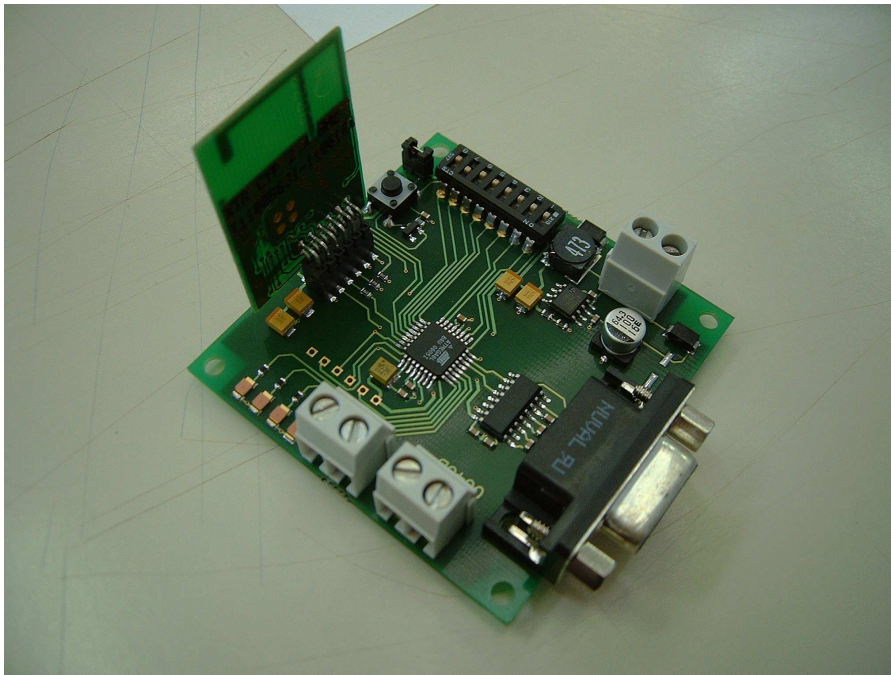# DEMO BOARD
XTR CYP 2.4GHz/XTR VF 2.4 LP
## User Manual

Description

DEMO BOARD has been made to allow easy functionality test of radio modules CYP 2.4GHz and XTR VF 2.4 LP. In fact these modules are 100% compatible. Therefore it's possible to have a link working both with two identical devices and with an a XTR CYP 2.4GHz and a XTR VF 2.4 LP by setting a given dip-switch on the board.
It makes possible programming the radio module, choosing the transmission/reception channel, data transmission speed and eventually RF radiated power. The DEMO BOARD core is in fact the Atmel ATMega8 microcontroller. Dip switch 8 allow to set which the type of radio module used (XTR CYP2.4GHz or XTR VF 2.4 LP) while dip switch 7 allow to set the board as transmitter of receiver.
SPI interface is used between Demo Board and the transceiver, while RS232 (19200 bps) is used as output interface.

This Demo Board can be used in pair with previous version 1.0. In this case the only available speed is 16 Kbit/s.

NOTE: DEMO BOARD XTR CYP 2.4GHz/XTR VF 2.4 LP, with relative software release, is marked by a label sticked on the bottom side saying "*Versione 2.0*".

DEMO BOARD
XTR CYP 2.4GHz/XTR VF 2.4 LP

User Manual
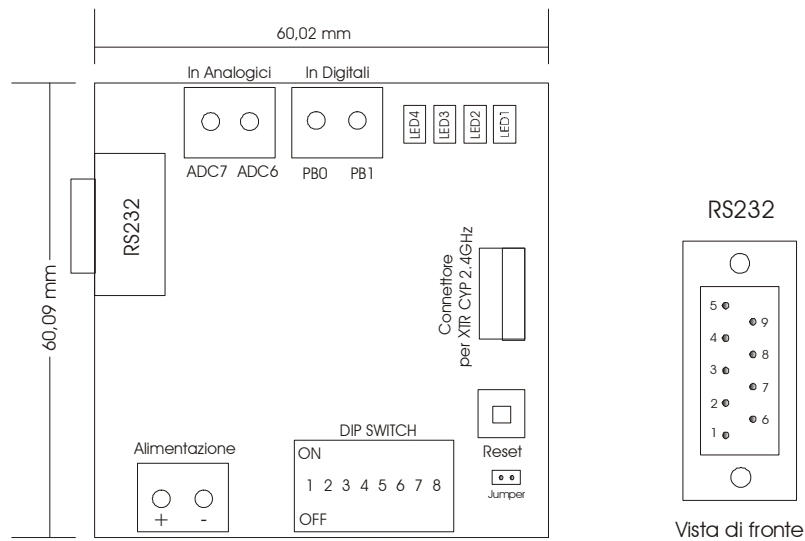
How to get started

Demo Board needs Voltage Supply at specific connection. Requested voltage is 6 to 10 Volts (cc), a 9 Volt battery can be useful for field testing.

A jumper connector (useful for current measurements) must be shorted out for normal operation.

The XTR CYP 2.4GHz module should sit in the available connector so component side is facing the external side of board. If no module is installed into Demo or if module is wrongly inserted in connector, the Demo Board Led4 will be flashing.

The push-button near dip switch is available for a full Reset of microprocessor, it is necessary to activate it after a new module is set in place into connector or after a new setting of the dip-switches.

The microprocessor program will run in 2 different ways according to setting of Dip Switch Pos. 6.

