Didactics Multiplexed Vehicle

INTRODUCTION

The device VMD (Didactics Multiplexed Vehicle) allows the study of the local network CAN :

- Industrial Local Network CAN (Controller Area Network) with wheel order of an automotive (order lights and windshield wiper),
- Web Server embarked.

The vehicle is available in two items :

- **VMD001B-A** : fit out model, study of the signposting
- **VMD001C-A** : full fit out model, signposting, + speed servo system on DC engine, Web Server embarked, study of real time kernel.

AREAS OF APPLICATION :

♦ **Professional Training Schools,**

Technical Colleges, Higher level Schools

♦ **Universities.**

COMPOSITION :

The **VMD001B-A** is a self-contained device constitued by a PVC thermoformed support représenting an automotive vehicle. The processor board 16/32 bits EID210000 (compare with corresponding documentation) and an other board with graphic display and keybord constitute the trip computer and the Man Machine Interface of the vehicle.

An industrial board (commercialising by ATON SYSTEME) do the CAN interface, it allows the communication with:

- An acquisition board 8 ON/OFF inputs and its light control unit ,
- Four boards by 4 digital outputs each whith their optical bloks corresponding (2 front light clusters diplights/driving lights/sidelights, 2 rear clusters sidelights/brake light/blinkers) and a horn,
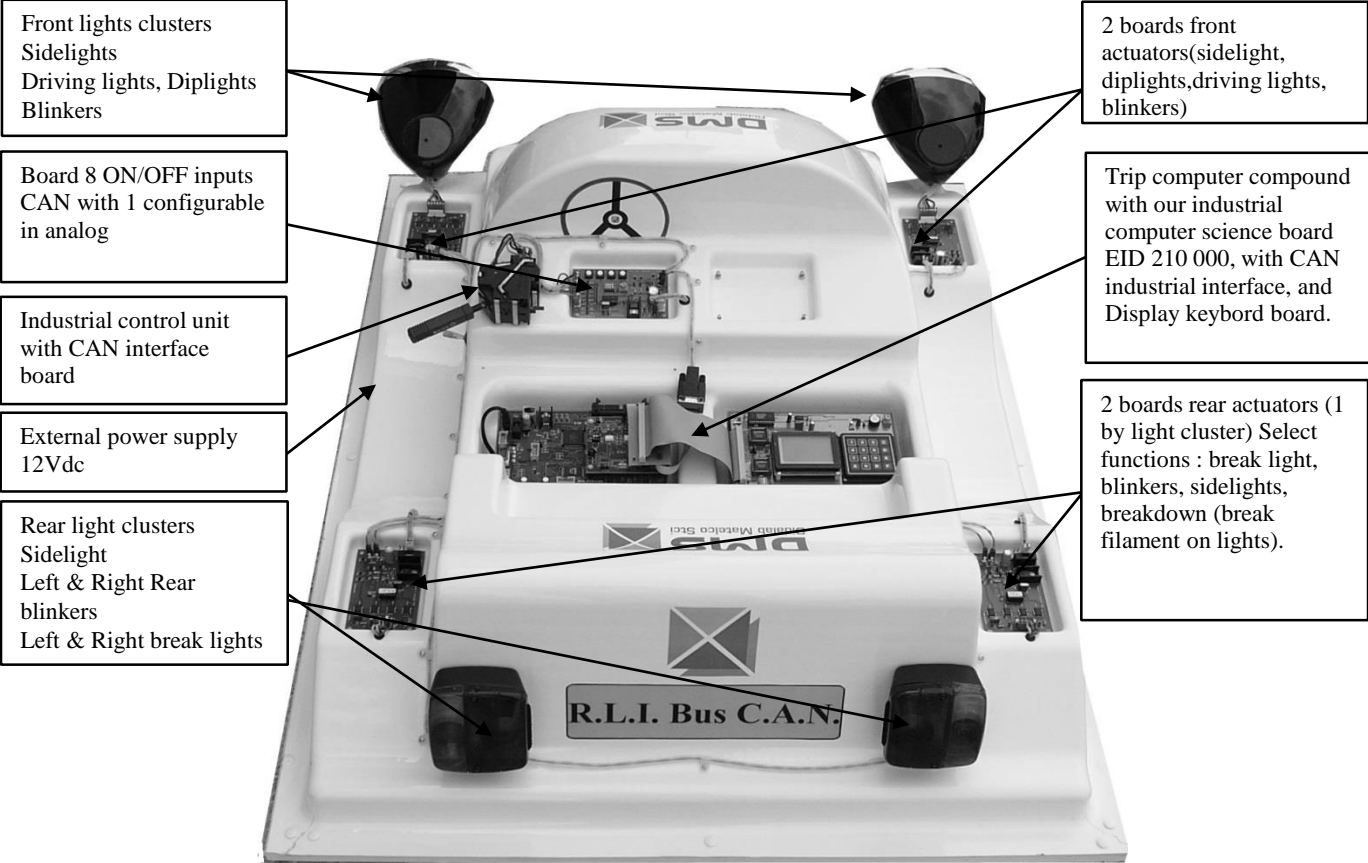
The entirety is delivered with the software pack éditor, cross assembler débugger, cross compiler C and C++ and some full and progressive practicals works manuals. The sources files SRC, C et C++ are supply with the setup CDROM.

