

Highly opinionated, brutally frank

Starting an electronics business

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Times have never been better for launching a business

- Low threshold cost of entry
- Open software is available
- Hardware is powerful and cheap
- Design tools are Powerful and Cheap
- Minimal equipment required
- Subcontractors readily available

Cost of starting a business

Restaurent \$500,000

Manufacturing automobile
\$100x10⁶

Chemical plant (millions)

Consumer good \$50,000 minimum

Syscomp Electronic Design Limited

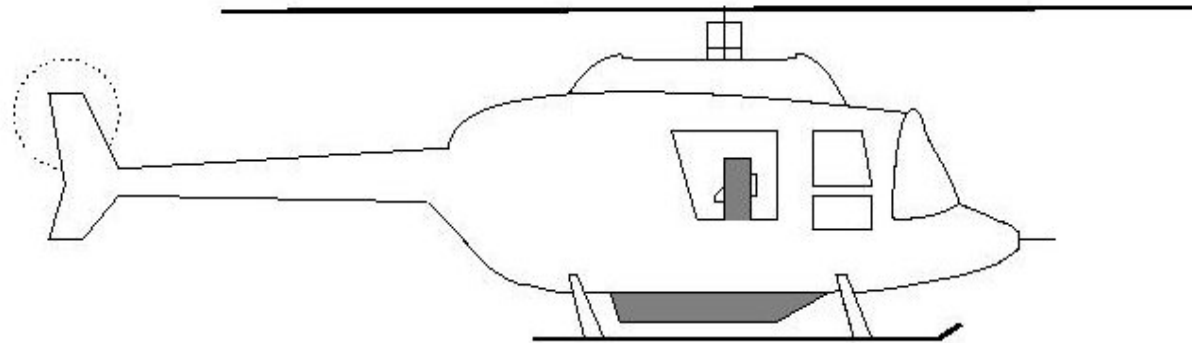
- Incorporated in 1979 for consulting
- Convergence of events spring 2005
- Launched two products January 2006
- Bootstrapped via a personal financing, line-of-credit and family loan
- Cash flow positive within one year
- Debt free with reserves within two years
- First school presence mid 2007
- Additional products in development

Syscomp Consulting

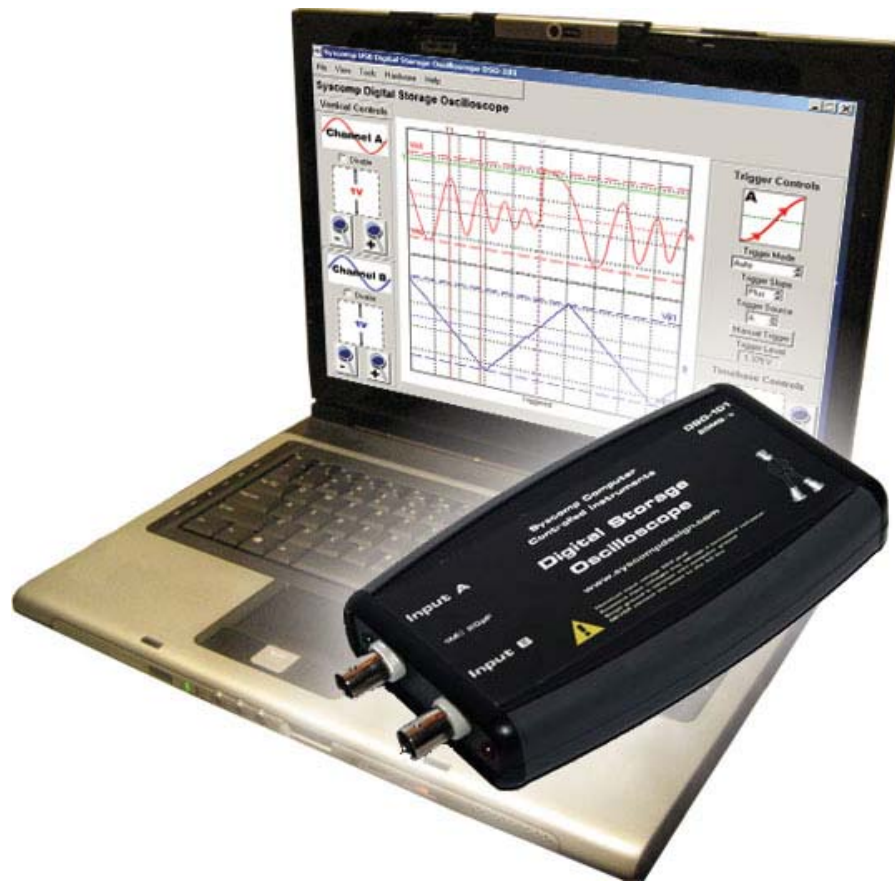
HELICOPTER DATA ACQUISITION POD

The Problem:

Design an instrumentation package including 2 Vinten 70mm aerial photo cameras, video viewfinder camera, and terrain-profiling RADAR or LIDAR, all attachable to Bell 206B Jetranger helicopter. All equipment must operate from one battery pack.



