TECHNICAL DATA SHEET

SMART

CUSTOMIZABLE DASHBOARD



MTA®
Advanced Automotive Solutions

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PRODUCT VERSION

This technical data sheet is related to following version of SMART:

1. SMART dashboard
   PN# 6100318/2X

GENERAL DESCRIPTION

SMART is a dashboard designed for motorbikes or agricultural and off-highway vehicles, on wheels or tracks.

Power supply is 12Vdc.

SMART features:

- 1 color 4.3” TFT WQVGA;
- 10 telltales;
- 10 digital inputs;
- 4 analog inputs;
- 1 CAN bus FD (+1 optional high speed).

SMART can be used as a dashboard with the following features:

- hour meter, odometer, gear, speed, Engine RPM, trip data, etc.;
- digital signal interface and monitor;
- analog signals from external sensors.

Optional contents:

- 8 LEDs for bar graph visualization;
- 3 low side drivers (1 channel 500mA, 2 channels 3.5A);
- 4 channels high side driver (10W load);
- 1 H- bridge (2 dedicated outputs, 2A typical);
- adjustable voltage 100mA sensors supply;
- 1 LIN bus;
- Ethernet AVB OPEN Alliance BroadR-Reach compliant;
- HyperFlash (to support 2.5D graphics);
- immobilizer (PCF7991AT);
- RTC, without backup battery;
- bluetooth LE module.

MTA STUDIO

SMART is configurable with MTA Studio.
MTA Studio is a specific tool used to program Dashboards, Displays and Electronic Control Units which have been developed with customizable functions allowing the customers to create “tailored” devices.

BLOCK DIAGRAM

BroadR-Reach Ethernet *

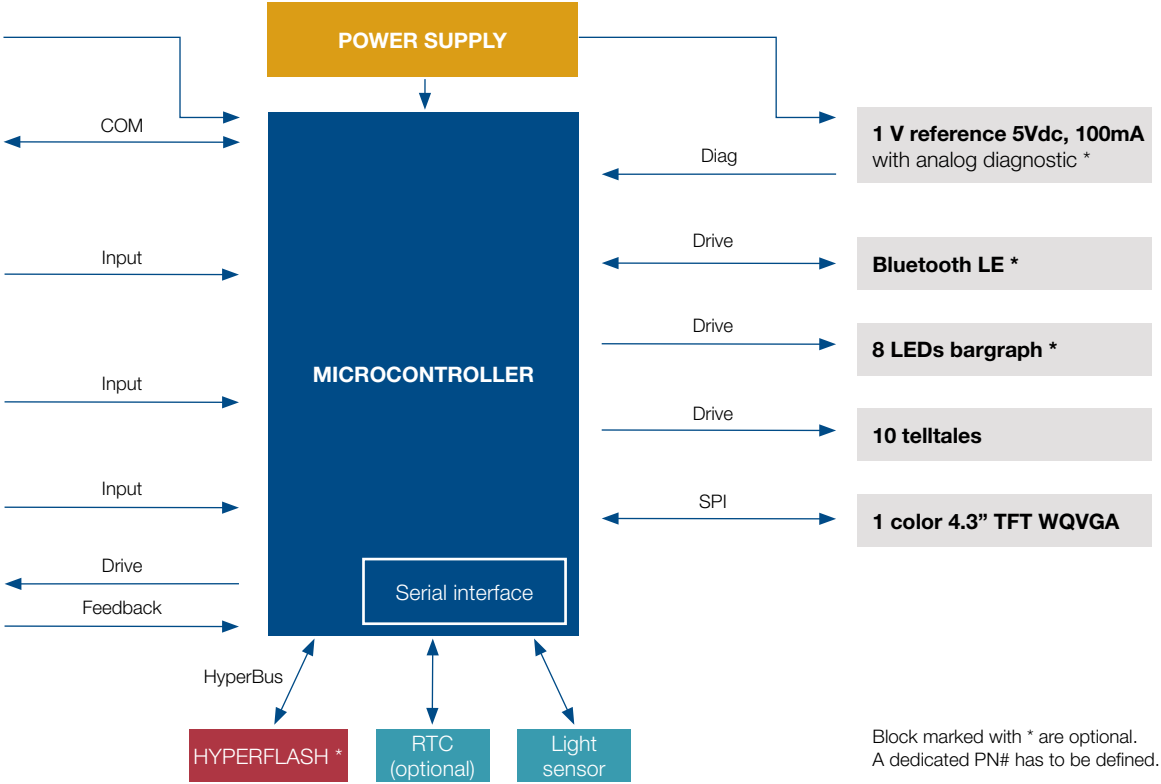
Communications:
1 CAN FD
1 CAN HS *
1 LIN *

