

Installation guide

ARM-IO

Advanced Radio Modem
Serial



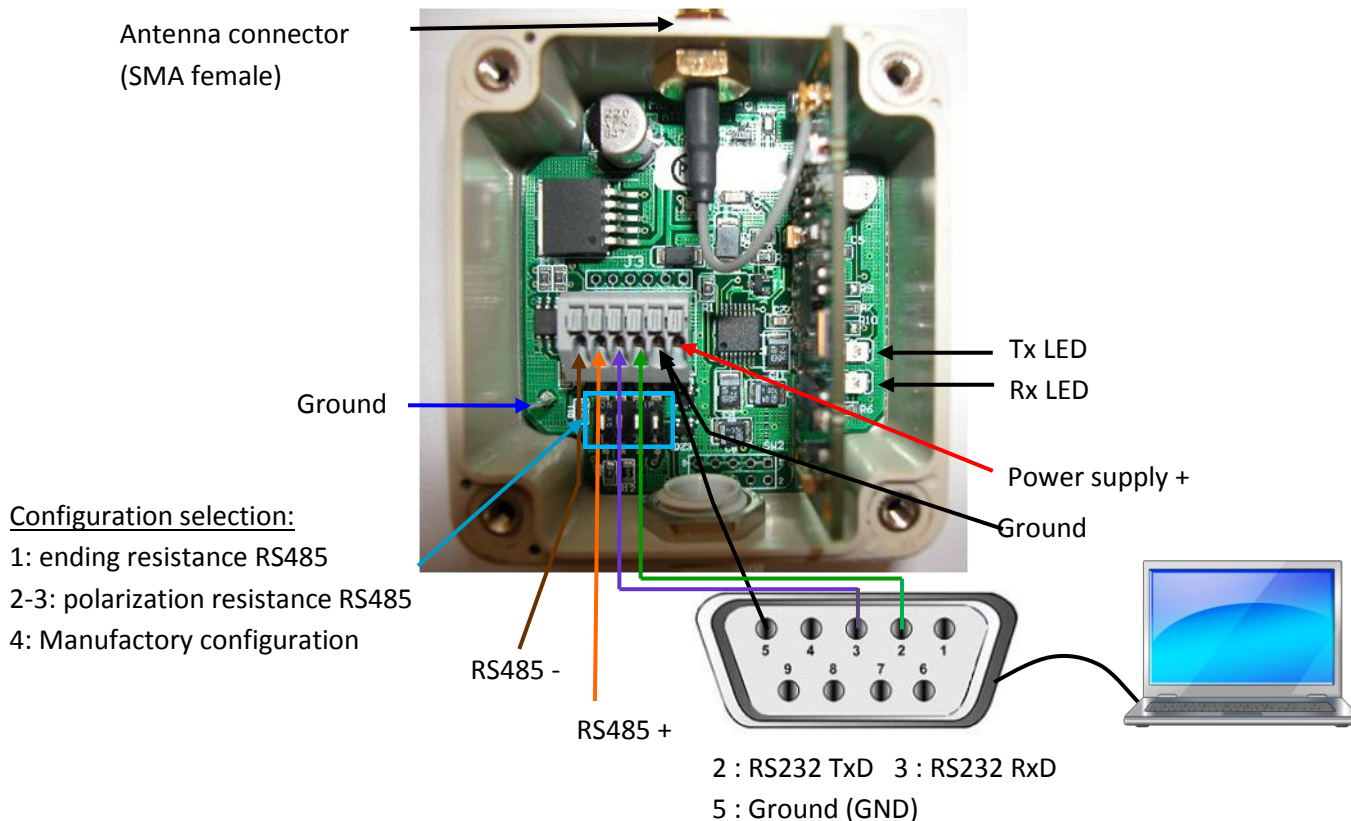
Configuration:

- AT commands
- With ARM Manager

Before using the product, read carefully the following recommendations:

- ✓ Do not supply the radio modem with 110 or 120V (recommended voltage: 10 to 30Vdc).
- ✓ For your safety, the power supply connection to the radio modem must be realized off voltage. Check that the module power supply is off before all operations.
- ✓ Do not use without antenna!
- ✓ If the antenna is fixed outside on a pole, it must be link to the ground. A surge protector must be installed between the antenna and the ARM radio modem.
- ✓ Respect the norms, using recommended antenna cables to stay in the authorized emission limits (according to the channel: 5mW, 25mW or 500mW).

1. DESCRIPTION



Configuration selection:

1: ending resistance RS485

2-3: polarization resistance RS485

4: Manufactory configuration

N°	Pin	Input / Output	Name
1	Vcc	Input (power supply)	5,4 – 30Vcc (min/max)
2	Gnd	Ground	0V
3	TxD	Output	RS232 TxD
4	RxD	Input	RS232 RxD
5	RS485 +	I/O	A
6	RS485 -	I/O	B

Note: use this cable type : 0,4 à 0,8mm (AWG26-20), strip it on 9mm.

2. INSTALLATION

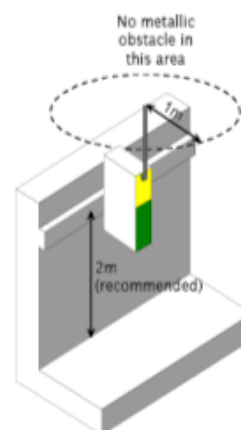
2.1. Antenna

The ARM-IO is supplied with a small $\frac{1}{4}$ wave antenna, if you want better performances, use one of the following antennas:

- ✓ ANT868-12FSC (Antenna $\frac{1}{2}$ wave): this antenna can be directly mounted on the ARM-IO.
- ✓ ANT868-12S-L (Antenna $\frac{1}{2}$ wave): no need metallic floor plan to correctly works, and can be directly mounted on a polyester support of a vehicle or on a PVC box.
- ✓ ANT868-BZ (Bazooka): this antenna is made for outdoor pole mounting (supply with fixation kit), plan some lowloss cable CFP10-NM-NM and an adaptor CFP5-NFC-SMAM.

