

GMB HR168

grifo® Mini BLOCK Housing, 16 Opto Input, 8 Relay Outputs

GMM AM644

grifo® Mini Module AT mega 644P

TECHNICAL MANUAL



grifo®

ITALIAN TECHNOLOGY

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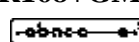
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GMB HR168+GMM AM644 Rel. 5.00 Edition 12 August 2011

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TECHNICAL MANUAL

Couple between interface board of **Digital Block GMB HR168** series and **Mini Modules** with **AVR Core** with **40 pins GMMAM644**, able to manage application that involves both **Digital** and **Analog Signals** and line **Communication**.

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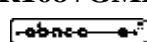
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For specific informations on the components mounted on the card, please refer to the Data Book of the builder or second sources.

SYMBOLS DESCRIPTION

In the manual could appear the following symbols:



Attention: Generic danger

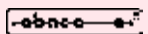


Attention: High voltage



Attention: ESD sensitive device

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GENERAL INDEX

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COUPLE RESOURCES

The **GMB HR168 + GMM AM644** couple has the following resources:

| | |
|--|--------------------|
| Relay Outputs: | 8 |
| Optocoupled Inputs: | 15 |
| Optocoupled Inputs Type: | NPN , PNP, Powered |
| Multifunction Signals I/O TTL, A/D, PWM, CAN, etc.: | 6 |
| Analog Input (0÷Vfs, 0÷4*Vfs): | 1 |
| Max. Value Voltage of A/D Converter (Vfs): | 2,5 V o 10,0 V |
| Serial Line in RS 232: | 1 |
| Serial Line in TTL: | 1 |
| Serial Line in RS 422: | 1 |
| Serial Line in RS 485: | 1 |
| Serial Line in Current Loop: | 1 |
| Serial Line in I2C BUS: | YES |
| CAN Interface: | NO |
| USB Interface: | NO |
| LITIUM Battery | YES |
| Real Time Clock: | YES |
| FRAM | YES |

It is important to note that the previous list shows the maximum available resources and some of these ones are not usable in the same time, as described in following figures.

COUPLE CONNECTIONS

In the following tables are reported connections of all user available signals on **GMB HR168** related to **GMM AM644 Mini Module**. With these connections the user can manage all available resources either by hardware and by software.

When a more detailed documentation is required (connection diagrams, signals location on connectors, power supply, jumpers configuration ,software management, etc.) please, see technical manuals of the two modules contained in the couple.

In the tables are present the following abbreviations and references:

N.C. = Not Connected

N.M. = Not Mounted

*1 = to configure according to the performed connection.

| GMM HR168 Connector Pin | GMM HR168 Signal Name | GMM HR168 Configuration | ZC1 Pin | GMM AM644 Pin | GMM AM644 Configuration | GMM AM644 Signal Name | Use on GMM AM644 |
|--|-----------------------|-------------------------|---------|---------------|-------------------------|-----------------------|------------------|
| CN1: Connector for Optocoupled Digital Inputs | | | | | | | |
| CN1.1 | IN1-A | - | 32 | 32 | - | PA.1 | - |
| CN1.2 | IN2-A | - | 31 | 31 | - | PA.2 | - |
| CN1.3 | IN3-A | - | 25 | 25 | - | PC.2 | - |
| CN1.4 | IN4-A | - | 24 | 24 | - | PC.3 | - |
| CN1.5 | IN5-A | - | 23 | 23 | - | PB.0 | - |
| CN1.6 | IN6-A | - | 22 | 22 | - | PB.1 | - |
| CN1.7 | IN7-A | - | 21 | 21 | - | PC.4 | - |
| CN1.8 | IN8-A | - | 19 | 19 | - | PC.5 | - |
| CN1.9 | COMUNE | - | - | - | - | - | - |
| CN2: Connector for Optocoupled Digital Inputs | | | | | | | |
| CN2.1 | IN1-B | - | 1 | 1 | - | PB.4 | - |
| CN2.2 | IN2-B | - | 2 | 2 | - | PB.3 | - |
| CN2.3 | IN3-B | - | 3 | 3 | - | PB.2 | - |
| CN2.4 | IN4-B | - | 4 | 4 | - | PC.6 | - |
| CN2.5 | IN5-B | - | 35 | 35 | - | PD.4 | - |
| CN2.6 | IN6-B | - | 36 | 36 | - | PD.6 | - |
| CN2.7 | IN7-B | - | 37 | 37 | - | PD.7 | - |
| CN2.8 | IN8-B | - | 38 | 38 | - | - | - |
| CN2.9 | COMUNE | - | - | - | - | - | - |

