

K9YA Telegraph

Robert F. Heytow Memorial Radio Club

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AADE L/C Meter IIB

Review of the AADE L/C Meter IIB Kit

Philip Cala-Lazar, K9PL

The last few years I've built a bunch of kits, QRP mostly, with the very occasional foray into test instrumentation, e.g., the 4SQRP HF Test Set, Hendricks Deluxe Tenna Dipper and Nor-Cal S9 signal generator.

copy is thoughtfully provided) what followed was a very simple build despite the non-silk-screened PCB. The manual includes photo IDs of the kit's components, troubleshooting and technical discussion sections.

I established two adjacent resistors as landmarks, one vertical and one horizontal, and worked the locations of the rest of the components off of them. Sure enough, just as many reviews asserted, it took but two hours to populate the PCB, insert a 9-volt battery

and mount the few pieces of hardware required. Depressing the power button for the first time indicated success: L/C Meter IIB appeared in LCD letters followed by CALIBRATING and READY MEASURE μ .

Included, but not mentioned on the AADE Web site or manual, are two banana plug terminated alligator clip test leads—red and black.

“...passel of toroids...”

The meter features five operating modes as described in the manual:

When the Lx and Cx switches are off pressing the ZERO button sequences L/C Meter IIB through five different operating modes.

CONTINUED - AADE L/C METER ON PAGE 8

Building the number of kits I have with their myriad capacitors and passel of toroids I got to thinking it would be nice to have an L/C meter in the shack. It would be a great help in inventorying and matching capacitors and when winding toroids. Looking around the Internet for vendors and reading a number of reviews on several Web sites I settled on the Almost All Digital Electronics L/C Meter IIB Kit

AADE Published Specifications

Range

- .001 mHy (1 nHy) to 100 mHy (most units measure to 150 mHy)
- .010 pF to 1 mFd (most units measure to 1.5 uFd)
- (Capacitors must be non-polarized)
- AUTOMATIC RANGING

Many of the reviews noted the kit's simplicity and quick construction times, between one and two hours. Scanning a downloaded PDF construction manual before the kit arrived, the low parts count and few assembly steps appeared to reinforce the reviews' validity.

Kit in Hand

Little more than a week after mail ordering the L/C Meter IIB it arrived securely packed and via USPS Priority Mail. Thanks to the manual's thorough descriptions and full-color photos (a printed



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A Bicycle Mobile Adventure

Part X

Scott B. Laughlin, N7NET

Synopsis of Part IX

After the tandem bike was serviced at Kingman, Alice and Wiley set out for Las Vegas. However, along the way and miles from the nearest cell phone tower, they came upon a couple standing beside a broken-down Harley-Davidson motorcycle. In spite of the man's rude remarks, Wiley set up his 20-meter rig and summoned roadside assistance through a midday traffic net.

After reaching Boulder City Alice was able to contact a Las Vegas ham on two-meters who volunteered to meet them for breakfast and then escort them across Las Vegas.

Part X

A rap came at the door at seven sharp.

"Looks like it's the cycling club," said Wiley after withdrawing the motel window curtain.

"How many are there?"

"Two," said Wiley, heading for the door.

"Are you Wiley and Alice?" asked the stocky man in yellow cycling shorts and matching jersey and helmet. Both cyclists were deeply tanned by the Nevada sun and their muscular legs verified that the majority of those hours were spent in the saddle.

"That's us," said Wiley, accepting the rider's hand.

"I'm Bob and the fellow holding the bikes is Cliff. We've come to share breakfast with you both and then escort you through Las Vegas.

Wiley waved and Cliff responded by touching his helmet with an index finger. That was when Wiley noticed the high-dollar road bikes—narrow tires, thin, lightweight saddles, and drop bars.

"Didn't know about the dog," said Bob, smiling.

"He's our mascot, alarm clock, and burglar alarm all wrapped in one. He's already had his breakfast. He'll wait in the room for us," Alice said.