10 digital inputs:
8 digital HS/LS configurable
2 digital LS

4 analog inputs
voltage/resistance
(HW configurable pull-up/down)

Immobilizer *

3 outputs LS * 1 x 0.5A, 2 x 3.5A
4 outputs HS * 10W
1 H-BRIDGE * 2CH 2A



Block marked with * are optional.
A dedicated PN# has to be defined.

SPECIFICATIONS

		Qty
Operating voltage		
Nominal	12Vdc	
Supply voltage, permissible range	9÷16Vdc	
Current consumption		
Without load, backlight off, telltales off, inputs/outputs floating	< 400uA at key off	
Constant voltage source		**1**
PMIC External sensor supply	5Vdc / 3.3Vdc / 1.2Vdc Adjustable set to 5Vdc ± 2%	
Analog inputs (voltage or resistance)		**4**
0-5V or 0-16V hardware configurable pull-up/down	12bit	
Digital inputs		**10**
High side/low side with configurable pull-up/down	2mA or 16mA wetting current configurable	8
Digital low side with pull-up	2mA or 16mA wetting current configurable	2
Low side outputs		**3**
Not current controlled PWM	max. 0.5A	1
Not current controlled PWM	max. 3.5A	2

		Qty
High side outputs		**5**
Current controlled PWM	10W lamps	4
Current controlled PWM 2A full-bridge	max. 7A	1
Interfaces		
CAN bus FD (up to 5Mb/s)	ISO 11898 with wake-up function	1
CAN bus 2.0B high speed up to 1Mb/s (optional)	ISO 11898	1
LIN (optional)	LIN 2.1	1
Ethernet AVB (optional)	BroadR-Reach	1
Bluetooth (optional)	BLE 4.2	1
CAN bus termination resistor		**1**
Termination resistor	Not mounted, hardware configurable	
Fault detection in the event of cable break and short circuit		
Inputs	✓	
Outputs	✓	
Reverse polarity protection		
Power supply	✓	
Inputs	✓	
Outputs	✓	

		Qty
Telltales		**10**
High efficiency LED	Light intensity driven by PWM	
Digital indicators		**8**
LED bar graph	8 high efficiency LEDs driven by PWM	
Display		**1**
TFT 4.3" WQVGA display, form factor 16:9	Color, 480x272 pixels, 16.7 M colors	
Protective glass features		
Optically bonded	✓	
SODA LIME Cover Glass chemically strengthened (6H)	✓	
Wake-up		
From KEY, CAN line and from all digital inputs (programmable)	✓	
Microcontroller		
ARM Cortex R5F	Cypress Traveo S6J32 family	
Operating temperature range	-40 to +105°C	
Clock frequency		
MHz	Up to 240	
Internal memory capacity in microcontroller		
Flash	2112kB	
TCRAM	128kB	

		Qty
Memories		
EEPROM	Internal on MCU	
HyperFlash	16MB (32MB as optional)	
Real time clock (optional)		
Non battery powered	✓ Clock time deviation: ±2.17sec per day (-40 to +85°C temp range)	
PCB temperature sensor		
Internal	✓	
Battery voltage measurement		
Internal	✓ Accuracy: ±5% of full scale value	
Backlight		
LCD	White with dimming function	
Materials and other mechanical characteristics		
Front mask: plastic PC+ABS Black RAL 9005		
Back side: plastic PC+ABS Black RAL 9005		
Chassis Gore-Tex valve for environment air exchange		
Ambient light sensor		
Ambient light sensor for manual night and day view managing. No algorithm implemented	✓	

	Qty
Operating temperature	
External ambient temperature	-30 to +85°C
Storage temperature	
External ambient temperature	-40 to +85°C

	Qty
Protection rate	
IP67	
Weight	
350gr	

CHARACTERISTICS

COMMUNICATION INTERFACES

- CAN FD communication is according to protocol 11898-1 v2.0 part A, B and CAN FD specifications v1.0.
  Data rate is up to 2Mbps. Wake-up capability.
- LIN communication is compliant with LIN 2.1 standard.
- Ethernet is OPEN Alliance BroadR-Reach compliant. The device provides 100Mbit/s transmit and receive capability over a single Unshielded Twisted Pair (UTP) cable. Wake-up capability.
- Bluetooth Low Energy Module. Bluetooth 4.2 (BLE).

