The Technician as a Mechanic

Mechanical skills are important to the electronics technician since he can't always choose what he will or will not service.

By **John Frye**

BARNEY had been working for three-quarters of an hour on the record changer precariously propped up on the bench with spray chemical cans. As he hunkered down for the twentieth time to observe the cycling actions of the mechansim below the motorboard, he muttered disgustedly:

"I *hate* fooling around with these mechanical things. I could have fixed three radios while I've been messing around trying to get unfailing precision performance out of this collection of warped pot metal and plastic. This is no job for an electronics technician."

"You think you're too good for mechanical work, maybe," Mac, his employer, suggested with disarming mildness.

"Now that you mention it, I do," Barney answered defiantly, straightening his back with his hands placed above his hip pockets. "Any ding-a-ling can work on a mechanical gadget where you can *see* what's wrong and needs doing. But the work for which I've been trained demands imagination coupled to a sound knowledge of electronic theory, because no one can see the tiny electrical currents I have to herd around. For me to work on mechanical things is a waste of my training. It's like putting a heart surgeon to trimming pork chops."

"The simile is clever but the argument is specious," Mac observed, grinning. "I'm not buying your innuendo that mechanical work requires less intelligence than electronic work simply because the action is easier to observe. That theory breaks down when the mechanic works on an internal combustion engine or refrigeration equipment, for he can't see what's taking place with the gases doing the work any more than you can see your electrical currents. But even when you *can* see the entire operation, as is the case with that record changer, you can focus on only one part of the action at a time. You need all the memory and imagination you have to keep in mind the events that precede and must follow the movement you're watching."

"You've got a point," Barney grudgingly admitted. "Working on a record player is sort of like trying to figure out a Rube Goldberg cartoon without an explanation. You have to figure it out a step at a time before you can understand everything that must occur in proper sequence from the triggering action to the conclusion. Come to think of it, I'm sure this mechanical job must take quite a bit of intelligence or I'd have had it working a long time ago. But I still don't like to work on mechanical things," he stubbornly concluded.

"I'm sure you don't, and you have lots of other technicians on your side," Mac agreed. "But let's try to see how rational this feeling really is. We've already agreed that there is no foundation to the feeling that mechanical work is somehow beneath the dignity of a technician. The fellow who comes here and works on our *IBM* electric typewriter is not exactly a Mortimer Snerd type. But there are other more concrete reasons for the technician's disliking mechanical work.

"Quite often the mechanical job is a dirty one involving work in awkward, cramped positions. This is usually true of installing and servicing auto radios and of industrial electronic servicing. At least some of the work, in such cases, must be performed on location rather than at a service bench. Another reason for disliking mechanical work is that the electronics technician quite often lacks the proper mechanical tools. His thinking and interest are usually oriented more toward electronic instruments than hand tools and his money is more likely to be spent on a new digital v.t.v.m. than for a right-angle screwdriver.

"But maintaining such a negative attitude is a mistake. *Some* mechanical equipment almost always accompanies electronic apparatus. This is true of your record player, sound and video tape recorders, garage-door openers, SCR control equipment, electric-eye supermarket door openers, and all sorts of industrial equipment. In each case there is a close marriage between the electronic and the mechanical, and the over-all performance depends upon the proper functioning of both. As a single example, distortion in that record player can be caused by either a leaky coupling capacitor in the amplifier or a slipping motor-drive wheel. As far as the customer is concerned, he isn't interested in whether his trouble is mechanical or electronic. He just wants his record player restored to proper operation.

"*RCA's* ServiceAmerica policy of servicing everything electronic is forcing independents to be less choosy about what they service. Even if the independent service shop owner hates record players, garage-door openers, and tape recorders, he hardly dares turn them down. Actually, this is not all bad. There always has been good money in doing work most people dislike. That's why our garbage collector owns hundreds of acres of rich farmland."

"Yeah," Barney agreed, "and I don't remember seeing many plumbers or undertakers on welfare."

