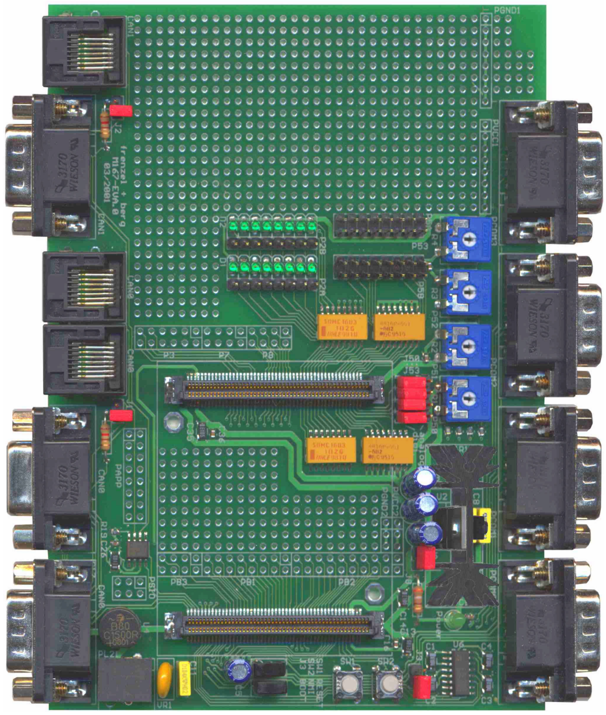
# *M167-EVA*

***Eva-Board for M167 controller board and EASY235 PLC core***

## *General Description*

The M167-EVA is an evaluation board for using with the M167 microcontroller module. Many features like an on board power supply, LED's, potentiometers, interface drivers and connectors are implemented. So it is possible to start the development of your application immediately.

The Evaluation board is also for applications using the EASY235 PLC core module. The EASY235 is general purpose PLC kernel with PLC run time system and an integrated CANopen master. Programming is done with the powerful development environment CoDeSys (3S).



## *Features*

- **On board power supply**
- **16 LED's at Port 2.0 to Port 2.15**
- **4 Potentiometer (at Port 5.0 to 5.3)**
- **RS232 transceiver for COM2 and COM3**
- **4 D-SUB connector for COM0 to COM3**
- **CAN transceiver for CAN1**
- **2 D-SUB and 2 RJ45 connector for CAN0**
- **1 D-SUB and a RJ45 connector for CAN1**
- **Headers for all port pins and busses**
- **2 pad fields for user specific circuits**
- **Dimensions 152mm x 150mm x 50mm (without M167 module)**

## *Ordering Information*

| Part | Description |
|---|---|
| **M167-EVA** | **Evaluation Board for M167** |
| M167-CR20-S4 | C167CR, 20 MHz CPU clock, 128 kByte Flash, 256 kByte RAM, 4 serial Interfaces |
| M167-CR24-S4 | C167CR, 24 MHz CPU clock, 128 kByte Flash, 256 kByte RAM, 4 serial Interfaces |
| M167-CR20-L4 | C167CR, 20 MHz CPU clock, 512 kByte Flash, 1 Mbytes RAM, 4 serial Interfaces |
| M167-CR24-L4 | C167CR, 24 MHz CPU clock, 512 kByte Flash, 1 Mbytes RAM, 4 serial Interfaces |
| M167-CON | SMD-Connector for M167 boards (SUYIN 80064AT-100G2T) 2 pieces needed |

**Other versions of M167 available on request**

## Power-Supply (PL21)

The evaluation board has an own 5V power regulation. It needs an external power supply unit with 9V to 12V DC at the power input connector PL21. The polarity at PL21 is optional.

## PCOM0

PCOM0 is a D-SUB9 Connector that is used for RS232-Interface COM0 (asynchronous serial interface 0 of the C167 Controller). The Interface uses the RS232 transceiver on the M167 board.

| **PCOM0** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 2 | RS232R0 | Receiver line of SIO 0 |
| 3 | RS232T0 | Transmitter line of SIO 0 |
| 5 | GND | Common Ground |
| 1,4, 6..9 | NC | Not connected |
| frame | GND | Common Ground |

## PCOM1

PCOM1 is a D-SUB9 Connector that is used for RS232-Interface COM1 (COM1 of the M167 on board 16C554 interface unit). This Interface uses also the RS232 transceiver on the M167 board.

| **PCOM1** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 2 | RS232R1 | Receiver line of 16C554 |
| 3 | RS232T1 | Transmitter line of 16C554 |
| 5 | GND | Common Ground |
| 1,4, 6..9 | NC | Not connected |
| frame | GND | Common Ground |