FIGURE 1: CONNECTION TABLE (1 OF 7)

| GMB HR168 Connector Pin | GMB HR168 Signal Name | GMB HR168 Configuration | ZC1 Pin | GMM AM644 Pin | GMM AM644 Configuration | GMM AM644 Signal Name | Use on GMM AM644 |
|--|-----------------------|-------------------------|---------|---------------|-------------------------|-----------------------|------------------|
| CN3: Connector for Relays Outputs | | | | | | | |
| CN3.1 | OUT A1 | - | 29 | 29 | - | PA.3 | - |
| CN3.2 | COMMON A | - | - | - | - | - | - |
| CN3.3 | OUT A2 | - | 28 | 28 | - | PA.4 | - |
| CN3.4 | OUT B1 | - | 27 | 27 | - | PA.5 | - |
| CN3.5 | COMMON B | - | - | - | - | - | - |
| CN3.6 | OUT B2 | - | 26 | 26 | - | PA.6 | - |
| CN3.7 | OUT C1 | - | 14 | 14 | - | PB.5 | - |
| CN3.8 | COMMON C | - | - | - | - | - | - |
| CN3.9 | OUT C2 | - | 15 | 15 | - | PB.6 | - |
| CN4: Connector for Relays Outputs | | | | | | | |
| CN3.1 | OUT D1 | - | 18 | 18 | - | PB.7 | - |
| CN3.2 | COMMON D | - | - | - | - | - | - |
| CN3.3 | OUT D2 | - | 16 | 16 | - | PA.7 | - |

FIGURE 2: CONNECTION TABLE (2 OF 7)

| GMB HR168 Connector Pin | GMB HR168 Signal Name | GMB HR168 Configuration | ZC1 Pin | GMM AM644 Pin | GMM AM644 Configuration | GMM AM644 Signal Name | Use on GMM AM644 | |
|--|-----------------------|---|---------|---------------|---|---------------------------|------------------|---|
| CN6: Connector for Asynchronous Serial Line in RS 232 (1) | | | | | | | | |
| CN6.1 | +5 Vdc | - | 34 | 34 | - | +Vdc POW | - | |
| CN6.2 | Vopto A | - | - | - | - | - | - | |
| CN6.3 | TX RS232 | J3, J4, N.C. J6, J7, J8 in 2-3 J5, Indifferente | 10 | 10 | Jumpers J1.1 = 2-3 J1.2 = 2-3 J1.3 = 2-3 | PDO , TXD RS232 , TXD TTL | - | |
| CN6.4 | - | | - | - | | - | - | - |
| CN6.5 | RX RS232 | | 9 | 9 | | PD1 , RXD RS232 , RXD TTL | - | |
| CN6.6 | - | | - | - | | - | - | - |
| CN6.7 | GND | - | 20 | 20 | - | GND | - | |
| CN6.8 | Vopto B | - | - | - | - | - | - | |
| CN6: Connector for Asynchronous Serial Line in TTL | | | | | | | | |
| CN6.1 | +5 Vdc | - | 34 | 34 | - | +Vdc POW | - | |
| CN6.2 | Vopto A | - | - | - | - | - | - | |
| CN6.3 | TX TTL | J3, J4, N.C. J6, J7, J8 in 2-3 J5, Indifferente | 10 | 10 | Jumpers J1.1 = 1-2 J1.2 = 1-2 J1.3 = 1-2 | PDO , TXD RS232 , TXD TTL | - | |
| CN6.4 | - | | - | - | | - | - | - |
| CN6.5 | RX TTL | | 9 | 9 | | PD1 , RXD RS232 , RXD TTL | - | |
| CN6.6 | - | | - | - | | - | - | - |
| CN6.7 | GND | - | 20 | 20 | - | GND | - | |
| CN6.8 | Vopto B | - | - | - | - | - | - | |

