

Fault Trees

Rooting About For Electronics User Errors

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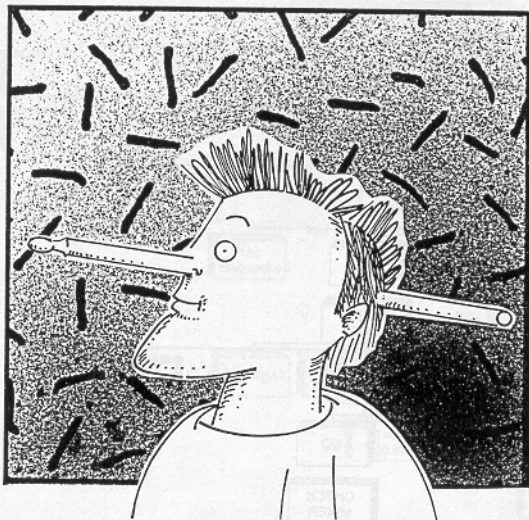
IT'S BOUND TO HAPPEN sooner or later. The muse of inspiration strikes and you rush to your equipment ready to begin work on the masterpiece of the moment. Then, without warning, nothing works as it should. No sound from the drum machine, the computer's messages aren't being read by the sampler, and your Octapad has turned into a Monopad. There must be some sort of glitch in the system, a gremlin in the gears, that prevents you from getting anything accomplished. Your first thought: "Everything's broken." Relax. We're going to figure this thing out.

My first experience with electronic problem-solving came when I was about 13 years old. All of a sudden one day, my turntable wouldn't produce any sound. Pete's father had a big tower in his backyard and lots of radio-type equipment in his den. Since I knew absolutely nothing about this kind of stuff, Pete's dad was a logical choice to turn

to for help.

After carrying the turntable over to Pete's house, I watched his dad pick up a little box with a neat dial and a couple of wires hanging out the end, and proceed to look for the problem. I remember being fascinated with the logical approach he took in finding the faulty element. He started at the underside of the turntable and checked each step of the sound production chain.

At first, I was puzzled as to why he would start testing at the back of the



turntable instead of at the needle or cartridge. Now it seems to make sense. If the cartridge had tested out as bad, he would know that there was one problem, but he couldn't be sure that the rest of the unit was operating properly. By starting at the end of the chain, he could be assured that everything was working up to a certain point. Then the game plan would be to fix that problem area and keep working backward until the unit checked out completely.

If your electronic system is fairly modest, you may not run into complicated problems, but

in large sophisticated systems, finding the fly in the ointment can be a little tricky. Regardless of the size or complexity of your system, more often than not, the problem can be traced to something called "User Error." New digital electronic instruments are so solid that they hardly ever break down unless you abuse them.

As Emily Latella, the character on *Saturday Night Live*, used to say, "It's always something!" Most of the time, your problem is going to be so simple that finding it