"What's his name?" called Cliff.

"McBark, the trailer dog, we call him."

"McBark," echoed Bob, turning and smiling at Cliff. "We know a couple in Tucson who ride a Bike Friday Tandem Two'sDay. They have a dog much like McBark. They call him Yackster."

They stowed the bikes in the room and hoofed it to a nearby restaurant. Sabatto's Italiano Food, read the sign out front. It was small and personal, only eight tables with checkered tablecloths. Tony Sabatto, a short man with a prominent nose, spotted Bob right off and showed the four of them to a table near a window and then brought coffee and menus.

"Bob, my friend, you brought others with you today. Welcome. Welcome," he said and then hustled off toward the kitchen.

"Is that Sabatto?" asked Alice.

"It is. He's one of the finest chefs in all of the southwest. At midday folks wait for a table," Bob assured her. "But Sabatto is not his real name. Well, maybe I should say it is and yet it isn't."

Alice thought it was a strange comment. He certainly seemed Italian. "Why would he use a different name than his own?"

"It's a long story. I'll have to let him tell it," said Bob.

Directly, he came from the kitchen with pad in hand. "Are you ready?"

They all ordered sausage and eggs with a biscuit.

"I've seen Sabatto spelled with one 'r', but never with two, that is, until this morning," said Alice as he jotted their orders on the ticket.

"It's because it's not a real name."

"What?" she said.

"I'll explain when I bring your breakfasts," he promised.

"McBark, the trailer dog..."



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“You live in Las Vegas?” Alice asked, directing her question at Bob.

“Yup. I’m a blackjack dealer at Circus Circus,” Bob said. “Cliff repairs slot machines. We both work nights. A third cyclist, Newt, was hoping to come along today. But duty called. He drives for a limo company. A special client, a high-dollar attorney, is flying in from Los Angeles this morning. Newt will stay with him the entire time and then take him back to the airport. He’s a big tipper.”

Tony returned with a pitcher of ice water and tall glasses and returned to the kitchen again.

“You’re both hams?” Wiley asked.

“Yes sir. VHF is my thing. I used to run the old style packet back in the nineties, but changed over to APRS when it changed over. I run one of Byon’s Tiny Trackers on my bike that’s reporting my position, elevation, and speed every fifteen minutes—not that anyone else really cares,” said Bob.

“What about you, Cliff?”

Cliff smiled. “My main interest is CW QRP. I didn’t bring the rig along today, but I fabricated a key that’s fixed to a Velcro strap on my right hand. I key one of Dave’s SW-20s while on the move, feeding a couple watts into a MFJ Ham Stick tuned to the lower portion of the General band. No tuner. It’s not perfect, but it serves me well.”

“It sounds fun,” said Wiley.

Tony came scurrying across the room laden with four breakfast plates, warmed their coffee and then pulled up a chair.

“My parents owned an upscale night club in a city on the island of Sicily during the years of the worldwide Great Depression. My father was the chef and manager while my mother was the bookkeeper. After they were well established the Sicilian Mafia moved in and began levying outlandish protection fees. Father refused to pay and raised such a ruckus with them they apparently decided to have him disappear. Abandoning the nightclub and with the help of loyal friends my parents were spirited away one night. With what cash they could conjure up on short notice they bought passage on a steamer sailing for America.

“Wow. What an experience”

“I was born in New York City in 1931, during the Great Depression. While I was still a toddler we moved here to Boulder City where they started this restaurant serving the workmen building Hoover Dam. They did well, but after their experience back in the old country they decided to maintain a low profile, keeping the place small and the overhead low.

“It wasn’t until after my father passed away that mother told me about a name change that had taken place prior to my arrival on the scene. The Italian community within New York City had, and still has, its means for getting things done in its own way. Our surname became Sabatto and no trace of what it was originally is recorded anywhere.”

“What was it?” asked Alice.