The **VMD001C-A** include all the functions from the **VMD001B**, it is enriched by a windshield and its wiper which allow to do supplementary praticals works:

- Order and speed servo system on engine by CAN.
- Reading of analog signal,
- Making of a Web Server embarked,
- To make use of réal time kernel on target device.

Electrical Engineering Range

VMD001B-A, Didactics Multiplexed Vehicle, Basic Version

The VMD01B is a basic self-contained device, it allow to do some praticals works on the Industrial Local Networks as Control Area Network in languages C and C++ and also to learn basic UML analysis.

The details of the technicals specifications of the entire digitals boards industrial which fit out the VMD are describe in the documentation « **32 BITS MICROCONTROLLER BASED SYSTEM EID–210** »
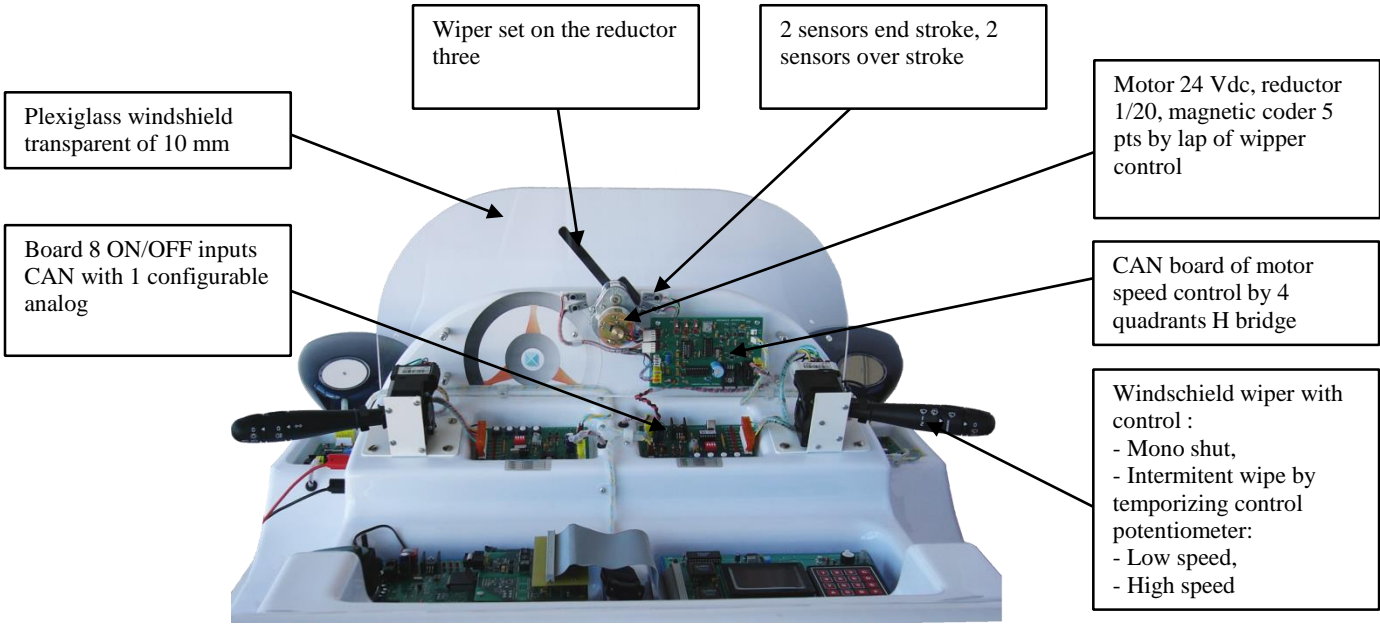
Front lights clusters
Sidelights
Driving lights, Diplights
Blinkers