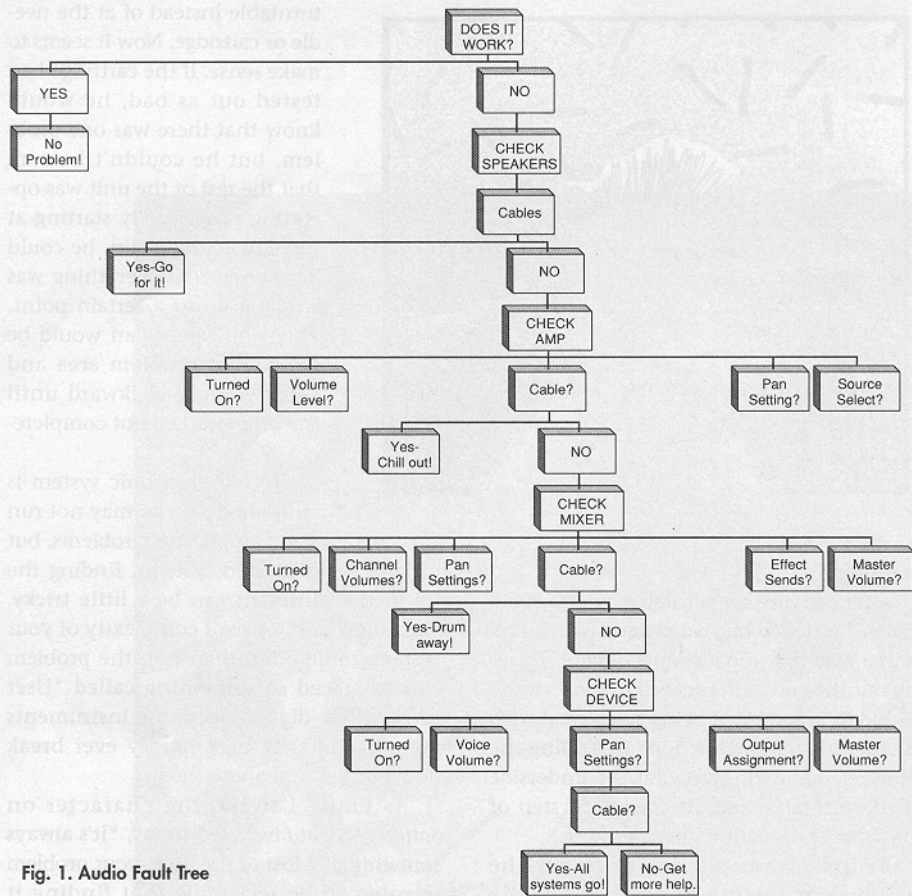


Fig. 1. Audio Fault Tree

might make you feel just a little bit stupid. Maybe you forgot to bring up the mains of your mixer, neglected to plug in the speakers, or even forgot to turn on the amplifier. But in all cases the key to finding the problem lies in having an organized game plan.

Audio Fault Tree

As you look at the diagram of the audio fault tree (Fig. 1), notice that it begins at the end of the chain. The first items to check are your speakers. Are the speakers properly connected to your amp? If so, it's time to move on to the power amp.

Is the amp turned on? Is the volume level up? Some people use a home stereo amp in their system. Do you have the source selector switch set to the proper input (TAPE, CD, PHONO, AUX, VIDEO)? If you use a stereo power amp, are the PAN settings correct?

If you determine that the amplifier and speakers are operating as they should, it's time to check out your mixer. Again, the power switch, channel volume, and master volume controls are the usual culprits. But also pay attention to your EFFECT SENDS and PAN settings.

If all systems are go, it's time to check out the offending instrument or device that is supposed to be creating the sound. Drum

If all else fails, take the guilty component to the repair shop. It may be that your five-year lithium battery only lasted four years.

machines often have individual voice volumes in addition to the master volume. Are they at the proper settings? Perhaps the PAN control or AUDIO OUTPUT routing of a voice needs adjustment.

It's a good idea to try to check your audio cables without actually replacing them. To check the cables connecting the amp to your speakers, try sending a different source through your amplifier. To check the cable going from the mixer to the amp, send a different source through the mixer. This way, you'll know quickly whether it's the cable or the source that is the offending device.