The radio waves propagation is highly influenced by the antenna height and position. Try to use a coaxial cable as short as possible (for example, for 25m of CFP10 cable, the attenuation is around 3dB, which means that the power is divided by 2).

For best results, we recommend to place antennas in line of sight (without obstructions) and as high as possible.



2.2. Serial Communication

L'ARM-IO has 2 modes:

- Transparent (default)
- Secured

Timing:

- Starting time after reset: 150ms
- Wait Rx/Tx : <1,15ms
- RS232 T reversal: 0ms
- RS485 T reversal: 10µs

By default, serial port format:

RS232 – 9600bps, 8 bits, without parity.

Configuration and modifiable interface choice (RS232 or RS485).

The transparent mode is adapted for most applications: automats, weighing systems, electronic cards with serial ports, etc.

The secured and addressed mode can be useful with an ASCII equipment, for example a, electronic display. In this mode, if there is an error on the radio media, the message is repeated. You can also add an address at each modem.

The sleep mode is very useful if you want to power supply the radio module with a solar panel. The ARM-IO can wake up every second and listen during 10ms if it receives something. Otherwise, it goes back to sleep. This technical allows to divide the consumption by 100!

If you want to use the ARM-IO in RS485, you must change the configuration by modifying the AT register [S16=48] or by configuring it with the ARM Manager software.

You can use all the ARM-IO with other modems from the ARM range: ARM-SE, ARM-D, ARM-X, etc.

IMPORTANT:

The RS232 cable must be shielded and we recommend a maximal length of 3m. For longer length, use RS485 converter.

The RS485 bus needs a 120Ω terminal resistance which must be placed at each end of the RS485 line (in the case of a long line in disrupted area).

2.3. FREQUENCY TABLE

Channel	Frequency (MHz)	Default powerful	Duty Cycle	Range
0	869, 800	5 mW	100%	< 1 km
1	868, 075	25 mW	1%	< 2 km
2	868, 125			
3	868, 175			
4	868, 225			
5	868, 275			
6	868, 325			
7	868, 375			
8	868, 425			
9	868, 475			
A (10)	868, 525			
B (11)	868, 850	5 mW	100%	< 1 km
C (12)	868, 900	50 mW	10%	> 2 km
D (13)	868, 475			
E (14)	868, 525			
F (15)	868, 575			

3. TECHNICAL CHARACTERISTICS

ARM-IO	CARACTERISTIQUES
Interfaces	RS232 : Rx, Tx RS485 : 2 wires A(+), B(-) Debit UART : de 1200bps à 115 000bps
Operating modes	Serial mode : transparent, secured, routing
Configuration	With ARM Manager software, or Hayes commands
Alimentation	5,4 – 30Vcc (value min/max)
Consumption max	25mA (Rx) – 100mA to 50mW (Tx) – 270µA (sleep mode)
Emission powerful	5mW, 25mW, 50mW, according to the radio channel
Frequency	From 868,000 to 869,900MHz
Modulation	FSK
Debit radio	9600bps
Channel number	16 channels from 50kHz spacing to 9600bps

Range	Up to 2,5km in outdoor
Connections	Terminal 6 points
Box	ABS (IP65) : 65x60x40mm (without antenna)
Functioning/storage temperature	From -20°C to +55°C / from -40°C to +70°C
Conformity	ETS300-220-3 v1.1.1 / EN 301 489-3 v1.4.1

4. MODEM CONFIGURATION

AT commands board:

Command	Function
AT	Necessary prefix for any AT command
&W	Register writing in Eeprom (uniquely if the content was modified)
+++	Return to « Hayes » mode
ATR	Reset
Sxx ?	Register reading x return an hexadecimal value (? facultative)
Sxx=nn	Writing in the register xx, nn values in hexadecimal

N.B: each line must be ended by a « CR » (carriage return).

The Hayes commands must be sent to the ARM in the UART format in memory (by default: 9600bps, 8 bits, without parity, 1 stop bits).

If you have forgot the last format saved in the ARM, it is possible to come back to default configuration.

For register modifications of the radio modem, link the modem to the PC with a RS232 cable. Use a terminal or the ARM Manager software. Set the terminal serial link parameters on 9600bps, 8 bits without parity 1 stop bit. Supply the modem.

4.1. Register reading :

With ARM manager or AT commands as follows:

Command	Modem answer	Function
+++	ARM version x.x	Transition to command mode
ATS16	Value=88	Register reading
ATR		Modem reset

4.2. Modification canal radio :

Command	Modem answer	Function
+++	ARM version x.x	Transition to command mode
ATS02=01	Value=01	Radio channel 1 selection
ATS03=01	Value=01	Radio channel 1 selection
AT&W	Writing to EEprom ok	
ATR		Modem reset

4.3. Modification forçage liaison RS485 :

Command	Modem answer	Function
+++	ARM version x.x	Transition to command mode
ATS16=C8	Value=C8	
AT&W	Writing to EEprom ok	
ATR		Modem reset

4.4. Modification forçage liaison RS232 :

Command	Modem answer	Function
+++	ARM version x.x	Transition to command mode
ATS16=88	Value=88	
AT&W	Writing to EEprom ok	
ATR		Modem reset