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Picking an Engineer— Making the Right Choice

By Bob Cordell

In choosing an engineer, the importance of technical competence goes without saying, but it is just the starting point. Ideally, the engineer should know the industry and some of the people in it. The candidate should be creative, and not just at the circuit level, but also in solving problems and satisfying the needs of the target consumer. A myopic engineer who is very good in just one specialized technical area is not what you want.

Ideally, he or she should be as fluent in the languages of marketing and manufacturing as in pure engineering, and should have the ability to walk in the shoes of the end user. Finally, the engineer must have the mentality that his goal is not so much to make a perfect design as it is to make the very best set of design tradeoffs to meet the needs of the target market in terms of technical performance, features, convenience, manufacturability, reliability, and price.

TECHNICAL COMPETENCE

The importance of technical competence goes without saying, but it is just the starting point. Indeed, what comprises technical competence? It includes intelligence, education, training, experience, common sense, and good instincts.

Start with a good review of the resumé and then consider contacting some of the supplied references. Formulate conversational questions in your interview that will reveal the candidate's technical competence relevant to your organization. Casual discussion of technical challenges that your organization and the candidate have faced in the past is the way to go.

KNOWLEDGE OF THE INDUSTRY AND THE PEOPLE IN IT

Never underestimate the importance of networking in your industry. An engineer who is comfortable with networking and adept at exchanging ideas with others in the industry can be more effective than one who keeps to himself. A good engineer maintains an awareness of others' ideas and approaches and is inclusive of a spectrum of ideas and approaches in his approach to design.

Evaluation of other ideas is technically stimulating and gives perspective on your own ideas and a reference by which to measure them. Some of the best ideas are inspired by understanding the pros and cons of other approaches. This kind of openness is the opposite of "not invented here."

CREATIVITY

Your candidate should be creative in

more ways than one. Sure, he needs to be creative in circuit design if that is the assignment, but he also needs to be creative in solving problems and dealing with design challenges. He should be creative in satisfying the needs of the target customer, in partnership with your marketing team. At the risk of citing a well-worn phrase, he must be able to think outside the box.

You often hear the joke about the engineer who did something great because someone forgot to tell him he couldn't do it. This is the kind of possibility thinking you seek in a good engineer. Just because someone else may not have been able to do it, don't assume that you cannot. Maybe that person's constraints were different, he just wasn't as smart as you, or he wasn't as good at thinking outside the box. Besides, different technology is now available. The key here is for an engineer not to be self-inhibited. This is a subtle form of negativism.

BREADTH

A good engineer must be able to look at the big picture and be versatile. A myopic engineer is one who is good in only one special area; this is the opposite of being technically well-rounded. A brilliant RF designer may not be a top-notch audio power amplifier designer. Try to discern the ease with which the candidate can pick up new concepts and work with different applications.

While management is ultimately responsible for defining an engineer's role, a good engineer will also take part in this process, taking initiative to act beyond his well-defined boundaries. An engineer who only does exactly what his manager tells him is not nearly as valuable as one who defines his role more expansively, and takes broad responsibility for the team's success. The opposite of this is

the engineer who declares victory in doing his part and then just throws his work product over the wall.

FLUENCY IN MULTIPLE LANGUAGES

A good engineer is fluent in multiple languages. We're not talking about Spanish and German here, but rather the multiple languages of product development, such as marketing, manufacturing, and quality. These are the languages that the other members of the team speak. Others appreciate it when you are able to speak their language and understand their issues and concerns. It helps you to walk in their shoes. Transferring your design successfully into manufacturing can spell the difference between success and failure, and between timely delivery and constant time to completion.

Gordon Moore of Intel once defined the term "REFSNART." It is the word "transfer" spelled backwards, and refers to when a design is transferred to manufacturing and it bounces back.

COMMUNICATION

As a group, engineers are not known for being great communicators, yet this is the key area that influences their effectiveness in the organization. In fairness to my engineering brethren, I know many engineers who are very good communicators.

As with other aspects of their assignment, engineers must be able to prioritize their communications. This means being concise and to the point, allowing for the discussion to drill down to necessary details later. Finally, prioritizing communications means allocating plenty of time for listening.

SENSE OF SALESMANSHIP

This is really a sub-category of communications. The engineer who has great ideas must be able to articulate

them to the team effectively and understandably. If the engineer is good at this, not only will he get the team onboard with his idea, but he will have laid the foundation for much of the sales, marketing, and advertising.

PERSONALITY

The words "personality" and "engineer" are not often found in the same sentence—but personality is important even in a highly technical area if you are to be effective. He should be able to get along with the people you currently have who don't enjoy all of the wonderful traits described here. You want an engineer with a large comfort zone, who is at ease with people in other disciplines, not just engineers.

Another desirable personality trait is a selfless generosity with younger and less experienced engineers in the organization, often characterized by a willingness to mentor them and share credit with them. This encourages a sense of teamwork and helps the organization grow in its technical competence. It truly leverages what the new engineer brings to the table. Of course, this trait may be difficult to recognize in an interview, especially in a young engineering candidate.

THE RIGHT GOALS AND THE RIGHT TRADEOFFS

This may seem counterintuitive, but one of the worst things an engineer can do is try and make a perfect design. That is not an engineer's job. An engineer's job is to design the best widget he can, given all of the constraints he faces. He needs to minimize the imperfections that count, and know what counts. Indeed, engineering is the art of making the right tradeoffs.

Sometimes there is a delicate balance between the engineer's satisfaction derived from the assignment, and

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the need to make his team successful. A good engineer shows maturity in managing this balance. Some of the best engineers are passionate about their job, but this passion must be tempered by realistic goals and priorities. A top engineer maintains focus on the end goal while balancing creativity with diligence, and balancing dreams with reality.

The overriding goal of the engineer and the team is to meet the needs of the target market. These include technical performance, features, convenience, manufacturability, reliability, and cost.

WHAT TO AVOID

No discussion of how to pick an engineer is complete without touching on a few traits to avoid. Although a candidate with some of these traits should not be dismissed out of hand, you may wish to proceed cautiously when some of them are apparent.

Being too much of a perfectionist can be a distraction and deadly to a schedule. A related weakness is exemplified by an engineer who is non-

committal in regard to when something will be ready for release. Nobody wants junk to be released solely in order to meet a schedule, but you do want an engineer who will make things happen and take a pragmatic approach to releasing something that meets the needs of the company and the customer.

Engineers by nature are highly analytical, but this can sometimes lead one to be a bit of a negativist. I've seen engineers who almost relish the opportunity to identify reasons something will not work. This kind of negativism must be kept in check. Otherwise, it can spread throughout the organization like a virus.

Sometimes an engineer who is able to tell you all the reasons something won't work needs to be reminded that that is not why he was hired; he was hired to find the ways to make something work. Indeed, most managers are smart enough to figure out why something won't work.

CONCLUSION

Just as engineering is about tradeoffs

in an imperfect world with constraints, so is picking an engineer. You're not going to find one with all the good traits and none of the things to avoid. Which of those traits is more important will be a function of your particular business and its needs at the time.

Finally, pick an engineer whom you think would be good at picking an engineer. Think about the future. Will he be in your position at some point?

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