



Micronet SmarTab LTE Model: Micronet SmarTab Rugged Android Tablet Hardware Guide

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powered by

android

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Table of Contents

Table of Contents.....	3
Revision History	4
Safety Precautions	6
1. Introduction	8
Micronet SmarTab Platform Overview	8
Micronet SmarTab Cradle Models.....	8
GSD® Software Services.....	8
Development Tool Kit.....	9
Platform Key Feature Specifications	10
2. Micronet SmarTab Views	11
Micronet SmarTab Front View.....	11
Micronet SmarTab Rear View	12
Micronet SmarTab Left View	12
Micronet SmarTab Right View.....	13
Micronet SmarTab Top View.....	13
3. Micronet SmarTab Functional Details	14
Platform Core	14
User Interface.....	15
Cameras	16
Sound.....	17
Connectivity	17
Wireless LAN.....	17
Bluetooth 4	17
Cellular Modem	17
GPS Receiver.....	18
Battery.....	18
Capacity	18
Charging the Battery	19
Charging Mechanism	19
Charging Temperature	19
Motion Control.....	19
Communication Interfaces	19
Serial Communication	19
USB Communication	20
General Purpose I/O	20
Input lines.....	20
Output Lines.....	20
Vehicle Bus Connectivity.....	20
SAE J1939 CANBus.....	20
Single Wire CANBus	21
SAE J1708	21
4. Micronet SmarTab Cradle Views	22
Cradle Front View	22
Cradle Rear View	23

5. Standard Cradle Configuration	24
Functional Details.....	24
Cradle Power Consumption	24
Serial Communication	24
USB Communication	24
Automotive Input	25
6. Enhanced Cradle Configuration.....	26
Platform Core	26
MCU Processor	26
Functional Details.....	26
Cradle Power Consumption	26
Serial Communication	26
USB Communication	27
General Purpose I/O	28
Vehicle Bus Connectivity.....	28
Customized Front Panel Label.....	29
7. Cradle Signals Map.....	30
Overview	30
Standard Cradle Signals Map	30
Enhanced Cradle Signals Map.....	30
Overview	30
Interface Connectors	30
Main Connector Pinout.....	31
Secondary Connector Pinout	34
8. SmarTab Cradle Installation	39
Mechanical Installation	39
Mounting Arm.....	39
Mounting Inserts Location and Dimensions.....	39
Device Installation Steps.....	41
Electrical Installation	42
Vehicle Battery Connection	42
Electrical Installation Procedure	43
9. Insertion to Cradle	44
Inserting the Micronet SmarTab into Cradle.....	44
Removing the Micronet SmarTab from Cradle	45
10. Physical Characteristics	46

Revision History

Revision	Date	Change
1	November 2017	Document created

Revision	Date	Change
2	May 2018	Added Enhanced cradle information

Safety Precautions

Read the following safety precautions before installation or operation.



WARNING!

Abnormal Conditions

Should the Micronet SmarTab become hot, start to emit smoke or a strange odor, immediately turn off the power and contact your original dealer or authorized service provider. Continued usage is dangerous and may result in fire or electric shock.



WARNING!

Foreign Objects

Avoid having foreign matter or objects enter into any opening of the Micronet SmarTab. This could result in fire or electric shock. Immediately turn off the power and contact your original dealer or an authorized service provider.



WARNING!

Liquids

Keep the device away from water, other liquids and liquid containers. Liquid entering into the device can cause fire and electric shock.



CAUTION

LCD Screen

Never apply heavy pressure to the Micronet SmarTab display or subject it to strong impact. Doing so may crack the screen or LCD panel glass, resulting in personal injury or major damage to the device. Should the LCD panel glass break, do not touch the liquid inside. Should liquid from the LCD panel accidentally touch a person's skin or enter a person's mouth or eyes, immediately rinse the area affected with water and contact a physician.



CAUTION

Battery and Power Supply

- Charge the battery only as instructed on [Charging the Battery](#) instruction.
- Immediately stop the charging while battery or device - overheating, smell, smoke, change color, distortion etc.
- Battery charging temperature can review on [Charging Temperature](#)
- Micronet SmarTab includes unremovable battery. Therefore, the Micronet SmarTab rear panel should not open for remove the battery.



CAUTION

Risk of explosion if battery replaced by an incorrect type. Dispose of used batteries according to the instructions.

**CAUTION**

Use careful with the earphone maybe possible excessive sound pressure from earphones and headphones can cause hearing loss.

1. Introduction

Micronet SmarTab Platform Overview

The Micronet SmarTab is a rugged Android tablet designed for both in-vehicle and out-of-vehicle use. It provides a versatile vehicle-centric mobile computing platform for a variety of MRM (Mobile Resource Management) applications.

With integrated GPS, cellular communication, and cameras, with support for a suite of vehicle and peripheral interfaces, Micronet SmarTab enables a host of advanced mobility solutions such as ELD HOS, Driver Behavior, ADAS, Video Analytics, Driver Distraction Solutions, Routing and Dispatch, Fuel Efficiency, Navigation, Fleet Tracking, Driver Interaction, and more.

Designed to operate in rough commercial automotive environment, including a wide range of temperatures, vibrations and shock, Micronet SmarTab lowers the Total Cost of Ownership.

The Micronet SmarTab platform supports the Google Android™ 5.1.1 operating system. Its Open Platform offers a comprehensive development environment for independent application programming and system integration.

The Micronet SmarTab is a GSD™ enabled device, allowing for advanced device update, and control.

Using the integrated GPIO, GPS and 3.5G DC-HSPA+ cellular communication features, the Micronet SmarTab platform supports a fully integrated and standalone fleet management solution.

Micronet SmarTab Cradle Models

Micronet implemented the Micronet SmarTab cradle platform in two product models:

- **Standard Cradle Model** - provides Basic key features set, described in [Standard Cradle Configuration](#) list below.
- **Enhanced Cradle Model** - provides basic + enhanced key features set, described in [Enhanced Cradle Configuration](#) list below.

Wireless Module

The Micronet SmarTab tablet supports cellular communication via a 3.5G GSM modem, Bluetooth and Wi-Fi.

