# ACME Corporation  A Company That Makes Everything!

## Product Development Office
## Chuck Jones Parkway
## Warner, CA

Product Development Managers
September 15, 2017

Dear Product Development Manager:

**ACME Corporation, A Company That Makes Everything!** is pleased to provide this Request for Proposal to your corporation.  Because we make absolutely everything, we have recently expanded our business to service educational institutions.  In particular, we have a desire to advance our collection of signal processing projects by creating a Galois Field Algebra Unit (GFAU).

**Program Overview**

After decades of study, the ACME marketing team has determined that there is a need for Galois Field Algebra Unit.  As envisioned by our ACME engineers, this unit will be a peripheral to a general purpose microprocessor or microcontroller. The unit will serve as a co-processor unit, specifically tasked with performing operations in Galois Field.  While a fully general purpose GFAU would be desirable, the current development need only support $\mathrm{GF}\left(2^{N}\right)$, where $2 \le N \le 16,\ N \in \mathbb{N}$.  That is, $N$ is an integer between 2 and 16 (inclusive).  The *minimum acceptable capability* is for $2 \le N \le 8$.

Function:  The device shall accept 8-bit-bytes or 16 bit words corresponding to field elements from $\mathrm{GF}(2^{N})$ and an appropriate operation code and shall perform the dedicated operation.  The result, returned back to master processor/controller shall be an 8 bit bye or 16 bit word corresponding to the result of the designated operation in $\mathrm{GF}\left(2^{N}\right)$.  At a minimum, the GFAU shall provide addition, subtraction, multiplication, division, and logarithm for elements of $\mathrm{GF}(2^{N})$.  The value of $N$  shall be established by the processor interface as part of GFAU initialization.

Configuration:  The ultimate device shall be a VLSI chip of [64] pins, with fewer pins being desirable. The prototype deliverable from this first contract shall be a PC board of approximately 24 square inches, although this valuable is somewhat flexible.

Cost:  Prototype units should cost less than $400.   Cost in production quantities of 10,000 or more should be less than $1 per GFAU.

ACME Corporation envisions a three stage development process for the GFAU.  In the first stage, commencing as soon as practical and completing no later than eight months later, the contractor will design the GFAU and associated Application Programming Interface. This prototype unit need not satisfy the final configuration or cost requirements of the ultimate product.  For the prototype, the developer may select a particular host processor platform.  The intent of the design should be to make a universal interface that could be used by any host processor.  Upon successful demonstration of the prototype device, we anticipate a limited production phase to build 100 sample devices for field testing under the direction of our lead Field Demonstration Engineer.  These devices should be no more than twice times the final volume of the ultimate device, and cost no more than $5000 each.   If the functionality of the the limited production unit, we plan to enter into a contract for production runs in lots of 10000, 30000, and 100,000 units, with additional follow-on purchases possible.

**Instructions for Proposers**
Specific deliverables will be established per the CMPE450 syllabus and detailed plan.

**Response Dates**
Specific deliverable dates will be established per the CMPE450 syllabus and detailed plan.

**Questions and Clarifications**
Questions and Clarifications regarding this RFP may be submitted to the ACME Chief Engineer via e-mail at chuck.laberge@umbc.edu. All such e-mail should have a subject line that starts with "SSD Inquiry:" followed by your company name or acronym. E-mail will be answered within 48 hours of receipt. Dr. LaBerge will schedule a face-to-face meeting with all responders to resolve any issues with this RFP at a mutually agreeable time during the week of September 29, 2017.

We at ACME, the premier manufacturers of everything, look forward to your participation in this exciting development project.

Sincerely,
E.F. Charles LaBerge, PhD
Chief Engineer & ACME Poobah