

**LEO SHEPARD PASSES ON**  
SEE PAGE 3

VOL. 1 FEBRUARY, 1953 No. 2

## *Frequency Shift Exciter the Easy Way*

TED SWIFT, W6CMQ

Is February 20th getting close? Have you considered modifying the present rig? Have you considered modifying a command set? Have you considered looking for a surplus FSK exciter? Have you considered everything and still find yourself not ready to join the fun in the opening days of low frequency RTTY? In other words are you in the mood for an excellent crystal controlled FSK exciter that can be built from scratch in six hours and that will put your present rig on FSK without touching a wire? If so then read on.

First break out "CQ" for October, 1952 (page 37) and contemplate the beautiful simplicity of the "Collins 709D-1" (fig. 1) there shown. Three miniature tubes, one tuned circuit, a crystal and a handful of small parts. Pretty sweet, huh?

Now examine the diagram of your present transmitter. Does it have an oscillator tube? (Most of them do). Look at the leads connected to the oscillator tube socket. The 709D-1 needs 6.3 volts a. c. for the heaters, it's probably available at pins 2 and 7 of your oscillator socket. The 709D-1 needs 150 volts d. c. (or something close to it). What's the screen voltage on your oscillator? The diagram of the 709D-1 indicates a lead through a "stand-by" switch to ground — does the cathode of your oscillator tube go through such a switch, or perhaps through a telegraph key to ground? Hot dog!

All swell so far, but what about the r. f. output? Does your rig have a tuned circuit that normally connects to the plate of the oscillator tube? Would that do for the tuned circuit shown for the 709D-1? If so, your in business! If your rig uses some form of Pierce oscillator, capacity coupled to the grid of the next tube, you are still in business and all that you have to do is provide the necessary tuned circuit in the unit you build and connect the hot end through the socket pin to the coupling condenser that is now in your rig.

The only thing you won't find is a lead on your oscillator tube socket to the sending contacts on the teletype machine. Maybe you

(Continued on Page 6)

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# RTTY

12

RTTY



## HORSE TRADES

This page of the Bulletin is for use of amateurs who have teletype equipment for sale or trade and for those looking for equipment to buy or trade. It is a free service and may be the means of getting some one on the air.

Wanted—Receiving Distributor Only . . . . . W6IZJ

Wanted—Receiving Distributor . . . . . W6ILW

Wanted—Model 12 with Keyboard . . . . . W6WYH

Wanted—Model 12 Keyboard, with receiving and transmitting distributor or just transmitting distributor . . . . . W6GFI

Wanted—Model 12 Keyboard . . . W6NAT and W6CL

*RTTY is the Official Publication of the*

**Southern California Radio Teletype Society**

and is published for the benefit of all Radio Teletype Amateurs and Experimenters.

**SOUTHERN CALIFORNIA RADIO  
TELETYPE SOCIETY**

3769 East Green Street  
Pasadena 10, Calif.

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## Southern California Radio Teletype Society Monthly Meeting

The January meeting of the Society was held at the home of Lewis Rogerson, W6SCQ, in San Gabriel, California.

Lewis has just completed his new ham shack consisting of two large rooms with a space between the walls to accommodate his radio gear, leaving only the front panels exposed in one of the rooms. In addition he has a complete bathroom and a 30-gallon hot water tank. This is really a ham's dream.

Ed Simmons, W6CLW acted as Chairman while Bert Ayers, W6CL pinch-hit for Lewis as Secretary-Treasurer as Lewis had his hands full playing host to the 24 people present.

Merrill Swan gave reports on letters addressed to the Society and received by him.

After a general discussion on the normal Society business Ted Swift, W6CMQ gave a talk and displayed his FSK Exciter which was enthusiastically received by all. The text and diagrams of the exciter are described in this issue of the bulletin.

Emile Duval, W6FLW, reported on Net activities and outlined procedure to be followed for Net operation. Several of the problems were ironed out and all agreed the Net is shaping up nicely.

Ed Simmons, W6CLW gave an interesting talk on his trip to the Monitoring station in Santa Ana, explaining some of the functions of the personnel and a description of

the equipment. Ed wound up the business end of the meeting with some reports on new regulations to become effective on February 20th, 1953.