GSD® Software Services

Micronet's GSD™ (Guardian System Design) is a cloud-based SaaS platform for managing mobile devices in the field.

GSD™ enables remote delta-based, over-the-air, firmware and application updates allowing customers to keep devices relevant anywhere, anytime. It features Mobile Device Management functionality, Remote Control, and self-tests.

Administrators can proactively monitor and manage connected devices with a flexible web interface.

Introducing GSD® - Advanced software tools to manage and support mobile devices in the field.

Micronet's new comprehensive software framework called GSD® - Guardian System Design - is a cloud-based Software-as-a-Service platform that provides advanced software tools to manage and support applications and system firmware upgrades on Micronet and third party devices installed in the field. The GSD® enables remote over-the-air access and control of Android based mobile devices to conduct individual or group diagnostics to support training activity.

GSD® a fully integrated software framework enabling new levels of control, support and corporate policy compliance

GSD® is offered on Micronet SmarTab series of rugged, automotive-grade, MDTs. It enables both firmware and application software to be remotely managed, and simplifies maintenance, trouble-shooting and remote training, significantly reducing operational costs over the life time of the product, and substantially improving user experience and customer satisfaction.

GSD® features white-label cloud-based software as service solutions, offered as two key services:

- Mobile Device Management and remote control
- Fail-safe firmware and application over-the-air updates (FOTA/OTA)

Development Tool Kit

Micronet's SmarTab Development Package provides all the tools required for product evaluation, application development quick-start, and product testing. The Developers Package contains all essential hardware and software components as described in the following sections.

Hardware

- Micronet SmarTab tablet
- SmarTab Standard or Enhanced cradle
- Wall power supply
- Main cable harness
- Mechanical and interface connection accessories
- Mounting accessories

Software

- Software Development Kit (SDK) provides a set of software tools and API documentation.
- Android demo samples for some device features including the source code.

Documentation

- [Micronet SmarTab Hardware guide](#)
- [Micronet SmarTab Getting Started guide](#)
- [Micronet SmarTab OS Update guide](#)
- [Micronet SmarTab Remote Control and Display guide](#)

Platform Key Feature Specifications

The Micronet SmarTab tablet key feature specifications documented in the "Micronet SmarTab Datasheet" document provided with the DTK documentation.

2. Micronet SmarTab Views

Micronet SmarTab Front View



Figure 1: Micronet SmarTab Front View

For more information about the Micronet SmarTab front view see:

- [Front Camera](#), on page 16
- [LED Indicator](#), on page 16
- [Antiglare LCD and Touch Panel](#), on page 15
- [Touch Buttons](#) on the Touch Screen Panel 15

Micronet SmarTab Rear View

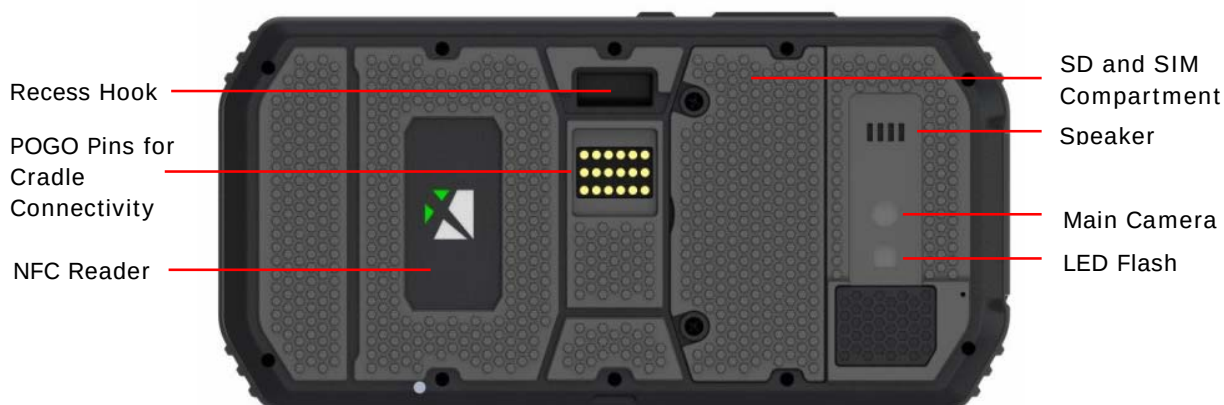


Figure 2: Micronet SmarTab Rear View

For more information about the Micronet SmarTab rear view see:

- **Recess Hook** to lock the Micronet SmarTab on cradle
- **POGO Pins** to establish a connection between the Micronet SmarTab and cradle PCBAs. It provides battery charging, ignition switch state, cradle detection and serial communication
- **NFC Proximity** reader, on page 16
- **Memory Card** Compartment, on page 14
- **MicroSIM Card Slot** Compartment, on page 18
- **Speaker**, on page 17
- **Rear Camera**, on page 16
- **LED Flash**, on page 16

Micronet SmarTab Left View



Figure 3: Micronet SmarTab Top View

For more information about the Micronet SmarTab left view see:

- [Headphone Jack Plug](#), on page [17](#)
- [USB CLIENT Connector](#), on page [27](#)

Micronet SmarTab Right View



Figure 4: Micronet SmarTab Bottom View

For more information about the Micronet SmarTab right view see:

- [Microphone](#), on page [17](#)

Micronet SmarTab Top View



Figure 5: Micronet SmarTab Right View

For more information about the Micronet SmarTab top view see:

- [Power Key](#), on page [15](#)
- [Audio Key](#), on page [15](#)

3. Micronet SmarTab Functional Details

Platform Core

Operating System

The Micronet SmarTab tablet powers by Google Android™ 5.1.1 Lollipop.

ELD Compliance

The Micronet SmarTab system boot time is ~40 seconds. The ELD requirement is up to 1 minute.

Application Development Environment

The Micronet SmarTab tablet supports any open source IDE. Micronet recommends using the Android Studio IDE.

Micronet's Development Toolkit (DTK) includes the following components:

- Micronet SDK
- Application samples demonstrate the Micronet's proprietary API
- Device management and upload tools
- Development accessories
- Documentation

For more details about the development infrastructure, product tools, and DTK contents, please refer to the "Micronet SmarTab Tablet Getting Started" Guide.

