TECHNICAL PAPER 3

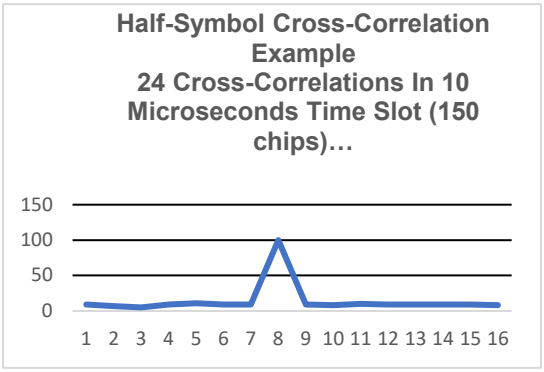
CSK Code Symbol Pair Cross-Correlation Parameters

The last 50 years of shift register based PN codes have ignored options for pre-filtering binary codes because the shift register codes have no options for “selections” of alternative binary codes. This extreme limitation prevented consideration of CSK options for advanced navigation and communications CSK Codes. The **Patent No. US 10056937 B1 dated Aug. 21, 2018**, describes the new technologies of CSK Codes of any length and any unique orthogonal code count by a code generator. Random binary codes stored and retrieved from memory were not an option. These filtering results are included in each code epoch file.

The common code generation and memory storage processes defined in the patent allows many potental CSK Codes operating at multiple chipping rates to be synchronized to the same precision 20 microsecond (50 KHz reference) clock. The whole symbol or half-symbol CSK pulse-width distributions are preferred options to provide controlled symbol cross-correlations that are compatible with closely clustered in multicarrier channels. All carriers are defined by:

Carrier Frequency = Chipping Rate (code length / 20) * Integer Multiplier

The CSK half-symbol maximum cross-correlations are typically 9% of the half-code length. The half symbol possible cross-correlations per CSK Code are pretested after each CSK Code is created by the generator. Accepted CSK Codes passing all symbol cross-correlation criteria are then conditionally saved to memory. These parameters are verified in each trailer of every 4-millisecond frame CSK file of the 250 frames generated wherein each frame file defines the results of the applicable cross-correlation analyses.



This Fig is an example of phase lock loop tracking of the saved cross-correlation parameters in percentage of half-code length. The half-symbol detection option is assumed in this example.

Primary CSK Codes Advantages

- The precision Universal Time to .5 ns accuracy is provided to all CSK symbol transmitters and receivers
- The common time reference provides phase lock loop tracking parameters usable in symbol detections
- Half-symbol deterministic detection using CSK Code symbols doubles the available receive throughput
- Common transmit carriers for all defined CSK Code symbols have a common QPSK demodulation process