**THE PREZ SEZ:**

June is upon us and it seems only yesterday when we had our previous Field Day. A big mystery is how band conditions will be this Field Day. Propagation may be fantastic or it may be poor. Either way we will have fun meeting the challenge, and learn to operate in under those conditions.

Doris, WB1CDD and I will contribute a nice Cheese Cake for everyone's enjoyment (by the way, we don't want any of it back!).

This being a Bully Pulpit, I want to thank everyone who contributed their time and efforts to putting Field Day together and making it a good success.

Don't forget about the next monthly meeting and enjoy HHC's presentation of Field Days Past; it promises to be an interesting presentation especially since Ken has moved up to using DVD's rather than photographic slides for his show.

73,
Steve, KB1GZ

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**ARRL Field Day**

**JUNE 26th and 27th**

**OCARC** will be operating Field Day from Portola Park in Santa Ana. (22 Fwy. to Grand Ave., S on Grand two lights to Santa Clara; E on Santa Clara; the park is on the right) We will be setting up at 7:00 AM on Saturday. Operations will be from 11:00 AM Saturday to 11:00 AM Sunday. Teardown should be complete by 1:00PM.

Please come out and join us. We need help from as many members as possible. We need operators (both voice and CW); and people to help setup and teardown.

Members and guests are welcome to come out and participate, or just visit the operation and see what Field Day about.

As of the writing of this article we are still looking for a member to help out with the food. (Two meals, Dinner Saturday evening and Breakfast Sunday morning.)

---

**Meeting Notice**

Due to recent security changes at our meeting place, you may find the door locked if you arrive at the meeting late. This is an automatic lock and the club has no control over it. Please give W6ZE a call on 146.55 MHz, and someone will come down and let you in. Additional methods for our radioless friends are being studied.

---

**JUNE PROGRAM:**

The June Program will be a DUD presentation by Ken, WACO, on Field Days Past of the Orange County Amateur Radio Club.

Ken is busy digitizing photos from years past and putting them into a presentation for the meeting. This will be a club first. Be sure to attend; it will help us all prepare for Field Day which occurs one week after the meeting. Final Field Day plans will also be discussed at the meeting.

The next regular meeting will be:

Friday, June 18th 2004 @ 7:00 PM

We will be meeting on the 2nd floor in the east bldg.

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**Next Club Breakfast & Open Board Meeting**

Sat. July 3rd 2004
2004 Board of Directors:

President:
Steve Brody, KB1GZ
(714) 974-0338
stevebrody@sbcglobal.net

Vice President:
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2004 Club Appointments:

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ARRL Awards Appointee:
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(714) 557-7217
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OCCARO Delegate:
Bob Buss, KD6BWH
(714) 534-2995
kd6bwh@aol.com

Monthly Events:

General Meeting:
Third Friday of the month
At 7:00 PM

American Red Cross
601 N. Golden Circle Dr.
(near Tustin Ave & 4th St)
Santa Ana, CA

Club Breakfast:
First Saturday of the month at 8:00 AM
CowGirl’s Cafe, Too
2601S. Harbor Blvd.
(just south of Warner)
Santa Ana, CA

Club Nets (Listen for W6ZE):

7.086 MHz CW OCWN
Sun - 9:00 AM - 10:00 AM
Rick KF6UEB, Net Cntl.

28.375± MHz SSB
Wed - 7:30 PM - 8:30 PM
Bob AF6C, Net Control

146.55 MHz Simplex FM
Wed - 8:30 PM - 9:30 PM
Bob, WB6IXN, Net Control

VISIT OUR WEB SITE
http://www.w6ze.org
for up-to-the-minute club information, the latest membership rosters, special activities, back issues of RF, links to ham-related sites, vendors and manufacturers, pictures of club events and much much more.

Club Dues:

Regular Members .......... $20
Family Members* .......... $10
Teenage Members .......... $10
Club Badge** ................. $3

Dues run from January thru December & are prorated for new members.

*Additional members in the family of a regular member pay the family rate up to $30 per family.

**There is a $1 charge if you'd like to have your badge mailed to you.
Once upon a time...

...in lands called DX lived three little Hams. Their calls were P1G, BC1N and PØRK. They had built their own amateur radio stations in the forests and were happily logging other stations from around the world.

