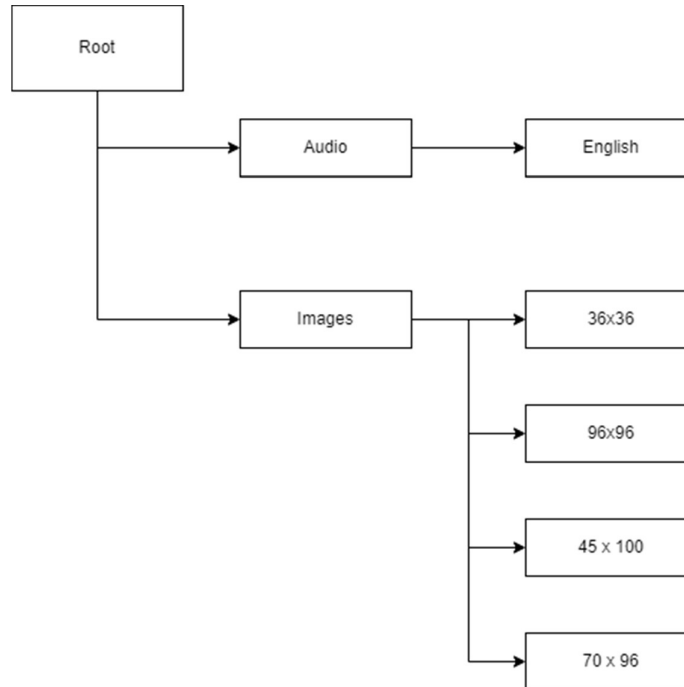


Figure 5: HMI100 folder structure

13. Log extraction

The Commander HMI100 stores various types of data logs. These include its own operational data log, as well as redundancy data logs originating from any connected Gateway100 units.

13.1 Commander HMI100 Log file extraction

Log files can be extracted from the Titan Commander HMI100 easily by simply accessing the unit USB storage in the same manner as noted in section 12.1.

When the USB is connected, select the “SD MMC” drive on the connected PC file explorer and simply copy the desired log files.

14. Collision avoidance display

During operation, the user can expect to see a variety of information displayed on the HMI100. The HMI100 is the primary display for the CAS system and is therefore the way in which the CAS system alerts the operator of any detections, as well as the overall system state.

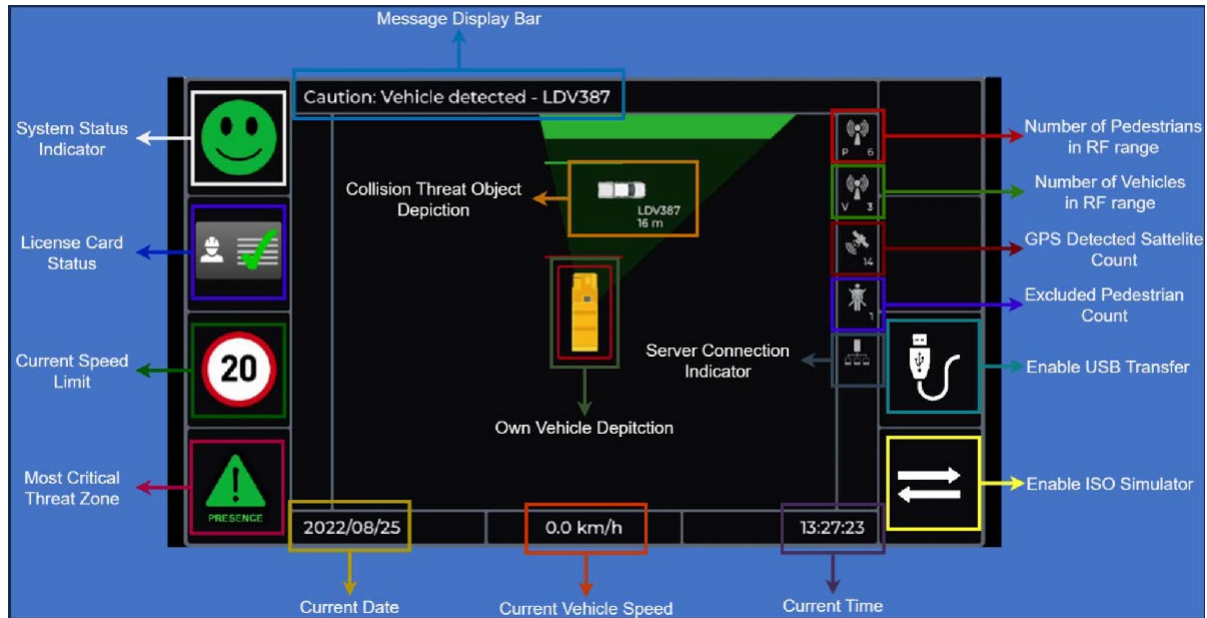


Figure 6: HMI100 display layout

14.1 System Status Indicator

This section is used to indicate the health status of the Titan Commander CAS. One of three possible images will be displayed here as described in Table 7.