1) With Dip Switch Pos. 6 in CLOSED condition, there will be an automatic transmission (every 300milliSec.) of a standard message in the format "0123456789ABCDE-xxx" if speed is 16 kbit/s and '0123456789ABCDEFGHIJKLMNOPQRSTUV WXYZ012345-xxx' if speed is 250 kbit/s (where xxx is an incremented number from 0 to 999).

At receiving side, the packets will be made available on the RS232 interface and can be seen on a Pc screen. Software suggested is Hyper Terminal™. RS232 interface speed is set to 19200 bit/sec.

2) With Dip Switch Pos. 6 in OPEN condition, two Demo Boards can be used as simple RS232 modems. Typing with Hyper Terminal on one side, it is possible to receive and display on the other side.

Dip switch configuration

The desired channel of transmission/reception, the transmission data speed and the irradiated RF power are selectable through dip switch placed close to Leds. This makes possible, in simple and immediate way, to carry out tests of transmission/reception with some of the possible channels, to change the transmission speed, with the consequent change of the robustness of the code, and RF power transmission. After to have set up the configuration of the dip switch it is necessary to reset the micro controller through the provided Reset key in order to make confirm the change.

Le caratteristiche tecniche possono subire variazioni senza preavviso. La AUREL S.p.A non si assume la responsabilità di danni causati dall'uso improprio del dispositivo.

AUREL S.p.A. Via Foro dei Tigli, 4 - 47015 Modigliana (FC) – ITALY
Tel.: +39.0546.941124 Fax: +39.0546.941660
http://www.aurelwireless.com - email: rfcomm@aurel.it

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DIP SWITCH CONFIGURATION								
	1	2	3	4	5	6	7	8
Channel 10 (2.41GHz)	Off	Off	-	-	-	-	-	-
Channel 30 (2.43GHz)	Off	On	-	-	-	-	-	-
Channel 50 (2.45GHz)	On	Off	-	-	-	-	-	-
Channel 70 (2.47GHz)	On	On	-	-	-	-	-	-
Speed16Kb/s	-	-	Off	-	-	-	-	-
Speed 250Kb/s[1]	-	-	On	-	-	-	-	-
15dBm ERP [2]	-	-	-	Off	Off	-	-	-
10dBm ERP[3]	-	-	-	Off	On	-	-	-
-1dBm ERP[4]	-	-	-	On	Off	-	-	-
-6dBm ERP[5]	-	-	-	On	On	-	-	-
Cyclical package	-	-	-	-	-	Off	-	-
Data from RS232	-	-	-	-	-	On	-	-
TX mode	-	-	-	-	-	-	Off	-
RX mode	-	-	-	-	-	-	On	-
XTR VF 2.4 LP	-	-	-	-	-	-	-	Off
XTR CYP 2.4GHz	-	-	-	-	-	-	-	On

[1] Possible only with XTR VF 2.4 LP. In case of this choice with XTR CYP 2.4GHz the Led4 will be flashing as it happens when the module is not properly inserted into the connector or it's not inserted at all.
[2] Irradiated power in case of XTR CYP 2.4GHz. In case of XTR VF 2.4 LP it turns out 4dBm.
[3] Irradiated power in case of XTR CYP 2.4GHz. In case of XTR VF 2.4 LP it turns out -5dBm.
[4] Irradiated power in case of XTR CYP 2.4GHz. In case of XTR VF 2.4 LP it turns out -18dBm.
[5] Irradiated power in case of XTR CYP 2.4GHz. In case of XTR VF 2.4 LP it turns out -30dBm.

Configuration setting

The choice of 4 radio channels (out of the 78 possible ones on the XTR CYP2.4 module), allows selecting channels 20MHz apart one from the other.
Four different levels of RF emitted power can be chosen depending the distance to be covered. If the transmission/reception must be established within a short distance (some meters) will be better to select the lower power in order not to interfere other radio systems present in the proximity.
250 Kbit/s speed selection is viable only for XTR VF 2.4 LP. It's necessary to point out that the transmission is based on spread spectrum technology, that is a redundant code is transmitted to prevent errors caused by noise. More is the redundancy of the code (more the immunity to noise) less is the data transmission speed and vice versa. It should be chosen a high degree of redundancy, with lower data transmission speed, in case the reception is interfered.

Data transmission on RS232

It's possible to send data bytes through RS232. There is NO requirement to add any HEADER to data, while the end of data packet will be recognized by one of these options (the first occurring):

- pushing the "Enter" key
- 2 seconds timeout from last character typed
- achievement of maximum length allowed (20 bytes in case of 16kbit/s and 48 bytes in case of 250kbit/s).

Whatever event happens the string is RF transmitted and it's necessary to wait until the RF transmission is over. Such time depends on the speed, the device used and the length of the string and it's never longer than 15 ms. If further bytes are sent through RS232 before this time is expired, those bytes will be lost.
The length of strings above indicated makes possible the transmission and reception in best condition of the Demo Board.

For the transmission/reception through RS232, Pins 2 and 3 only will be used, the pin 5 is ground connection, as in the table. Other Rs232 data lines/pins are not used.

RS232 9pin			
Demo Board Connector		PC connector	
TX Data	Pin 2	RX Data	Pin 2
RX Data	Pin 3	TX Data	Pin 3
GND	Pin 5	GND	Pin 5

Digital and anlog I/O

In the Demo Board, two analog inputs, ADC6 and ADC7, and two digital input, PB0 and PB1, are present, as available in the Atmel microprocessor.
To use this possibility, a new software, implemented to handle this input points, must be written.
The software now available on Demo Board does not have such facility.
In case digital inputs are handled it's not possible to use dip-switches 7 and 8.