The usual refreshments were served and the members gathered around a magnificent display of teletype gear that was layed out on Lewis' work benches.

The following is a list of those present at the meeting.

W6EV	W6CMQ
W6KNI	W6NSS
W6BWQ	W6LSG
W6LGO	W6AEE
W6MRO	W6VHR
W6IIV	W6SCQ
W6RL	W6OZE
W6FLW	W6CL
W6CYR	W6CLW
W6GFI	W6PNW
W6NAT	(XYL of W6PNW)
W6ILW	R. A. Howard

The next meeting is tentatively set to be held at Roy Meadows, W6GFI at 516 West Knoll Drive, Hollywood. To get there drive 1 block west of La Cienega and 1/2 block north of Melrose. Roy has all current types of teletype gear and will have the Military FGC/1 Terminal Unit in operation. The date will be announced later on the teletype frequency.

For information regarding membership in the Southern California Radio Teletype Society contact committeemen W6CLW, Ed Simmons, W6SCQ, Lewis Rogerson or W6AEE, Merrill Swan.

## In Memoriam

LEO SHEPARD, W6LS

(1907 - 1953)

*It is with deep regret we report the passing of one of our most ardent fellow amateurs. Leo passed away on Sunday, January 18 at 10:15 a. m. in the Long Beach Naval Hospital. Funeral services were held Wednesday, January 21, at the Hollywood Cemetary, Hollywood, California. He leaves his wife Emma (QRMMA) and three sons. In his early youth he sailed the seas as a radio operator, after which he spent 20 years with C. B. S. During and after World War II he spent 5 years of active service with the United States Navy. Leo was one of the pioneers of teletype and was always the first to help other amateurs with their problems. His memory and good deeds will be with us forever.*

# Simple Auto-Start Circuits

ED PHILLIPS, W6IZJ

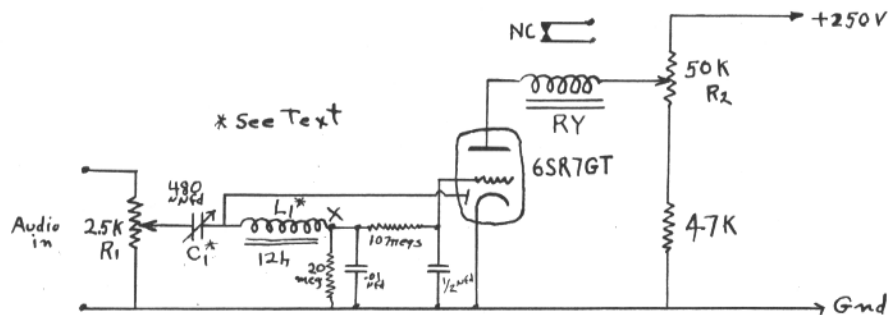
The "Auto-Start system provides a means of copying all the TTY signals on a radio channel without requiring the complete station equipment to run continuously. Depending on the method used, more or less of the equipment runs all the time, the rest being turned on and off by reception of a TTY signal. In the circuits to be described the receiver and relay circuits run continuously and the printer and terminal unit are switched on whenever the mark tone of a TTY signal is received. Switching is done by a relay in series with the AC power line.

The basic circuit required consists of a tone filter tuned to mark frequency (2125 cps), and a detector and an amplifier tube to operate the AC relay. The mark filter and detector from the TU could be used for this purpose, but this would require the TU to operate all the time. The audio input to the auto-start circuit must be obtained from a point in the receiver which has constant audio

