Jarrel Mallari
Perry Pe
Ps141

Very Basic Circuitry for Idiots

Hello there preteens, idiots and people who generally hasn't had a hand in circuitry yet, and welcome to Circuitry for Idiots, where you learn things about general circuitry you probably already know while I have fun occasionally insulting your intelligence and bloodline.

First, what is a circuit? For those of you who haven't lived your childhood to the fullest and has yet to crack open a random appliance, then here is a very simple explanation. A circuit is a thingie with lots of wires going in and out little holes in it that makes the little thing we call electricity flow all the way around an electrical appliance, making it do things like make the air cool, make large turtles and little monkeys appear in TV screens, and make Iraq blow up with a push of a button. Wondrous isn't it? These circuits rarely work alone, so they're usually jumbled up in a **circuit board** filled with more wires that bring electricity in and out of them.

So how does it work? Well, see, here things get a little complicated. Oh sure, I can just say "Electricity runs from the source, to the input thingie of the circuit and back, making it work" and leave it at that, but a little too simplistic, even for my tastes. So… let's treat this as something more detailed and needlessly complicated.

First, think of the circuit board like a racetrack, with the electric current being the cars. Now, if any of you, for same strange reason, has NOT seen a racetrack, it's this little circling road thing that cars run around over and over again, until the race stops, or an accident happens that usually involves huge flaming death, whichever comes first. Got that? Good. The same thing happens in a board with electricity running around it over and over again until you turn it off, or you forget to turn it off and things begin to snap, crackle and pop in flames.

Now that that pretty little image has burned itself into your mind let's stretch that metaphor a little bit more. Now, all race tracks have starting points, heaven knows how difficult it is to begin a race without a start point, and in the case of our race track, the starting point is the power source/battery/socket/regulator/what-have-yous. Of course, as all good races, there needs to be a signal of come sort to start the races, and in the case of this race track, the fun thing called the switch is just the thing, so with a quick flip of the switch, the racers go, go, go!

Now, while race tracks and circuit boards are pretty similar, there are things that are quite different. For one thing, while the cars are running around the place, every so often, they come across special checkpoints that allow special things to happen. These are the **integrated circuits (IC)**, and how they work would depend on the IC, but generally, they have these little pins in them that the currents go in and out, sort of like cars with tunnels, only these tunnels make strange things happen. What will happen

when entering each tunnel depends on the IC, but usually there's one tunnel that bring energy in it, another tunnel that get energy out of it, one tunnel that makes the thing start, another tunnel that makes it start over, another tunnel that makes currents run out with some info on them, and another tunnel that tells it what to do based on the circuits that's traveling out of a tunnel from another IC. What do these ICs do? Why, they do a lot of things. They can lights shine, or speakers sing, or clocks run or bombs explode. Such wondrous things, aren't they?

Another thing that a circuit differs from a racetrack is how the racers in a circuit board can go anywhere as long as there is a road. That's right. These electric currents are obnoxious bastards who don't care about stupid rules, and screaming at them won't stop them from going wherever they want. So how do you control these troublemakers? Well we'll learn about that in the next paragraphs.

So, how do we make them follow rules? Why by forcing the rules onto them of course. One way of doing that is by using **diodes.** Now diodes have lots of complicated thingies going for them regarding how different diodes work, but to make things simple, I'll just say this. Diodes are like huge one-way signs that tell circuits that they can only enter on one side and exit on the other side. Any other way is a no-no, and they'll have to go somewhere else.

Of course, while telling a current to "not go here" all the time is useful, there are times when you sometimes want the currents to sometimes go through somewhere. And this is why there are things called **gates**. Now see, every so often, a certain something, like a 555 circuit, decides that it likes to be funny and gives a current a number between '0' and '1'. Now, when a current carries the number '0', some circuits will *close* their doors to them as they don't want their kin inside their circuits. Oh no. Those elitist circuits will only *open* their doors to the '1' currents, those bastards.

So what does this little bit of drama have to do with us? Well, **gates** are those kinds of objects that enjoy randomly changing the currents' numbers from 1 to 0 and back to 0, depending on what they are. There are the **ANDs**, who turn two '1' currents entering them into a '1' current, and everything else into a '0' current. The **NANDs**, who are like the ANDs, except the results are switched. The **ORs,** who turn to '0' currents into '0', and everything else into '1'. The **NORs**, who are like that except opposite. And the **Inverters** who like changing '1's to '0's and vice versa.

…that was pretty confusing wasn't it? Well then, let's add some more metaphors to make things easier. For the following paragraphs, remember that 'close' = '0' and 'open' = '1'. Also, whenever I say 'sides' or 'end', I really mean current.

AND gates are like tunnels. When either one end is 'closed' no one can get through it and it's considered 'close'. Only when both sides are 'open' is it considered 'open'. **NANDs** are like that, only change the second 'close' word to 'open' and the second 'open' word to 'close'.

OR gates are like a pair of gates that lead to the same place. When any one gate is 'open' then the path is considered 'open'. Only when both sides are 'closed' is it considered 'close. **NORs** are like that, only change the second 'close' word to 'open' and the second 'open' word to 'close'.

Inverters just like to screw with your mind and switch whatever enters it to the thing it's not.

So with these things, you'll be able to more or less control when and where your circuit will run to make your own personal time bomb or something like that.

And there you have it, enough general knowledge to help you begin create your own circuit. While these are not all there is to it with circuitry, such a thing will take days to teach, or at least ten more pages of these stuff, this should be enough knowledge for you to go out there and create your own basic circuit. Have fun.