Processor

- Qualcomm Snapdragon™ 410 - 1.2GHz Quad Core
- High-performance Superscalar 4x ARM® Cortex™ A53

RAM

1GB LPDDR3 RAM memory

Flash Memory

8GB eMMC

Memory Card

The Micronet SmarTab consists of a MicroSD card slot, up to 32GB.

The MicroSD card slot is located on the Micronet SmarTab rear panel cards compartment.



Watchdog

To monitor mission-critical processes, the platform provides an intelligent watchdog mechanism. This mechanism provides various capabilities for guard and restarts the tablet if the system hangs.

The Android provides a level of watchdog mechanism by the "Applications Manage" to control application stability.

User Interface

LCD and Touch Panel

The Micronet SmarTab has 5.5" HD color LCD, TFT, 1280x720 pixels, brightness of 500 NITS. The touch panel has antiglare surface, capacitive multi-touch panel, 5 points.

Hard Keys

The Micronet SmarTab has two keys on the right panel of the tablet:

- Power key for power on and off, and suspend mode
- Audio key for adjusting the volume

Touch Buttons

The Micronet SmarTab has three touch buttons as part of the touch panel on the right side of the front panel. The keys are Home, Back and Menu buttons.

NFC Proximity

The Micronet SmarTab tablet provides NXP PN547 NFC (Near Field Communication) proximity reader. When the Micronet SmarTab tablet is docked in the cradle, the cradle has NFC slot for reading the NFC proximity card by the Micronet SmarTab tablet. It supports 13.56MHz card and complies with IS15693 and IS18000-3 standards.

NFC Antenna

The NFC antenna located on Micronet SmarTab back panel. When docked, the cradle has a slot for inserting the NFC card, as described on the pictures below.



Picture 6: Tablet NFC Proximity Reader Area



Picture 7: Cradle NFC Reader Slot

LED Indicator

The Micronet SmarTab has LED indicator on left side of the front panel.

Cameras

Rear Camera

The Micronet SmarTab has a 8MP rear camera with autofocus on the back panel.

Front Camera

The Micronet SmarTab has a 2MP front camera with autofocus on the front panel.

LED Flash

The Micronet SmarTab has LED Flash that can be used with the main camera.

Sound

Speaker

The Micronet SmarTab tablet has 0.8W-integrated speaker located on the rear panel.

Microphone

The platform has a high-sensitive microphone located at the bottom of the right panel.

Headphone

The Micronet SmarTab has a 3.5mm Jack headphone on the left panel

Connectivity

Wireless LAN

The Micronet SmarTab tablet provides a Wireless Local Area Network (IEEE 802.11 b/g/n) 2.4GHz module.

Wireless LAN communication is especially suited for high-speed data transfer over the air when a hotspot infrastructure exists. For applications that require large data transactions wireless LAN is the most economical way to implement the solution.

The WLAN module provides a 2.4GHz IEEE 802.11 b/g/n Ethernet adapter with high rate of wireless speed up to 150Mbps. The module supports WPA / WPA2 encryption.

Bluetooth 4

The Micronet SmarTab provides a Bluetooth 4.1 BLE module.

Cellular Modem

The Micronet SmarTab tablet provides two hardware options of the cellular modem:

- **3.5G GSM** - B8/900 and B3/1800, DC-HSPA+ B1/2100 and B8/900 for Europe
- **4G LTE** – North America bands, AT&T and T-Mobile B2 1900MHz, B4 AWS1700MHz, B5 850MHz, B12/B13 700MHz

MicroSIM Card Slot

The GSM modem requires a MicroSIM card connection. The MicroSIM card slot is located on the rear panel compartment of the tablet.



Cellular Antennas

The Micronet SmarTab has two Main and Diversity internal integrated antennas.

GPS Receiver

The Micronet SmarTab tablet provides a high sensitive GPS receiver support 50 channels, NMEA0183 standard sentences, AGPS, GPS and GLONASS satellites.

GPS Antennas

The Micronet SmarTab has an integrated Ceramic internal antenna.

Battery

Capacity

The Micronet SmarTab includes a Non-removable Li-Polymer 2000mAh internal battery.

Charging the Battery

The Micronet SmarTab provides fast charging through its USB OTG connector on the left panel and through the cradle, which connected permanently to the vehicle battery. The cradle charges the tablet through the POGO pins at 5V DC power.

Charging Mechanism

The Micronet SmarTab provides a smart charging mechanism. When connected to a power source (e.g. wall mount power supply, PC USB, SmarTab cradle), the battery is charged and in parallel powers the CPU. On a temperature over 45°C, the internal battery disconnects from the power. When disconnecting the power source from the SmarTab the battery reconnects and provides power to CPU. This mechanism keeps the battery healthy.

Charging Temperature

The Micronet SmarTab battery charging temperature is as follows:

- Charge - -20°C to ~ +45°C, 45~85% RH
- Battery operating temperature - -20°C to ~ +70°C, 45~85% RH

**NOTE:**

The operation system blocks the charge when temperature is over the defined (45°C). By this function the device is protected even while operation state.

Motion Control

The Micronet SmarTab tablet provides an Accelerometer, Compass and Gyroscope module. The accelerometer is an electromechanical device used to measure acceleration forces. Such forces may be static like the continuous force of gravity or, as is the case with many mobile devices, dynamic to sense movement or vibrations.

Acceleration is the measurement of the change in velocity or speed divided by time. For example, a car accelerating from a standstill to 60 mph in six seconds is determined to have an acceleration of 10 mph per second (60 divided by 6).

Communication Interfaces

Serial Communication

The Micronet SmarTab tablet supports serial communication ports through the cradle.

The standard cradle model includes one serial port, and the enhanced cradle model includes five serial communication ports. Please refer to the detailed description of the standard cradle [Serial Communication](#) and of the enhanced cradle [Serial Communication](#).

USB Communication

The Micronet SmarTab supports a USB OTG interface; it located on the [Micronet SmarTab Left View](#) of the tablet.

