



# ***ELECTRONIC PRODUCT DESIGN SERVICES***



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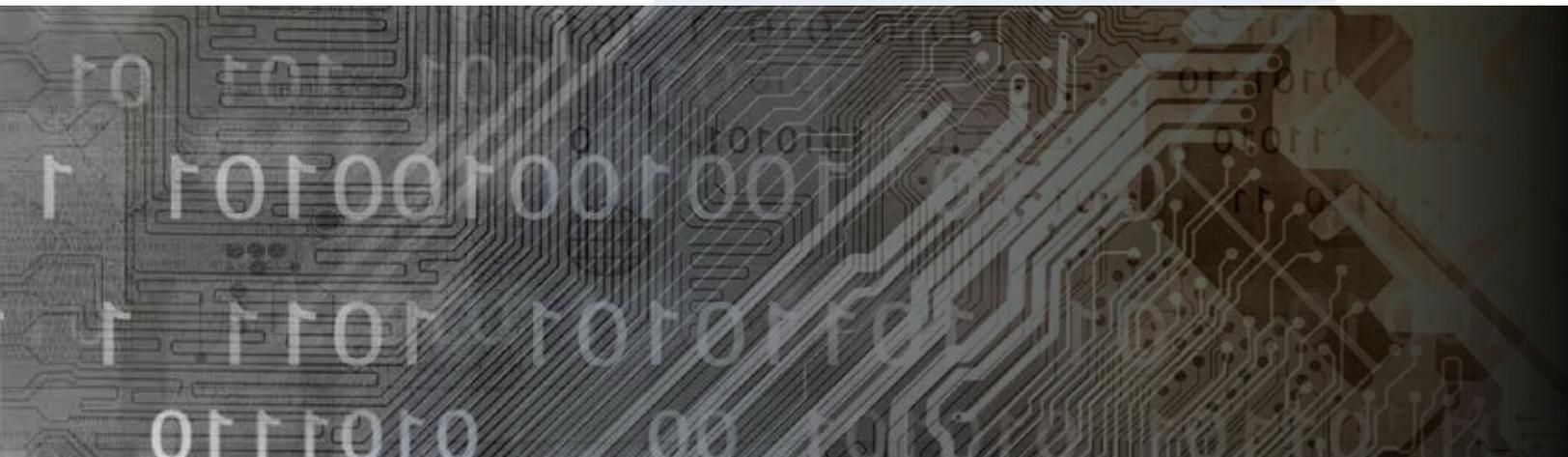
***EXTREME TECHNOLOGY FOR EXTREME CONDITIONS***

## **OVERVIEW**

Since 2001, ETC has specialized in designing, building, testing, and manufacturing electronic controls and sensors for the oil and gas industry. These products must not only be low power, wide temperature range, and approved for hazardous locations, they must also be incredibly rugged and reliable. Our contract engineering team have over 130 years' combined experience and possess a wide range of specialized skills in hardware, firmware, mechanical, and test design and implementation. Our extensive product-centric experience and expertise provides everything you need to take your innovative ideas all the way through design to full production and maintenance.

### **AREAS OF SPECIALTY**

- *Full product development*
- *Hazardous locations design*
  - *Intrinsically safe*
  - *Non-incendive*
  - *Flameproof / explosion proof*
- *Wireless*
- *Low power design*
- *Wide temperature range*
- *Design for manufacturing*
- *Design for test*



# SERVICES

## EMBEDDED HARDWARE

- Schematic design
- Schematic capture
- Circuit board layout
- Circuit board prototyping
- Board bring up

## EMBEDDED FIRMWARE

- Driver design & implementation
- User interface design & implementation
- Test software
- Full application design & implementation
- PC software utility design & implementation



## MECHANICAL

- Mechanical engineering design
- Finite Element Analysis (FEA)
- Drafting
- 3D modeling
- 3D scanning
- Assembly drawings
- Mechanical prototyping

## TEST SERVICES

- Test plan design
- Automated testing
- Product validation
- Production test design
- Temperature testing