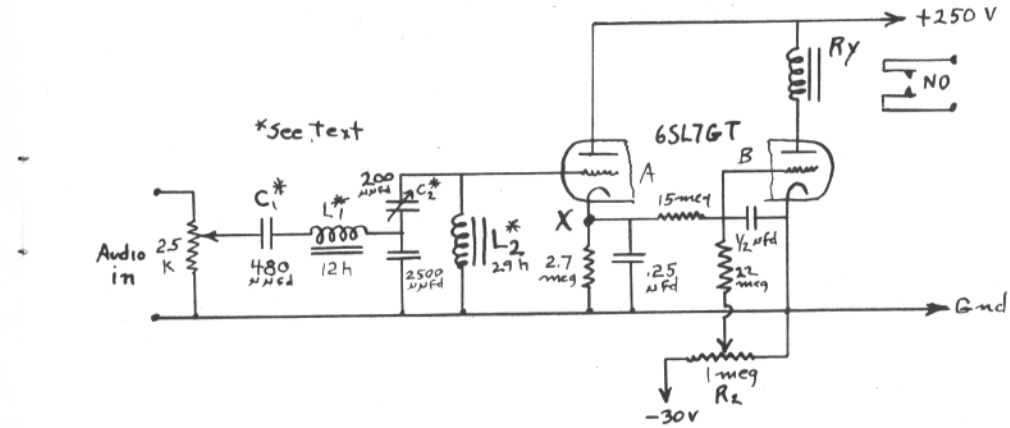
level. The "phones" output or a 500 ohm line are preferable, but the voice coil winding of the output transformer may be used if ten volts of audio is available.

Circuit A uses a tuned filter made up of C1 and L1, a detector from the diode unit of the 6SR7, and a relay tube or triode unit. A signal at the resonant frequency of the filter causes a negative voltage to appear at point X, which biases the triode to plate current cutoff and closes the normally closed contacts of the power relay. The RC network in the grid circuit causes about five seconds delay in closing of the contacts and about ten seconds delay in opening.

The circuit is adjusted by applying a mark tone to the input and tuning C1 for a voltage maximum at point X, as measured with a DC voltmeter. R1 is then adjusted to give about minus 15 volts at this point. R2 is adjusted to



(A)—SUPER SIMPLE



(B)—SIMPLE

give about five ma. through the coil with the signal removed. The circuit is then ready for operation and should require no further adjustment provided the receiver audio gain is left unchanged. Until more fone QRM is experienced on our new channels this circuit should be entirely satisfactory.

Circuit B is similar, except that the relay tube is biased to cutoff in the absence of a signal, and an infinite impedance detector is used. The input filter is much sharper, and operates well in the presence of heavy fone QRM. In this circuit the normally open relay contacts are used. If a battery is used for the negative 30 volt supply the potentiometer in the bias circuit should be increased to 5 megohms to reduce the current drain.

Adjustment is similar to that for the previous circuit, except that both C1 and C2 are tuned for maximum voltage at the cathode of tube section A. R1 should then be set to give about thirty volts at this point. R2 is then adjusted for plate current cutoff of section B with the signal removed. The closing time of the circuit is about two seconds and the

opening time five seconds. Increasing the setting of R1 reduces the closing time and increases the opening time. A more exact setting can be obtained by adjusting R1 to the point where the relay just stays closed when a weak station sends "blank" steadily.

A comment is required concerning L1 C1, L2, C2. The condensers are compression mica padders, and the inductances were obtained from a surplus "1000 cycle" filter unit sold by International Radio and Electronics Co., Fairfax at Melrose, Hollywood. The price was about 20c at Christmas time. The coils are removed by cutting away the can and melting the tar out over the kitchen stove. The 12 henry choke has two leads. The 29 henry choke has three leads and the connection is made to the high resistance pair.

**RY—Both Circuits:** SPDT relay, 5 to 10,000 ohms, set to close at 3 ma. and release at about 1.8 ma. (Sigma 41F or equivalent).

**NB—**At least 10 volts of audio should be available at the input terminals.

## FREQUENCY SHIFT EXCITER THE EASY WAY

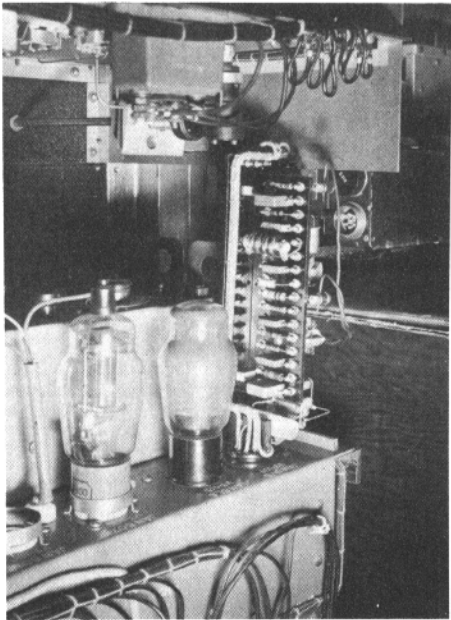
(Continued from page 1)

have a blank pin in your oscillator tube socket that could be used for that. If not, the worst you will face is providing a jack or a pair of terminals to connect the FSK unit to the sending contacts.