The SmarTab standard cradle supports USB Client interface for ADB communication. The enhanced cradle support two USB communication ports, one USB Host and one USB Client device. Please refer to the detailed description of the standard cradle [USB Communication](#) and of the enhanced cradle [USB Communication](#).

**NOTE:**

The product will be connected only to a USB interface of version USB 2.0.

General Purpose I/O

Input lines

The Micronet SmarTab supports general-purpose input lines for ignition sense and other functions, A2D and automotive digital lines.

The standard cradle model includes one input line for ignition sense. The enhanced cradle model includes one input line for ignition sense and seven general-purpose input lines. Please refer to the detailed description of the standard cradle [Automotive Input](#) and for the enhanced cradle [Analog and Digital Input lines](#).

Output Lines

The Micronet SmarTab supports general-purpose Open-Collector output lines for various functions, through the enhanced cradle only. Please refer to the detailed description of the enhanced cradle [Open Collector Output lines](#).

Vehicle Bus Connectivity

SAE J1939 CANBus

The Micronet SmarTab provides two SAE J1939 CANBus ports through its enhanced cradle that enable the connection of a variety of vehicle peripherals, such as the vehicle's computer, vehicle's sensors and so on. Please refer to the detailed description of the enhanced cradle [SAE J1939 CANBus](#).

Single Wire CANBus

The Micronet SmarTab provides a single wire CANBus port through its enhanced cradle. Please refer to the detailed description of the enhanced cradle [Single Wire CAN](#).

SAE J1708

The Micronet SmarTab provides J1708 port through its enhanced cradle. Please refer to the detailed description of the enhanced cradle [SAE J1708](#).

4. Micronet SmarTab Cradle Views

Cradle Front View



Figure 8: Cradle Front View Components

For more information about the cradle front view see:

- Latch for dock and undock the Micronet SmarTab
- [Customized Front Panel Label](#), on page 29

Cradle Rear View



Figure 9: Cradle Rear View Components

For more information about the cradle rear view see:

- [NFC Proximity Slot](#), on page 16
- [Mounting Arm Screw Nuts](#), on page 39

5. Standard Cradle Configuration

Functional Details

The Micronet SmarTab standard cradle provides the following interfaces:

- 12V/24V for charging the Micronet SmarTab battery
- Digital input signal for ignition switch control
- USB OTG for ADB connection
- Serial communication port

Cradle Power Consumption

Table 1: Micronet SmarTab Standard Cradle Current Consumption

Micronet SmarTab/ Standard Cradle Current Consumption			
Micronet SmarTab Un-docked		Micronet SmarTab Docked	
12V	24V	12V	24V
3mA	3mA	240mA	130mA

Serial Communication

Serial Port 1 (COM1)

The Micronet SmarTab standard cradle supports an (EIA) RS-232 level serial communication on its port. It provides TX and RX signals at 300 up to 115,200bps.

USB Communication

USB OTG

The standard cradle supports USB OTG port. It provides ADB connectivity and supports:

- Device configuration
- Application development
- Debugging caution

There are two ways to use the USB OTG:

- Through the Micronet SmarTab USB OTG connector on the left panel while the tablet is not docked
- Through the standard cradle USB OTG cable while the tablet is docked


Note:

OS Burn using Fastboot performs only through the Micronet SmarTab USB OTG plug.



Automotive Input

The Micronet SmarTab standard cradle provides one automotive digital input for ignition.


NOTE:

Ignition input line powers ON the Micronet SmarTab from shutdown and suspend states. For proper power management implementation, the ignition input line should connect to the vehicle's ignition switch, and power to the cradle should connect to the vehicle's battery. See [Electrical Installation](#) on page 42.

Table 2: Ignition line States, Electrical Parameters

Input State	Typical	Minimum	Maximum
Low	0V	-30V	+6V
High	12V-24V	+7V	+30V

6. Enhanced Cradle Configuration

Platform Core

MCU Processor

The enhanced cradle MCU CPU consists of the Freescale K20_120 MQX RTOS.

Functional Details

The Micronet SmarTab enhanced cradle provides the following interfaces:

- 12V/24V for charging the Micronet SmarTab battery
- Digital input signal for ignition switch control
- Seven general-purpose input lines, A2D or Automotive digital inputs
- Four general-purpose O.C output lines
- J1939 CAN interfaces
- Single Wire CAN
- J1708 interface

Cradle Power Consumption

Table 3: Micronet SmarTab Enhanced Cradle Current Consumption

Micronet SmarTab/ Enhanced Cradle Current Consumption			
Micronet SmarTab Un-docked		Micronet SmarTab Docked	
12V	24V	12V	24V
5mA	4mA	600mA	300mA

Serial Communication

The enhanced cradle supports four serial communication ports for external devices connections, and a debug port connected to the MCU Co-Processor. These ports support various hardware and software flow control functions. For more information about the interface signals, please see the signal map [Pinout by Functionality](#) on page 37.

Serial Port 1 (COM1)

The enhanced cradle supports an (EIA) RS-232 level serial communication on its port. It provides TX and RX signals at 300 up to 115,200bps. The serial port provides one pair of communication control handshake CTS/RTS signals.

Serial Ports 2-4 (COM2-4)

The enhanced cradle supports EIA-RS232 level serial communication ports 2-4. The ports support a baud rate of 300 to 115,200bps, and provide the TX and RX signals only.

Debug Serial Port (COM7)

The enhanced cradle supports EIA-RS232 level serial communication port for Co-Processor debugging purposes. The port supports a baud rate of 300 to 115,200bps, and provides the TX and RX signals only.

USB Communication

USB HOST

The enhanced cradle supports both USB HOST and Client. The USB Host interface supports the following profiles:

- USB Standard HID
- USB Printer (PCL)
- USB Storage

USB CLIENT

The USB Client interface supports Android ADB for application development and device management.

The USB Client port provides Android's ADB connectivity and supports:

- Device configuration
- Management tools
- Application development
- Debugging caution

There are two ways to use the USB Client:

- Through the Micronet SmarTab USB OTG connector on the top panel while the tablet is not docked
- Through the Micronet SmarTab cradle USB Client cable while the tablet is docked

**Note:**

Burning the OS using Fastboot performs only through the Micronet SmarTab USB OTG plug.



