SKU 26019 / 26020
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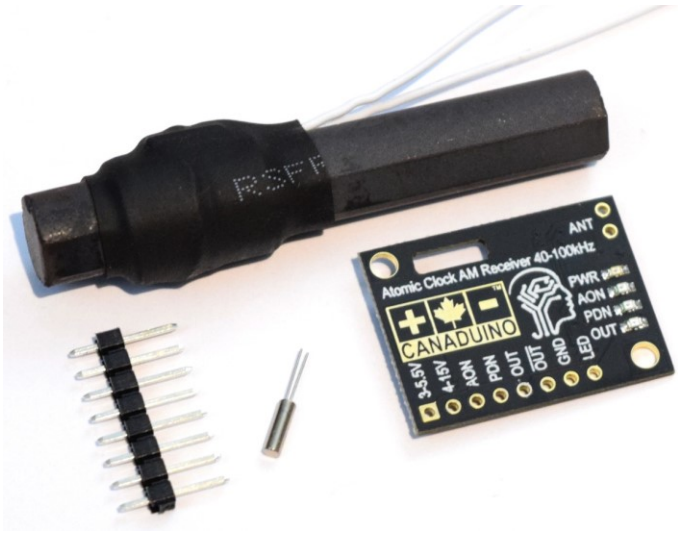
CANADUINO Time Signal AM Receiver Kit (SMD)



- **Fine tuned ferrite antenna**
- **Receiver module:**
  - 2-15V operating voltage
  - 20mA (+/-) outputs
  - 3.3/5V logic level
  - Status LEDs
  - extra inverted output
- **Reception of (examples):**
  - US/Canada WWVB
  - British MSF
  - Japanese JJY60
  - German DCF77

INTRODUCTION

The time signal receiver module comprises of a fine-tuned ferrite antenna and an AM receiver circuit board. The board includes a MAS6180C AM receiver IC accompanied with necessary filter crystal and capacitor components. The circuitry also includes a super low-noise 5V voltage regulator, RC-filter for supply voltage, high-current CMOS output driver (inverted and non-inverted) and status LEDs for Power, Automatic Gain Control, Power Down Mode, and Output Signal. All LEDs can be deactivated to safe power, for example in mobile applications.

The Kit, available in 2 different frequencies, also contains a crystal, matching the antenna's frequency (60/77.5kHz).

The new designed, 60mm long antenna, comes with a higher Q-factor and higher gain to guarantee best reception and shortest synchronization times also under more difficult conditions, where a typical radio-controlled clock already quits.

The MAS6180C AM receiver IC includes amplifier, demodulator and comparator blocks that transforms the received AM transmission into series of pulse width coded digital pulses which can be directly processed by an appropriate digital circuitry such as a micro controller unit (MCU).

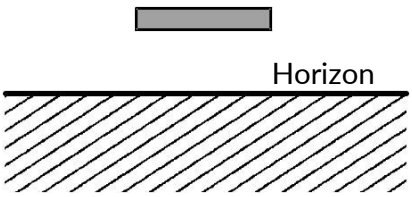
PIN DESCRIPTION

Pin Name	Function	Note
3-5.5V	Operating voltage bypassing regulation	Min. is 2V if status LEDs are not used
4-15V	Operating voltage, passing regulation	
AON	Auto Gain Control on/off	High = on (open = high)
PDN	Power Down	High = on (open = high)
OUT	Non-inverted output signal	Push-pull 20mA max.
/OUT	Inverted output signal	Puch-pull 20mA max.
GND	Ground level for receiver and control	
LED	Ground level for status LEDs	Low = LEDs activated. Max. current 10mA.
ANT	Antenna input pins	

Note: For detailed information about the receiver IC please see MAS6180C AM receiver IC datasheet

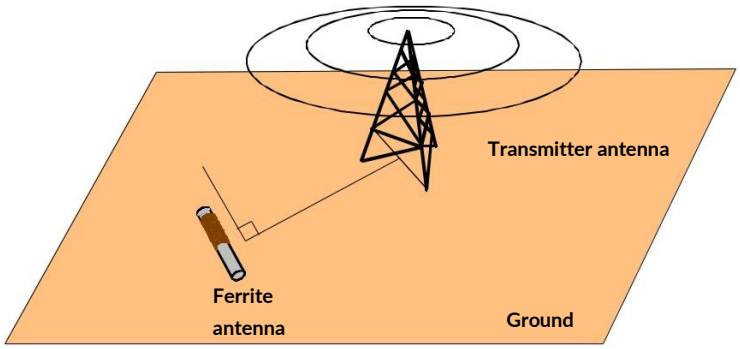
APPLICATION INFORMATION

Antenna orientation



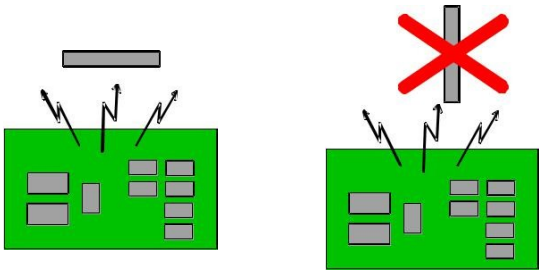
The magnetic field component of the propagating long wave time signal transmission has a horizontal polarization thus the ferrite antenna should be oriented horizontally to maximize the signal (see figure 1).

Figure 1. Antenna orientation relative to ground



The ferrite antenna should also be pointing orthogonally relative to the transmitter.

Figure 2. Antenna orientation relative to transmitter station



The ferrite bar antenna should be located as far as possible from conductive metal walls, PCB ground plane or ferromagnetic objects (speakers). All those objects affect the antenna tuning and can attenuate the received signal. To avoid noise coupling the ferrite antenna should also not be pointing towards noisy electronic circuits (figure 3). It is a good practice to turn off all unnecessary electronic circuits when receiving the weak radio transmission.

Figure 3. Antenna orientation relative to noisy electric circuits

Getting a signal

The antenna is sensitive for magnetic and electric disturbances. As an example, in digital radio-controlled clocks it is known that LCD displays, refreshed using a 32Hz signal, has a1875th odd harmonic hitting exactly at 60kHz and its amplitude can be strong enough (µVrms level) to reduce the sensitivity. The antenna and module placement is critical and one should maximize distance to other disturbing electronics and metal/ferrous parts which might affect the antenna and the reception.

A good place to start is to put the module close to a window and turn the antenna to an optimal position relative the transmitter (see the figure 2 above). As the second step trigger the fast startup by moving PDN control from power down (high or floating) to power up (PDN = GND) which will make the AGC find its level within a few seconds if the receiving conditions are sufficient. Initially the OUT signal should be high but soon after finding a signal (or disturbance in case of poor SNR) the output goes low and after a few seconds it should start receiving pulses. If the output stays low all the time, there is probably some disturbance stronger than the signal. If the signal is bad, change location and repeat the fast startup by setting PDN = GND (power down) to PDN = HIGH (logic high or open).

Please note that if PDN control is not used the PDN pin must be permanently tied to GND. The start-up time before the receiver finds the signal then can take a few minutes.

MECHANICAL DIMENSIONS

Antenna: 60mm long, 10mm diameter core, max. 15mm diameter with coil and capacitor

PCB: 28mm long, 21mm wide

ORDER INFORMATION

The kit is available as single packaged item, containing receiver PCB, antenna, pin headers, and crystal. The parts need soldering to complete the module (crystal and antenna), the use of the pin headers is optional.

EAN numbers for the kits are: 4260474030200 for 77.5kHz version
4260474030194 for 60kHz version

Higher volume orders are available in bulk as well.