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CNM based RF Remote Control Demo Boards

These simple application boards are made available to demonstrate the capability of Radiometrix CNM Narrow band modems for an RF wireless remote-control application. A system consists of a RED board (which initiates communication burst cycles) and a GREEN (which responds to them). In hardware terms these boards are the same but have different firmware settings.

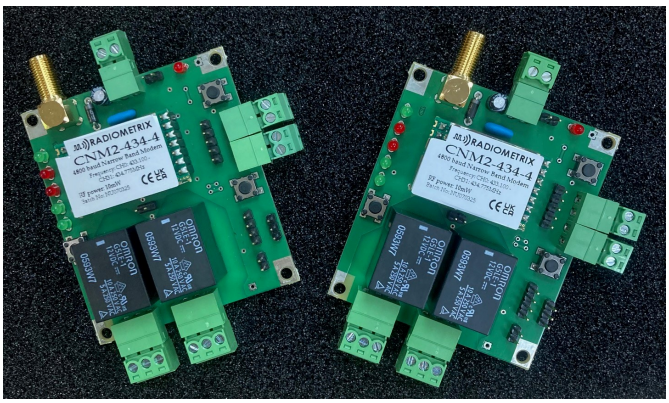

Figure 1: CNM DEMO BOARDS

Two relay outputs are provided on each board, controlled by two logic (or push button) inputs on the "opposite" board. CNM demo board operates in one of two modes: Simple mode (one way operation) and Bidirectional mode.
These units use a 24 bit (3 byte, raw binary) address This is randomly generated when the unit is FIRST (ever) powered up

Features

- 24 bit unit address
- Two relay to control mains powered devices rated up to 10A, 240VAC
- Visual LED indication of communication status, relay states and input states
- Logic or Push button inputs for momentary control of relays
- One way or bi-directional operation
- Very low idle current (<1µA @ simple TX mode)
- Simple “plug-and-play” setup. No complex programming / PC needed
- Demo boards are paired without hardware DIP switches

Applications

- Security and Alarm systems
- Emergency assistance call system
- Status reporting and monitoring systems
- RF Remote control systems
- Industrial controls
- HVAC controls
- Simple On/Off switching

Kit Contents

The CNM Demo boards supplied with the following contents:

1 CNM Red Demo board
1 CNM Green Demo board
2 Radiometrix CNM modems *(ordered separately)*
2 1/4-wavelength monopole or helical antennas

