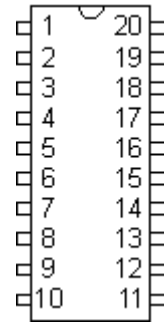


HX5 Ultrasonic Tag/Transmitter**Features**

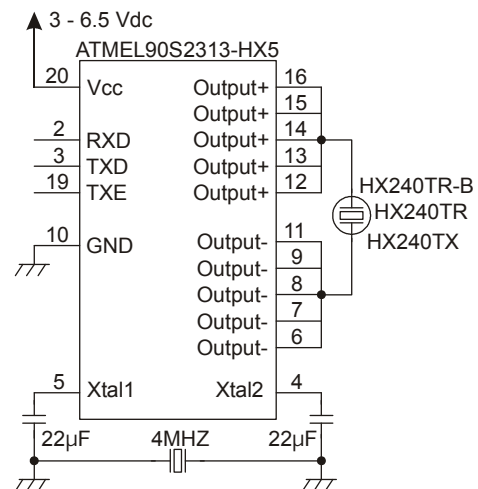
- Battery Operated HX5 tag
- High noise immunity
- Adjustable Position Update Rate

**HX5T2313**

The HX5T2313 is a HX5 tag on a chip. This makes it possible for the user of the HX5 system to construct inexpensive HX5 tags according to need. The user can integrate these tags into a system and have some control over the directionality of the tags.

The Basic Tag

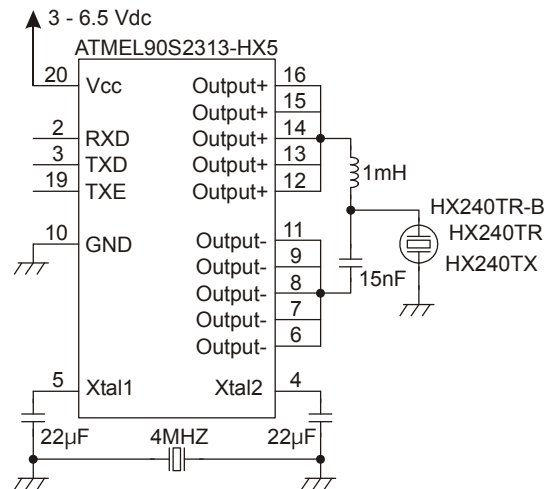
The figure on the right shows the most basic HX5 tag, this design will have limited range somewhere around 5 meters. A HX240TR or the miniature button size transceiver HX240TRB can be connected to the chip as shown. The HX240TRB can be either glued to the PC board or on the Atmel 90S2313-HX5 chip using silicon sealants.



HX240TR-B

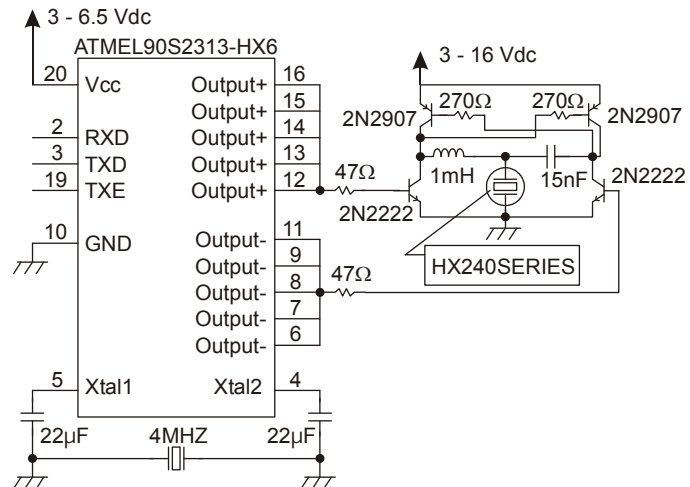
The Standard Tag

The schematic on the right shows the HX240 transceiver connected using series resonance. This design has a range of about 8 meters if driven using 3.5-volt supply. The range increases if higher supply voltages are applied. The standard HX5T tags have this basic design and are powered by a 3.5 V lithium source.