P1G had based his station in a straw shack in the forest and his antenna was an all-band HF dipole that was held between trees in an opening atop a hill.

PØRK didn’t have any trees to use to hold a dipole, so in the desert sand he erected an all-band HF trap vertical antenna held up by nylon line and fastened to the ground by tent pegs. He built his shack from bamboo and palm fronds to protect his transceiver and power supply from the rains and monsoons.

BC1N, after contacts with P1G and PØRK, while using his mobile rig mounted on his ox-cart with the monkey treadmill, attached to a generator supplying 12 volts of power (it was a two monkey wheel and delivered seven amps/monkey), decided that the others didn’t exactly plan for future environmental problems such as earthquakes, monsoons, hurricanes, or landslides. He built his station of cinder blocks far from the base of the mountain, on high ground above the river basin, and within a circular stand of very hearty matured trees. He mounted his 4 element tri-band beam on a 45 foot steel tower that was guyed and mounted in a large concrete footing.

Things went well for many months with Q-5 conditions and wonderful rag-chews with stations everywhere. They were certainly in demand for all of the Amateurs around the world attempting to earn awards such as DXCC.

One day, while all three were having their regular roundtable discussion with each other, there came a breaker; “this is WØLF in Gaughtcha, Colorado.” The conversation became long and sort of very friendly and when WØLF mentioned that he’d like to visit their countries, the three little hams were very excited at the prospect of an American Ham coming to visit. They each gave WØLF very explicit directions to their QTHs.

Soon, WØLF visited the QTH of P1G. P1G saw WØLF coming down the driveway and immediately, recognizing the danger of dealing with a “bootlegger,” he locked his front door and wouldn’t open it. The bootlegger, WØLF, bellowed to P1G, “open your door or I’ll blow your shack down!” P1G replied, “not by the S-units of my 100 watt rig.” Then came the mighty rush of air molecules as WØLF pumped out 200 decibels of audio at 250 Hz. from his huge truck mounted-amplifier, power supply and humongous speakers. Sure enough the straw shack collapsed from the rush of air molecules and P1G was off the air and quite literally an SK in hot water.

In the next few days, PØRK and BC1N wondered what had happened to P1G. PØRK told BC1N that it must be a power failure due to heavy rains or something similar keeping P1G away from their daily roundtable. BC1N agreed, “it must be something like that.”

WØLF, the bootlegger, next visited PØRK and again as he walked up the path to PØRK’s shack, he was recognized as a bootlegger. PØRK locked all of the doors and windows.
Bob’s Tech Talk #30
by Bob, AF6C

A Simple Transistor Checker:

We've gotten into some interesting theory over the past few years. Perhaps it is time to change pace and build something! To be honest, my initial idea was to build a fancy code practice oscillator (CPO) – something every ham should have. The CPO I was planning would have three stages and plenty of audio; and we could discuss each stage and how it worked as we went along. However, much of my free time recently was used taking an ARRL antenna modeling class, and I wanted to breadboard up the circuit before passing it on to others to build. So look for it in a not-to-distant Bob’s Tech Talk series. I’ve also had a request to talk about inductors, those mysterious components that make radio possible. Look for that in an upcoming series too.

This month I’m going to show you how to build a simple transistor checker. This checker can measure a transistor’s beta (β) and can check for leakage (we’ll discuss beta later in the article.) It can also tell you if a transistor is NPN or PNP. Figure 1 shows a prototype of the transistor checker that I built some years back. It is powered by four common alkaline AAA batteries and reads beta on a 1 mA meter. The prototype has two scales: 0–500ß and 0–50ß. The latest version has scales of 0–500ß and 0–100ß. The latest version also has a battery test function. While accuracy could be improved by using 1% precision resistors for R1, R2, R4 and R6, standard 5% quarter or half-watt resistors will give adequate precision for most uses.

What is Beta?:

Beta is one of the most important parameters of a transistor. Actually, there are two beta parameters — βDC and βAC; we’re mostly interested here in βDC. The ARRL handbook has a good chapter on the basics of how transistors work, so I won’t get into the physics of their operation here. Instead, let’s look at figure 2, which is a simple representation of an NPN transistor.