“I don’t know. Mother wouldn’t tell me. She said that the Mafia never forgets and never forgives. Even after the passing of so many years it still isn’t safe to have knowledge of my original name.”

“Wow. What an experience,” exclaimed Wiley.

“That’s my story. Will you share yours with me?” Tony asked.

Wiley went into detail about his Air Force career and Alice’s bout with cancer and how the doctor had encouraged them to live life like tomorrow would be their last day together. The doctor’s statement influenced their decision to pedal a bicycle from Mexico to the Willamette Valley in Oregon.

By this time they were finished with their breakfast. Tony realized they were anxious to get on their way. “I hope you will return,” he said.

They were on the road shortly after eight, drafting one another, each taking his turn out front. In this manner they reached the outskirts of Las Vegas in less time than any one of them could have done alone. ■

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Repeat After Me

A Better Understanding of Repeater Technology

Paul W. Ross, W3FIS



NF4GA Amateur Repeater

Photo courtesy: N4CLA

Unless you have been hiding under the proverbial rock, all of us generally make extensive use of VHF and UHF repeaters for our two-meter, 1.25-meter, and 70-cm local amateur communications. The repeater has replaced the “party line” of telephone lore in the daily activities of most of us. With Internet links through facilities such as EchoLink, we have access to our favorite repeaters anywhere we can get computer or cell phone access.

However, for both new hams, and those of us who have played the game for more years than you want to know about, we often take our repeater systems for granted, and leave the horrid details to the “repeater committee.” As for me, being the treasurer of our local amateur radio club, I get all sort of weird bills for bits and pieces of our club repeater.

Just how do these things work? Why do we need one in the first place? Are there different ways to implement a repeater system? What really goes on inside of one?

The first question we need to ask is “why do we need a repeater in the first place?” Well, the laws of physics come around to bite us in the backside here. VHF and UHF signals are generally limited to “line of sight” due to the curvature of the earth. If we can get up higher, we enjoy better range. On a recent trip, I could work from the fourth floor of a condominium complex into a local repeater without trouble. When I went down to ground level, operation was sporadic, at best. That means simplex operation is going to be limited to 15 or 20 miles, unless you have a decent beam and a lot of power. This negates the convenience of the nice hand-held transceivers we all love. If you want to fool with long distance VHF and UHF propagation, that is quite another game. Flourish of trumpets, 100-foot towers, and multiple-bay Yagi antennas...

“What really goes on inside one?”

Back in the days of AM two-meter operation, I struggled to make contacts with a 100-watt vacuum tube rig and a four-element Yagi on the top of my house. I got to know my neighbors real well with TVI!

The clear answer to this problem is the repeater. Repeaters come in three general flavors, which we will explore in detail:

- Simplex repeaters, which record and play back a short message. Cheap and dirty, but of limited usefulness.
- Cross-band repeaters, which receive on one band (such as two-meters), and retransmit at the same time on another band (such as 70-centimeters). A modest step up in complexity and cost.
- Duplexer repeaters that receive on one frequency, and retransmit on a frequency nearby the received frequency. As you will see, this is the most common repeater implementation. More complexity, and more cost.

There are a number of simplex repeater controllers on the market. These are conveniently connected to a simple transceiver, such as an HT. They record about 30 seconds of incoming signal, then transmit it back on the same frequency. All this requires is the controller, a nice high antenna and adapter cable, and a simple HT. If the

simplex repeater is within “sight” of all the stations that wish to use it, then the effective range of the using stations is greatly expanded with little cost. This system is promising for emergency communications work, where rapid deployment, simplicity and low cost are paramount.

If this isn’t to your liking, the next move up is the cross-band repeater. It is possible to implement this with two transceivers and a controller. If an antenna is to be shared by the two transceivers, then a diplexer is needed. A diplexer is a fancy name for the familiar “signal splitter” we used to use to get the VHF and UHF signals from a common antenna. It is also identical to the “crossover” network used in audio systems to separate out the base and treble components to two different loudspeakers. It has a common port, and



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two ports, one for high frequencies, and the other for low frequencies. For example, the MFJ diplexer I use for satellite radio work is fed from a dual-band transceiver. One output port goes to the two-meter antenna, and the other to the 70-cm antenna of my Arrow Satellite antenna system.