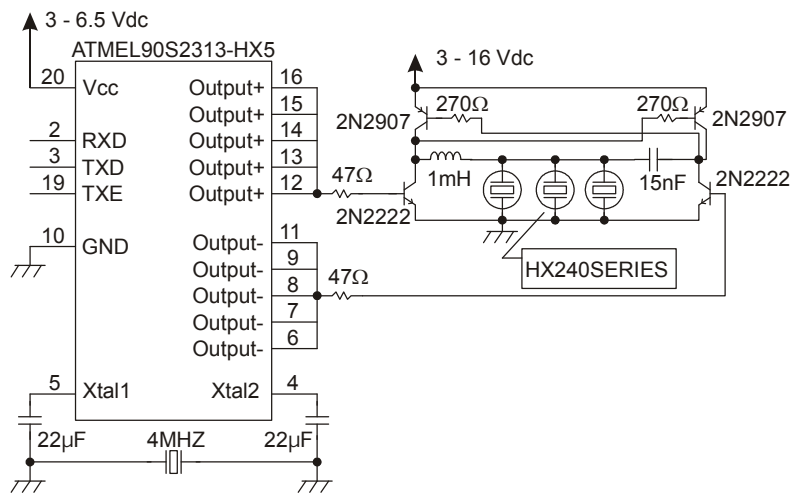
Boosting the Transmission Power

The schematic on the below shows a long range design using a transistor bridge for a push pull operation through series LC circuit. This design is capable of ranges up to 10 meters.



Improving Line of Sight

The schematic below shows how multiple HX240 can be connected to a bridge driver. Each HX240 has a load impedance of 1000 ohms and each transmitter can accept peak momentary power of 2.5 watts or peak-to-peak voltage of 100 volts. The transmissions at this level cannot be continuous; a duty cycle of 10% at 100 volts peak to peak must not be exceeded. This means that at least 130mS must elapse between transmissions. If this limit is exceeded the HX240 will develop a fatigue over time and it's efficiency will degrade. The rate of degradation is in proportions to the level by which this limit is exceeded, in terms of duty cycle and voltage level. Both the range and the line of sight limitation; is affected by the number of transmitters and the power applied to each.

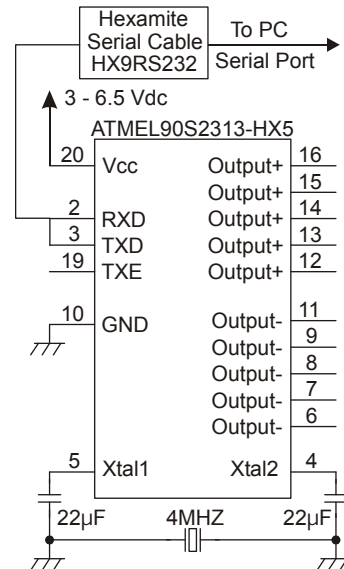
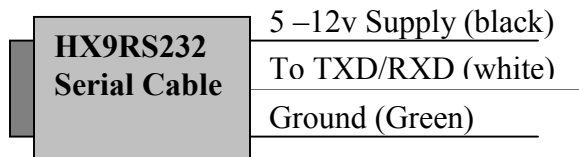


HX5 Chip Tag Communications

The serial communication is simplex. This means the chip doesn't transmit and receive simultaneously. Normally the chip's serial port is in a listening mode, all communication is analyzed. If the communication is intended for the chip, it transmits the appropriate response immediately. The following shows a few ways of setting up the communications with the HX5 chip tag.

