Well, gentlemen, this is the last call.

Here is the situation, briefly. The FCC has proposed a set of rules which will permit teletype operation in the lower frequency bands. These rules may be modified in accord with the letters that are received in comment on them. They will not become effective unless there is a big indication that the legislation is wanted. I have been assured that the FCC will carefully read and consider each and every letter sent in and weigh each argument pro or con that is brought up.

The FCC wants your opinion on the matter and also wants to know why you came to that decision. They are not so much interested in your blanket approval of the issues as they are in why you approve of them, what you think about them, how you would suggest bettering them, etc.

My letter to the FCC will go into detail on my feeling about the restrictions that the regulations place upon development of RTTY techniques. Many of our gang are interested in working on such projects as narrower frequency shifts, multiplex, etc., which are specifically not permitted by the rules. These developments are necessary to the spirit of ham radio. This business of setting up a bunch of regulations to keep RTTY ten years behind the times does not make good sense. Without given a bit of free reign how can the FCC expect the amateur to uphold one of his major and basic reasons to be, his experimentation? For some reason the FCC has been bureaucratically cutting off such development in the last few years and I don’t think it can be considered a healthy sign for either the amateur or the FCC.

As an example of this way of thinking I would like to cite the problem of the "Burp," an automatic repeater transmitter built a year and a half ago, installed and tested atop a New York skyscraper. This transmitter, if permitted to operate, would enable all of the RTTY stations in the vicinity of NYC to talk to each other. The FCC has delayed action on licensing this unit and has thus kept most of the stations in the area incomunicado. When the Burp is operating I can work any station within 50 or more miles of NY, without it not one single station can hear me. This same stifling of the ham spirit of development is before us in the exact standards of RTTY transmission specified by the FCC. What are we going to do? I suggest that those that are interested suggest improvements to the proposed rules when they write to the FCC. Why should we be held to 850 cycles shift? Would it not be better if they set only a maximum allowable shift of say 900 cycles, with no specified minimum? This attitude of mine may not be the best for the immediate development of RTTY nets since some of the gang might adopt narrower shifts right away. Still, in the long run I think it would be better.

Another standard that would keep us considerably behind the times is the one about the single channel (12.107a). This means that we cannot experiment with or set up point to point multiplex stations. I cannot believe that either the traffic stations or the defense stations would like this restriction. I am sure that the military would not agree either. If they want to limit the bandwidth of RTTY stations, ok, but why not allow them as many channels as they want within the 850 cycles? Another point in this paragraph specifies the use of five unit code. This may be ok for the machines we are using now, but what if we start getting some of the six unit code equipment? What then? Again we are being limited, rather strictly, in the latitude of our future work. Is this limitation absolutely necessary? I don’t think so.

The real joker is section 12.52a3 which says that we have to sign our call letters and the call letters of the stations we are working every ten minutes on both RTTY and C.W. Consider this for a moment and you will see that this makes all tape transmissions impossible. This also difficulties the setting up of unattended printers for every time the key is used all of the printers tuned in will run wild. Either we will have to come up with a circuit to disconnect the printer during Morse attacks or we will have to turn off the printer by hand. Messy.

This is the dark age. Why this peculiar stipulation? Why? Every FCC official monitoring station has RTTY equipment, if they want to use it. A few of the smaller listening posts may have a temporary lack of equipment, but this doesn’t seem like a reasonable excuse for such drastic measures. If there were rules making SSBG stations insert a carrier for
identification every ten minutes than perhaps the c.w. for RTTY identification might seem a bit more reasonable.

As most of you know by now the ARRL Board held a meeting a couple of weeks ago and came up with some suggestions for the FCC as to what they think should be done with the amateur bands. Their suggestion is that RTTY share 7150-7200 kc with the novices, and no other low frequencies! Let's face it: the ARRL, for some reason, is very much against teletype. Perhaps they see RTTY as a threat to the traffic net system that they have built up through the years. This might well be for I have had letters from several stations that are quite active in this branch of ham radio and they are quite interested in RTTY for some of their circuits. What a change that could make in the ARRL! Their total traffic could be handled almost automatically and infinitely faster than it is with the present setup. Since the ARRL has come out against RTTY in this way it is of even greater importance that you write to the FCC and make it good. There are no words to overemphasize the importance of your letter. We will not have teletype unless you do write in. Whatever you wrote to the FCC last winter is all well and good, but it doesn't count for this phase of the docket. The actual rules are now proposed and you must write and tell them what you think of them. Write: Secretary, FCC, Washington 25, D.C. Quadruplicate, of course, if it poses no special problems to you, otherwise one copy will do the trick.