FIGURE 3: CONNECTION TABLE (3 OF 7)

| GMB HR168 Connector Pin | GMB HR168 Signal Name | GMB HR168 Configuration | ZC1 Pin | GMM AM644 Pin | GMM AM644 Configuration | GMM AM644 Signal Name | Use on GMM AM644 |
|--|-----------------------|--|---------|---------------|---|---------------------------|------------------|
| CN6: Connector for Asynchronous Serial Line in RS 422 | | | | | | | |
| CN6.1 | +5 Vdc | - | 34 | 34 | - | +Vdc POW | - |
| CN6.2 | Vopto A | - | - | - | - | - | - |
| CN6.3 | TX- RS422 | J3, J4 (*) J7, J8 in 1-2 J5= 2-3 J6=1-2 | 10 | 10 | Jumpers J1.1 = 1-2 J1.2 = 1-2 J1.3 = 1-2 | PDO , TXD RS232 , TXD TTL | - |
| CN6.4 | TX+ RS422 | | | | | | |
| CN6.5 | RX+ RS422 | IC10=MAX 483 IC11=MAX 483 | 9 | 9 | | PD1 , RXD RS232 , RXD TTL | - |
| CN6.6 | RX- RS422 | | | | | | |
| CN6.7 | GND | - | 20 | 20 | - | GND | - |
| CN6.8 | Vopto B | - | - | - | - | - | - |
| - | DIR | J10 = L Trasm. Att. J10 = H Trasm. Dis. | 11 | 11 | - | PD7 , OC2 | - |
| CN6: Connector for Asynchronous Serial Line in RS 485 | | | | | | | |
| CN6.1 | +5 Vdc | - | 34 | 34 | - | +Vdc POW | - |
| CN6.2 | Vopto A | - | - | - | - | - | - |
| CN6.3 | - | J3, J4 (*) J7, J8 in 1-2 J5= 1-2 J6=1-2 | 10 | 10 | Jumpers J1.1 = 1-2 J1.2 = 1-2 J1.3 = 1-2 | PDO , TXD RS232 , TXD TTL | - |
| CN6.4 | - | | | | | | |
| CN6.5 | RXTX+ RS485 | IC10=MAX 483 IC11=NM | 9 | 9 | | PD1 , RXD RS232 , RXD TTL | - |
| CN6.6 | RXTX- RS485 | | | | | | |
| CN6.7 | GND | - | 20 | 20 | - | GND | - |
| CN6.8 | Vopto B | - | - | - | - | - | - |
| - | DIR | J10 = L Trasmissione J10 = H Ricezione | 11 | 11 | - | PD7 , OC2 | - |

FIGURE 4: CONNECTION TABLE (4 OF 7)