In other words, all the power and r. f. leads that the 709D-1 requires are available at the oscillator socket. Let's build the 709D-1 on a small base, mounted on an old tube base, and wired to plug into the present rig.

Look your rig over carefully and see how much space is available around the oscillator tube socket. It does not take much for the few small parts of the 709D-1. Build some kind of a frame to mount the parts. Arrange the variable condensers so that their shafts point toward some clear space so that you can adjust them. If the space is not too convenient its still ok because they will not have to be touched after they are once set properly.

The accompanying photographs show a unit mounted on a 3x8x1/8-inch bakelite panel with a 2x6x1/8-inch bakelite terminal board arranged to mount the fixed condensers and resistors. The unit shown plugs into the oscillator tube



Exciter Plugged Into Rig

socket of a surplus BC-610 exciter deck. Bakelite was chosen in this case for the frame to allow terminal posts to be mounted in it to support the small parts. If you have nothing fancier, number 10 or 12 tinned wire forced through small holes makes a dandy terminal post for such purposes.

A copper ground strap was made by pressing a sheet of shim copper over the completed terminal board in such a way as to leave a dimple in the copper at each post. A strip of copper was cut from this 1/2-inch wide, with ears sticking out to each of the several terminal posts that are to be grounded. The dimples were punched out and the strip then fitted back on the terminal board and the ears soldered to the terminals for common grounds.

The unit pictured is mounted on an 8-prong tube base taken from a metal tube. The center bakelite post was drilled and countersunk for a number 6x32 FHB machine screw. By this screw, the base was attached to a bit of 1/4-inch bakelite which in turn was attached to the exciter panel. The addition of a metal bracket arranged to mount under some available screw in the transmitter would make the finished product more rigid. But heck, the idea was to get FSK going by February 20th.

A couple of parting thoughts. Take one of the six hours required for the construction of the unit to carefully plan the location of ALL parts on the panels. With a little care in placement, the unit can be wired with about three wires; two for the heaters and one for the B-plus. The rest of the connections are made with short straps of wire run from one terminal to the other.

Oh yea! Don't forget if you connect the unit shown in "CQ" directly to the sending contacts of your keyboard you will get low frequency "Mark" and high frequency on "Space" which is backwards. Either use back contacts on your sending relay to key the thing, or modify the circuit, (see Fig. 2). The modification consists of connecting the 150 volt lead to the 15K resistance as though the leads marked "to polar relay" were connected together. Wire the keyboard sending contacts from the other side of the same 15K resistor where it joins the .05 condenser and the 10K resistor to ground. This arrangement will short the d. c. diode voltage on "mark" and result in right-side-up keying. This arrangement will also put 150 volts across the 15K resistor so use a two watt unit at least.