General Purpose I/O

Analog and Digital Input lines

The SmarTab tablet provides seven automotive input lines (0-32V) through its enhanced cradle. The input lines can be read as digital (state 0 or 1) or analog (voltage level) lines.

Digital inputs

IGN (automotive voltage state) is for monitoring the ignition switch signal. The other seven input lines can be used for any purpose, like sensing door opening, sensing bus amber lights, etc.

**NOTE:**

IGN line powers on the device from shutdown state. For proper power management implementation, the input should be connected to the vehicle's ignition switch.

Analog Inputs

GPIO can be treat as analog input to monitor the value range of compatible vehicle sensors, such as an analog fuel gauge. The supported voltage range is from 0V to 30V.

Open Collector Output lines

The SmarTab tablet provides four O.C output lines through its enhanced cradle for external peripheral control.

For more information about these interface signals please see the digital output signals map [Pinout by Functionality](#) on page 37.

Vehicle Bus Connectivity

SAE J1939 CANBus

The SmarTab enhanced cradle provides two SAE J1939 CANBus ports that enable the connection of a variety of vehicle peripherals, such as the vehicle's computer, vehicle's sensors and so on.

The provided CANBus V2.0B (a 1 Mbit port) supports the following functionality:

- 0 - 8 byte length in the data field
- Standard and extended data and remote frames
- Two receive buffers with prioritized message storage
- Six 29-bit filters
- Two 29-bit masks

- Three transmit buffers with prioritization and abort features

Single Wire CAN

The SmarTab enhanced cradle provides SAE J2411 single-wire for CAN network applications with low requirements regarding bit rate and bus length. The communication takes place via just one bus line with a nominal data rate of 33,3 Kbit/s (83,3 Kbit/s in high-speed mode for diagnostics).

SAE J1708

The SmarTab enhanced cradle provides SAE J1708 port. The SAE J1708 is a standard used for serial communications between ECUs on a heavy-duty vehicle and between a computer and the vehicle. With respect to Open System Interconnection model (OSI), J1708 defines the physical layer.

Customized Front Panel Label

Micronet provides the option to attach a customized front panel label based on your specifications. To enable rebranding the product, Micronet will provide graphic files and size specifications. This is subject to an additional charge per unit, based on the quantity ordered.



Figure 10: Customized Front Panel Label

7. Cradle Signals Map

Overview

This chapter describes the Micronet SmarTab standard and enhanced cradles signal interfaces.

Standard Cradle Signals Map

The Micronet SmarTab standard cradle has the following interfaces on its main cable harness:

- Power line
- Ground line
- digital input line
- USB OTG type A connector cable to be connected on the computer USB Host connector
- Serial port with TX, RX ,GND signals, baud rate 300-115200bps

Enhanced Cradle Signals Map

Overview

The SmarTab enhanced cradle has the following interfaces found on the main and secondary cradle connectors.

The following abbreviations are used:

- I - Input signal
- O - Output signal
- B - Bus signal
- V - Voltage signal
- G – Ground
- P – Positive
- N – Negative

Interface Connectors

The SmarTab enhanced cradle interface contains Molex Pico-Clasp™ Wire-to-Board Header 1.00 mm pitch 20 and 50 pin connectors. All pins are ESD protected (against electrostatic discharge). The [Main Connector Pinout](#) and [Secondary Connector Pinout](#) tables below describe the pinout of each connector.



Figure 11: SmarTab enhanced cradle Interface connectors

Main Connector Pinout

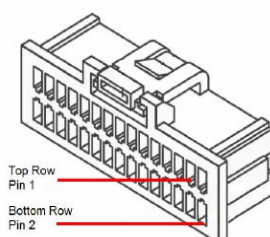


Figure 12: Main 20 pin connector

Pinout by Pin Number

The following table lists the main 20 pin connector signals by pin number.

Table 4: Main Connector Signal Map (by Pin Number)

Pin	Signal	Type	Function	Specifications
1	+VIN	V	Input Power 12V/24V	Typical – 12V/24V - Minimum continues – 6V (5V for up to 40ms according to ISO7637) - Maximum continues – 32V
2				
3	VIN_GND	G	Ground	
4				

Pin	Signal	Type	Function	Specifications									
5	Ignition Input	A	A2D Input Ignition switch	<table><tr><th>Typical</th><th>Min</th><th>Max</th></tr><tr><td>Input Low: VIL</td><td>0V</td><td>-30V 6V</td></tr><tr><td>Input High: VIH</td><td>12V-24V</td><td>+8V +32V</td></tr></table>	Typical	Min	Max	Input Low: VIL	0V	-30V 6V	Input High: VIH	12V-24V	+8V +32V
Typical	Min	Max											
Input Low: VIL	0V	-30V 6V											
Input High: VIH	12V-24V	+8V +32V											
6	AN1 H	I/O	CAN High Signal										
7	ABLE_TYPE	I	Cable designator	By a resistor on the cable the application can recognize the cable type which is connected to the enhanced cradle									
8	AN1 L	I/O	CAN Low Signal										
9	/A												
10	AN2 H	I/O	CAN High Signal										
11	ND	G	Ground										
12	AN2 L	I/O	CAN Low Signal										
13	SB Host +5V	V	USB Host Port VBUS	USB 2.0									
14	1708 P	P	J1708 Positive Signal										
15	SB Host D-	B	USB Host Port1 Data-	USB 2.0									
16	1708 N	N	J1708 Negative Signal										
17	SB Host D+	B	USB Host Port1 Data+	USB 2.0									
18	SWC	I/O	CAN	Single wire CAN									
19	USB Host GND	G	Ground	USB 2.0									
20	GND	G	Ground										

Pinout by Functionality

The following table lists the 20 pin connector signals by functionality.