2 boards front actuators(sidelight, diplights,driving lights, blinkers)

Board 8 ON/OFF inputs CAN with 1 configurable in analog

Trip computer compound with our industrial computer science board EID 210 000, with CAN industrial interface, and Display keybord board.

Industrial control unit with CAN interface board

External power supply 12Vdc

2 boards rear actuators (1 by light cluster) Select functions : break light, blinkers, sidelights, breakdown (break filament on lights).

Rear light clusters
Sidelight
Left & Right Rear blinkers
Left & Right break lights

R.L.I. Bus C.A.N.

Reference which compound the basic pack VMD001B-A		
Reference	Designation	Qtes
EID210000	Study board on the 32 bits microcontrôler 68332 (CPU32) rated at 16,7 Mhz,USB port, RS232, PC104 bus, // port 24 bits, 6 I & 4 O A/D, with éditor, cross assembler linker, débugger, technical manuel.	1
EID001000	Input Output Simulator, with 40 points ply	1
EGD00006	USB lead	1
EGD00001	Power supply 8 VAC, 2 A	1
EID210040	Pratical Work Manuals for the EID210000 board	1
EID211040	Pratical Work Manuals for the EID210000 board with applications on the Input/Output board EID 001000	1
EID211060	UML Pratical Work Manual & OBJET programming on EID210000 board and I/O board EID 001000	1
EID210100	Developing environment, GNU C/C++ cross compiler , GDB monoposte applied to EID210000	1
EID004000	CAN bus board on PC 104	1
EID005000	Display Keybord board 16 keys, ASCII readout 7 x 16 characters and/or graphical 128x64 monochrome,with ply PC104	1
EID215040	Pratical Work Manuals for the EID210000 board with applications on Display Keybord board EID 005000	1
EID050000	8 ON/OFF Inputs and 8 ON/OFF Outputs CAN Module (and 1 parametrable in analog input) with wires supply bus	1
EID051000	4 ON/OFF Inputs and 4 ON/OFF Outputs I/O CAN Module with wires supply bus and CAN	4
EID050040	Pratical Work Manuals (can bus) in C language applied to EID210	1
EID055000	Support représenting an automotive vehicle scale 1/4, equiped	1
EID054000	Reals componants set : 1 light control unit, 2 front light clusters 30W sidelight, diplights,driving lights, 2 blinkers 2 rear break light, blinkers, sidelights, horn, each modules whith them wires	1
EGD00004	Ventilated Power Supply 13.5 Vdc 20 A	1

VMD001C-A, Didactics Multiplexed Vehicle Full Version

The VMD001C allow to realize some practicals works more elaborate than the VMD001B.
It's made up of : real time kernel, embarked server Web board and an order device of motor speed control of windshield wiper.
For example, many control methodes of the windshield wiper's motor are handled in practicals works, reading of the end strokes by scanning or interruption. Make of Web server embarked with memo from the light clusters state on the Web page.
Display prominently & valuation of the real time kernel performance.