## CIRCUIT DIAGRAMS OF THE 709D-1 EXCITER UNIT

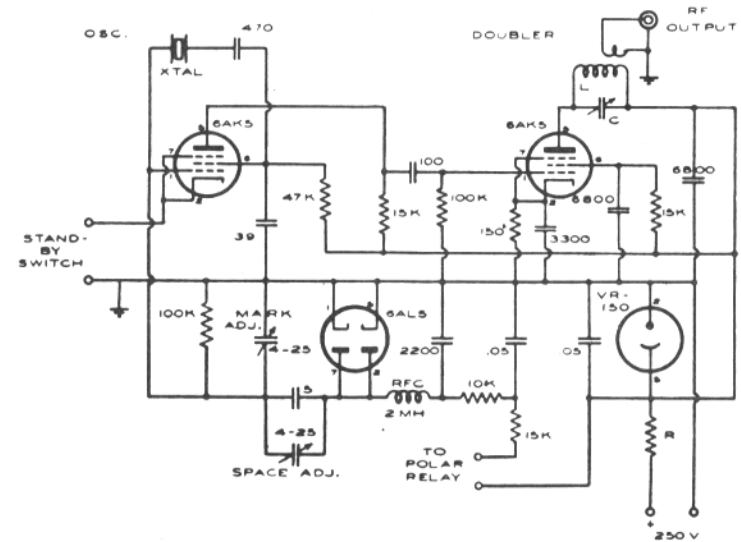


FIGURE 1

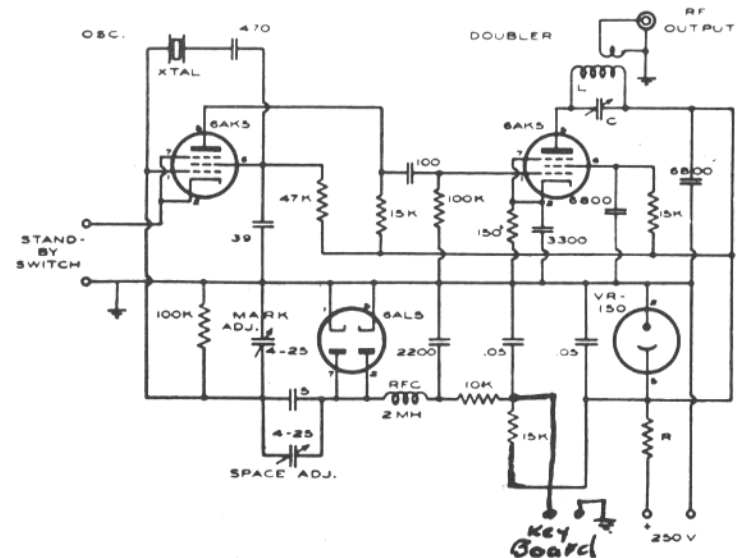


FIGURE 2

## Further News on the New Regulations

ED SIMMONS, W6CLW

### Amateur Radio Teletype Subject of New Federal Communications Commission Regulation

The Federal Communications Commission at a session on 23 December, 1952 made a final decision on Docket 10073 comprising miscellaneous amendments to the operating rules of the amateur radio service with respect to 7 mc radio telephone, novice operation, amateur teleprinter standards, F-1 (FSK) emission allocations, and call sign procedure. Notice of these proposed rules were published on 26 April, 1952. Comments were filed by 266 individuals and organizations, mostly favorable to the proposals. Some opposition to the severity of technical and identification requirements for teleprinter operation was expressed. Several individuals and the ARRL requested that F-1 emission be restricted to a segment of the 7 mc. band only.

The request for more severe requirements for call sign identification came largely from the FCC Field Staff where difficulty in monitoring has been experienced. The restricted technical standards for teleprinter operation in the regulations arise from the same circumstances. Since present practice in amateur teleprinter operation is to concentrate operation on a few frequencies in a manner least likely to interfere with other amateur activity, the commission ruled that the larger choice of operating frequency for teleprinter use in the regulation would be most beneficial to the amateur service as a whole.

Under the new rules, radio teletype operation of a specifically defined type will be permitted within the non phone frequencies of the 3.5, 7, and 14 mc. amateur bands. Radio teleprinter operation in these bands must conform to the following standard:

Single channel, sixty words per minute.

368 operations per minute, start-stop, seven and one half unit timing.

Standard five element coding of International telegraphic alphabet No. 2, using pure radio frequency shift keying of 850 cycle deviation.

These teleprinter transmissions must be identified at the beginning and end of each single or series transmissions and at least once every ten minutes during transmission.

Teleprinter transmissions above must be identified both by print and by Morse code using make-break or frequency shift keying.

The following high frequency bands are allocated for radio printer operation using 1.1 F-1 frequency shift telegraph emission subject to the rules:

3,500 to 3,800 kc.  
7,000 to 7,200 kc.  
14,000 to 14,200 kc.  
14,300 to 14,350 kc.  
26,960 to 27,230 kc.  
29,000 to 29,700 kc.