Table 5: Main Connector Signal Map (by functionality)

Pin	Signal	Type	Function	Specifications																
1	+VIN	V	Input Power 12V/24V	Typical – 12V/24V - Minimum continues – 6V (5V for up to 40ms according to ISO7637) Maximum continues – 32V																
2	+VIN	V																		
3	VIN_GND	G	Ground																	
4	+VIN	V																		
5	Ignition Input	A	2D Input Ignition switch	<table><tr><td></td><td>Typical</td><td>Min</td><td>Max</td></tr><tr><td>Input Low: VIL</td><td>0V</td><td>-30V</td><td>6V</td></tr><tr><td>12V-24V</td><td>+8V</td><td>+30V</td><td></td></tr><tr><td></td><td></td><td colspan="2">Input High: VIH</td></tr></table>		Typical	Min	Max	Input Low: VIL	0V	-30V	6V	12V-24V	+8V	+30V				Input High: VIH	
	Typical	Min	Max																	
Input Low: VIL	0V	-30V	6V																	
12V-24V	+8V	+30V																		
		Input High: VIH																		
6	CAN1 H	I/O	CAN High Signal																	
8	CAN1 L	I/O	CAN Low Signal																	
10	CAN2 H	I/O	AN High Signal																	
12	CAN2 L	I/O	AN Low Signal																	
18	SWC	I/O	CAN	Single wire CAN																
14	J1708 P	P	J1708 Positive Signal																	
16	J1708 N	N	J1708 Negative Signal																	
13	SB Host +5V	V	USB Host Port VBUS	USB 2.0																
15	USB Host 1 D-	B	USB Host Port1 Data-	USB 2.0																
17	USB Host 1 D+	B	USB Host Port1 Data+	USB 2.0																
19	USB Host 1 GND	G	Ground	USB 2.0																
7	CABLE_TYPE	I	Cable designator	By a resistor on the cable the application can recognize the cable type which is connected to the enhanced cradle																
11	ND	G	round																	
20	ND	G	round																	

Secondary Connector Pinout

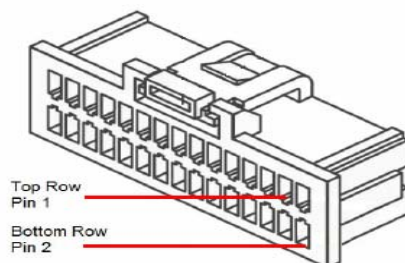


Figure 13: Main 50 pin connector

Pinout by Pin Number

The following table lists the 50 pin connector signals by pin number.

Table 6: Secondary Connector Signal Map (by Pin Number)

Pin	Signal	Type	Function	Specifications
				Typical Min Max
1	Automotive Input	I	Digital Input 1	Input Low: V_{IL} 0V -30V 6V Input High: V_{IH} 12V-24V +8V +30V 0V-30V max, 12k OHM
2	.C Output	O	Open Collector Output1	Max. switchable current = 300mA Max. switchable voltage = $+V_{IN}$ Max. saturation voltage = 0.6V
3	Automotive Input	I	Digital Input 2	Same as Input1
4	.C Output	O	Open Collector Output2	Same as Output1
5	Automotive Input	I	Digital Input 3	Same as Input1
6	.C Output	O	Open Collector Output3	Same as Output1
7	Automotive Input	I	Digital Input 4	Same as Input1
8	.C Output	O	Open Collector Output4	Same as Output1
9	Automotive Input	I	Digital Input 5	Same as Input1

Pin	Signal	Type	Function	Specifications
10	ND	G	Ground	
11	utomotive Input	I	Digital Input 6	Same as Input1
12	/A			
13	utomotive Input	I	Digital Input 7	Same as Input1
14	/A			
15	ND	G	Ground	
16	/A			
17	/A			
18	/A			
19	/A			
20	ND	G	Ground	
21	ND	G	Ground	
22	/A			
23	ND	G	Ground	
24	/A			
25	S232_RTS1	I	RTS (COM1)	EIA-RS232 level
26	S232_CTS1	O	CTS (COM1)	EIA-RS232 level
27	S232_TX1	O	Transmit Data (COM1)	EIA-RS232 level
28	E232-RX1	I	Receive Data (COM1)	EIA-RS232 level

Pin	Signal	Type	Function	Specifications
29	S232_TX2	O	Transmit Data (COM2)	EIA-RS232 level
30	S232_RX2	I	Receive Data (COM2)	EIA-RS232 level
31	S232_TX3	O	Transmit Data (COM3)	EIA-RS232 level
32	S232_RX3	I	Receive Data (COM3)	EIA-RS232 level
33	S232_TX4	O	Transmit Data (COM4)	EIA-RS232 level
34	S232_RX4	I	Receive Data (COM4)	EIA-RS232 level
35	/A			
36	/A			
37	S232_TX_DBG	O	Transmit Data DBG	MCU Debug port EIA-RS232 level
38	S232_RX_DBG	I	Receive Data DBG	MCU Debug port EIA-RS232 level
39	/A			
40	/A			
41	USB OTG +5V	V	USB OTG VBUS	USB 2.0
42	GND	G	Ground	
43	USB OTG D-	B	USB OTG Data-	USB 2.0
44	GND	G	Ground	
45	USB OTG D+	B	USB OTG Data+	USB 2.0
46	GND	G	Ground	
47	SB OTG ID	B	SB OTG Identifier ^U	USB 2.0
48	ND	G	Ground	
49	SB OTG GND	G	Ground	USB 2.0

Pin	Signal	Type	Function	Specifications
50	GND	G	Ground	

Pinout by Functionality

The following table lists the 50 pin connector signals by functionality.