## PRODUCTIZATION

- Manuals
- Instruction sheets
- Packaging
- Labeling



## ***PROPOSAL***

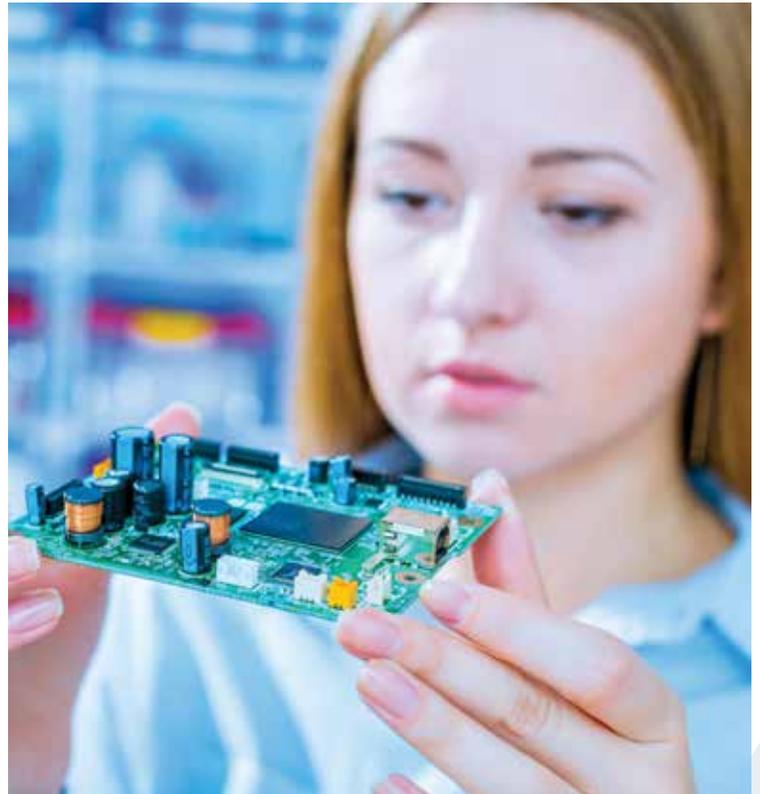
The default style for proposals is time and materials. This allows us to work collaboratively with you to deliver a design that is of the highest quality. You will be given fair hourly rates by job function and assigned experienced resources that are more than capable of executing your project. The proposal will include the full work description as well as project plan.

## ***WHY NOT FIXED PRICE?***

By proposing a fixed price, the relationship starts with mistrust and can be more antagonistic. The proposal has to be quoted high enough to account for any unforeseen problems. During the execution of the work there is motivation for the services company to cut corners and deliver the minimum to meet the requirements as quickly as possible.

## ***CONTRACT***

Once the proposal has been accepted, a formal contract will be put into place to protect both parties. It will outline payment terms, liabilities, ownership of designs, and any other required details.



***Let's get started. Visit [www.ETCorp.ca](http://www.ETCorp.ca) to get a free project estimate today.***

# **PRODUCT DEVELOPMENT PROCESS**

The following process is how we run all of our projects. If something is not applicable to your project, we can work with you to omit it or re-arrange the process to best fit your application.

## **TEST PLAN DESIGN**

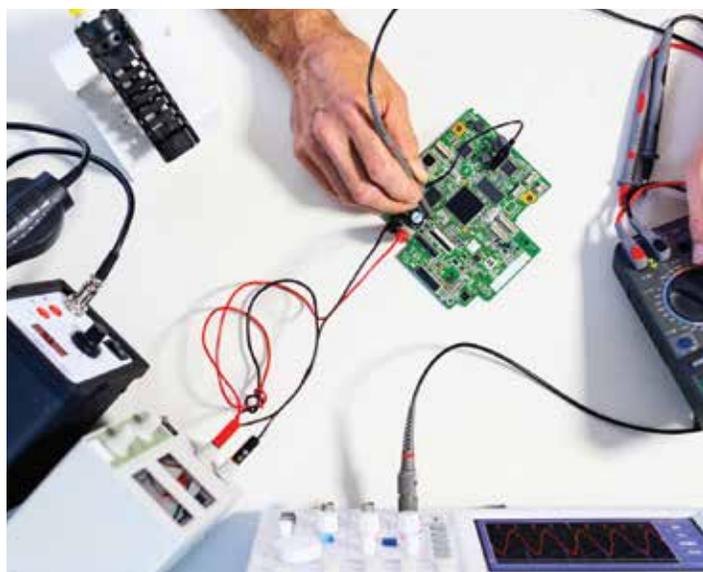
Our experienced test developer will put together a plan to ensure the final product will meet the requirements that were laid out during the engagement. This will allow us to clearly define what success looks like before starting the design. If at any time during the project the scope is changed, the test plan will be updated before any design work is completed.

## **HIGH LEVEL DESIGN**

A high level design document will be built to translate the requirements into an architecture and specific implementation pieces. This will be used as a guide for everyone involved in the project.