All types of emission for teleprinter signaling are permitted in part or all of the VHF and UHF bands and Eleven Meter Band. Where audio frequency shift keying type A-2 or F-2 is utilized, the audio deviation is limited to 850 cycles and the highest audio frequency is limited to 3000 cycles per second.

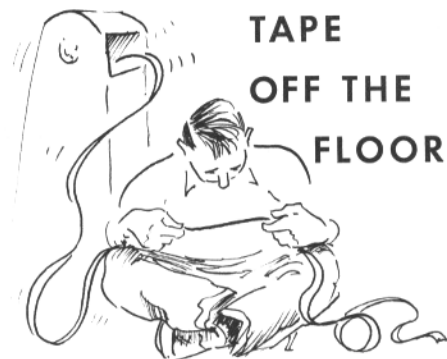
## DON'T JUMP THE GUN!

The regulations regarding FSK on 80, 40 and 20 meters do not go into effect until February 20th. Please wait until the deadline before doing any testing or checking on the air until legal to do so. It is for our own protection that we obey our laws and regulations.

Last month when the Bulletin was mailed a 2c Postcard was enclosed for constructive comments. Appreciation is expressed to the following for the nice comments made on the returned post cards:

W6FLW	W6FNW
W6KLD	W6KYV
W6OWP	W7VS
W6NSS	

Thanks again fellows and for those who still have the cards we would like to hear from you.



... by the way—I have coax antenna up now, just a single and that is what I have on now. It seems to work pretty good . . . . W6AEE de W6PNW.

... do you have any of the plugs that fit the back of the BC-459A? I had some but cant find them, and sure could use one right now. So how about it? W6AEE/Gang de W6IZJ.

Here is a little cutie: All of us have practically worn out the old phrase "The Quick Brown Fox Jumper Over the Lazy Dog's Back" for the purpose of trying every letter in the alphabet and naturally there are a lot of duplicated letters but the following was copied from the Commercial RTTY circuit and the sentence uses only six letters more than once—and they are the vowels—One "E" two "I" two "O" and one "U" . . . . "PACK MY BOX WITH FIVE DOZEN LIQUOR JUGS."

... and another first this evening, got hooked up with Emile, W6FLW this evening, and this is the first time I have heard your signal, you are about S5-6 but I can copy you solid here . . . . What's new? W6CL de W6NWM.

W6ILW Steve Stevens is under way on a "Merrill Terminal Unit" and should have the thing working in about two weeks. Steve is located in Los Angeles near Huntington Park.

... the rate I'm going I hope it won't be too long before I get on the air . . . . I am using the Terminal Unit circuit described in September CQ. It looks like it ought to be a pretty fair unit. W6DEO de W6GFI.

W6CAP, Robert Thompson has picked up a complete Model 12 and proceeded to build the terminal unit shown in the latest QST reporting the operation very successful. He is now in the process of fixing up the transmitter and receiver and in a very short time we should hear the signals of another new station on 2 meters. W6CAP is located in the city of Gardena.

... I am located in Los Angeles about three quarters of a mile from Alhambra, in other words in El Sereno (on a hill top) of course. W6IZJ de W6EV.

... as for the low frequency tone, it never has looked just right since we put that new pot in, but that sure works, might have to make a trip to Green St. W6AEE de W6RL.

Last month we reported that W6NSS sold his model 12 to W6NYS . . . this is a slight error for Brody actually sold the gear to W6NYF . . . sorry Al and Roy, but that doggone S got in there somehow.

... also sorry you were not on the air, you missed a lot of fun. I had no idea that we could gather so many RTTY stations at one time on this frequency. W6BWQ de W6CMQ.

Another Terminal Unit is in the early stages and if all goes well we should have a new 2 meter station as well as FSK on the other bands. The call and name is W6WYH, Ted Wilson . . . . located in Los Angeles.

... and sorry Johnny that you could not make the meeting last Saturday. Boy we sure had a house full. The more the merrier. W6NWM de W6SCQ.

Also reported last month was a "T" welding job that didn't make the grade. Shorty's "T" fell off again and has now been replaced with the complete "T" bar. Be a little more careful the way you handle those letters Shorty.