There are a number of high-end transceivers on the market that allow cross-band repeater operation. They are essentially two transceivers in one box. Separate cross-band controllers can be purchased, and all you need is a dual-band antenna and two transceivers. If you have two separate antennas, add a diplexer.

Clearly, the cross-band repeater is not quite what you might want. It would be more convenient to be able to run a repeater on say just two-meters, or 70-cm.

The way out of this is a repeater with a duplexer. How does a duplexer differ from a diplexer? As we said, the diplexer involves two frequencies well separated in frequency. A duplexer presumes two frequencies quite close together, both lying in the same amateur band in our case. The original motivation for duplexers was in the early days of television and FM radio, when there was a need to run multiple transmitters into the antenna system on the top of the Empire State Building in New York. Think of the duplexer as a pair of traps to produce a “notch” to reject the other frequency and pass the desired one.

Practical design considerations lead to an offset of 600 kHz for the two-meter band, and 5 MHz for the 70-cm band. The filters in a duplexer are effectively constructed as quarter-wavelength resonators. The device is adjusted with a threaded rod, which tunes the cavity to the desired frequency. Energy is coupled into and out of the tuned circuit by coupling loops extending through the top of the resonant cavity.

The cavity functions as a series resonant circuit. When a capacitor or inductor is connected across a series resonant circuit, an anti-resonant notch is produced, and the resonant frequency is shifted. If a capacitor is added, the notch appears below the resonant frequency. Adding an inductance will make the notch appear above the resonant frequency, and the value of either component will determine the spacing between the notch and the resonant frequency.

All right, now we have a transmitter and receiver, a single antenna, and a mechanism to keep them from interfering with each other. How do we control this thing? We have to sense the presence of an incoming signal, and re-broadcast it with the transmitter. To avoid “kerchunking” the repeater with spurious signals,

the common strategy is to require that the transmitting station include a suitable sub-audible tone, which is detected by the repeater receiver. If this tone is not detected, then no repeat operation takes place.

On the user end, all that is necessary to do to use the repeater is to:

- Set the power level. Most people run their HTs at full power.
- Set the desired repeater frequency for reception on the user transceiver.
- Set the desired offset frequency to transmit to the repeater. This is usually done automatically, but needs to be done manually on the Wouxun HTs. The offset direction is determined by the conventions used in the band plan. When in doubt, look it up in your repeater directory (ARRL publication or on-line reference).
- Set the sub-audible tone (if needed) to the desired value. This is usually called a “PL” tone, after the Motorola term “Private Line[®]” that has been adopted as a standard in the amateur radio community.

When everything works, just store these values in your HT memory and move on to the next group of repeater settings.

When setting up a new HT, I have found it easier to put together a spreadsheet of frequencies, offsets (if needed),

PL tones (if needed) and repeater names. Then, the HT programming process goes smoothly. If you have the appropriate software and interface cable for your HT let that do the dirty work for you.

Another useful feature of many repeaters is their ability to accept DTMF (“Touch Tone[®]”) to control either the repeater, or implement an auto-patch into the local telephone system. To do this, check with your repeater administrator for the exact details. The DTMF tones are also used to perform maintenance, administration and programming of the repeater controller.

Hopefully, this overview has given you a better understanding of a technology most of us use every day, and frequently take for granted. Now, go “kerchunk” your repeater and get everybody upset! Listen first, then talk! ■



Four Cavity Duplexer

“kerchunk”



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The Clandestine Experience

Jim Henson, W4UFP



W4UFP's First Station

My entry into the wonderful world of ham radio came just after WWII—a perfect time to get interested in anything technical. Surplus markets were crammed with the leftover electronics from the just ended war and tons of radio equipment became available at giveaway prices. This brought about renewed interest in amateur radio and soon converted military units like the ARC-5 command sets began to fill

the ham frequencies. I first went on the air with an ARC-5 receiver and a homebuilt transmitter fashioned from surplus parts. These were the glory days and what an experience it was, not only to watch this phenomenon grow, but to also be a part of it.

