

PARC

Guide to Developing and Presenting an Amateur Radio Buildathon

Introduction:

The following document will guide club members through each step of implementing a successful construction project. The guide is primarily written for a club Buildathon in which all the participants build the project together at one location. It could also be used to develop a club project that could be distributed individually and built at home. The Buildathon approach has the advantage of being able to test, align and troubleshoot each completed kit in one location and at one time. Other benefits of a Buildathon include the ability to assist the builders during the process and help to complete the individual kits so they are usable immediately rather than sit on a shelf to be built "one day".

Selecting a Project:

The end product should be a piece of Amateur Radio related equipment such as an element of the station to use on the air, or a piece of test equipment. There are a wide variety of projects to choose from which could include receivers, transmitters, antenna tuners, power supplies, keyers, L/C meters, attenuators, interfaces, frequency counters and also include a variety of digital and microprocessor equipment.

There are several decisions to be made in choosing a project beginning with the construction method:

Full Kit: The project could be a full kit including cabinet purchased from one of the many kit suppliers. Often a supplier will give the club a discount on the cost if all the units are sent to one address. The other advantage of this approach is that there is a minimum of preparation by the club. Be aware that many of these full kits come with limited instructions and the manual may have to be supplemented with a construction guide.

Partial Kit: Many of the larger Amateur Radio clubs offer partial kits of projects they have developed. Usually a PC board is supplied along with the components that go into the board. The builder supplies the cabinet and all the case mounted parts including controls, jacks and knobs. The club would fabricate the cases and source the additional components prior to the Buildathon.

Bare Board: There are many sources of bare boards for projects on the Internet, which gives the club a tremendous choice of projects to select.

One of the largest suppliers of bare boards is Far Circuits. The majority of construction articles written in ham magazines have bare boards available from either the author, or a third party. The club would then supply all of the parts along with designing and fabricating the case.

Build From Scratch: The Peel club has already built a few projects from scratch primarily using “Manhattan Style” construction methods. It is true that the preparations are more extensive and the building process is slower, but it opens up an unlimited choice of projects. Two or more projects can be combined to develop a very useful piece of equipment such as the Antenna tuner/SWR meter project.

In choosing a project, consideration must also be given to the complexity of the process and whether it can be completed in a day. If more than one day is required, then it is suggested that two weeks elapse between building sessions to give the participants a chance to work on the project at home during the intervening weekend. The skill level of the participants should also be considered. As the same builders seem to participate in each Buildathon, the skill level of the majority of the builders increases and allows for more complex projects. Surface Mounted Technology is showing up in an increasing number of available kits but is only suitable for a limited number of club members. This method could be utilized if only a small number of components are SMT and these can be mounted prior to the building day.

Building the Prototype:

Even if the project chosen is a complete kit with case, at least one version of it should be built prior to the Buildathon to become familiar with its construction and operation. In the case of a partial kit, the prototyping exercise will include designing the final layout and fabricating a case. It is essential that the other two methods go through the prototype phase to create a parts list and ensure the project actually works. It is during this phase that photos can be taken to include in the manual. If the instruction manual provided with a complete kit lacks details, photos taken during the building process can be used to supplement the manual.

Writing the Instruction Manual:

The instruction manual is usually written in conjunction with the prototyping phase. It should be a precise step-by-step procedure for building, aligning and operating the project. A schematic, parts layout, parts list and any graphics needed for the cabinet should be included. Hints and shortcuts based on experience from other projects can be added to assist builders who are new to the process. Warnings should also be spotted throughout the manual where necessary to avoid obvious pitfalls that could lure the builder into trouble. One or

more members of the Buildathon team should proof the manual in its draft form to ensure there are no typographical errors and it flows logically.

Sourcing the Parts:

Once the prototype has been tested and the parts list confirmed, it is time to determine the final cost of the unit by pricing the components in the price list. Don't forget the cost of producing the manual and any shipping costs that may be encountered. Here is a partial list of sources that have been used in the past:

DigiKey

<http://ca.digikey.com>

Mouser

www.mouser.com

Far Circuits

www.farcircuits.net

Metal Supermarkets

170 Wilkinson Rd Unit 16
Brampton, ON

Honson Computer Corp.

306 College St.
Toronto, ON

Sayal Electronics

1350 Matheson Blvd E.
Mississauga, ON

Orion Electronic Supplies Inc.

40 Lancaster St W
Kitchener, ON

The author of an article about the project is also an excellent source of both parts and supplier information. It's time to decide exactly how many units will be built during the Buildathon. At this point the prototype can be shown or demonstrated at a club meeting and the members given an opportunity to enrol in the Buildathon. A group purchase can reduce the list price of a full kit so that it is more appealing to the members. In the case where parts are purchased individually buying in bulk can reduce the cost as well.

Fabricating Unique Components:

In most cases other than full kits, sub-assemblies and cabinets need to be fabricated before the Buildathon. This is best done by a small group of two or three volunteers and can also be a learning experience in building these components that will serve them well in future homebrew projects they may tackle on their own.

Building the Beta Version:

A sample kit is then made up exactly as it would be for the final Buildathon. This kit is given to a builder who is outside of the group that brought the project to this point. He or she will build the project step-by-step using the provided documentation and critique the entire process along with providing constructive comments on improvements. From this exercise, the manual can be edited and the design and parts list modified accordingly. It's time to place the parts order and accumulate everything that is needed to kit the project. Remember to add some spare parts to the order just in case they are needed on building day.

Kitting the Project:

Once again this part of the project is best done with a group of three or four volunteers depending on the amount of parts to be kitted. It is best to use a large area in which all the components can be laid out in an assembly line fashion. Using the final parts list each component on the list is collected and placed together in a container until all the components have been gathered and the number of containers is equal to the number of committed builders. Add any item that will be included in each kit to enhance the building experience. This could be as simple as component holders, sand paper to clean off oxidization or a template for component placement.

Choosing and Setting up the Buildathon Site:

The primary considerations of a Buildathon site are space, lighting and power. It should be large enough to layout tables for the number of builders expected. Good lighting is critical for reading component values and a combination of sunlight from windows coupled with fluorescent lighting has proven to provide the best results. Power should be available to operate a series of solder stations, coffee makers and auxiliary desk lamps. It is also important to know where the circuit breakers are located and have access to them during the Buildathon. In addition to the primary considerations, suitable tables and chairs, parking and washroom facilities must be considered

It has been found that setting the tables up in two rows with the builders facing each other works out the best. The advantage of this layout is that a

single power line can be used between the tables and each soldering station or auxiliary lamp power cord can be dropped between the tables and plugged into the power line. This arrangement also allows for two people to share a soldering station if there is not enough for each builder to have one. Finally the experienced builders are easily accessible for questions or clarification if they are seated across or beside a novice builder.

Either the day before or early on the scheduled day the tables should be set in their positions along with all the manuals, kits and solder stations. Necessary test and demonstration equipment should be set up prior to the starting time.

Building Day:

Finally building day is here! Place direction signs to guide everyone to the correct locations and have the coffee perking before their scheduled arrival time. It is best to start on time, as some projects will need all day to complete. A description of the circuit design and function along with a demonstration of the complete beta version usually kicks off the day. There should be one support person for every four to six builders to provide assistance in both building and troubleshooting the project.

The most important thing to remember is that we are all here to have fun. If we produce an operational and useful piece of ham equipment that's a bonus!