Wiper set on the reductor three

2 sensors end stroke, 2 sensors over stroke

Motor 24 Vdc, reductor 1/20, magnetic coder 5 pts by lap of wiper control

Plexiglass windshield transparent of 10 mm

Board 8 ON/OFF inputs CAN with 1 configurable analog

CAN board of motor speed control by 4 quadrants H bridge

Windschield wiper with control :
- Mono shut,
- Intermitent wipe by temporizing control potentiometer:
- Low speed,
- High speed

Reference which compound the full pack VMD001C-A		
Reference	Designation	Qty
VMD001B-A	The basic pack Didactics Multiplexed Vehicle in addition with the references following:	1
EID003000	PC104 study board of the Ethernet network 10 Mbits, with TCP/IP stake, sockets, Web server, SPI bus, I2C.	1
EID053000	Motor servo-control CAN bust, motor/coder, support, wires CAN bus & supply, 1 windshield wiper control unit	1
EID210200	Real time Kernel MTR86 (monoposte version)	1
EID050000	8 ON/OFF Inputs and 8 ON/OFF Outputs CAN Module (and 1 parametrable in analog input) with wires supply bus	1
EID003040	Pratical Work Manuals applied the embarked server Web board EID003000	1
EID050240	Pratical Work Manuals Real time Kernel applied to the CAN network	1

Practical Work Manuals

A complete subjects list with answers.

EID210041/ EID210040 Teacher Manual of practical works on EID 210 000 board, approached subjects :

TP 0   : Discovery and implementation of the program pack
TP 1   : Writing in a RAM area
TP 2   : Diode control of the micro-controller "QS" port
TP 3   : Carrying out of an "ECHO" mode from the terminal
TP 4   : Give the value of a register specified by the user
TP 5   : Writing or reading to a specified address

EID211041/ EID211040 Teacher Manual of practical works on EID 210 000 board with "Inputs/Outpts Simultaor" Module, approached subjects :

TP 1   : Sequential shift device with LEDS onto port A
TP 2   : Recovery of 8 bits input port onto 8 bits output port.
TP 3   : Control of 7 segments display
TP 4   : Display of potentiometer position

EID050041/ EID050040 Teacher Manual of practical works on VMD system :

TP 0   : Bidirectional parallel and serial port programming
TP 1   : Internal and external interrupt managing
TP 2   : Hierarchical programs
TP 3   : Realisation, validation and integration of software functions by different teams
TP 4   : Realisation of low level functions to driving CAN EID 004 000 board
  (SJA1000 Philips)
TP 5   : Realisation of a monitor allowing CAN Network frame transmission and reception
TP 6   : Realisation of a GRAFCET diagram steps/transitions
TP 7   : Control of a ON/OFF module through CAN bus
TP 8   : Realisation of Man Machine Interface
TP 9   : Control of DC machine in PWM process, evaluation of reel time constraint in speed regulation
TP 10   : Realisation of interface Web page server, setting a TCP/IP stack on a process board

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EID050061 /EID050060 Teacher Manual of practical works UML C++ analysis on VMD :

TP 1   : Control lights on VMD
TP 2   : Reading the state of light commodo
TP 3   : Check up a bloc optic unit

EID215041 / EID215040 Teacher Manual of practical works on Display Keyboard Board :

TP 1   : Writing a word in graphics display
TP 2   : Writing a group of words in graphics display
TP 3   : Reading of matrix keyboard in polling mode ,
TP 4   : Detection of key activation,
TP 5   : Realisation of lines, circles et curves on LCD in graphic mode,
TP 6   : Drawing a animated clock on LCD.