

Question #1 – Roger Kasl: *What temperature range on speaker wires would indicate problems (i.e. using OEM harness for 25-35w RMS aftermarket amp)?*

Todd Ramsey: Temperature range will vary on different gauge of wires, the length of those wires, the power level of the amplifier (actual output) and the output impedance. The lower the impedance, the more current that's on the output and hence the greater the temperature. Depending on the mass of the voice coil and motor of the speaker, it could be no consequence or it could be a real big deal. Lots of factors there.

Question #2 – Nathan Meyer: *Where can I buy a phase tester?*

Todd Ramsey: One great model is the PT-9A and you can get it from Mobile Solutions (888) 480-5959 and let them know Todd sent you. You can also find it online at Creative Tools - http://www.creativetools-us.com/online_store.htm.

Question #3 – Michael Abeita: *What is your favorite color of M&M's?*

Todd Ramsey: M&M's are not my favorite, but I like the green ones. I think there was an urban myth about those.

Question #4 – Jay Small: *Hello Todd! Does an oscilloscope introduce a load or negative effects on the circuit under test?*

Todd Ramsey: No. No problems because the scope (or even a DMM) has a very high input impedance in the Megohm range. It's virtually invisible to the circuit.

Question #5 - Chris Silva: *Where do we connect leads for O-Scope?*

Todd Ramsey: For an aftermarket headunit, you will connect to the RCA or speaker level outputs. A factory headunit would be the speaker outputs at the headunit or (often) at the factory amplifier.

For a signal processor, connect to the RCA output. For an amplifier, connect to the speaker output terminals. Audio is AC voltage so set the scope to AC volts. Most digital scopes are auto ranging so you generally don't have to set a "range" of voltage level.

Question #6 – Gerson: *Do you have a complete list of professional Test Equipment out there for MECP?*

Answer: The main things I think that are important in electrical test equipment for installation technicians are:

- A good quality DMM – I prefer Fluke products.
- Probe accessories (alligator clips, backprobe pins, etc)
- Hall Effect Current Clamp
- Digital Storage Oscilloscope (better because they are handheld not tethered to a bench)
- Polarity Detector such as the PT-9A
- Real Time Analyzer (RTA)
- Signal Generator – even test CD's with various test signals are a must!

If you can find one, an old Rockford Impedance Meter (IM-1) is a cool tool to have! They don't make them anymore.

I would also recommend an OBD-II scan/reset tool to be able to reset the occasional Malfunction Indicator Light (MIL) or – with the better tools – you can reset some airbag and ABS warning lights too. Beyond that, there are some additional tools, but those are my tools that will definitely keep you relevant in this business.

Question #7 – Matthew: *When level setting an amp with my oscilloscope, what's the best frequency or pink noise to use?*

Todd Ramsey: Level setting with O-scope uses test tones. Pink noise is used with the RTA. As far as the best frequency for level setting, it depends on the range of frequency of the output of the device. For full range, often people use 1kHz. If it's bandwidth limited (such as a subwoofer output from a sub amp) then you would use a more appropriate frequency for that situation. In that example for a sub, you might use 50Hz because it's well below the low pass crossover point that's usually set at around 100Hz on many subwoofer applications.

Question #8 – Doug Tessman: *What is the difference between pink noise (correlated uncorrelated) and white noise?*

Todd Ramsey: Great question, Doug. I have used the following web tutorial before as I think it explains it very well without being overly technical and it has the plus of allowing you to listen to samples of both kinds:

<http://www.luxeivant.com/index.asp?PageAction=Custom&ID=13>

The reason we use pink noise in a car set up is that music has a spectral content that's more closely replicated by pink noise rather than white noise. It also provides the added low frequency masking of outside sounds when using a microphone to "tune" the car.

Question #9 – Joey Cloninger: *What is the voltage limit on Input 2 on the SA-3055?*

Todd Ramsey: According to Audio Control, the input #2 on the SA-3055 takes a range from -56dBu to +36dBu. Now that level description is frequently used in pro audio, but does not make much sense to installers, so what that means is 48.9 volts RMS or 69 volts peak...more than enough for any OEM audio system out there. Like I said, I have never had one single issue with my SA-3055 as far as feeding it too much. It's hungry and it can take it!

Question #10 – Eddie Sargent: *Will you continue to offer these free online conferences?*

Todd Ramsey: Yes, keep up to date by subscribing to the MECP newsletter (send contact info to mecp@mecp.com) or checking the MECP.com website. You can also follow MECP on Twitter (twitter.com/4MECP).