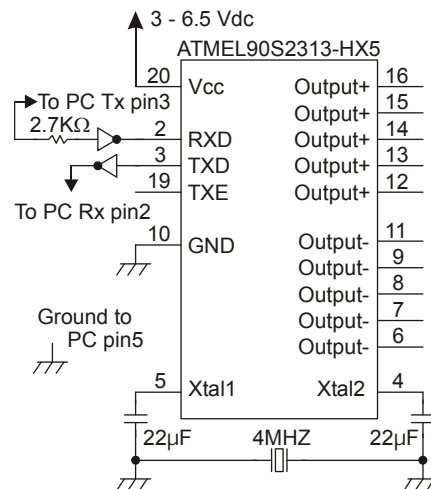
Using Hexamite Serial Cable HX9RS232

The HX9RS232 can be used to bridge the gap between the chip and the ordinary PC serial port. See the figure on the right.



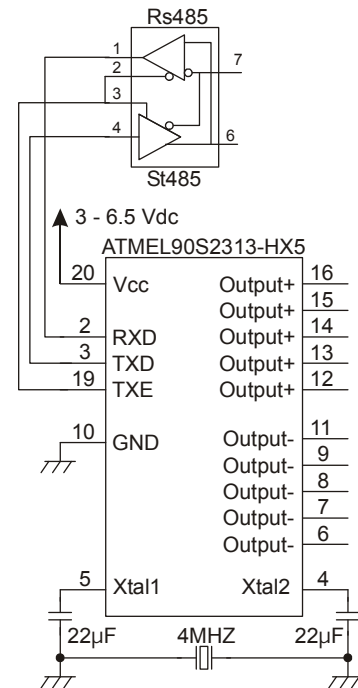
Connecting the chip directly to the PC serial Port

The figure on the right shows how the HX5 tag chip can be connected to the RS232 port of the PC using inverters. Most PCs are able to read logic level transmissions; very few serial ports strictly require the voltage levels of recommended standard 232C. If there is have trouble with the following, get a new serial card.



Using RS485

RS485 can be used for long distance communications in harsh environments. The following example shows how a typical RS485 interface is accomplished. Manufacturers like Linear Technology, Maxim and ST – electronics all supply RS485 interface chips.

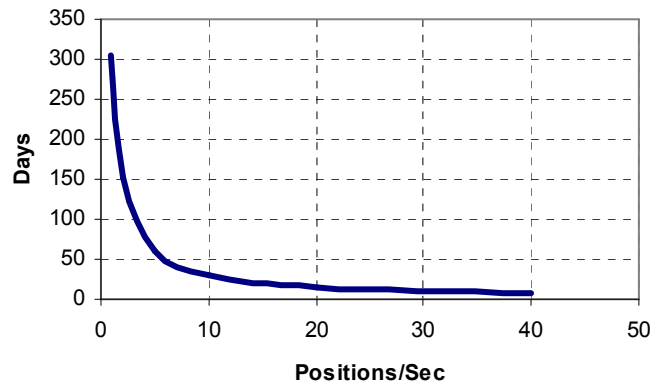


Specification	
Supply Voltage (battery)	2.7 to 6.5 Vdc
Maximum Average Transmission Rate	40 positions/second
Battery Life @ 20 positions/second Battery source 3.6V lithium 2000mAhrs	15 days (15*24hrs)
Battery Life @ 0.2 positions/second Battery source 3.6V lithium 2000mAhrs	4 years