Table 7: Secondary Connector Signal Map (by Functionality)

Pin	Signal	Type	Function	Specifications												
1	Automotive Input	I	Digital Input 1	<table><tr><th>Typical</th><th>Min</th><th>Max</th></tr><tr><td>Input Low: V_{IL}</td><td>0V</td><td>-30V</td></tr><tr><td>Input High: V_{IH}</td><td>12V-24V</td><td>+8V</td></tr><tr><td colspan="3">0V-30V max, 12k OHM</td></tr></table>	Typical	Min	Max	Input Low: V_{IL}	0V	-30V	Input High: V_{IH}	12V-24V	+8V	0V-30V max, 12k OHM		
Typical	Min	Max														
Input Low: V_{IL}	0V	-30V														
Input High: V_{IH}	12V-24V	+8V														
0V-30V max, 12k OHM																
3	Automotive Input	I	Digital Input 2	Same as Input1												
5	Automotive Input	I	Digital Input 3	Same as Input1												
7	Automotive Input	I	Digital Input 4	Same as Input1												
9	Automotive Input	I	Digital Input 5	Same as Input1												
11	Automotive Input	I	Digital Input 6	Same as Input1												
13	Automotive Input	I	Digital Input 7	Same as Input1												
2	O.C Output	O	Open Collector Output1	Max. switchable current = 300mA Max. switchable voltage = +VIN Max. saturation voltage = 0.6V												
4	O.C Output	O	Open Collector Output2	Same as Output1												
6	O.C Output	O	Open Collector Output3	Same as Output1												
8	O.C Output	O	Open Collector Output4	Same as Output1												
25	RS232_RTS1	I	RTS (COM1)	EIA-RS232 level												
26	RS232_CTS1	O	CTS (COM1)	EIA-RS232 level												
27	RS232_TX1	O	Transmit Data (COM1)	EIA-RS232 level												
28	RE232-RX1	I	Receive Data (COM1)	EIA-RS232 level												
29	RS232_TX2	O	Transmit Data (COM2)	EIA-RS232 level												
30	RS232_RX2	I	Receive Data (COM2)	EIA-RS232 level												
31	RS232_TX3	O	Transmit Data (COM3)	EIA-RS232 level												
32	RS232_RX3	I	Receive Data (COM3)	EIA-RS232 level												
33	RS232_TX4	O	Transmit Data (COM4)	EIA-RS232 level												
34	RS232_RX4	I	Receive Data (COM4)	EIA-RS232 level												
37	RS232_TX_DBG	O	Transmit Data DBG	MCU Debug port EIA-RS232 level												
38	RS232_RX_DBG	I	Receive Data DBG	MCU Debug port EIA-RS232 level												

Pin	Signal	Type	Function	Specifications
41	SB OTG +5V	V	USB OTG VBUS	USB 2.0
43	SB OTG D-	B	USB OTG Data-	USB 2.0
45	SB OTG D+	B	USB OTG Data+	USB 2.0
47	SB OTG ID	B	USB OTG Identifier	USB 2.0
49	SB OTG GND	G	Ground	USB 2.0
10	GND	G	Ground	
15	GND	G	Ground	
20	GND	G	Ground	
21	GND	G	Ground	
23	GND	G	Ground	
42	GND	G	Ground	
44	GND	G	Ground	
46	GND	G	Ground	
48	GND	G	Ground	
50	GND	G	Ground	

8. SmarTab Cradle Installation

Mechanical Installation

Mounting Arm

The rear panel of the Micronet SmarTab cradle provides the mechanical infrastructure for a RAM® mount arm installation.

The RAM® mounting arm is a flexible, rotating, arm-based mount that provides a wide range of fixed in-cabin positions for maximum comfort and visibility. The mounting-arm screw-insert positions on the cradle rear panel are compatible with AMPs standard mounting-arm products.

**NOTE:**

In-vehicle installation instructions must be provided by a qualified installation technician.

Mounting Inserts Location and Dimensions

There are two M5 thread mounting [PEM Screw Inserts](#) found on the rear panel of the Micronet SmarTab cradle. The distance between the PEM screw inserts is 48.50mm.

Micronet provides with the Micronet SmarTab DTK two screws with the RAM® mounting arm (RAM® P/N RAM-B-138U) with two screws. If you source the RAM mount arm or another mounting arm brand by yourself, you must take in account the [Mounting Arm Ball Base](#) Adapter base thickness when calculating the screw thread length.



Figure 14: Micronet SmarTab Cradle Rear Panel Mounting Arm Screw Inserts

PEM Screw Inserts

The following parameters present the calculation of the screws and PEM screw insert dimensions:

1. M5 thread
2. PEM thread length 6.6 mm
3. Screw length 5.5 mm + [Mounting Arm Ball Base Adapter](#) Adapter depth

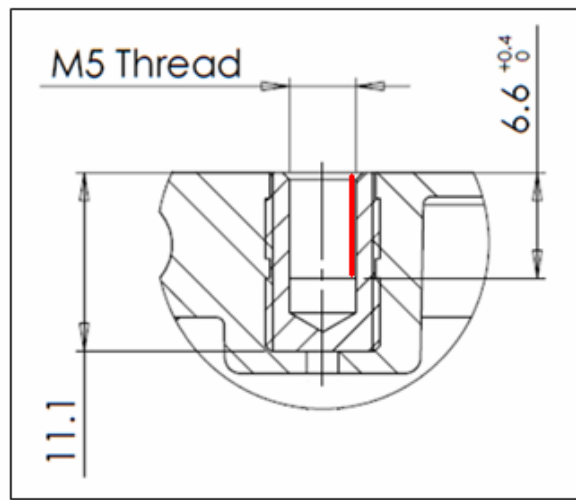


Figure 15: Micronet SmarTab Cradle Rear Panel Mounting Arm PEM Screws Inserts Dimensions

Mounting Arm Ball Base Adapter



Figure 16: Mounting Arm Ball Base Adapter thickness

Device Installation Steps

1. Determine the optimal positioning of the Micronet SmarTab cradle in the vehicle that provides easy access and a clear view of both the road and the display.
2. Attach the base of the mounting-arm assembly to the dashboard or cabin.
3. Attach the mounting arm to the cradle rear panel using the mounting screw inserts.
4. Connect the Micronet SmarTab cradle with the mounting arm to the mounting arm base.
5. Follow the power cable preparation as described in [Electrical Installation](#), on page 42.

Electrical Installation

Vehicle Battery Connection

The Micronet SmarTab input power connects directly to the vehicle's battery. See the Electrical Installation [Figure 17](#) below.

The supported nominal battery voltage supply is 12V or 24V DC, with an operating range between 8V to 30V DC.