Maybe I am a bit overemotional about the situation at present and shouldn't point out that your letters will be checked against my list of members of ARRL. (If you get this Bulletin you are a member). If there is no letter then your's don't exist. No excuses, no apologies, and the deadline for receipt is July 1, 1952. GET BUSY!!!

NEITHER RAIN NOR SLEET STAY THE COURIERS DEPARTMENT:

Telleson (Pasadena): "While in the Army I operated several multi-channel carrier telephone and teletype systems over VHF radio relay. I saw at first hand the superiority of teletype over telegraph. I was quite surprised the way teletype could override interference too. I can recall one time in particular when my telephone circuits were R2 and the teletype was copying solid over the same VHF channel.

Has any thought been given to the use of RTTY nets in conjunction with these emergency networks that are being set up now? It seems to me that the message handling ability of RTTY would prove invaluable in such cases, assuming of course that the bugs were worked out of the systems beforehand."

W8XXM (Columbus): "I wish to let you know that I have been discharged from the Navy, and am on my way home. One of my hobbies is flying, and I have my own plane. Just wondering what kind of "burp" operation I could cook up with a receiver and transmitter going at the same time on 144 me? Ought to be able to get some fair range at 12,000 feet. As soon as I can get back into the research end of RTTY I will try to finish the auto-start circuit I was working on when I was recalled to the Navy. I like to design circuits, so you have another rabid experimenter here."

W2AXC: "I have the FSK unit working very well and the oscillator is within 25 cycles of standard. The amplifiers are close too. Am getting a frequency standard made up so I can get them all on the ball. Am starting a freq shift oscillator for the lower frequencies and should have it going before long. Have talked to John (W2BFD) several times and copy commercials well."

VE3TC: "As Vic Hastings, VE3ATF, wrote you, he, VE3BUN, and myself have been on since January and another half dozen who have machines at home are still in that stage of being almost ready. Lou Buck of Montreal, who was up to see me a couple of weeks ago, has been fooling around with radio teletype for several years, but it takes a long time (and available machines) to get a few others on. Lou and I work for the Canadian Press so the TT's are no novelty to us, but the other fellows in Toronto are getting quite a bang out of them. I've been licensed since about 1922 and have worked all bands from 160 to 2. Presently use 20-40-80 occasionally but am on two metres most of the time."

W7GDP is looking for #12 keyboards, #21A printer, and tape equipment.
W6DOU: "Have another RTTY man. He is Howard Smith, W6COU, Radio Technician for the California State Division of Highways in Fresno. I plan on helping him locate some equipment and RTTY from Hayward to Fresno on 80 meters, much the same as we did when W6NRN/9 (W9TOJ) was out here at Oxnard, Cal."

W3LCH had his amateur teletype life nipped in the bud when the Army recalled him to active duty. At that time he had completed the APSK units for receiving and transmitting and had a complete model 12 printer, however he hadn't been able to put it on the air. While in the service he has built a receiving FSK converter consisting of some limiting stages, discriminator, and amplifiers to a relay. With a mighty sigh of relief Andy announces his coming paroles from the Army.

W2PKR, another victim of the inoperative Burp, is about to put up a larger two meter beam with the hopes that he can then work some of the New York area on TT.

W6GEO is looking for a copy of the Nov. 1946 QO article on the original BFD panel. Copies of all circuits, instructions, including a full size drilling template for a much newer version of this unit are available from W2BFD for $3.50 (I believe). A steal. Harry also needs the model 12 keyboard. Anybody got extra keyboards? There is quite a demand.

W2DAV: "Read a copy of your TTY Bulletin at K2USA here at Fort Monmouth and very much interested in getting on your mailing list. Who knows, some day I may have some surplus funds and go on the air with RTTY. (Funds is another surplus bargain I missed - wayne) You might be interested to know that I am an instructor (civilian) in the signal school at Fort Monmouth, teaching radio teletype equipment."

KL7BK: "Got myself involved in a little house-building project in order to get a roof of my own over my head for a change. In order to prove up on the homestead I got from the Gov't. I have to have a 12-months habitable dwelling built this summer, so it behooves me to move myself along those lines. Got a fine collection of info from John, wish you would pass my thanks on to him for sure. (Thanks John) Am also embroiled in the construction of a full gallon rig (capable of quite a bit more in fact, since it is basically for other uses) capable of FSK, APSK, NBFM, 333C, CW, and AM on all bands 60-10. If and when it is in operation I should have a nasty signal down there to communicate with you guys since I have a rhombic to feed it to."