Question #11 – Dustin Twyman: *Where can I find more detailed info about setting a stereo system using the SA-3055? We do have one here but we mainly use it for db readings. What about learning even more uses for the SA-3055?*

Todd Ramsey: Yes, the Audio Control website has the SA-3055 owner's manual available for download: http://rs.audiocontrol.com/company_38//SA-3055_OM.pdf

Question #12 - Chris Silva: *What does a CAN-BUS wire look/feel like? Is it like fiber-optics?*

Todd Ramsey: CAN-BUS wires are usually small pairs, often twisted so they can be mistaken for speaker wiring. Some GM applications use a slow single-wire CAN derivative, but that's going away if not already gone in most models. As far as fiber optics, the presence of fiber optic cables does not indicate the type of data bus protocol – it's just a different way to transfer data than over copper wiring. In general you will find a lot of MOST applications where you see fiber optic cables (often orange or green in color), but some of that information can be CAN data over that network too.

In short, data transfer (copper wiring or fiber optic) does not mean the same thing as the data protocol (which is the actual language of what IS transferring from one place to another along those lines). Obviously with a scope you can't probe optical cables, but you also know it's data on those cables to begin with. It's the twisted pair network wires that sometimes get people confused thinking it's a speaker or analog audio wire.

Question #13 – Guest: *I have a customer with a boat and at the instrument cluster the voltage drops when you rev the engine. The batteries show proper voltage and raise with the RPMs. Any ideas? It has 2 batteries and a Rockford system regulator in it. It charges the first battery and then allows charge to the 2nd battery. Both batteries are charging together. The 2nd battery dies when he uses it just to run the stereo throughout the day.*

Todd Ramsey: I have seen that before and it's usually caused by insufficient wire gauge for the gauge power and/or ground wires. Run some larger gauge wires temporarily up to the gauges to power and ground them to see if the problem goes away. If it does, you know what you need to do. In the past, this has worked for me many times. The boat manufacturers usually don't have a large selection of many wire gauges, so depending upon how many accessories are connected to the gauge cluster power circuit or the ground that is connected there – you can see where the problem may lie.

For isolating batteries on a boat, you can use a standard marine "Perko" switch. It's pretty easy to understand and consumer friendly. Of course there are other choices too. Check out a marine supplier like West Marine just to get a feel for what's available. As a secondary option, you could install a PAC-500 high current relay between the batteries to run them in parallel while the boat is on, but isolate them so the stereo battery is separate from the starting battery when the ignition and engine are off.

The other thing is that the reference ground on the engine block to the negative battery post can also be a problem. Check to make sure it's connected well and of sufficient gauge. Usually if it was a problem, the engine would experience starting problems too.

Question #14 – Roger Kasl: *Thanks, Todd and Lindsay. I have a testing voucher from a CES show 2-3 years ago. Any chance I could still use that to get recertified?*

Todd Ramsey: Hi, Roger. Testing vouchers typically are valid for one year from the date of issue, so sorry about that, but it has certainly expired if it was 2-3 years ago. We still hope you make the path back to MECP by getting recertified though. If you need info about testing, check

out the “exams” page at the MECP website - <http://www.mecp.com/exams.asp> and you can always email questions to mecp@mecp.com.

Question #15 – Fernando Arias: *How do I become an MECP test proctor?*

Todd Ramsey: Eligible proctors are industry reps, MECP Masters (unless the employer prohibits or declines it) and representatives from schools, community colleges, etc (usually instructors or education center directors). There’s a list available at the MECP website – http://www.mecp.com/downloads/MECP_Proctors.pdf

If you qualify and wish to become a proctor, you can send a request to mecp@mecp.com and you will be considered. Retailers can’t be proctors as a general rule, so it must be a non-conflicting position in education or the industry.

Question #16 – Dustin Twyman: *I would like to know where to get some more detailed info on using the oscilloscope in setting amps and the SA-3055.*

Todd Ramsey: Mark Eldridge does a great 2-day sound quality seminar in various places across the country. That’s your best bet for getting some more detail about using RTA’s for tuning. For more info, contact Mark at meldridge@mblsound.com and let him know Todd sent you!

My company (Ramsey Consulting Group, Inc.) also does independent training at a retailer’s location or for groups on the topics we discussed today, in particular OEM Integration and vehicle electrical system analysis and troubleshooting. Should you be interested, shoot us an email at info@ramseyconsultinggroup.com.

Check YouTube too. Some of the guys at Rockford Fosgate (Greg and Jason) have done a few videos showing use of a scope.

Thanks again to everyone for attending. It’s very encouraging to know there are still a lot of professionals out there in our industry who are motivated to participate in a learning opportunity, even if it’s just a refresher of what you may already know.

--TODD RAMSEY