

**Michael J Martin's Rules of Good Business
and
Technical Design for Broadcasters
or
OK, what did we learn from that experience?**

Rules for Broadcast Systems Design

Philological Concepts

[Helping People – “Pay it forward”](#) - a concept that developed from a book and motion picture.

Background – A school social studies assignment leads to social changes that spread from city-to-city. Assigned to come up with some idea that will improve mankind, a young boy decides that if he can do three good deeds for someone and they in turn can "pay it forward" and so forth, positive changes can occur. What appears to initially be a failure, is indeed a success that is not immediately known but is traced backwards by a reporter who is a benefactor. The initial recipients of the boy are a drug addict, his badly scarred school teacher, and his alcoholic mother. While physically and mentally scarred by past events, the teacher is not the only one bearing scars.

[Experience](#) - Experience is something you don't get until just after you need it.

[Wishful Thinking](#) – Hope is not a strategy!

Technical Concepts

RF Rules

[Analog modulation](#) – If an analog signal is modulated, then leave it modulated till the bitter-end of the connection. Then, and only then should the baseband signal be demodulated. If you must transition the baseband signal from one medium to another, then up-convert it or down-convert it within the RF domain. Likewise, if the modulation schemes are different from each other, then trans-modulate the signal.

Every time that you demodulate and then modulate, the signal is damaged!

[Passive gain before active gain](#) – In a RF connection, like a microwave link or a satellite link, always use strategies that employ passive gain before active gain. This means to use a larger antenna before you purchase a larger amplifier. Amplifiers are a greater point of failure in a system's design and have a far greater cost associated with them; power consumption, maintenance, etc. Whereas, passive gain derived from a larger antenna is significantly cheaper to buy and operate.

Baseband Rules

Analog to Digital – If an analog signal is to be digitized, then leave it modulated till the bitter-end of the connection. Then, and only then should the baseband signal be converted back to analog. If you must transition the baseband signal from one medium to another, then up-resolution it or down-resolution it within the digital domain. Likewise, if the digital schemes are different from each other, then trans-digitalize the signal.

Computer Rules

Storage Space – Storage space is like closet space in a new house. No matter how much new closet space you get in your new home, it is never enough. You will fill these closets to the point of overflowing. Storage is the same. Get more than you think you need and ensure that you can easily and economically scale your solution for far greater expansion than even envisioned in your wildest dreams. You will need it over time.

Murphy's Laws of Computing

- When computing, whatever happens, behave as though you meant it to happen.
- When you get to the point where you really understand your computer, it's probably obsolete.
- The first place to look for information is in the section of the manual where you least expect to find it.
- When the going gets tough, upgrade.
- For every action, there is an equal and opposite malfunction.
- To err is human . . . to blame your computer for your mistakes is even more human, it is downright natural.
- He who laughs last probably made a back-up.
- If at first you do not succeed, blame your computer.
- A complex system that does not work is invariably found to have evolved from a simpler system that worked just fine.
- The number one cause of computer problems is computer solutions.
- A computer program will always do what you tell it to do, but rarely what you want to do.

Troubleshooting Technical Problems

Catastrophic Failure – The worst problems are rarely the result of just one problem. Most often, they are the result of two, three, or more problems combining together at one time to create the “perfect technical storm”.

Advanced Technology – Any circuit design must contain at least one part which is obsolete, two parts which are unobtainable and three parts which are still under development.

Quality Control – A failure will not appear till a unit has passed final inspection.

Solutions – If you can't fix it – document it.

Manufacturing – The primary function of the design engineer is to make things difficult for the fabricator and impossible for the serviceman.

Project Management

Plans – Nothing ever gets built on schedule or within budget.

Deadlines – A plan without a deadline is nothing but a dream!

The Six Phases of a Project

1. Enthusiasm
2. Disillusionment
3. Panic
4. Search for the Guilty
5. Punishment of the Innocent
6. Praise and Honors for the Non-Participants

...and a 7th suggested phase: Prayers for Forgiveness

Success – If everything seems to be going well, you have obviously overlooked something.

Time – The sooner you fall behind, the more time you'll have to catch up.

Most Important Project – "This project is so important; we can't let things that are more important interfere with it." (Advertising/Marketing manager, United Parcel Service)

Schedule – "Doing it right is no excuse for not meeting the schedule."

Engineering Truths

Universal Law for Naive Engineers – The Recommended Practices Committee of the International Society of Philosophical Engineers

Law #1: In any calculation, any error which can creep in will do so.

Law #2: Any error in any calculation will be in the direction of most harm.

Law #3: In any formula, constants (especially those obtained from engineering handbooks) are to be treated as variables.

Law #4: The best approximation of service conditions in the laboratory will not begin to meet those conditions encountered in actual service.

Law #5: The most vital dimension on any plan drawing stands the most chance of being omitted.

Law #6: If only one bid can be secured on any project, the price will be unreasonable.

Law #7: If a test installation functions perfectly, all subsequent production units will malfunction.

Law #8: All delivery promises must be multiplied by a factor of 2.0.

Law #9: Major changes in construction will always be requested after fabrication is nearly complete.

Law #10: Parts that positively cannot be assembled in improper order will be.

Law #11: Interchangeable parts won't.

Law #12: Manufacturer's specifications of performance should be multiplied by a factor of 0.5.

Law #13: Salespeople's claims for performance should be multiplied by a factor of 0.25.

Law #14: Installation and Operating Instructions shipped with the device will be promptly discarded by the Receiving Department.

Law #15: Any device requiring service or adjustment will be the least accessible.

Law #16: Service conditions as given on specifications will be exceeded.

Law #17: If more than one person is responsible for a miscalculation, no one will be at fault.

Law #18: Identical units which test in an identical fashion will not behave in an identical fashion in the field.

Law #19: If, in engineering practice, a safety factor is sent through the service experience at an ultimate value, an ingenious idiot will promptly calculate a method to exceed said safety factor.

Law #20: Warranty and guarantee clauses are voided by payment of the invoice.

Law #21: The rule for engineers: "Change the data to fit the curve."