... I thought I would mention that the Auto-Start here is on every evening from six until eleven, and that I usually get solid copy from everyone except for about 2 or 3 stations. W6CLW de W6IZJ.

And here's a report on another Terminal Unit in the final stages. W6KNI in Alhambra is due on the air at any moment on 2 meters. Fine Cliff and welcome to the 2 meter teletype group. The teletype gear? A Model 12.

*Traffic Net News*

EMILE DUVAL, W6FLW

The Southern California Radio Teletype Society Net operates every Tuesday evening at 8 p. m. on 147.85 mc.

The Net has now been in operation for 4 weeks and shows promises of doing a swell job after ironing out difficulties and gaining experience.

Procedure of operation is the Roll Call and request for traffic. After Roll Call the traffic that was signified is handled in the rotation of stations that requested the direction of traffic. This is followed by pertinent bulletins. When the Net is formally closed a round table is set up and goes on indefinitely. Those wishing to pair off or work specific stations are requested to go to the other Channels A; B or C so that more stations can work simultaneously.

The listing of stations answering Roll Call for Net operations for the past 4 weeks are:

JANUARY 6—1953 This was an informal meeting.

W6DEO	W6CLW
W6RL	W6BWQ
W6FLW	W6IZJ
W6QQM	

Total Checking in: Seven

JANUARY 13, 1953—First formal Net meeting.

W6AEE	W6GFI
W6CL	W6NWM
W6CLW	W6QQM
W6DEO	W6SCQ
W6FLW	W6IZJ

Total Checking in: Ten

JANUARY 20, 1953

W6AEE	W6FLW
W6BWQ	W6NAT
W6CL	W6NWM
W6CLW	W6PNW
W6CMQ	W6RL
W6DEO	W6SCQ
W6EV	W6IZJ

Total Checking in: Fourteen

JANUARY 27, 1953

W6AEE	W6FLW
W6CL	W6NWM
W6CLW	W6QQM
W6EV	W6RL
W6IZJ	

Total Checking in: Nine

## SOUTHERN CALIFORNIA RADIO TELETYPE SOCIETY MEMBERS

W6AEE—Merrill Swan  
3769 East Green St., Pasadena

W6BWQ—Bud Kuhlemeier  
1630 Kenilworth, San Marino

W6CL—Bert Ayers  
2132 West 146th Place, Gardena

W6CLW—Ed Simmons  
455 South Oakland Ave., Pasadena

W6CMQ—Ted Swift  
2330 Melville Drive, San Marino

W6CYR—Jim Perkins  
1419 So. Spruce St., Santa Ana

W6DEO—Fletch Hantke  
1261 Linda Rosa, Los Angeles

W6EV—Lester Hammond  
5045 La Calandria Way, Los Angeles

W6FLW—Emile Duval  
11420 East Dickey St., Whittier

W6FNW—Jim Ries  
332½ East 76th St., Los Angeles

W6GFI—Roy Meadows  
516 West Oak Knoll Dr., Hollywood

W6IIV—George Lowe  
1516 Las Lunas, Pasadena

W6ILW—R. B. Stevens  
1328 E. 83rd St., Los Angeles

W6IZJ—Ed Phillips  
170 S. Michillinda Ave., Sierra Madre

W6KNI—Cliff Schwander  
420 So. 7th St., Alhambra

W6LGO—Nelson Hannawalt  
2531 Second St., La Verne

W6LSG—Larry Mueller  
5413 Passons Blvd., Pico

W6MRO—Braz Brazelton  
3120 Poplar Blvd., Alhambra

W6MYC—Johnny Rothrock  
69 Mar Vista, Pasadena

W6NAT—Bill Driml  
912 So. Montebello Blvd., Montebello

W6NSS—Al Brody  
1962 So. Sterns Drive, Los Angeles 34

W6NWM—John Gross  
122 Ave. "C" St., Yucaipa

W6PNW—M. R. Reynolds  
13503 Stanbridge Ave., Bellflower

W6OQB—Ralph Poore  
230 West Camino Real, Arcadia

W6OZE—Charles Patrick  
402 North Lucia, Redondo Beach

W6QQM—Walt Nestler  
1727 New York Drive, Altadena

W6RL—Shorty Griggs  
110 Standard St., El Segundo

W6SCQ—Lewis Rogerson  
5340 No. Muscatel St., San Gabriel

W6VHR—Geo. E. Marshall  
631 So. Norton, Los Angeles

KMB899—R. A. Howard, Pomona, Cali  
Art Addaway—9700 Ben Hur, Whittier  
Jim Childress (2nd Op. W6RL)