Morse Code

Thus began my lifelong affection for the art of radio communication. The principal aspect of this deep appreciation is the now dying art of the use of Morse code. This ancient mode is still, to this day, the most reliable form of transmitted signal. A good Morse code operator can copy the very weak signals from a low-power source when voice transmissions are lost in the garbled mud of atmospheric noise. As an active radio “ham” for more years than I like to think about, I have enjoyed this wonderful avocation from the comfort of a commercial station to the rigors of a dank tent on a barrier island using a low-power, home-constructed, radio apparatus and loved every pest-ridden minute of it.

It was a Sunday morning, not unlike any other. I had retrieved the unusually large state newspaper and while I searched through this mammoth weekend edition, I flipped on my short wave radio

receiver to observe the activity on my favorite band of Morse code frequencies. My engrossed attention to the recent baseball scores was interrupted by an unusually strange sounding signal. I had noticed this same type phenomenon before from stations in third world countries with little or no regulation in their AC power grid. This one, however, was even stranger; he was sending five-letter code groups with no plain text meaning. This, of course, is not lawful and could only mean this station was sending a secretly coded message.

FBI

After some consideration I felt that what I was hearing could be important and made the decision to record these activities on my mini-cassette recorder. After some forty minutes the station stopped sending only to start up again in a few minutes. By afternoon I filled three tapes of these transmissions. Wanting to report this unusual happening to some authority, but not knowing what entity to inform, I tried several government agencies with no luck until I dialed the local FBI office and chatted with the intern manning the Sunday phones. He understood my excited explanation and said he would have an agent call, who, as it happened, was also a ham radio operator.

“...he wasn't wearing a fedora.”

As the agent emerged from the black Crown Victoria, I was already on my way to greet him and hand over the three mini-tapes. I included the pertinent references to time, frequency and conditions. This middle-age government man bore no resemblance to what I had imagined in my mind's eye. The dark three-piece was a bit of a giveaway, but he didn't look at all like Elliott Ness or my mind picture of Dick Tracy. Short, very slender, and bald, he would not make a good candidate for the next agency recruitment poster. My biggest disappointment was that he wasn't wearing a fedora.

Only about two hours had lapsed when my phone rang and upon answering, I immediately recog-



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nized our Dick Tracy “poster boy.” “We want all the tapes you can get for us, I can’t tell you anything else at this point, all I can say is this is very Important.”

During the next two days I stayed glued to the clandestine station’s frequency, filling tape after tape of these “important” coded messages. Each time I called and said I had filled more tapes, the FBI Ford would show up almost instantly. I accused my Fed friend, and his new sidekick, of being parked just around the corner or else were driving much too fast. Neither appeared to see the humor I did as I received an unappreciative stare from both “dark suits.” They would then go away and await my next alert. I still think they were secretly stationed “just around the corner.”

QRT

On the third day the transmissions abruptly stopped. A call from the local FBI office indicated they did not need further cassettes and they would bring me a box of blank replacements. I asked again if the source had been identified and was told similarly there was no other information available.

I never stopped wondering just what had happened. My imagination conjured up scenes of heavily armed and armored special agents bursting in, capturing the bad guys and smashing the station. Probably not quite that dramatic, but the fact remains the transmissions had stopped and the clandestine station was now off the air.

*“...my tale of
mystery...”*

Some years later I was having lunch with a friend and his FBI agent son. Jonathan had volunteered after graduating from USC with a Master’s in political science some fifteen years earlier. He was now stationed in Charleston. I related my tale of mystery and how I could never finish my story until I knew what happened with the information I so dutifully collected. He said there was a time limitation on such matters and promised to check and determine if it could legally be made public knowledge.