If you look at figure 3 (which uses a PNP silicon transistor just to be different), you can determine the base current I_B as:

\[ I_B = \frac{10V - 0.7V}{230k\Omega} = 0.04mA \]

Now that we know the base current, the collector current is:

\[ I_C = \beta I_B \]

\[ = 25 \cdot 0.04mA \]

\[ = 1.00mA \]

Thus, if we know the base current and measure the resulting collector current we can easily calculate the transistor’s DC beta. Note that the 1KΩ collector resistor doesn’t play...
a part. However, there are three things you must watch out for; they are: saturation, cutoff and drift.

**Saturation:**
If you continue to raise the base current the collector current will increase; as it does more of the 10 volts is dropped across the 1K resistor. Finally when the collector current reaches 10 mA the collector current cannot increase any more because the current is being limited by the 1KΩ resistor. The voltage across the transistor is nearly zero. This is saturation. The saturation current is set by the resistor in the collector circuit.

**Cutoff:**
The base current is usually determined by a voltage flowing through a resistor. If the voltage at the base drops below about 0.7V for a silicon transistor or 0.3V for a germanium transistor no collector current will flow. This is cutoff.

**Drift:**
The beta of a transistor is not very stable in value. It changes from transistor to transistor of the same type and is also very subject to change with temperature. When you learn about biasing transistors you learn about the K-value which is the sensitivity of a transistor circuit to changes in beta. Many biasing circuits are designed to make a transistor circuit much less sensitive to changes in beta.

**Figure 4:** An NPN Darlington transistor symbol.

Different transistors have different DC beta values. Numbers from 10 to around 300 are often encountered. Darlington transistors, which are two transistors with their collectors wired together and the emitter of the first connected to the collector of the second have values of beta in the tens of thousands! Figure 4 shows the schematic symbol for a Darlington transistor.

**A Simple Transistor Checker:**

Figure 5 is the schematic of the latest version of my transistor checker. The circuit is very simple. Power is supplied by six volts from four AAA batteries. The meter normally reads a full scale of 5 mA, corresponding to a beta of 500, because of the shunt resistor R1. S3, a normally closed pushbutton switch, removes the shunt resistor (R1) from the meter, so the meter reads 0–1 mA full scale, corresponding to a beta of 100, a five fold increase in sensitivity. A **Battery Test** pushbutton, S4 (not on the prototype) checks the condition of the batteries. When pressed it causes the meter to read the battery voltage with 6V being about 4/5s of full scale.

The two transistor sockets are wired identically except for polarity. We'll discuss the NPN socket circuit; the PNP socket circuit works similarly except for polarity. When an NPN transistor is placed in the NPN socket, the only current that will flow is the collector-to-emitter leakage current. This is read directly on the meter and should be almost zero on the most sensitive meter position, though it may be measurable on a germanium transistor. Pushing the NPN TEST pushbutton sends a current of 10 µA into the transistor's base. The resulting collector current is measured on the meter. Meter scales of 0 - 500 and 0 - 100 will read beta directly and read leakage times 10 µA on the normal position and the high sensitivity position (S3 pressed.) Add a green arc on the meter scale between 360 and 420 on the 0 - 500 scale to indicate the condition of the batteries.

There is one very minor fault with this circuit! Actually you're not measuring beta on the meter, instead you're measuring beta + 1. This is because the current measured is the base current plus the collector current. Except for very low gain transistors, this is hidden within the accuracy of the circuit components. However, to be a perfectionist you may want to mark the meter scale as “ß+1”

**Selecting R1:**
Since the meter is the most expensive part of this circuit, and since numerous 0–1 mA meters are available on the retail and surplus market, I don't want to specify a meter. Any 0–1 mA meter with an internal resistance less that a few hundred ohms will work. I used a surplus 1-1/2” square Simpson voltmeter (Series 1212) that has a 0–1 mA movement and took out the multiplier resistor. Since your meter will be different from mine, you must choose your own R1. The value of R1 is dependent upon the resistance of the meter. Most meters in the 0–1mA range have an internal resistance on the order of 50Ω. YOU CANNOT measure the meter resistance with an ohmmeter without probably damaging the meter. Instead, breadboard the simple circuit shown in Figure 6. Set the potentiometer R102 to maximum and attach the 6V battery (Use the 4 AAAs in the battery holder you've obtained for your project) Leave R103 totally disconnected from the circuit. The meter should be reading somewhere near 3/4 scale. Now slowly increase R102 until the meter reads full scale (the last mark on the scale). Being careful not to change the setting of R102, attach R103 and adjust it until the meter reads 1/2 scale. Next, being careful not to change the setting of R103, remove it from the circuit and measure its resistance with your ohmmeter. What you read is the same as the resistance of the meter. Divide this value by four to obtain the needed resistance for R1 for that particular meter.