| GMB HR168 Connector Pin | GMB HR168 Signal Name | GMB HR168 Configuration | ZC1 Pin | GMM AM644 Pin | GMM AM644 Configuration | GMM AM644 Signal Name | Use on GMM AM644 |
|--|-----------------------|--|---------|---------------|---|---------------------------|------------------|
| CN6: Connector for Asynchronous Serial Line in Current Loop | | | | | | | |
| CN2.1 | +5 Vdc | - | 34 | 34 | - | +Vdc POW | - |
| CN2.2 | Vopto A | - | - | - | - | - | - |
| CN2.3 | TX- C.L. | J3, J4, N.C. J5, Indifferente J6 in 1-2 J7 in 1-2 J8 in 1-2 IC12=HP 4200 IC8=HP 4100 | 10 | 10 | Jumpers J1.1 = 1-2 J1.2 = 1-2 J1.3 = 1-2 | PDO , TXD RS232 , TXD TTL | - |
| CN2.4 | TX+ C.L. | | | | | | |
| CN2.5 | RX+ C.L. | | | | | | |
| CN2.6 | RX- C.L. | | | | | | |
| CN2.7 | GND | - | 20 | 20 | - | GND | - |
| CN2.8 | Vopto B | - | - | - | - | - | - |

FIGURE 5: CONNECTION TABLE (5 OF 7)

| Connettore Pin GMB HR168 | Nome del Segnale GMB HR168 | Configurazione GMB HR168 | Pin ZC1 | Pin GMM AM644 | Configurazione GMM AM644 | Nome del Segnale GMM AM644 | Utilizzo su GMM AM644 |
|--|----------------------------|--------------------------|---------|---------------|--------------------------|----------------------------|-----------------------|
| CN7: Connector for Multifunction Signals I/O TTL, A/D, PWM, CAN, etc. | | | | | | | |
| CN7.1 | +5 Vdc | - | 34 | 34 | - | +Vdc POW | - |
| CN7.2 | MM PIN 5 | - | 5 | 5 | - | N.C. | - |
| CN7.3 | MM PIN 14 | - | 14 | 14 | - | PB.5 | - |
| CN7.4 | MM PIN 11 | - | 11 | 11 | - | INT RTC | - |
| CN7.5 | MM PIN 15 | - | 15 | 15 | - | PB.6 | - |
| CN7.6 | MM PIN 30 , PWM | - | 30 | 30 | - | PD.5 | - |
| CN7.7 | GND | - | 20 | 20 | - | GND | - |
| CN7.8 | MM PIN 33 , A/D | - | 33 | 33 | - | PA.0 | - |
| CN5: Connector for Power Supply | | | | | | | |
| CN5.1 | Vac oppure +Vdc | - | - | - | - | - | - |
| CN5.2 | GND | - | 20 | 20 | - | GND | - |

FIGURE 6: CONNECTION TABLE (6 OF 7)

| GMB HR168 Connector Pin | GMB HR168 Signal Name | GMB HR168 Configuration | ZC1 Pin | GMM AM644 Pin | GMM AM644 Configuration | GMM AM644 Signal Name | Use on GMM AM644 |
|---|-----------------------|-------------------------|---------|---------------|-------------------------|-----------------------|------------------|
| CN8: Connector for I2C BUS Line | | | | | | | |
| CN8.1 | +5 Vdc | - | 34 | 34 | - | +Vdc POW | +5 Vdc |
| CN8.2 | SCL | - | 12 | 12 | - | PC.0 , SCL | I2C BUS |
| CN8.3 | SDA | - | 13 | 13 | - | PC.1 , SDA | I2C BUS |
| CN8.4 | GND | - | 20 | 20 | - | GND | GND |
| CN9: Connector for Asynchronous Serial Line in RS 232 (2), USB, ecc. | | | | | | | |
| CN9.1 | +5 Vdc | - | 34 | 34 | - | +5 Vdc | - |
| CN9.2 | (+5 Vdc USB) | - | - | - | - | - | - |
| CN9.3 | TX-2 | - | 39 | 39 | - | TX (2) | - |
| CN9.4 | USB-DL | - | 14 | 14 | - | PB.5 | - |
| CN9.5 | RX-2 | - | 40 | 40 | - | RX (2) | - |
| CN9.6 | USB-DH | - | 15 | 15 | - | PB.6 | - |
| CN9.7 | GND | - | 20 | 20 | - | GND | - |
| CN9.8 | GND | - | 20 | 20 | - | GND | - |

FIGURE 7: CONNECTION TABLE (7 OF 7)