## PCOM2

PCOM2 is a D-SUB9 Connector that is used for RS232-Interface COM2 (COM2 of the M167 on board 16C554 interface unit). This Interface uses the RS232 transceiver (U6) on this evaluation board.

| **PCOM2** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 2 | RS232R2 | Receiver line of 16C554 |
| 3 | RS232T2 | Transmitter line of 16C554 |
| 5 | GND | Common Ground |
| 1,4, 6..9 | NC | Not connected |
| frame | GND | Common Ground |

## PCOM3

PCOM3 is a D-SUB9 Connector that is used for RS232-Interface COM3 (COM3 of the M167 on board 16C554 interface unit). This Interface uses the RS232 transceiver (U6) on this evaluation board.

| **PCOM3** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 2 | RS232R3 | Receiver line of 16C554 |
| 3 | RS232T3 | Transmitter line of 16C554 |
| 5 | GND | Common Ground |
| 1,4, 6..9 | NC | Not connected |
| frame | GND | Common Ground |

## PCAN0A and PCAN0B

PCAN0A and PCAN0B are both D-SUB9 Connectors and they are used for the CAN0-Interface of the controller internal CAN interface unit 0. This Interface uses the CAN transceiver on the M167 module.
(See also PCAN0C and PCAN0D / they are also used with the CAN0 interface)

| **PCAN0A, PCAN0B** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 1 | L1 | Line 1 |
| 2 | CANL0 | CANL line of bus interface 0 |
| 3, 6 | GND | Common Ground |
| 4 | L4 | Line 4 |
| 5 | L5 | Line 5 |
| 7 | CANH0 | CANH line of bus interface 0 |
| 8 | L8 | Line 8 |
| 5 | L9 | Line 9 |

**Note: The Lx lines are only connected from Header PCAN0A to PCAN0B.**

## PCAN0C and PCAN0D

PCAN0C and PCAN0D are both RJ45 Connectors and they are used for the CAN0-Interface. (See also PCAN0A and PCAN0B / they are also used with the CAN0 interface)

| **PCAN0C, PCAN0D** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 3, 7 | GND | Common Ground |
| 4 | CANL0 | CANL line of bus interface 0 |
| 5 | CANH0 | CANH line of bus interface 0 |
| 1,2,6,8 | NC | Not connected |

## PCAN1A

PCAN1A is a D-SUB9 Connector that is used for the CAN1-Interface of the controller internal CAN interface unit 1(C167-CS) only). This Interface uses the CAN transceiver on this evaluation board.
(See also PCAN1C / this is also used with the CAN1 interface)

| **PCAN0A, PCAN0B** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 2 | CANL0 | CANL line of bus interface 0 |
| 3, 6 | GND | Common Ground |
| 7 | CANH0 | CANH line of bus interface 0 |
| 1,4,5,8,9 | L8 | Line 8 |

## PCAN0C

PCAN0C is a RJ45 Connector that is used for the CAN1-Interface. (See also PCAN0A and PCAN0B / they are also used with the CAN0 interface)

| **PCAN0C, PCAN0D** | | |
|---|---|---|
| ***Pin No.*** | ***Pin Name*** | ***Function*** |
| 3, 7 | GND | Common Ground |
| 4 | CANL0 | CANL line of bus interface 0 |
| 5 | CANH0 | CANH line of bus interface 0 |
| 1,2,6,8,9 | NC | Not connected |

## Jumper Settings

| Jumper | Setting | Function |
|---|---|---|
| J1 | open | No bus termination at CAN0 |
| | closed | Bus termination at CAN0 active |
| J2 | open | No bus termination at CAN1 |
| | closed | Bus termination at CAN1 active |
| J3 | open | Normal operation |
| | closed | Boots Trap Mode active |
| J50 | All open | Port 5.0 can be used as an analog or digital input |
| | 1-2 | Port 5.0 is connected to potentiometer R1 |
| | 2-3 | Port 5.0 is digital input with a 6,8 kOhm Pull-Up resistor |
| J51 | All open | Port 5.1 can be used as an analog or digital input |
| | 1-2 | Port 5.1 is connected to potentiometer R1 |
| | 2-3 | Port 5.1 is digital input with a 6,8 kOhm Pull-Up resistor |
| J52 | All open | Port 5.2 can be used as an analog or digital input |
| | 1-2 | Port 5.2 is connected to potentiometer R1 |
| | 2-3 | Port 5.2 is digital input with a 6,8 kOhm Pull-Up resistor |
| J53 | All open | Port 5.3 can be used as an analog or digital input |
| | 1-2 | Port 5.3 is connected to potentiometer R1 |
| | 2-3 | Port 5.3 is digital input with a 6,8 kOhm Pull-Up resistor |

