

## Sealevel GPS (Global Positioning System) Datalinks

### A. Sealevel's GPS Modifications

Sealevel Systems offers two GPS options designed specifically for the Rockwell Collins GPS receiver. This receiver outputs its data at 76.8Kbps. This is a nonstandard data rate and is not achievable through standard COM: ports thus requiring a modification. The main part of the modification requires changing the clock frequency in order to match the 76.8Kbps data rate. The GPS modified boards are also able to communicate at several standard data rates as well and a brief explanation of choosing a data rate will help in understanding how to achieve data rates different than 76.8Kbps with the GPS boards. All standard COM: ports are based on a clock frequency of 1.8432Mhz. The highest speed available using this clock frequency is 115.2Kbps. This is a data rate most all have seen and/or used. The way that 115.2 is derived from the 1.8432Mhz clock frequency is as follows:  $\text{Clock Frequency}/16 = \text{max rate}$ . Example:  $1843200/16 = 115200$ . If you are writing a divisor to the UART a divisor of 1 will give you this 115.2Kbps. In the case of the GPS modification we have altered the clock frequency to 1.2288Mhz. Therefore the maximum data rate would be  $1228800/16 = 76800$ . Again, a divisor of 1 in this case would give you a data rate of 76.8Kbps. If you are running in Windows and have a GPS modified card and have to pick the standard Window's data rates you would choose 115.2Kbps. This would give you actually 76.8Kbps because the clock is slower than the standard clock by 0.66666.... That gives us the equation of  $115200 \times 0.6666 = 76800$ . In a number of cases people will use this card to receive the Rockwell Collins GPS rate of 76.8Kbps but need to transmit at 19.2Kbps. The question here would be how do you get 19.2Kbps.  $19200/0.6666 = 28800$ . That would be that data rate that one would choose. Remember that the ACTUAL data rate is the data rate chosen multiplied by 0.6666. Sealevel Systems offers two different GPS modifications. These differ enough that a description is necessary. The first modification is the GPS. The part number you would order and the part number that is present on the board would be #-GPS. An example would be 3087-GPS. The above explanation suffices enough to describe the modification. By following all of the above you should have no trouble using the GPS modification. The second GPS modification is the GPS1P. Again, an example of the part number would be 3087-GPS1P. This modification was done out of the need for a particular US DOD specification. Rockwell Collins performed the project and in its original state had nothing to do with GPS reception, but rather a gun camera mounted on an F4. The card is modified so that the receive side is "hardwired" to receive at 76.8Kbps and the transmit side is programmable just like any other serial port. However, the same offset of 0.6666 applies because the clock frequency is changed just as in the GPS modification. This was done so that one could receive at 76.8Kbps but transmit at, say, 19.2Kbps on the same port. No matter what you do in terms of setting the data rate the receive side is always going to be 76.8Kbps. If you have a GPS1P modification and wish to use our test software to verify that the card is working you must set the data rate to 115.2Kbps. This results in the transmit side sending at 76.8Kbps,  $(115200 \times 0.6666 = 76800)$ , and the receive side will always be 76.8Kbps. If you have any other questions about the Sealevel Systems GPS modifications please contact Sealevel Systems Technical Support at or call 864.843.4343.