"Exactly! Really mechanical work is not so bad if you have the right equipment and the right mental attitude. Half the battle is having the right tools for the job. Trying to improvise tools leads to a loss of time, temper, knuckle-hide, and cabinet finish. I was strongly reminded of this not more than a week ago. I had a tape recorder in which the split plastic case was held together by two *Tru-Arc* clips—they are shaped like C-rings—slipped over split extruded bosses on the sides of the case. To get the case apart, you had to spread the ends of these clips and shove the clips out of their grooves in the bosses. Sounds easy, doesn't it? And it would have been if I had had a pair of special *Tru-Arc* pliers to slip into holes in the ends of the clips and spread them apart, but I didn't; so I tried everything in the shop before I finally bulldozed them off. It took me thirty minutes to do something that should have taken only thirty seconds because I lacked the proper tool."

"No one is going to argue with you about the necessity for having the proper tools," Barney said. "Anyone who has ever cracked a tuning slug because he used an improper tool to turn it can read you loud and clear. So can the guy who has ruined a Phillips screw head beyond all turning by using a wrong size driver or straight screwdriver on it."

"That brings up another point," Mac interrupted. "A

good mechanic respects his tools and cares for them the way a good technician respects and takes care of his instruments. Unfortunately, not all technicians have this respect for their hand tools. It makes me cringe to see a technician beating on the back end of a screwdriver he is using as a chisel or rounding off the corners of an Allen wrench trying to turn an Allen screw one size too large.

"Selecting the right tools is very important. There's no point in buying a lot of tools you don't need. The requirements of a service technician are, in the main, different from those of a carpenter, automobile mechanic, or jeweler; yet the technician may 'borrow' from the tool kit of each of these, although he may call the tool by a different name. For example, the technician's 'diagonal cutters' look suspiciously like the garage mechanic's 'cotter-key pliers,' and the 'tongue-and-groove utility pliers' of the service shop are the 'water pump pliers' of the garage.

"A good rule is to buy only the tools you know you will need and then to buy the best. Name, price, and common sense—not necessarily in that order—are the most reliable guides to quality in hand tools. For example, you may be looking at two sets of nut drivers quite far apart in price. About the only difference you can see between the cheaper set and the high-priced name brand is that the latter drivers have thinner walls and hollow shafts, while the cheaper drivers have much bulkier wrench ends and sturdy-looking solid shafts. The difference lies in the quality of the steel used in the two sets of wrenches. The thinner wrenches are actually stronger than the heavier ones. You will see the advantage of the thin-walled wrenches when you are trying to loosen a nut in a tight corner, and you will appreciate the hollow shafts when you are loosening a nut far down on a long screw, such as is often found holding a speaker in place in a wood cabinet. Finally, it's generally a good rule to stay away from 'universal tools.' They represent a compromise at best. One of the first universal tools, the monkey wrench, gave rise to the contemptuous phrase 'monkey wrench mechanic'."

"Okay," Barney said, "let's see if I understand what you're saying: You think that a good technician can and should be a good mechanic. This is necessary because almost all electronic work involves some mechanical features, even though this may be no more than the mechanical anchoring of a chassis and picture tube in a cabinet, a dial-drive mechanism, or repairing the electric clock in a clock radio. You further think my aversion to doing mechanical work is largely prejudice arising from a feeling such work is *infra dig.* You believe I would do well to get over this feeling because there's good money in going after the electronic-mechanical service many others refuse to tackle. Doing mechanical work is not bad if you have the right tools."

"That's a pretty good summary," Mac applauded. "I didn't know you listened that well. However, I'd like to add a few more comments. I honestly believe you may find doing a mechanical job right takes just as much knowledge and can yield just as much satisfaction as purely electronic service. You know how you feel when you view the results of a near-perfect convergence job—there are, of course, no perfect convergence jobs. Well, I feel the same way when I put a test tape on a tape recorder I've worked on and find the tape speed is precisely on the nose with a very low wow and flutter figure. I get the same satisfaction out of seeing the sweep hand of a clock radio going around smoothly again after I have relubricated the frozen sealed-motor mechanism. And I have a sneaking hunch that child-mauled record player you've been working on will give you deep satisfaction when you have it working again. Why you may even want to specialize in changer mechanisms!"

"Don't you ever bet on it!" Barney warned as he hunkered down again and reached up to move the turntable slowly by hand. "You can brainwash me just so far, you know." ▲