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Specification for XYZ Project

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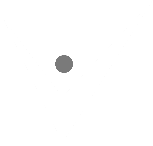
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# About this document

This document is meant to be a guide for creating a project specification. The sections included are not all inclusive, so feel free to add to it as necessary. The goal is to use the resulting specification for both quoting the project accurately and as a reference point for the actual work. Be specific regarding requirements. Text in italics describes the contents of the sections. *Delete this highlighted text and the italicized description text before completing the document for your current project.*

**

# System Overview

*This section should contain a good overall description of what the test system should do. Someone should be able to read this section and come away with a good understanding of what the system will do, not necessarily how it will be done.*

*Note some values will need to be determined empirically during the design stage. These values are noted as TBD (To Be Defined). Also, some modifications to the methods described are expected during design.*

# System I/O and configuration parameters

*All signals, both input and output, should be listed here, including any required means to control those signals. This section is critical in selecting the appropriate hardware and signal conditioning equipment. Err on the side of too much information. Specify who is responsible for each item, (the Vendor or the Customer). Who selects signal conditioning methods/hardware? Be clear in the separation of responsibilities. Some example sections are listed below.*

## DAQ

### Analog Inputs **-** number, voltage levels, signal frequencies, signal conditioning, clocking, isolation, accuracy.

### Analog Outputs - number, voltage levels, signal frequencies, current capacity, clocking, isolation, accuracy.

### Digital I/O - number of bits, minimum pulse width, output current capabilities, isolation.

### Counter/Timer I/O - number of channels, output current capabilities, rates.

## Instrumentation

### GPIB instrumentation.

### RS-232 instrumentation.

### USB instrumentation.

### Other devices (Ethernet, LXI, RS-485, Modbus, Profibus, and so on).

### Accuracy and precision required.

### Calibration required.

## Real-Time Control

### Standalone controllers for “slow” properties (temperature, pressure, and so on).

### Standalone controllers for “fast” properties (position, voltage, and so on).

### Loop rates, acceptable overshoot, acceptable settling time, and so on.

## Safety

### Analog I/O used to monitor sensor levels for out-of-bounds or pre-start (warm-up) conditions.

### Digital I/O used to indicate status.

It is assumed that all signals coming into the system are clean. Signal noise issues are the responsibility of [CUSTOMER].

# Application Software

*This section should be used to detail the application software functionality. We have listed the major common areas of a test system, but if your project has special requirements, list them here. This section should describe what the system will do, not how it will do it. Some examples are given below in this section’s subsections.*

*When replacing an “existing system”, it is easy to fall into the trap of saying "****The new system will be designed to work like the existing system****". That statement does not describe what the system needs to do. Detail the functionality you need and work from that. It can be difficult and time consuming to “reproduce” an older system because you would need to reproduce any undesirable quirks that the existing system has.*

*Be as specific as possible but leave room for the necessary modifications that will be required during the design process. Specifically note features that are* ***not*** *included.*

*Organize the specifications into major sections: System Configuration, Data Acquisition, Safety, Diagnostics, User (or Operator) Interface (e.g., diagnostic screens, operational screens, and report screens), Calibration, Control, Analysis, Report Generation, and Data Storage. Add or delete as appropriate.*

*Screen shots are extremely helpful in conveying the overall look, feel, and operation of the software. Specify the screen resolution to be used for user interface screens.*

## System Configuration and Recall

### Configuration files, Database storage, spreadsheets, etc…

### What parameters are saved and/or recalled?

### What is the persistence requirement? Auto save?

## Data Acquisition and Control

### Channels, Rates, Type of I/O. (see the I/O section above)

## Safety

### Enumerate the signals involved in safety monitoring.

### Describe the processes and conditions for detecting and alleviating any unsafe conditions, such as the removal of hazardous energy, whether mechanical, electrical, or otherwise.

## Diagnostics

### Which I/O and communications messages/responses need to be supported in a manual engineering-mode screen

### Does data need to be injected or recorded during diagnostic operation?

### How should acquired values be displayed? Numeric indicators? Graphically?

## Testing Modes and Display/Flowcharts

### What does the test do? List the overall test steps and include the details of execution of each test step.

### Describe any start-up and shut-down procedures performed before and after the test sequence.

### For each test step, discuss the required data display. If any data needs to be monitored continuously during a test (perhaps for safety or performance reasons), discuss those display.