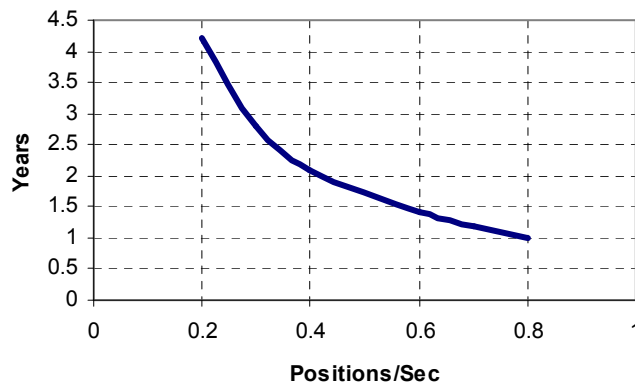
Battery Life Expectancy

The following graphs show battery life expectancy versus position update rate. A single 3.6V lithium battery 2000mAh was used as reference for the graphs. The batteries are replaceable and are shipped with the HX5T1 uninstalled. Batteries for the HX5T1 are available in most places selling electronic components, and can be obtained in the USA at www.mouser.com the mouser part number is 667-TL2100P. The leads must be cut to about 1/3" or 1cm lengths and fitted into the HX5T1 battery socket. Vendors like www.digikey.com, avnet, arrow, allied electronics and etc should also carry similar batteries. In Australia www.jaycarr.com.au part number SB-1775. The HX5T1 will run on any batteries supplying 3 to 7 volts.