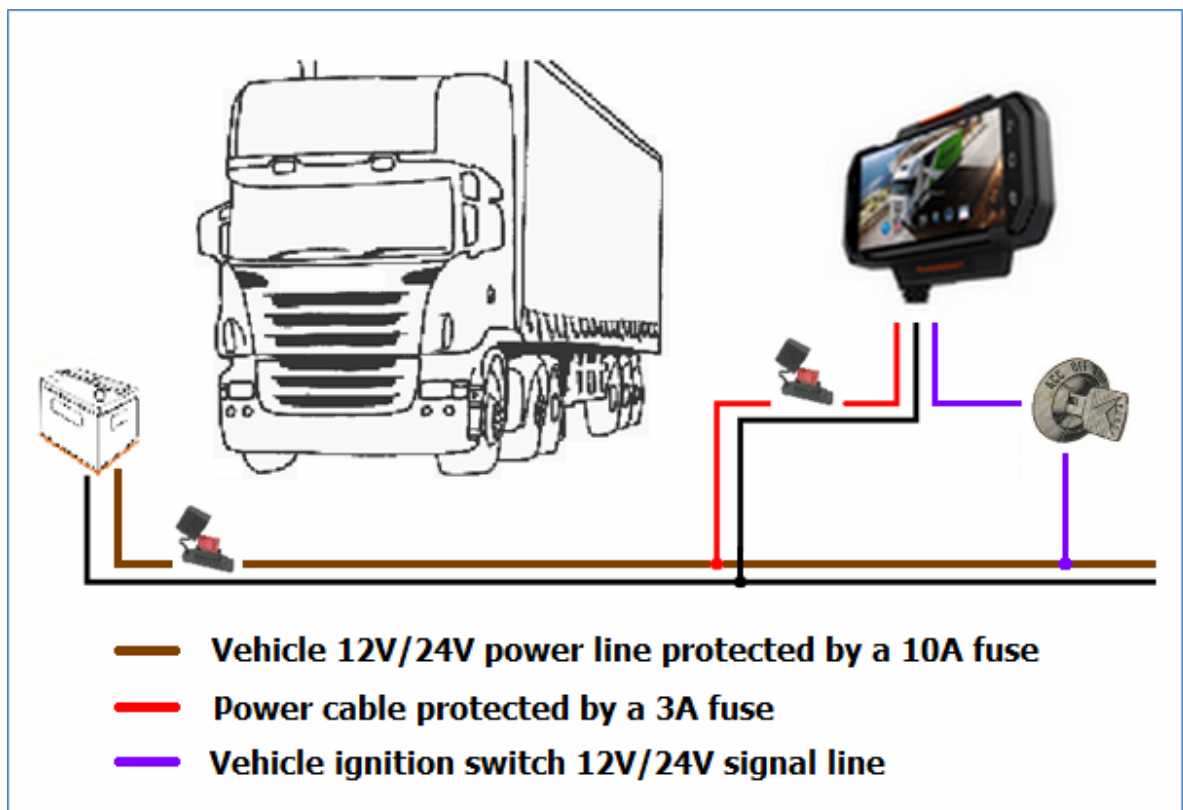


Figure 17: Electrical Installation Scheme

Electrical Installation Procedure

1. Prepare the wiring for power, ground and ignition switch in the vehicle, for connecting to the Micronet SmarTab cradle cable.
2. The power signal connects to the vehicle's power line protected by a 10A fuse. Add an inline 3A "Slow Blow" fuse with fuse holder for HHC/HHD blade-type fuses to the power cable.
3. The ground signal connects to the vehicle's ground line.
4. The ignition input signal connects to the vehicle's ignition switch line.
5. Fix the cable after verifying that all the functions are performing properly.
6. Arrange the cables using a plastic strip.

NOTE



The cradle must be connected to power before inserting the Micronet SmarTab into the cradle. If the Micronet SmarTab inserted while the cradle not connected to power, the Micronet SmarTab shuts down immediately.

9. Insertion to Cradle

Inserting the Micronet SmarTab into Cradle

1. Hold the Micronet SmarTab on top and insert it to cradle



2. Push the Micronet SmarTab on top against the cradle until you hear the click



Removing the Micronet SmarTab from Cradle

1. Press the **ORANGE** latch knob on top of cradle.



2. Pull the Micronet SmarTab from cradle.



10. Physical Characteristics

Table 8: Physical Characteristics

Table 6.1 Physical Characteristics		
Dimension	Measurement	
Micronet SmarTab Dimensions & Weight		
Width	6.50 inch	165 mm
Height	3.15 inch	80 mm
Depth	0.60 inch	15 mm
Weight	8.11 oz.	230 Gram
Micronet SmarTab Cradle Dimensions & Weight		
Width	6.70 inch	170 mm
Height	4.72 inch	120 mm
Depth	1.97 inch	50 mm
Weight	9.17 oz.	260 Gram

FCC Statement

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

SAR Information Statement

Your Micronet SmarTab LTE is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limits for exposure to radiofrequency (RF) energy set by the Federal Communications Commission of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health. The exposure standard for wireless mobile phones employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/kg. * Tests for SAR are conducted with the phone transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the phone while operating can be well below the maximum value. This is because the phone is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output. Before a phone model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government adopted requirement for safe exposure. The tests are performed in positions and locations (e.g., at the ear and worn on the body) as required by the FCC for each model. The highest SAR value for this model phone when tested for use at the ear is 0.5 W/Kg and when worn on the body, as described in this user guide, is 0.77 W/Kg (Body-worn measurements differ among phone models, depending upon available accessories and FCC requirements). The maximum scaled SAR in hotspot mode is 0.79W/Kg. While there may be differences between the SAR levels of various phones and at various positions, they all meet the government requirement for safe exposure. The FCC has granted an Equipment Authorization for this model phone with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this model phone is on file with the FCC and can be found under the Display Grant section of <http://www.fcc.gov/oet/fccid> after searching on FCC ID: U8O-STB5-LTE Additional information on Specific Absorption Rates (SAR) can be found on the Cellular Telecommunications Industry Association (CTIA) web-site at <http://www.wow-com.com>. * In the United States and Canada, the SAR limit for mobile phones used by the public is 1.6 watts/kg (W/kg) averaged over one gram of tissue. The standard incorporates a substantial margin of safety to give additional protection for the public and to account for any variations in measurements.