*Hints on Receiving  
FSK Signals*

TED SWIFT, W6CMQ

1—Use a stable receiver, if yours drifts, leave it on 24 hours a day.

2—Tune signals on the nose. This means the phantom carrier should be centered in the crystal filter pass band. One way to be sure of this on initial adjustments is to cut the BFO off and the "S" meter on. Adjust the tuning until the "S" meter flutter resulting from FSK keying is a minimum. Use some crystal filter during this check. With the receiver tuned on the nose, be sure that your BFO has sufficient tuning range on the panel control so that you can get the required 2125 and 2975 cycle beat notes. If you can't tune the BFO that far (mine won't) it may be necessary to adjust the BFO behind the panel to throw the zero beat position off center. If this is necessary, be sure you go the right direction. You can figure out whether the BFO should be on the high side or low side of the I. F. frequency if you know whether your high frequency oscillator (or oscillators) are on the high or low side of the R. F. signal. Cut and try is usually easier. Set the BFO on one side. If the machine prints greek then try the other side. Once the correct position of the BFO control is determined, mark it, and (if its stable) forget it. After that simply tune FSK signals for a good "X" on the tuning oscilloscope. (More on that later).

3—Use as much crystal selectivity as you can and still pass the required 850 cycle shift. The more selectivity the less noise and QRM you have to worry about. (News, huh?)

4—Run both R. F. and A. F. gain controls as high as practical without overloading the receiver. Depend on the limiter in your terminal unit to cut the signal down to size. This scheme is a fair substitute for automatic gain control. If you use a monitor loudspeaker you better connect about a 500 ohm pot in series with the voice coil so you can cut down the noise in the room without cutting the signal to the terminal unit. (Sure, use a pad instead of a pot if you want to be fancy).

5—Provide an oscilloscope connected to the terminal unit to show an "X" on correctly tuned signals. Mount the thing where you can see it while tuning. If you don't have an oscilloscope, better get one, or else provide a pretty fancy substitute for a tuning indicator, because tuning FSK teletype signals blind is for the birds. It is not like AFSK.

6—If you are going to modify your receiver for FSK work, the following features should be considered desirable but not essential. (If you have to modify your receiver to make it stable, that is essential! That's not what we are talking about!)

(A) Automatic frequency control: AFC is a poor substitute for a stable transmitter and a stable receiver. It's not recommended unless you are pretty hot at building fancy gadgets. However, it is one way to compensate for lousy receiving (and transmitting) oscillators.

(B) Diversity reception: A swell idea if you have two similar receivers that are stable and sensitive. Two antennas spaced several wavelengths apart are required, or as a substitute, one horizontal and one vertical antenna.

(C) Automatic Gain Control: The poor man's diversity receiver. Good stuff, especially if the limiter in the terminal unit aint so hot. (Don't confuse Automatic Gain Control with Automatic Volume Control). AVC is no use on FSK signals. The "Mark" and "Space" signals fade by vastly different amounts and at different times and at different rates. AVC will pull the receiver sensitivity down on a strong "Mark" signal and will not recover in time to let a weak "Space" signal through. Forget your AVC for FSK).

7—First, last and always, use a stable receiver or be prepared to ride the tuning control. Remember a CW receiver can drift a couple of kilocycles and the ear can still copy the beat note. A two kc drift on a fone signal will have no other effect than to change the "S" meter reading slightly. On FSK signals from teletype machines a drift of 100 cycles can change the language being used (from English to Greek, of course). You have enough to do with your hands, such as signing call letters with Morse code, operating control switches all over the shack and holding clip leads on terminals without having to tune a drifting receiver (or did I say that before)?