Image	Description
	System is healthy, no errors or warnings are present
	System has one or more warnings; however, no critical failures are present
	System has one or more critical errors. Contact a service technician.

Table 7: System health state indicators

14.2 License Card Status

This section is used to indicate the current license card state. One of three images will be displayed here as shown in Table 8.

Image	Description
	System does not detect a valid license card
	System is currently processing an inserted license card.
	System has successfully detected and processed a valid license card.

Table 8: License card state indicator descriptions

14.3 Current speed limit

Displays the current maximum speed limit applied to the system. This can be dynamically updated through various mechanisms such as GNSS geofences demarcating certain areas as higher or lower speed zones or underground speed beacons.

14.4 Most Critical Threat Zone

This section is used to display the zone (presence, advisory, slow down, stop or motion inhibit) of the threat calculated to be the most important at a given point in time. This section can also be used to display if a CAN bus fault is detected. The icons that could possibly be displayed are shown below in Table 9.

Image	Description
	The most severe threat is currently in the presence zone.
	The most severe threat is currently in the advisory zone.
	The most severe threat is currently in the slow down (forced) zone.
	The most severe threat is currently in the stop zone.
	The most severe threat is currently in the motion inhibit zone.
	A CAN bus fault has been detected in the system.

Table 9: Threat zone indicators

14.5 Message Display Bar

This section is used to display text messages containing system information such as system warnings and error descriptions.

14.6 Number of Pedestrians in RF range

This section indicates the number of pedestrian tags that the Titan Commander CAS is currently aware of.

Note: This number can and generally will be far greater than the amount of collision threats. This is because RF range is far greater than the proximity zone sizes around vehicles.

14.7 Number of vehicles in RF range

This section indicates the number of vehicle tags that the Titan Commander CAS is currently aware of. **Note:** As in the case of section 0, this number can and generally will be far greater than the amount of collision threats. This is because RF range is far greater than the proximity zone sizes around vehicles.

14.8 GPS Detected Satellite Count

This section indicates the number of GNSS satellites currently detected by the system's GPS sensor.

14.9 Excluded Pedestrian Count

The number of pedestrians currently in the exclusion field of the system.

14.10 Enable USB Transfer

This section indicates the availability to place the unit into USB transfer mode. This is only available upon insertion of a license card that has appropriate authorisation.

14.11 Enable ISO Simulator

This section indicates the availability to place the unit into USB transfer mode. This is only available upon insertion of a license card that has appropriate permissions.

14.12 Collision Threat Object Depiction

This section shows information about a given detected collision threat. Information provided includes the Unique ID of the vehicle, a description of the vehicle type (e.g., LDV, Rigid Haul Truck, etc.), the distance from the local vehicle and a colour depicting the detection zone (presence, advisory etc.). Furthermore, the colour width also indicates the accuracy of the detection (GPS and TOF can provide more accurate ranging information than LF for example).

15. Warnings

15.1 FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

15.2 IC Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- L'appareil ne doit pas produire de brouillage;
- L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

15.3 ENACOM warning

15.3.1 Equipment installed in vehicles

- **Resolution 854/2020:** When regulatory identification is not visible due to installation inside vehicles, the identification should be included in manuals or on-board documentation.
- **Resolution 586/2023:** In such cases, identification should be included in the manuals, on-board documentation, or the official website of the manufacturer/importer, as per points II, III, and IV.

15.4 Modification Statement

15.4.1 FCC Warning

Epiroc Digital Safety Solutions South Africa Pty Ltd has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

15.4.2 ISED Warning

Epiroc Digital Safety Solutions South Africa Pty Ltd n'approuve aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.

15.5 RF exposure warnings

15.5.1 Mobile Device RF Exposure Statement

1. Mobile Device definition: Mobile: (§2.1091) (b) — A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Per §2.1091d(d)(4) In some cases (for example, modular or desktop transmitters), the potential conditions of use of a device may not allow easy classification of that device as either Mobile or Portable. In these cases, applicants are responsible for determining minimum distances for compliance for the intended use and installation of the device based on evaluation of either specific absorption rate (SAR), field strength, or power density, whichever is most appropriate.
2. RF Exposure -
 - a. For FCC: This device is only authorized for use in a mobile application. At least 20 cm of separation distance between the *Titan Commander HMI100* device and the user's body must be maintained at all times.
 - b. For IC: La distance entre l'utilisateur et de produits ne devrait pas être inférieure à 20cm

15.6 Interference statement

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

16. Disclaimer

Although great care has been taken to try to ensure that the information contained in this document is accurate, some inaccuracies are inevitable. Neither the authors and editors of Epiroc Digital Safety Solutions South Africa Pty Ltd reviews, nor those responsible for compiling and disseminating this document, are responsible for any adverse consequences of these inaccuracies.

Please do not hesitate to notify us at Epiroc Digital Safety Solutions South Africa Pty Ltd of any mistakes or omissions you encounter, to enable us to make the necessary corrections if required.

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