**Operation:**
Your Transistor Checker is easy to use. If you haven't used it in a while, first check the battery by pushing the BAT. TEST pushbutton and being sure the meter reads

**See:** TechTalk on Page 8
Three Little Hams from page 3

and refused WØLF entry to the ham shack. WØLF, in a fit of rage again bellowed “open your door or I’ll blow your shack down!” PØRK replied, “not by the S-units of my 100 watt rig.” Recognizing that the shack was but a little sturdier than P1G’s, WØLF cranked-up the audio to 250 decibels and the massive rush of air molecules from the huge speakers first blew off the palm frond roof, and that allowed the walls to collapse. Before PØRK was also relegated to being an SK in hot water, he was able to broadcast a Mayday that was heard by BC1N, who unfortunately was too far away to help.

Poor BC1N was now very lonely during the afternoon when all other Hams were at work and he could no longer rag chew with his radio buddies, P1G and PØRK. He knew that something sinister must have happened to them. As he mused about what he would do, he looked out his open door and to and behold, coming straight for his shack was an obvious bootlegger. It was WØLF. BC1N quickly locked all of the doors and windows. That thoroughly aggravated WØLF, particularly after his long flight to BC1N’s QTH and having to deal with long-check-in lines, a strip and cavity search at every airport and having to explain to security that he forget his own amplifier failure to blow down BC1N’s shack, that he forget his own amplifier power and when he jumped down from the truck he mistakenly landed in front of the speakers spewing out 300 decibels and was hurled into the cinder block wall by the rush of air molecules and “splat” instantly became an SK, even though he was, after-all, a bootlegger.

BC1N continued to operate for many sunspot cycles from his cinder block shack. After many QSOs he became an on-air buddy of TØST and M1LK. They were very popular: after all, who doesn’t like milk with their bacon and toast.

Alternate ending:
Within minutes, the shuttered window of the shack opened and BC1N appeared with an RPG (Rifle-Propelled Grenade) in his rifle and WØLF in his sights and alas, a touch of the trigger and the bootlegger was now part of the ionosphere and the audio amp was diminished into cinders. It seems that BC1N was operating portable from IRAQ as HNA/BC1N.

BC1N continued to operate for many sunspot cycles from his cinder block shack. After many QSOs he became an on-air buddy of TØST and M1LK. They were very popular: after all, who doesn’t like milk with their bacon and toast.

First Ending:
WØLF was so infuriated about his failure to blow down BC1N’s shack, that he forget his own amplifier power and when he jumped down from the truck he mistakenly landed in front of the speakers spewing out 300 decibels and was hurled into the cinder block wall by the rush of air molecules and “splat” instantly became an SK, even though he was, after-all, a bootlegger.

BC1N continued to operate for many sunspot cycles from his cinder block shack. After many QSOs he became an on-air buddy of TØST and M1LK. They were very popular: after all, who doesn’t like milk with their bacon and toast.

[Editor’s note: Larry offered two endings for his ‘Bedtime’ story, so I’ve included both, and I’ll let you choose the one you like.]

Cortlandt Street: From Page 3
formed the Downtown West Businessmen’s Association (DWBA) in part to promote Radio Row as the “Electronic City”. When the proposed site for the World trade Center moved to their neighborhood they soon found themselves instead in a political battle to save their businesses. The Port Authority sent an acquisition notice dated October 8, 1965 to the businesses in the disputed area. Led by Oscar Nadel of Oscar’s Radio Shop, which had recently moved from Greenwich to Cortlandt Street, the 225+ man strong DWBA fought a losing battle against the unaccountable Port Authority and its wealthy backers. Some members gave-in when the PA offered a bonus of three month’s rent for those who moved out prior to the end of February 1966. In the end, the businesses still holding out received eviction notices requiring them to vacate by November 16, 1966, or else... Meanwhile demolition had started back in late March on those building already under control of the Port Authority. While some business moved, they were spread out around the City. An attempt to start a new “Radio Row” on 45th Street failed, though the Port Authority claimed it successful to show the evictions didn’t affect the overall business. Canal Street, about 18 blocks to the north, known for a row of general war surplus stores still had a couple of stores dealing in surplus electronics.