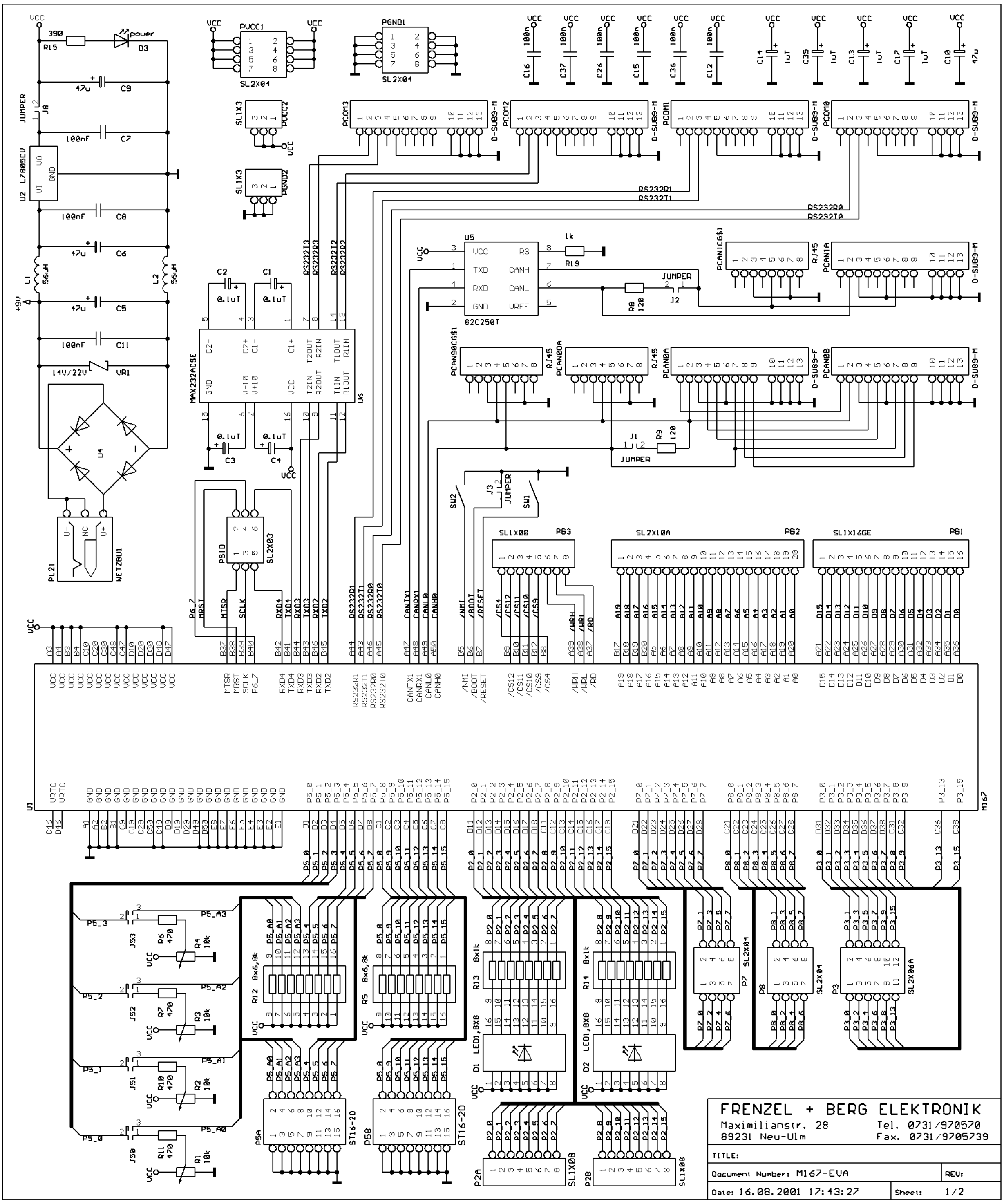
## Switch buttons

| Jumper | Function |
|---|---|
| SW1 | Resets the M167 controller board |
| SW2 | Activates the external NMI Interrupt of the C167 controller on the M167 |