Battery Life Vs Update Rate

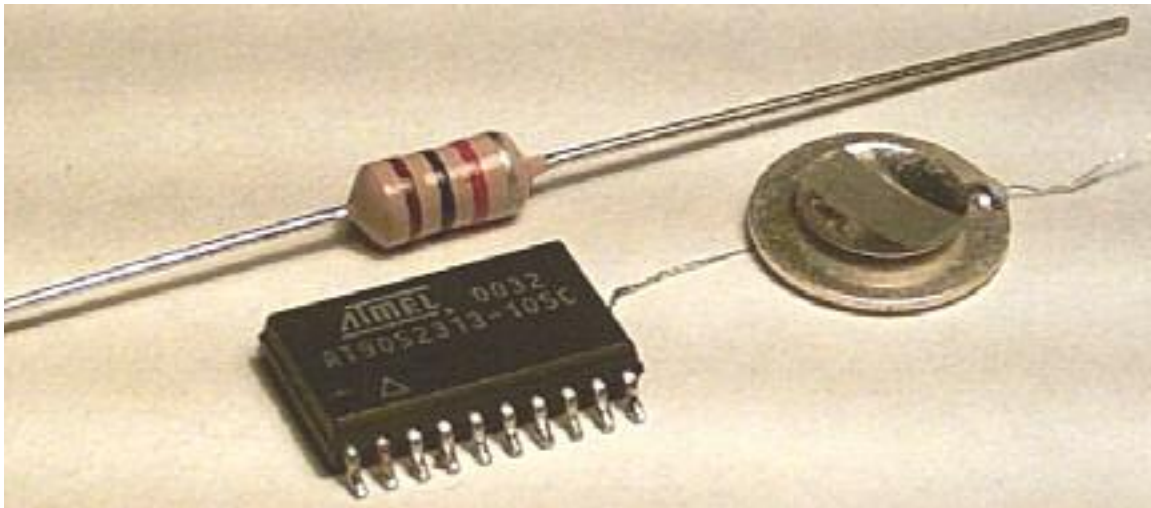


Battery Life Vs Update Rate

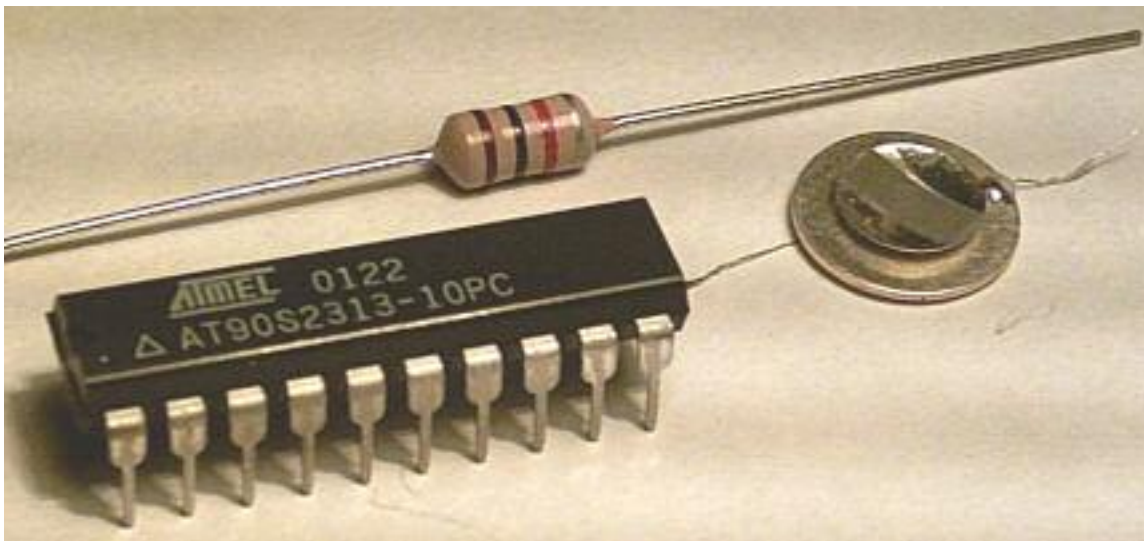


Available Kits

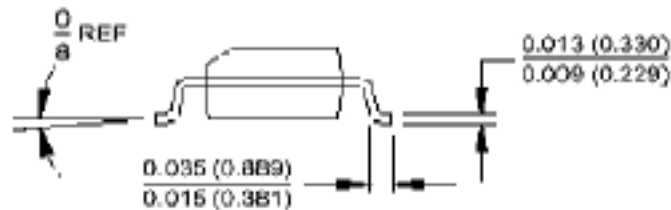
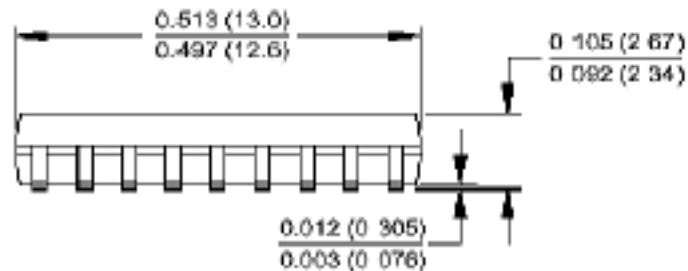
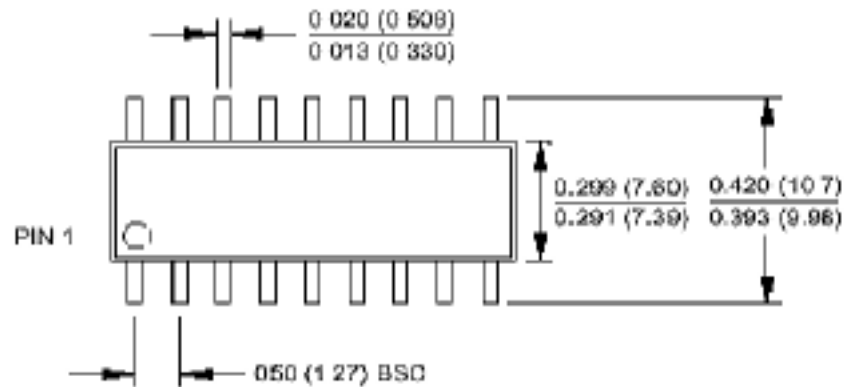
The illustration below shows surface mount components or HX5TKITS. The Kit consists of HX240TR-B sensor, a 1000mH coil and surface mount HX5T2313 chip.



The illustration below shows through pin components or HX5TKITP. The Kit consists of HX240TR-B sensor, a 1000mH coil and the HX5T2313 chip.



**20S, 20-Lead, 0.300" Wide,
Plastic Gull Wing Small Outline (SOIC)
Dimensions in Inches and (Millimeters)**



**20P3, 20-Lead, 0.300" Wide,
Plastic Dual Inline Package (PDIP)
Dimensions in Inches and (Millimeters)
JEDEC STANDARD MS-001 BA**