The Aftermath

Radio Row of New York City was no more. Many of the business owners just gave up. Their compensation from the Port Authority for giving up their places of business was reported to be a maximum of $3,000; this considered as a “moving allowance”. The Madnnes Restaurant, one of the last holdouts, moved east on Cortlandt Street three blocks after a forceful eviction in May of 1967. The move
General Meeting Minutes:  
May 21, 2004

At 1900 President Steve Brody KB1GZ called the meeting to order. After the introduction of visitors, Steve stated that Huell Howser of PBS Station KCET may visit our Field Day sight with Southwestern Division Director Art Goddard W6XD. Steve then turned the meeting over to Ken W6HHC to introduce the evening presentation, by Kathy Stanfill KS6CW and Tom Van Buskirk K6TV, on **American Morse Code is Still Alive**.

Following the presentation a 15 minute break was called.

At 2005 the Business meeting began. Roll call of the Board of Directors was called with seven present and the following absent, Rich KE6WWK, Larry K6LDC and Tom WA6PFA.

OLD BUSINESS:
It was discussed that a Problem still exists, on food being served, for Field Day. Two different approaches were decided. (1) People would bring their own food and Charcoal Grills would be furnished, for cooking and heating. (2) A proposal was made by Ken W6HHC to see if the food could be catered. It was agreed to investigate into the two proposals. Ken W6HHC made a motion to spend up to $300.00, for food, gasoline for the generator, and other expenses relating to Field Day. Motion was second by Doris WB1CCD and passed by all members present.

NEW BUSINESS:
None

FOR THE GOOD OF THE CLUB:
Bob AF6C announced that Chris Breller KJ6ZH is planning to visit and operate during Field Day, also other non club members will stop by and help us. Chris W6KFW stated that he will not be at Field Day and somebody needs to take possession of the club generator, by June 20.

CLUB OFFICERS REPORT:
**Vice President:** Ken, W6HHC, announced the June presentation will be the Annual Picture Show of Past Field Day.
**Treasurer:** Bob, KD6BWH, stated that we have $2661.03 in checking and savings.
**Membership:** Chris, W6KFW, announced that we have 44 members, by and that includes our newest member Ken N6CCE.

Meeting was adjourned at 2033.

Respectfully Submitted:
Lowell KQ6JD for Rich KE6WWK
Club Secretary

Letters to the Editor:
Hi Bob, AF6C

Last Sunday afternoon I went to a training session at Las Vegas Motor Speedway. Our radio club volunteers there for the three day NASCAR weekend running two stands and we get a percentage of the profits. That's our fund raiser. Anyway I was talking to two of the hams in the club and mentioned your article on Novice and that started a long conversation of what they remembered. One from the L.A. area mentioned the lady (grump) receptionist that was at the Los Angeles FCC Office. I remember her. The other was from New York and we had a great time reminiscing about our novice days.

Talk to you later,
Art, K7ZE

Errata:
In the April TechTalk column, the first sentence of the second paragraph should read:

The RMS voltage and RMS current are just the peak **voltage and current** divided by the square root of two or **multiplied by 0.707**.

Thanks to Kenan, N6CCE, for catching this typo.

Board Meeting Minutes:  
June 5, 2004

President Steve Brody KB1GZ called the meeting to order after a hearty breakfast for everyone. Seven Board members were present. Absent were Treasurer, Bob, KD6BWH, Technical Chair, Tom, WA6PFA, and MAL, Larry, K6LDC.