## LED’s

| LED | Function |
|---|---|
| D1 | Is an 8-LED line witch is connected to the port 2.0 to 2.7. They can be used as general-purpose indicators. A driven low level at P2.0 to 2.7 turns on one of this LED’s |
| D2 | Is an 8-LED line witch is connected to the port 2.0 to 2.7. They can be used as general-purpose indicators. A driven low level at P2.0 to 2.7 turns on one of this LED’s |
| D3 | Indicates power on |

## *Schematic*



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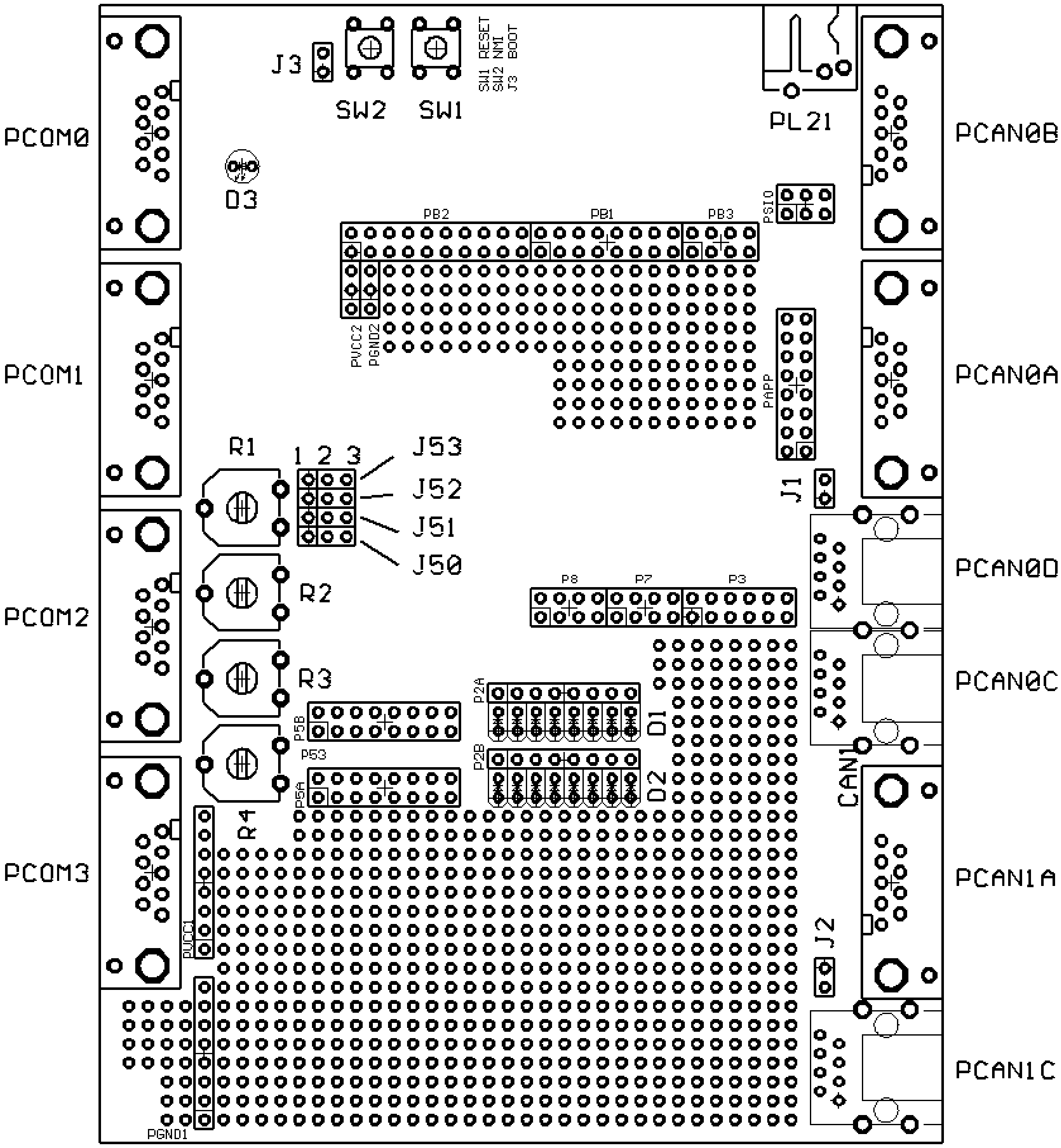