Electronics Lab Anywhere: The Open Instrumentation Project

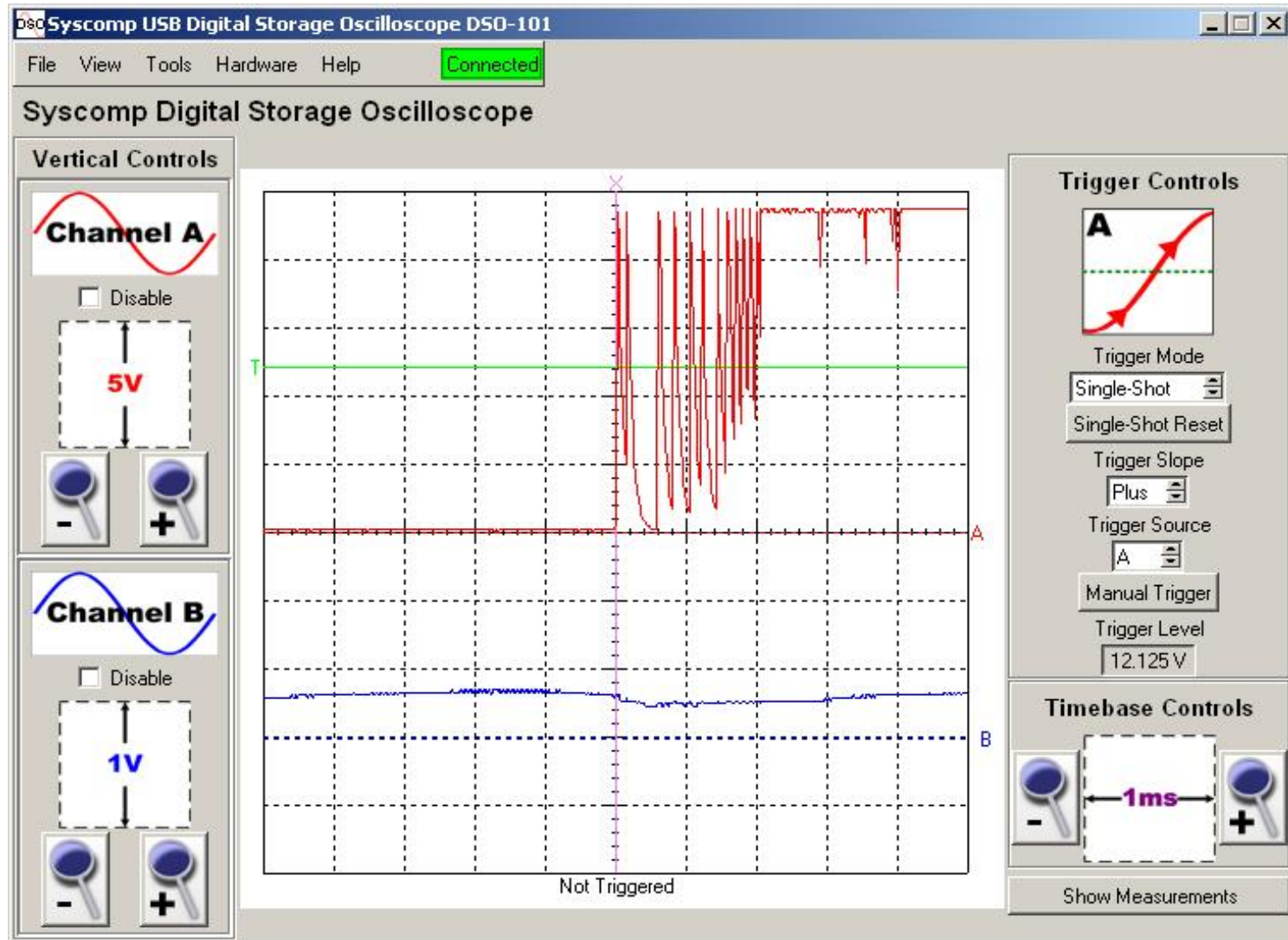


Oscilloscope, Engineering Features

- Adjustable gain preamp
- Scope x10 probe compatible
- Pre trigger (adjustable) view
- High resolution display, full 32k points
- Simultaneous display of XY plot



