



*Now, what's tomorrow's challenge?*

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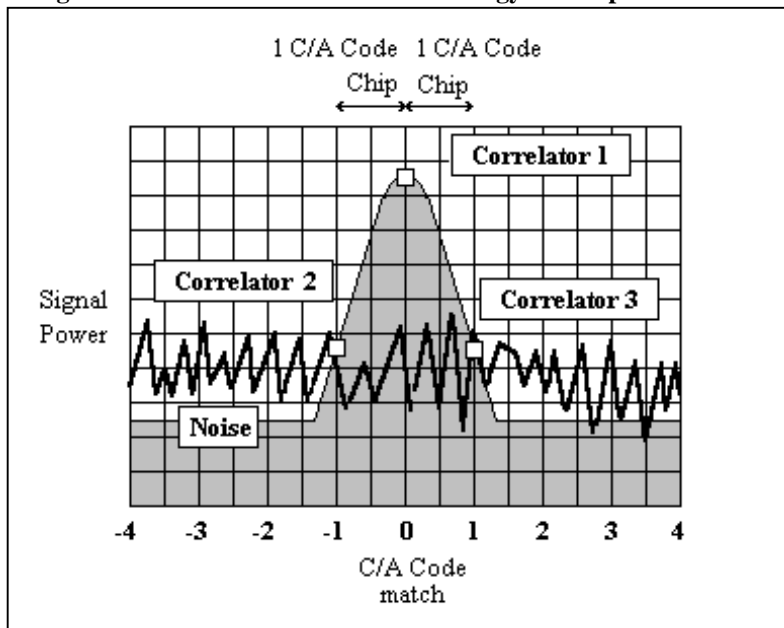
## TECHNICAL BULLETIN

### NOVATEL'S NARROW CORRELATOR TRACKING TECHNOLOGY

The NovAtel GPS single frequency product is a high performance 12 channel receiver capable of independently tracking the C/A code and carrier phase of all GPS satellites in view. It employs a patented **Narrow Correlator** tracking technology that drastically improves the pseudo-range accuracy and significantly rejects multipath signals.

Using high performance microprocessors, most GPS receivers adopt digital correlation techniques to de-modulate the incoming satellite signal. The correlation process is used to measure the phase offset between the incoming GPS signal and the locally generated signal. The pseudo-range is derived from this phase offset. The degree of C/A code correlation directly affects the signal power output from the correlator. Figure 1 illustrates the relationship between the signal strength and the C/A code correlation. It can be seen that as the C/A code approaches the "perfect" match condition, the signal strength becomes the greatest.

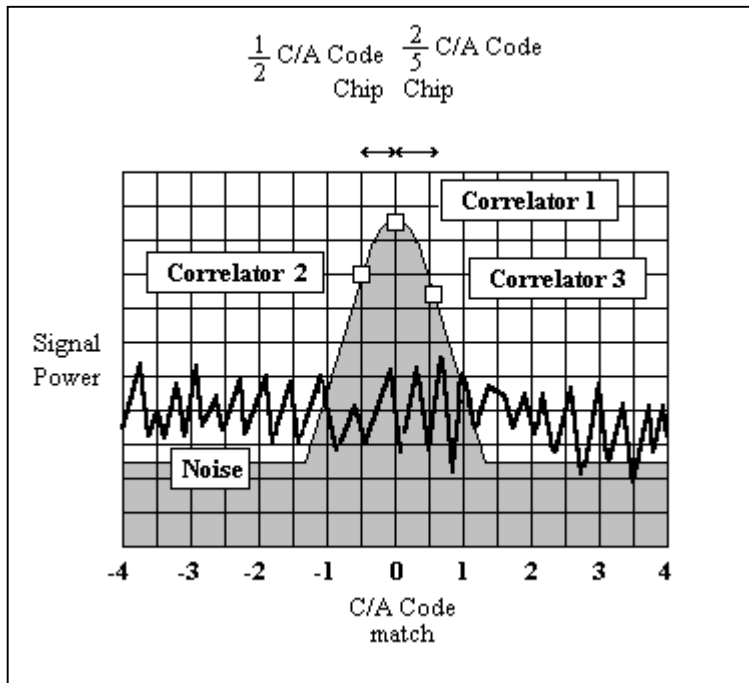
**Figure 1 - Common Correlator Technology - Susceptible to Noise**



The ability of a GPS receiver to accurately measure pseudo-ranges is a function of how well the correlation peak can be measured. High accuracy receivers usually have multiple correlators, as shown in the diagrams. The GPS receiver assigns one correlator to remain on the correlation peak (correlator 1 in figure 1). Another two correlators are positioned the width of one C/A code

chip on both sides of the correlation slope (correlators 2 and 3 in figure 1). The problem with this type of receiver is that since correlators 2 and 3 are placed 1 chip away from the peak, they are located just above the natural noise floor. As a result, the receiver will be more susceptible to noise and multipath, limiting the pseudo-range accuracy of the receiver to about 1 meter.

**Figure 2 - NovAtel Narrow Correlator Tracking Technology - The Difference**



NovAtel's patented **Narrow Correlator** tracking technology is capable of locating the other correlators as close as  $1/20^{\text{th}}$  of a C/A code chip spacing from the correlation peak (figure 2). The advantage of this approach is that it allows the receiver to predict more accurately where the correlation peak is. The pseudo-range measurement accuracy is improved ten-fold to about 10 centimeters and is less susceptible to multipath signals.

If you require a more in depth information about the Narrow Correlator tracking technology or other NovAtel GPS products, please contact:

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