Old Business:
Committee reports;

**Field Day**—Ken, W6HHC, reports Proof of Insurance for Field Day has yet to be received, ATV will be coordinated by Tom WA6PFA; Ken, W6HHC will assist with food for Field Day; Chris, W6KFW, has the generator and Bob, KD6BWH, will pick it up. Matt, K6LNX, will coordinate VHF Operations. Lowell KQ6JD reported he has given the flags and coffee pot to Bud WA6VVP.

**Membership:** Chris W6KFW reported there are 43 paid members with 2 pending.

**New Business:**
Carl WA6BSV, brought up the fact that the raffle does not produce money for the club. After some discussion it was felt that the raffle is not supposed to raise money rather it is for the good of the club and may or may not break even.

Ken W6HHC reported the program for June will be on Field Days past.

Meeting adjourned at 8:49 AM.

Respectfully Submitted,
Rich Helmick KE6WWK
Club Secretary
“in the green” (above 380 on the 0–500 scale). No transistor should be in a socket nor should S3 be pushed when checking the battery.

Now install the transistor you wish to check. If you know its polarity, install it in the correct socket. If you don’t, because it’s unmarked, or you can’t find any information on it, take your best guess. While this circuit is kind to most transistors even when installed in the wrong socket, certain special transistors can be damaged. However, most general 2N series transistors will not suffer; transistors to avoid are FETs, especially MOSFETS and GaAs FETS; they are expensive (especially the GaAS FETS) and you won’t often run into them without knowing. Generally J FETs will not be damaged, but are incompatible with this tester. When you install the transistor, be sure to connect the leads correctly into the socket.

Once you have the transistor in what you believe is the proper socket, check the meter. The meter gives an indication of collector-to-emitter leakage current on the 0–500 or 0–100 scales at 10 µA per division. Press the 0–100 Beta pushbutton for the more sensitive scale. If the meter moves upscale significantly you may have the transistor in the wrong socket. Leakage current should be almost (if not totally) unnoticeable for small silicon transistors and small, but possibly detectable for germanium transistors.

Now you’re ready to measure the transistor’s beta. Press the appropriate TEST pushbutton for the socket you have your transistor in and read beta directly on the 0–100 meter scale. If the reading is less than 100, you can push the 0–100 Beta pushbutton and read beta on the more sensitive scale.

Well, that about does it. You can read more about transistors in the ARRL Handbook. If you’d like to make your instrument more accurate, 1% resistors can be substituted for R1, R2, R4 and R6 (see Parts List), R3 and R5 act only to limit current and are fine at 5%.

Uses:

Besides the obvious use of checking transistors, this device is also handy for matching transistors and selecting transistors to use in circuits where complementary pairs (a matched NPN and PNP transistor is used). It can also help determine many of the characteristics of an unknown transistor and help select a substitute transistor.

Parts:

A list of parts is available on page 9. With the exception of the meter and possibly the transistor sockets, all parts are readily available. If there is enough interest perhaps the club can do a group buy.

Next month, maybe we’ll get started on a code practice oscillator.

de AF6C
Cortlandt Street: From Page 6 included a parade down Cortlandt Street of customers lead by a bagpiper. Without the draw of Radio Row, the relocated restaurant closed in its first year.

Construction of the WTC continued. The Port Authority claimed that 75% of the space was under consideration. What wasn’t said was that only 15% was under consideration by business tenants and the remaining 60% was to be occupied by 33 state entities.

There is a lot of speculation on what would have been if the World Trade Center had not demolished Radio Row, and devastated New York’s electronic industry. Some even say that Silicon Valley would now be on the East Coast instead of in California. Whether or not that would have happened is hard to say, however, New York City would most likely have participated heavily along with the San Francisco peninsula and West Boston in the computer revolution of the eighties and nineties.

Part of the PATH deal with New Jersey involved the building of container ports in Newark Bay; that coupled with the loss of the piers west of the WTC site, ended New York City’s reign as a great international shipping port.

Few photographs of Radio row exist today. Those that do are protected by copyright so I’ve been unable to attach any. However some may be viewed on the web. Here’s a link to get you started:


Be sure to view the historic legal notices and maps that are linked from this site!

Next month we’ll end this series with an imaginary 1960 trip to Radio Row. I hope it will be an adventure for all of us!