DIGITAL AND ANALOG INPUTS

Characteristics

- Digital high side/low side inputs software configurable (pins 12, 18, 19, 20, 21, 23, 26, 27):
  Switch Detection Threshold 3.7Vdc < 4Vdc < 4.3Vdc.
- Digital low side input (pins 11,22):
  Switch Detection Threshold 3.7Vdc < 4Vdc < 4.3Vdc.
- Analog input (pins 28, 29, 30, 31) with range:
  0-5Vdc (accuracy: ±5% of full scale value);
  0-16Vdc (accuracy: ±5% of full scale value);
  0-100kohm (accuracy: ±10% in the range 500-1000 Ohm; ±5% in the range 0÷500 Ohm;

Pull-down or pull-up to 5Vdc/16Vdc by hardware configuration.

Wake-up functionality

All digital inputs can be programmed with wake-up capability, by configurating CAN message by MTA Studio.

Wetting current activation

All digital inputs provide cleaning contact function (wetting current), by configurating CAN message by MTA Studio.
Analog multiplexer for reading the inputs as analog.

OUTPUTS

Protection

Driver protection in case of overload, short circuit and overvoltage.

Output high 10W lamps characteristics (pins 13, 4, 14, 5):

- minimum load resistance: min 15 Ohm @ 12Vdc (27 Ohm @ 16Vdc);
- power supply from battery input;
- current monitoring by analog voltage sense 0-5Vdc (accuracy: ±5% of full scale value);
- for inductive loads with characteristics out of these requirements a dedicated evaluation has to be done.

Output high side H-BRIDGE characteristics (pins 1,10):

- minimum load resistance: min 6 Ohm @ 12Vdc (8 Ohm @ 16Vdc);

- power supply from battery;
- current monitoring by analog voltage sense 0-5Vdc (accuracy: ±5% of full scale value);
- for inductive loads with characteristics out of these requirements a dedicated evaluation has to be done.

Output low side 3.5A characteristics (pins 6,7):

- minimum load resistance: min 3.6 Ohm @ 12Vdc (4.7 Ohm @ 16Vdc);
- recirculation diode connected to battery input;
- diagnosis by digital status;
- for inductive loads with characteristics out of these requirements a dedicated evaluation has to be done.

Output low side 0.5A characteristics (pin 15):

- minimum load resistance: min 24 Ohm @ 12Vdc (32 Ohm @ 16Vdc);
- recirculation diode connected to battery input;
- output voltage monitoring by analog voltage sense 0-16Vdc (accuracy: ±5% of full scale value);
- for inductive loads with characteristics out of these requirements a dedicated evaluation has to be done.

AUXILIARY SUPPLIES (PIN 8)

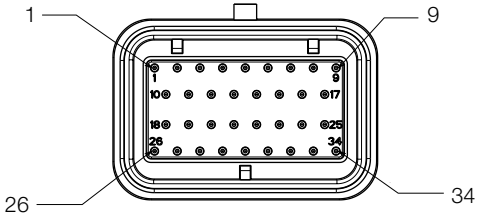
One auxiliary supply for external sensors is provided at 5Vdc (accuracy: ±2%), with 100mA current.

TELLTALES

All 10 telltales are driven by the microprocessor.
Each telltale is made by high efficiency colored LED, PWM controlled to achieve light intensity compensation.
PWM is 100% at 9Vdc; for Vbat > 9Vdc, PWM is reduced to compensate.

CONNECTOR

Tyco 34 pins, 3 keys, PN#4-1437290-0.