DSO-101 Oscilloscope, Switch Bounce



Waveform Generator Features

- 0.1Hz to 100kHz continuous coverage
- 0.1Hz frequency resolution
- Amplitude and Offset controls
- Distortion independent of amplitude
- All outputs programmable
- Arbitrary waveform, 256x256 points



WGM-101 Screenshot

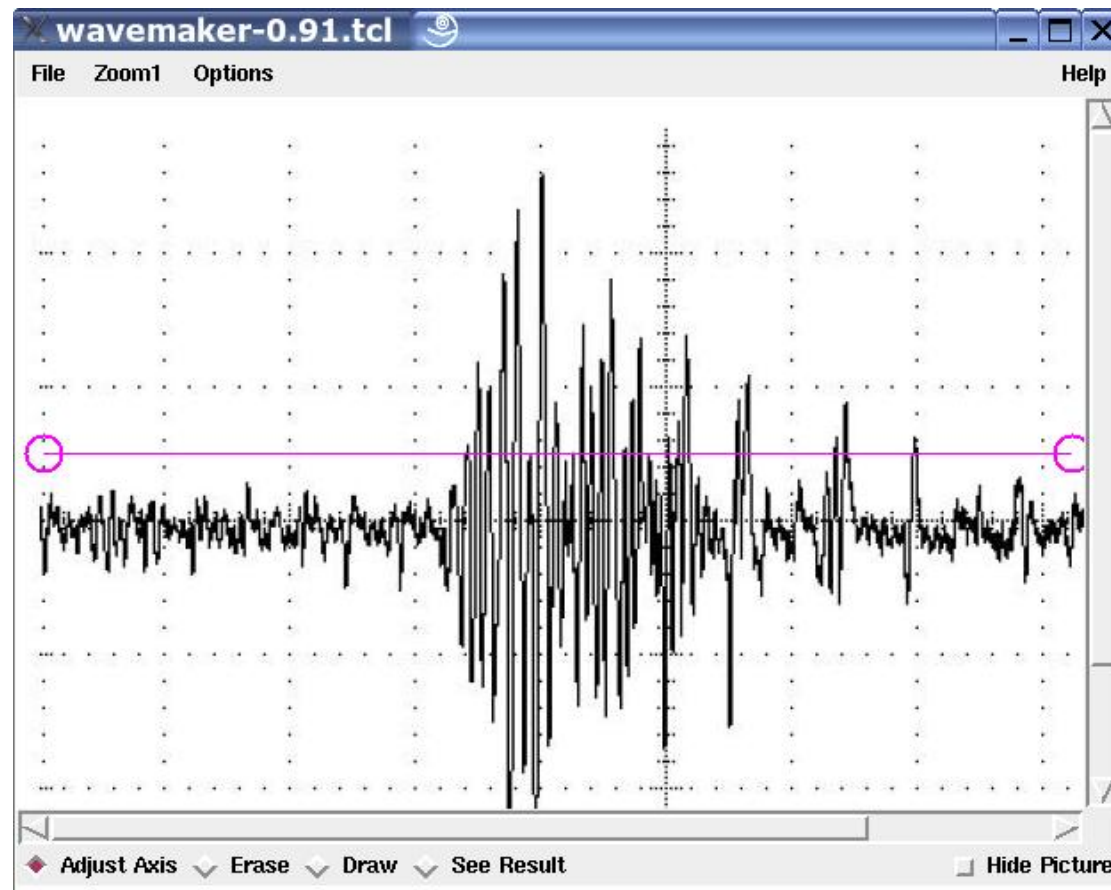
The screenshot displays the Syscomp USB Waveform Generator WGM-101 software interface. The window title is "Syscomp USB Waveform Generator WGM-101" and the status bar indicates "Disconnected". The menu bar includes "File", "View", "Hardware", and "Help".

The main display area shows a large red sine wave on a black background. Below the waveform, the frequency is displayed as **297.6 Hz**. The interface includes several control buttons and a dropdown menu:

- Buttons: "Set Frequency", "Set Max Frequency", "Set Min Frequency", "Sweep Mode", "Logarithmic" (selected), "Linear", "Sine", "Square", "Triangle", "Sawtooth", "Pulse", "User", and "Load User Waveform".
- Frequency controls: A vertical slider is set to 100000, with a range from 0.1 to 100000.
- Amplitude controls: A vertical slider is set to 10.00, with a range from 0.00 to 10.00.
- Offset controls: A vertical slider is set to 0.00, with a range from -8.50 to 9.50.

Each control panel includes a small diagram illustrating the parameter being adjusted: Frequency (period), Amplitude (height), and Offset (vertical shift).