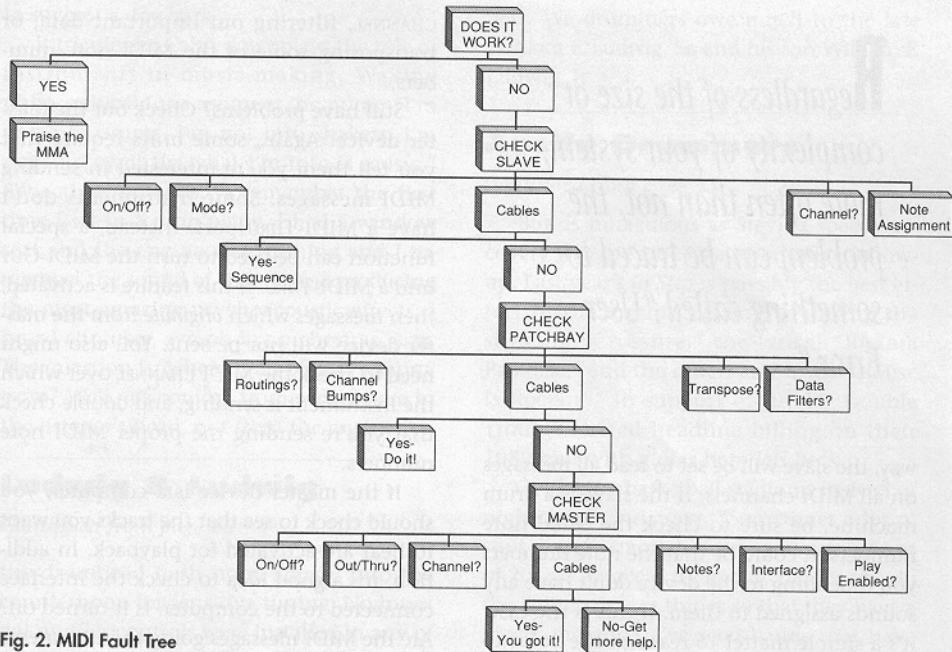


Fig. 2. MIDI Fault Tree

MIDI Fault Tree

Just as the audio fault tree runs from the end of the audio chain, this fault tree (Fig. 2) runs from the end of the MIDI chain. The first device to check is the slave. Some synthesizers and many drum machines (notably Yamaha units) have a control which turns

MIDI reception on and off. If this control is set to MIDI OFF, the unit isn't going to receive any messages from any MIDI controller.

Next, check the MIDI MODE and the MIDI CHANNEL of the slave. One of the easiest ways to accomplish this is to bring the instrument into MODE ONE (Omni On/Poly). This

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way, the slave will be set to read all messages on all MIDI channels. If the slave is a drum machine, be sure to check the MIDI note numbers. It could be that the note numbers you're sending to the device don't have any sounds assigned to them. If this is the case, it's a simple matter to reassign the voice to the proper note number.

If things still aren't quite right, move on to the MIDI patchbay. Be certain that the proper master device actually is routed to the proper slave. You'll never hear what you expect if the messages are being sent to the wrong instrument. If you're using a patchbay that allows MIDI processing, check to see if the patchbay is altering the MIDI

CHANNEL, filtering out important data, or transposing some of the MIDI note numbers.

Still have problems? Check out the master device. Again, some units require that you tell them you're interested in sending MIDI messages. Some instruments don't have a MIDI-THRU port. Instead, a special function can be used to turn the MIDI-OUT into a MIDI-THRU. If this feature is activated, then messages which *originate* from the master device will not be sent. You also might need to check the MIDI CHANNEL over which the instrument is sending, and double check that you're sending the proper MIDI note numbers.

If the master device is a computer, you should check to see that the tracks you want to hear are activated for playback. In addition, it's a good idea to check the interface connected to the computer. Is it turned on? Are the MIDI messages going to instruments or to some other peripheral? (Printers and modems have a nasty habit of not responding to MIDI messages.) Several computers, and even some of the more sophisticated master controllers, have multiple outputs for two or more discrete MIDI data streams. If this is the case, be certain that you have the messages directed toward the proper output.

Checking MIDI cables is a little more

complicated than checking audio cables. Since MIDI is a one-way communication system, be certain that the right cable is connected to the proper port—OUTPUTS should go to INPUTS. INPUTS should be connected from OUTPUTS or THRU.

Even if you go through the entire fault tree without success, don't give up hope. If you can isolate the problem to a single device, check to see if there is some secret code that will reload the instrument's memory and reset the device to the factory defaults. Sometimes these special operations are listed in the manual; if not you'll have to contact the manufacturer to learn about them. Be advised that performing this operation will cause you to lose all the data currently in the device's memory. If all else fails, take the guilty component to the repair shop. It may be that your five-year lithium battery only lasted four years.

It's often been said that one can learn more from mistakes than from successes. The logic behind this statement assumes that you are successful in finding your mistake. When you discover the "user error" problem, make a mental note and keep it to yourself. Nobody else has to know that you spent 20 minutes finding out that your computer's interface wasn't plugged in. •