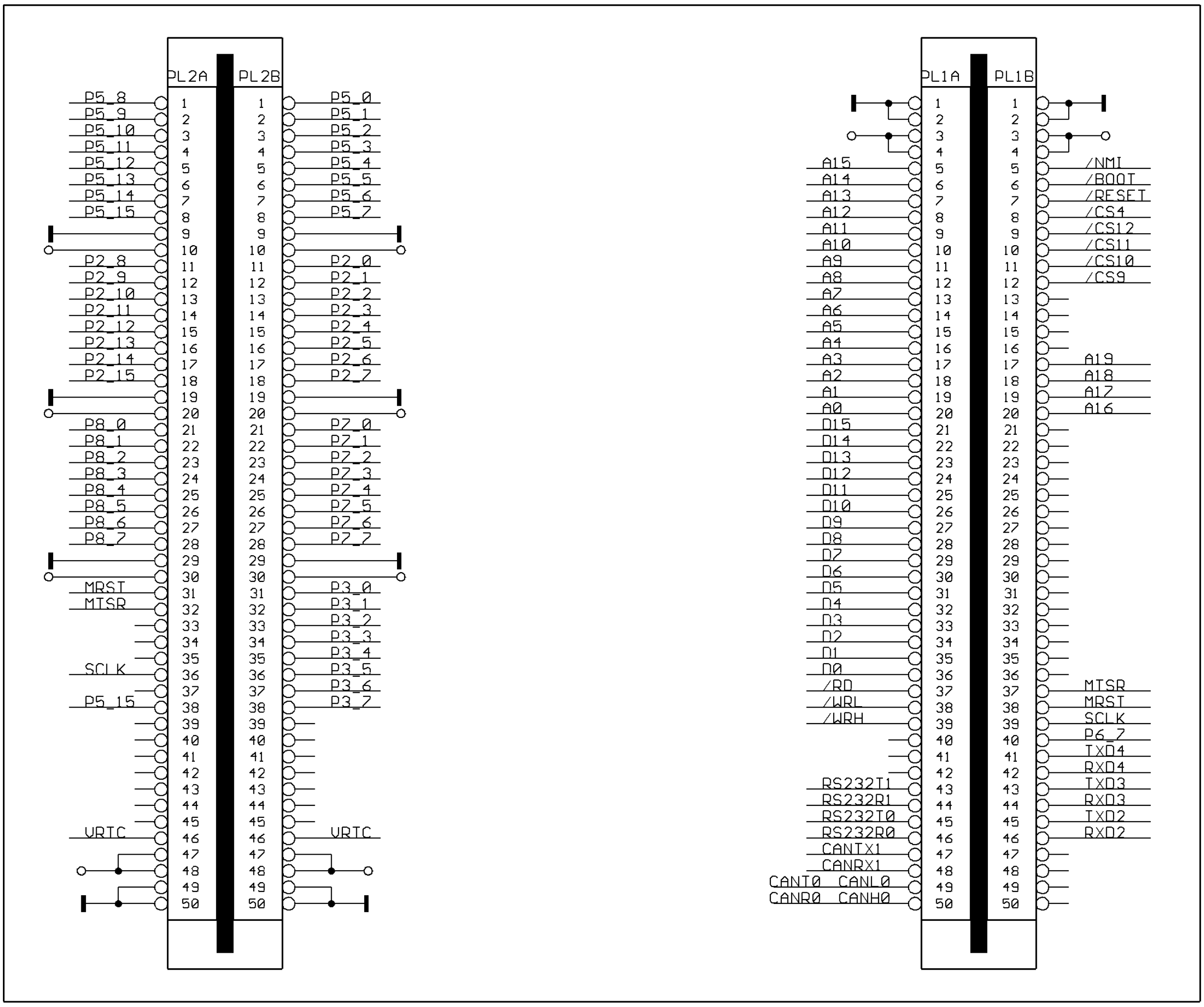
## *Place Plan*



PCOM0
PCOM1
PCOM2
PCOM3
PCAN0B
PCAN0A
PCAN0D
PCAN0C
PCAN1A
PCAN1C
J3
SW2
SW1
SW1 RESET
SW2 NMI
J3 BOOT
PL21
D3
PB2
PB1
PB3
PSIO
PVCC2
PGND2
PAPP
R1
R2
R3
R4
1 2 3
J53
J52
J51
J50
J1
J2
P8
P7
P3
P2A
P2B
D1
D2
P5B
P53
P5A
CAN1
PVCC1
PGND1

## *Addendum ( Pin Assignment of M167 )*




**The Pinning shows the pin configuration from M167 controller module TOP view. Use this pinning on your application board. For More Information about the pinning and pin functions see M167 data sheet.**