## **DETAILED DESIGN**

The detailed design can take many forms. For hardware it might be a schematic, board layout, and Bill Of Materials (BOM). For software, it would be code, build scripts, and interface descriptions. For mechanical it would be detailed drawings and 3D models. Whatever is required for your product, we have the people with the right skill set.



## **ALPHA PROTOTYPE**

The detailed design will be used to build an alpha prototype. This will be a physical circuit board that is populated with components and loaded with basic driver level software. The goal of the alpha stage is to prove out the design. It will help to discover and correct any issues early on. A first version of the mechanical design is fabricated at this stage to ensure the proper form and function.

## **FUNCTIONAL TEST**

Test software as well as other circuit boards to support testing will be developed at this time. The goal of this stage is to fully test the design. Depending on the scope of the project, this may involve automated testing. Any issues that are discovered are corrected both on the physical prototype and in the design.

## **BETA PROTOTYPE**

A second prototype is created to implement all of the changes made during functional test. This prototype will once again be tested to ensure that the design functions correctly. If any other issues are found, another cycle of testing and prototyping will be undertaken.

## **PRODUCTIZATION**

The final electronics will be assembled with mechanicals at this stage. Any labels, packaging, instructions, or other materials as required will be designed. The final package and high level bill of materials will be put together.

# ***ENGAGEMENT***

Our process ensures that we truly understand your application and the challenges that your users face. Most other services companies will simply take your requirements and ensure that they are met regardless if there may be other options that would lead to a better product.

We want to ensure that you end up with the best product possible and will always ensure you have all of the information to make the best decision for your product.

## ***CONSULTATION***

The first step involves sitting down and going through your application at a high level. We want to get a good feel for your company and what you are looking to achieve. We will come by and see your operation to understand what products you currently have and how this new product will fit. We also invite you to come by our office to see our setup. This gives you an opportunity to learn about ETC, our capabilities, and our staff. This consultation ensures that there is a fit from both sides before getting too far into the details.

## ***NON-DISCLOSURE AGREEMENT (NDA)***

We will work with you to put together an NDA that protects your confidential information. We are always discreet and never share information or work products between clients. This agreement will help give you peace of mind and let you know how seriously we intend to treat your information.

## ***PROJECT REQUIREMENTS***

If you have a detailed requirements document already or simply a list of high level features, we can likely move right into scoping your project. If you do not have this, we will work with you to formalize your ideas into the form of a high level requirements document. Once the scope is set, any guidance you might have for a required timeline and budget will help us to tune the project to best meet your needs.

## ***PROJECT PLAN***

We will engage our technical team and break down the work required to execute your project from the bottom up. This ensures that we start with realistic time estimates from the experts that will work on your project. Many other companies will over promise in terms of timelines and costs, then disappoint later when the project stretches out and runs over budget.

During this process, we will give you a best case estimate and corresponding timelines with allocated resources. This will give you an idea of what you can expect in terms of milestones, delivery date, and costs. We will also give you a worst case estimate, so you are aware of timelines that may stretch out depending on any issues faced during development and testing.

All projects experience challenges and uncertainties along the way. We would rather be up front with you to avoid any surprises later on.

## **CERTIFICATION**

If any certifications are required, the design and samples will be submitted for testing. During this phase, we will work with the certifier to answer questions, provide additional materials, and make changes if required. If you prefer to deal with the certifier directly, we can pass off the required materials at this point and provide support as needed.

## **PRODUCT VERIFICATION**

Product verification is the final testing stage for the completed product before field trial. It is used to validate the design versus the requirements and ensure that the product meets the customer's needs fully. During this phase, the tests will be implemented such that they can be used during mass production of the product.



## **FIELD TRIAL**

A field trial allows for exposure to end customers and gathering of data in real world scenarios. This will allow for any feedback that can be used to further improve the product before mass production. We can provide whatever support is required during this phase of testing with your customers.

## **FULL PRODUCTION**

We are capable of working with our contract manufacturer or another of your choosing to introduce the design, create assembly drawings and instructions, setup test procedures, and validate first articles. Once full production is underway, we can continue to engage the factory to address quality issues or increase efficiency and yield.

## **MAINTENANCE**

Any long term product requires ongoing maintenance. This might be the resolution of software defects, addition of software features, modifications to the hardware, component obsolescence, or changes to documentation. We are happy to continue to work with you over the life of your product.

## **HAND OFF**

At the conclusion of the project, we will provide you with a copy of all design files, outputs, prototypes, and finished goods. You are able to work with the manufacturer of your choice for production and handle your own maintenance if you choose. If you decide that you would like to retain us to manage your manufacturing and maintenance going forward, we would be happy to provide a proposal for this ongoing work.

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