The Rest of the Story

A few days later, and as good as his promise, Jonathan called and said he could now, long after the incident, put my long preoccupied speculations to rest. He read from a report that indicated the information gleaned from those mysterious signals showed that a Cuban terrorist group had compromised the White House phone system and was planning to plant a bomb in the plumbing chase just under the Oval Office. Also in the file was a personal letter, signed by President Carter, thanking the FBI for their fine work and attention to duty. Nothing was noted about an alert ham radio operator who had his baseball scores interrupted by a strange sounding Morse code signal! ■



Jim, W4UFP

K9YA Field Day Recipe

A Winning Combination

Dry Ingredients:

- Kenwood TS-850SAT (20 years old)
- Roll of THNN wire from Home Depot
- 24’ Aluminum Tower
- DOS Laptop running TR
- Honda Generator

Wet Ingredients:

- Mike, N9BOR
- Steve, N9WAT
- Art, WB9JKZ

Instructions:

Mix dry ingredients in a northern Illinois Boy Scouts campground. Slowly add wet ingredients until all lumps are removed. Bake for 24 hours. The results are outstanding!

Team K9YA made 1,375 contacts in category 1A (club/non-club portable)—a field of 149. This resulted in 4th place overall and 1st place in both Illinois and the Central Division.

A perfect recipe for fun and camaraderie.



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OzarkCon 2012

OzarkCon 2012 will be held April 13 & 14 in Branson, MO at the Stonecastle Hotel and Conference Center. Conference attendees enjoy benefits including breakfast, door prizes and special room rates.

OzarkCon is a well-established QRP conference; in 2011 it hosted over 100 attendees and 26 vendors. 2011 speaker presentations included the Iowa High Altitude Balloon Project and Software Defined Radios.

Saturday's presentations feature leading-edge activities, technologies and innovative QRP subjects. Conference activities include:

- Friday Evening Banquet and Speaker
- Kit Building Session
- Special Event Station, KØN
- Dummy Load QSO Party with Prize
- Open Music Session both nights
- Vendor and Swap fest Tables
- QRP flea market & vendor fair
- Whacky Key Contest with awards
- Homebrew Contest with awards
- Door Prize Drawings
- Private breakfast Saturday and Sunday mornings

The Branson area offers many attractions for non-ham spouses and families.

Registration opens 1 February 2012

We hope to see you at OzarkCon 2012.

Ham Quips

DICK SYLVAN, W9CBT



SLICES, DICES, CHOPS THRU QRM
MILLIONS SOLD IN EUROPE—BUY ONE NOW!

CONTINUED - AADE L/C METER FROM PAGE 1

READY MEASURE n measures L_x or C_x and displays the result in "nano mode"

READY MEASURE u measures L_x or C_x and displays the result in "micro mode"

READY MATCHnMODE first measures a reference component L_z or C_z and displays the value in "nano mode". When the ZERO button is pressed this value is stored in RAM and the difference between it and subsequent components is displayed in "nano mode"

READY MATCHuMODE first measures a reference component L_z or C_z and displays the value in "micro mode". When the ZERO button is pressed this value is stored in RAM and the difference between it and subsequent components is displayed in "micro mode"

READY MATCH%MODE first measures a reference component L_z or C_z and displays the value in "nano mode". When the ZERO button is pressed this value is stored in RAM and the ratio of the difference between it and subsequent components is displayed in percent.



Checking it Out

Now, with a working L/C meter in the shack, I tested a number of capacitors and inductors. The L/C Meter IIB provides for zeroing out stray inductance and capacitance prior to each testing session—all measured within manufacturers' tolerance. I then air-wound some coils and measured inductances with turns both close-spaced and separated various distances—very instructive. There's not much more to write, the AADE L/C Meter IIB is simple to build, features a user-friendly interface and works as its documentation describes.

Bring on the toroids! ■