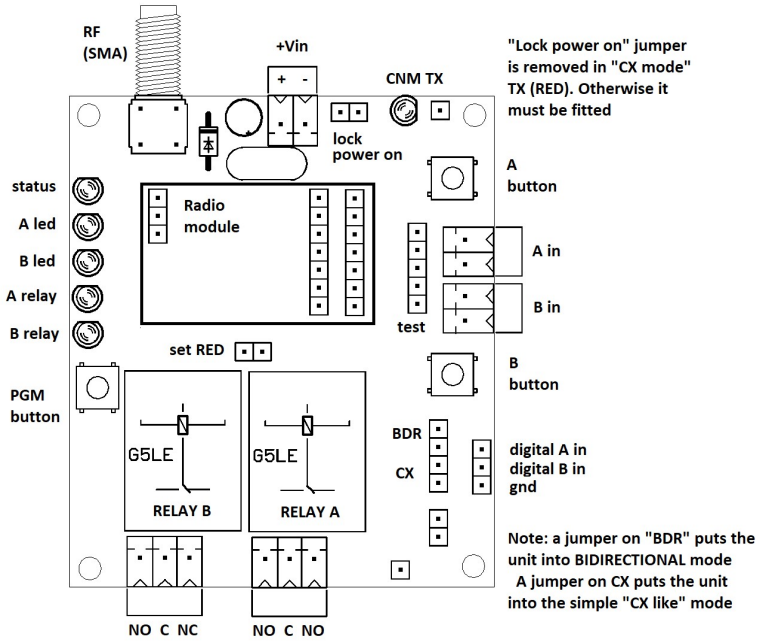

Figure 2: CNM Demo Board Component Layout

CNM demo boards features and characteristics

Interfaces	
Outputs	2 x 10A 240v rated SPDT "change over" relays (5v or 12v coils to order) (or an open collector switch in it's place) 2 x 3.81mm pitch 3 way 2 part "Phoenix" type terminal 5 pin ancillary connector for Test (STATUS, RXD, TXD, 3v3, GND)
Inputs	2 x Push buttons (TX activate) 1 x Push button for PGM 2 x Active low logic input (3.81mm pitch 2 way 2 part "Phoenix" type terminal): Pull-up to 5V, and protection diodes provided, Compatible with N/O volt-free closing contact 4 pin MODE select jumper 3 pin digital input connector 2 pin serial input connectors (to programme the CNM modem) 2 pin mode selection jumper (for RED unit) 2 pin power save jumper (only removed in RED board in CX mode)
Power	12V and 5V versions available (3.81mm pitch 2 way 2 part "Phoenix" type terminal) 40mA peak (plus relay coil current if activated) 17mA average current (simple RX mode) with relays off 1µA idle current (in simple TX mode)
RF	SMA (standard) or MCX (or optional terminal block)
Indicators	
	1 x Comms status LED (red)
	2 x Relay state LEDs (green)
	2 x Input state LEDs (red)
	1 x TX on LED (red)
Size	
	70 x 60 x 22 mm (excluding connectors)
	(four 3.3mm diameter mounting holes are provided)
Operating temperature	
	-20 to +70 degrees centigrade (some radios may be limited to -10/+55)
	(Storage -30 to +70 degrees)
Radio modules	
	CNM1, CNM2 and CNM3

CNM Demo Board setup

This demo board uses a CNM modems set to command mode, with slow data
This corresponds to a mode byte setting of 0x03
The channel (and other CNM parameters) can be re-programmed via a separate serial input connector (although this is only a one-way connection, without read back)

The CNM demo board operates in one of two modes of remote triggering:

1. Simple (red is TX and green is RX) mode - selected by CX jumper
2. Bidirectional mode - selected by BDR jumper

Lockout mode

To avoid data packet clashes with the output of the demo board processor, there is a lockout mode that can be enabled.
It is enabled by powering the unit up with the PGM button **already** held down.
In this mode the demo board does nothing at all, except that the B input lamp flashes.
If the PGM button is pressed again (or if the power is cycled), then the unit will restart normally
This is also the mode in which serial reprogramming commands can be sent to the unit

Unit Address assignment

These units use a 24 bit (3 byte, raw binary) address
This is randomly generated when the unit is FIRST (ever) powered up
When first powered on, the status and input lamps will "ripple flash" until the PGM button is pressed, at which point the unit will generate the address, and commence normal operation
After this first time, that mode will never be seen again

Pairing Units

Pairing the units is done in any mode (jumper fitted or not)
Power both units (ensure their inputs are unconnected)

Hold down the "PGM" button on one unit until the status and input lights all come "on".
Keep that button pressed
This unit will then look for a special pairing message from the other unit
When it receives it, the address is set, the unit will designate itself as "green", and the LEDs will go off

Briefly jab the "PGM" button on the **other** unit.
It will transmit a single "pairing" message (and designate itself "red")

It is not then possible to receive another address unless the whole process is repeated
As the design currently stands it is strictly a 1:1 system

Simple mode

If the CX jumper is fitted, then it operates much like a CX like simple set/reset remote control actuator.
One way operation, from a transmitter unit to a receiver

The "red" unit (the one which originated the pairing address) transmits only when one of the inputs is active (pulled low).
If no inputs are active, it enters a low power standby state with idle current consumption <1µA)

The "green" unit (the one which received the address during the pairing process) is the receiver.
It idles in "receive" mode (drawing about 17mA) and the input LEDs flash alternately on and off

Only the relays on the receiving ("green") unit operate
Those on the transmitter ("red") are not used
The input LEDs on the transmitter simply reflect the state of the corresponding inputs
The input LEDs on the receiver unit are inactive

When input A is active, then relay A on the green unit will latch on
When input A is released, then relay A remains on

When input B is active then relay A is latched off, and relay B is activated
When input B is released then relay B is also deactivated

Bidirectional mode

If the BDR jumper is fitted, then the units operate in bidirectional mode

In bidirectional mode the green and red units are effectively indistinguishable
Both idle in receive (again, about 17mA with no relays active)
Both units transmit an infrequent "heartbeat" burst, about every 5 seconds.
If the link has been lost for 15 seconds (three consecutive heartbeats) then the units will reset, and turn the status led solidly on

The state of the A and B inputs on each unit are mirrored in the state of the relays on the other (and vice versa).
A transmit and acknowledge protocol is used to ensure this remains the case.

The input lights of each unit reflect the state of the relays on the OTHER unit (not the local inputs)

Ordering Information

Part No.	Version	Frequency (MHz)
CDB-173-CNM1	CNM1-173-4	173.200 - 173.325
CDB-434-CNM2	CNM2-434-4	433.05 - 434.79
CDB-869-CNM3	CNM3-869-4	850 - 870
CDB-921-CNM3	CNM3-921-4	902 - 928

Note: For details relating to the radio module fitted on board, see relevant data sheet

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The Intrastat commodity code for all our modules is: 8542 6000

R&TTE Directive

After 7 April 2001 the manufacturer can only place finished product on the market under the provisions of the R&TTE Directive. Equipment within the scope of the R&TTE Directive may demonstrate compliance to the essential requirements specified in Article 3 of the Directive, as appropriate to the particular equipment.
Further details are available on The Office of Communications (Ofcom) web site:
http://stakeholders.ofcom.org.uk/spectrum/technical/rtte/

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