## Calibration

### What is the calibration policy? It is desired to do calibration done in-house or to send equipment out? Should a system end-to-end calibration be performed or is each piece of equipment calibrated separately as appropriate?

### Should the test system be inoperable if equipment calibration has expired?

## Data Analysis

### Real time or post analysis?

### Describe all the processing needs.

## Report Generation (Printing and Screen Display)

### Provide details on the content of reports with sample report layouts.

### List the types of reports needed: printouts, text, graphs, Word, Excel, and so on.

## Data Storage and Retrieval

### Describe the type of data being saved: ASCII, binary, XML, Excel, Access, SQL, and so on.

### Describe the formatting of the data: header section, data section, database tables, and so on. Are there any file naming conventions?

## System Limitations

### Include system limitations - e.g., the system will not count pulses over XXX frequency; the maximum test length will be XXX seconds; the user will not be able to change voltage ranges during a test, etc.

### Where the system capability is in question specify it as a TBD, For example, "The frequency will be user selectable over a range from 50 to TBD (target 3000) Hz" or "The method used will have a worst case accuracy of 2%".

### If possible, be specific about items **NOT** included. This can be very helpful to manage expectations and delineate when the job is completed.

# Hardware & Non-Custom Software Supplied with System

*Specify any hardware to be used in this project. If there are physical space requirements, infrastructure, or utility needs, list them here. If any mechanical fixtures or electrical cabinets, racks, or enclosures are required, list them here. Create a subsection if necessary to detail components and/or add schematics or drawings. No costing information is required here.*

*If the components are too numerous to list separately for each, or if it makes sense to bundle separate items into a subsystem, list a summary of the items or include the subsystem. Pricing is not needed here as that is reserved for the quote. For complex systems, provide a system block diagram.*

# Documentation

*None, some or all of the following documentation sets may be required. Please include those that are required and give a description about the level of detail. For example, source code can be delivered with just enough comments that a professional programmer might need or as much as an unfamiliar newbie might want. Specifying the amount of such content helps bounds the effort and cost. This list is not conclusive and some end-users have very specific document packages that need to be delivered.*

## Requirements Document (list of required system functionality)

## Design Documents (methods used, procedure descriptions, flow charts)

## Source Code

## User Manual (functional docs)

## Wiring Schematics

## Technical Drawings

## Bill of Materials

## Installation Procedure

## Acceptance Test

## Calibration and/or Support Procedure

# Special Technical Requirements and Exceptions

*This section is for any requirement or specification that is unusual or requires special action or attention. Some examples are:*

* Will the customer have to lend us equipment?
* Are there special requirements for site access?
* Will the customer need to provide broken parts for Acceptance Testing?
* Are there any items we don’t want to deliver due to perceived undue risks or the availability of better/different solutions?
* Is the delivery schedule achievable?

# Installation/Commissioning

*How will the installation proceed? Here are some example questions:*

* How much of the installation will the developer versus the end-user perform?
* Who does what during the installation?
* Where will installation be performed?
* How is system delivered? Source code or Executable?

# Testing/Acceptance

*How will the Acceptance Test proceed? Here are some sample questions:*

* Who will write the Acceptance Test Plan (ATP)? The ATP must include a description of what designates an acceptable system.
* Who will do testing according to the ATP?
* Where will testing take place?
* How long is the ATP execution expected to take?

# Training

*Is any training required? Some example questions are:*

* Is user training involved? Possible options are:
  + No training is required. Customer will learn operation of system during commissioning phase.
  + Viewpoint will write an Operators Manual and will spend time reviewing the system with the operators by walking through the Manual.
  + Custom training class needs to be developed.

# Warranty

*Warranty is not always needed beyond that offered by the hardware manufacturer. Some questions to consider:*

* What warranty is requested? Possible options are:
  + Is the manufacturer hardware warranty sufficient?
  + Is a system warranty required? If so, for how long?
  + Does the application software need a warranty period? If so, how long? Consider that the ATP needs have complete and rigorous coverage of the system requirements in order to avoid unexpected bug fixes.
  + How will warranty issues be handled? Is 8x5 response acceptable or is 24x7 required or something in between?