Arbitrary Waveform Generator



Two heads are better than one

..but make sure you can work with your business partner over the long term.

Business structures

- Sole proprietorship
- Partnership
- Incorporated company

Should you incorporate?

Pro:

- Required to do business with government
- Required to have a share structure (raise capital)
- Required to distribute assets to partners

Con:

- Tax Filing requirements are onerous and can be expensive

Breaking up is hard to do

Importance of 'Share Purchase Agreement'

Formalizes allocation of shares.

Provides mechanism for conflict resolution.

Taxes

PST Exemption

You are reselling the material

You need to file periodically

GST

You need to collect GST and file returns periodically

You can get a refund for GST paid on materials

Sole proprietorship

Simply include income and expense statement with your personal tax return

More Taxes

For a corporation

- Very simple when you are losing money
- Losses can be carried forward
- Investment can be applied against income, but be careful, they may object

And More Taxes

- investment paid with after-tax dollars can be retrieved from the company tax-free
- keep and file everything
- do not co-mingle your company and personal finances, have a separate account, do deposits and withdrawals separately

Basic startup models

1. Investment Model

Find investors, raise capital, start company

2. Bootstrap Model

Fund growth through revenue

Investment Model Advantages

- . Get to market relatively quickly (after capital becomes available)
- . Put together a development team
- . Purchase infrastructure (equipment, office space)
- . Accumulate expertise from board

Sources of Investment Funds

3F's: Friends, Family and Fools

People who supply investment capital based on personal a connection with the entrepreneur.

Angel Investors

Wealthy individuals who buy into the company vision and can provide funding and advice

Venture Capitalists (VC's)

Fund managers who will buy a significant percentage of the company and place people on the board.

Investment Model Disadvantages

- Failure may alienate friends, family and fools.
- Angel investor expects a substantial return, must buy into the vision, therefore difficult to find.
- VC's expect huge return and seat on the board. Founders are often dumped.
- Investors expect to see a substantial financial commitment from a founder, which may require mortgaging a home, borrowing, maxing out credit cards etc.

Bootstrap Model Advantages

- Low risk: start small and build.
- Mistakes are not expensive
- Marketing: the market can be probed with various products since development is low cost.
- Getting it right the first time' is not as critical

Bootstrap Model Disadvantages

- Longer time to market, especially for substantial market exposure.
- Better-funded competitors can move into the same niche.

Patents

Why do a patent?

- Keep competitors out of this field
- Prestige
- Company IP portfolio: useful if company is raising capital or will be sold
- Licensing revenue

Patents

Downsides

- Patent requires full disclosure.
- Only as good as your willingness to defend.
- Defense of electronic circuits is difficult (see Edwin Armstrong)
- Cost: start at \$10k

Patents

Alternatives

- Do it yourself patents
- Secrecy, obfuscation
- Publication to establish *prior art*

Given the motivation, anyone can reverse engineer your circuits

Starting Up

- Many businesses require substantial startup capital
- Electronics can be bootstrapped with minimal investment
- 'Deal with a high margin business'
- Relatively few 'electronics entrepreneurs' to compete with
- Internet has changed the playing field with *the long tail* and niche marketing

Starting Up

To start an electronics (and software) business you need a Good Idea, some management skills, and a lot of commitment.

Starting Up

You do not need a factory, fancy offices, lawyers, accountants, marketing advisors, etc etc.

You **do** need customers that will pay for your product. Everything else pales to insignificance.

Many companies are badly managed. A company that is basically well managed has a huge advantage.

Business Plan

Funding agencies will require a business plan
Forces hard thought about

- the available market
- how to reach that market
- your costs and margins

Launching a product is expensive and time consuming, so you can't live in a fantasy world about customers and distribution

Is that gross or net? Financial assessments.

- Return on Investment 35%
- Retail Margin 15-35%
- Cost of parts, labour, trends in costs
- Overheads, cost of production, cost of sales

Grants and Loans

- Government support - geared to medium sized enterprises, not startups
- Require separate premises from home office rules out Virtual Companies
- Can be frustrating and time-consuming to pursue
- Not the best focus of time and energy
- Exception: For hospital or bio-sciences, talk to MaRS

Marketing

- Know your market, go into a field where you have a background
- Feedback from the market is very valuable
- Informal surveys are easy to do
- Selling a product is the best market research

Do you have what it takes?

- A passion about the product: you must totally believe in what you are selling.
- Self-energized and motivated: no one will tell you what to do
- Find the process attractive: there will be long hours, setbacks, 'moments of sheer terror'
- Like people and interacting with people. Business is about relationships, mutual respect, win-win and trust.