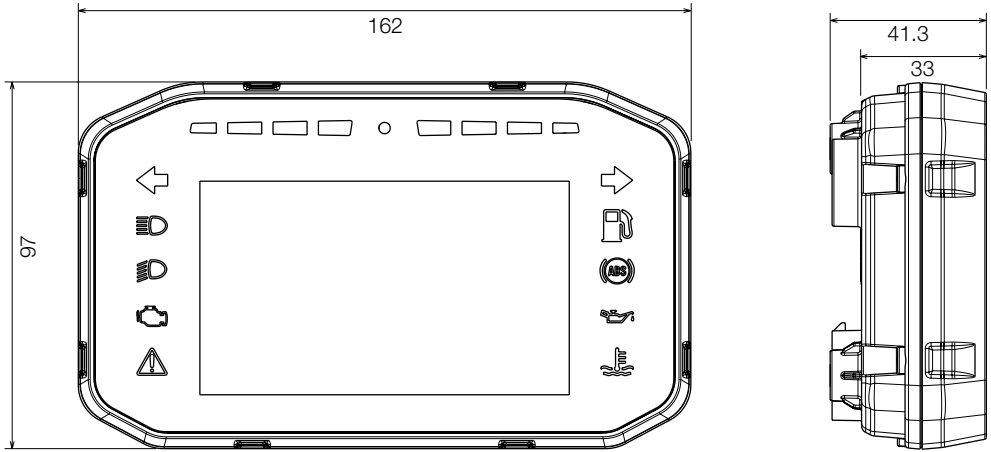
PINOUTS

PIN	NAME	TYPE
1	OUT_1/CAN2_H	DC motor output or CAN2 bus high **
2	IMMO_A	Immobilizer **
3	IMMO_B	
4	OUT_6	High side output **
5	OUT_8	
6	OUT_3	Low side output **
7	OUT_4/LIN	Low side output or LIN bus **
8	GND (Terminal 31)	Battery ground
9	VB (Terminal 30)	Battery power supply
10	OUT_1/CAN2_L	DC motor output or CAN2 bus low **
11	IN_1	Digital input or frequency input *
12	IN_2	Digital input
13	OUT_5	High side output **
14	OUT_7	
15	OUT_2	Low side output **
16	GND (Terminal 31)	Battery ground
17	VB (Terminal 30)	Battery power supply
18	IN_3	Digital input
19	IN_4	
20	IN_5	
21	IN_6	
22	IN_7	

23	IN_8	Digital input
24	GND (Terminal 31)	Battery ground
25	VCTRL (Terminal 15)	Ignition input
26	IN_10/ETH_BR-	Digital input – BroadR-Reach Ethernet *
27	IN_9/ETH_BR+	
28	IN_11	Analog input
29	IN_12	
30	IN_13	
31	IN_14	
32	CAN1_L	CAN1 bus low
33	CAN1_H	CAN1 bus high
34	VSS	AUX power supply **

NOTE: pins assignment is shown in the standard hardware configuration.
Pins marked with (*) are alternative contents to the standard version, meaning a new PN# (see I/O characteristics) with a dedicated hardware configuration.
Pins marked with (**) are optional contents, meaning a new PN# with a dedicated hardware configuration.

DIMENSIONS



FIXINGS

Fixing is made by 3 screw fixing points.



LCD



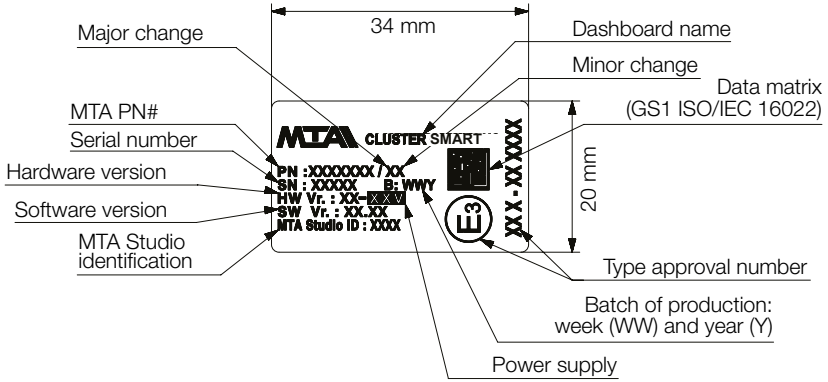
Features

- Size: 4.3” landscape
- Form factor: 16:9
- Active area: 97 x 56 mm
- Resolution: 480 x 272 pixel (WQVGA) x 16.7M colors
- Contrast ratio: typ. 1000:1 at Ta = 25°C (min. 800:1)
- Normally black
- Brightness: min 800 cd/*m*^2 (optional 1000 cd/*m*^2)
- Viewing angles: 80/80/80/80
- FFS technology, transmissive, amorphous silicon LCD module
- Antiglare and antireflective treatment (optional)

LAYOUT



LABEL DETAILS



MATING CONNECTORS

Mating connector used for wiring harness is a Tyco 34 pins, 3 keys, PN# 4-1437290-0.



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