---

**Parts List for Transistor Checker**

- **B1**: 4 ea. AAA alkaline batteries in an MPD battery holder (Digikey BC4AAA-W-ND)
- **M1**: 0-1 ma ammeter 1–1/2" to 2" face (see text) A Simpson 1212 series voltmeter (1000Ω/V marked in the meter corner) may be used by first removing the meter’s internal shunt resistor.
- **R1**: Resistor, meter shunt, 1/4 or 1/2 watt carbon film.
- **R2**, **R4**: 510KΩ 5% 1/4 or 1/2 watt carbon film resistor. [536K 1%]
- **R3**, **R5**: 820Ω 5% 1/4 or 1/2 watt carbon film resistor.
- **R6**: 1.5KΩ 5% 1/4 or 1/2 watt carbon film resistor. [1.5K - 4R1, 1%]
- **S1**, **S2**: SPST normally open miniature momentary pushbutton switch
- **S4**: (Radio Shack 275-1547 or Switchcraft 953 [SPDT])
- **S3**: SPST normally closed miniature momentary pushbutton switch (Radio Shack 275-1548 or Switchcraft 953 [SPDT])

**Miscellaneous:**

- **1 ea.**: Case, molded plastic with aluminum cover. 5–1/16” x 2–5/8” x 1–5/8”, (Radio Shack 910-5035)
- **2 ea.**: Transistor Socket, chassis mount, Elco 05-3301 (These may be hard to find, but there are many small PC mount transistor sockets that can be adapted)
- **1 ea.**: Meter face. Use an inkjet printer, glossy paper and your favorite drawing program. Mark two scales 0-100 and 0-500 and put in a green segment for the battery test indicator. Cement the paper to the back of the existing meter scale plate.

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**MAY MEETING PIX**

Tom Van-Buskirk, K6TV, and Kathy Stanfill, KS6CW, talk on American Morse is Still Alive. On the table are old keys, relays, sounders, and a Mc Elroy Instructograph code training machine. - Photo W6HHC
UNSUNG HEROES
by Bob, WB6IXN – Club Historian

It is time that the OCARC recognize the following OPs and volunteers, who deserve our utmost thanks and appreciation, for providing us with delicious Saturday dinners and Sunday breakfasts on Field Day!

1965 – Jack Shaw, WA6YWN
1967 – Dave Hollander, W6COJ, and XYL
1972 – Bill Hall, WB6CQR
1975 – W6HHC’s XYL, Diane
1975 – WB6AJ V’s XYL, Barbara
1975 – WA6LHB’s XYL, Jaycee
1975 – WA6WZN, Sandy, who cooked Sunday breakfast
1981 – W6RE, Alex, cooked Sunday breakfast
1981 – KB6MT, Jerry, helped cook Sunday breakfast
1985 – Jane Watts, NØNE (Club dubbed Jane with ‘none’; now she’s KC6TAM)
1986 – Jane Watts, NØNE
1986 – Jeannie Talcott, KB6EZ
1986 – Dottie Watts, W6iBP
1987 – Jane Watts, NØNE
1987 – Dave Hollander, W6COJ
1988 – Jane Breller, NØNE
1988 – Chris Breller, KA6MP/KJ6ZH
1990 – Jane Breller, NØNE
1991 – Don Hughes, KC6ONZ
1992 – Don Hughes, KC6ONZ
1993 – Don Hughes, KC6ONZ
1994 – Jane Breller, KC6TAM
1995 – Frank Smith, WA6VKZ
1996 – Frank Smith, WA6VKZ
1997 – Frank Smith, WA6VKZ
1997 – Steve Rasmussen, KE6NAH
1997 – Bob Schnabel, KM6TL
1998 – Frank Smith, WA6VKZ
1998 – Steve Rasmussen, KE6NAH
1998 – Bob Schnabel (?), KM6TL
1999 – Frank Smith, WA6VKZ
2000 – Frank Smith, WA6VKZ
2001 – Don Hughes, KC6ONZ
2002 – Don Hughes, KC6ONZ
2003 – Don Hughes, KC6ONZ

If you can fill in any of the blanks, contact Bob, WB6IXN, on the 10m or 2m Nets, at Club Meeting, or, at: bobev@netzero.net

FIELD DAY IS: JUNE 26th & JUNE 27th
Join Us!

Next RF Deadline: July 5th

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