W5COU: "W5DN3 and myself put on a demonstration of TT with a couple of 522's and TT equipped APSK last fall at the Meridian (MS) hamfest. Went pretty good and was the first any of them had seen. I would pay a premium for an induction motor for my model 15. Too much noise but have gotten most of it out. DNS figures it all comes from the governor."

W2MYL has completed his second W2BFD panel and burned if it doesn't work real slick. He just came back from going on a builders trail of the new superliner "United States" that you have been reading about. Graham has been really active on the FCC proposition too and has gotten a dozen of his friends to write in pushing the deal.

W1PWX (Arlington) and one or two of his friends are interested in TT and are looking around for equipment.

W6ITH says the FCC monitoring stations tried to get the UP to sign their calls on c.w. when they first opened up their Pacific circuits. They answered, "We are signing in the mode of emission authorized." The whole idea seems very pointless to him.

W6KYV: "I have a cool CW transmitter waiting to be put on Fl. This is independent from my regular Westinghouse TEM 11 which at present is used for traffic. The antenna is a 3 element 1/4 mc wide spaced rotary. This beam is loaded for 40M work and works exceptionally well. Sked KG6AAA traffic nightly. Rsrs are 75A1, Super-Pro, and 40P. I have a model 12 ans 21A printer. Need perforator and a 12 keyboard."
Forward: Frequency Shift transmission is universally used in point-to-point teletype work on the lower frequencies. Special receiving apparatus is required which will accomplish two basic needs: (1) Develop on-off or polar driving current from the incoming PS signals. (2) Exploit the anti-noise and other qualities of this Fm-type of transmission.

Unlike AF3K where the transmitting point controls the mark and space tones, PSK operates with a fixed amount of carrier shift. Keying is accomplished by switching between the limits thus established. At the receiving station the amount of shift will remain the same as originally transmitted, but the frequency for conversion purposes can be set by the beat oscillator to any required value. This greatly simplifies filter problems since units on hand can be utilized in place of special filters. The filter problem can be further simplified if using a single filter circuit. The ratio or differential type converter falls in this category. Essential details are diagrammed in ARTT 4033 and are covered in the following notes.

A limiting stage removes signal amplitude variations. This stage, in conjunction with an PL-5 or PL-6 filter (which possess a narrow band-pass characteristic centered on 1020 cycles) sets up the desired mark-space signal ratio. Additionally, noise reduction is achieved through the inherent property of this combination which can be described as follows: Connect a pair of phones to the output of the filter. With no carrier signal present from the receiver considerable noise will be heard (tube noise, QRM, etc.). As soon as a carrier outside the filter pass-band is tuned in this noise is sharply attenuated. Noise riding through when the intuned carrier is 1020 cps is of no consequence since it will combine with the carrier in developing keyer controlling voltage. This system is extremely tolerant of shift range. Any shift from 400 to 1500 cps will make excellent copy so long as the space frequency is stable.

A biased-diode detector is employed. Its adjustment is such that only the greater amplitude (space) signal is passed. This is rectified and the resulting DC applied to the keyer tube. The latter is unbiased in its normal condition and draws plate current through the teletype line relay. Presence of a 1020 cps signal at the converter input will instantly cut off this current.

Standard neutral teletype operation requires a closed loop, mark condition, except for the keying pulses. These are represented by an opening of the circuit, that is, by space condition. Thus, in receiving PS with the ratio converter, the 1020 cps beat from the carrier frequency must represent the transmitted space. In the unit diagrammed the mark condition must be the higher in frequency to avoid harmonic complications.

Meeting this requirement is simply a matter of correctly tuning the receiver and its beat frequency oscillator. It makes no difference whether the transmitted space is higher or lower than the mark frequency. The
correct condition can be extracted at the receiver. This follows since, by adjusting the BFO, two mark-space conditions, each the reverse of the other, occur as the beat oscillator frequency is varied either side of the i.f. center frequency.

Construction notes: A 12 X 7 X 3 chassis will accommodate this converter. Aside from the filter and power supply most of the components are tubes, resistors, and capacitors. Precautions to avoid audio oscillation in the two amplifier sections must be taken (shielding) since these stages are run "wide open."

The simplest sort of triode limiter is used. Measured limiting is 34 db. This is about the maximum that can be used without increasing amplification following the filter section. When a receiver that will allow the use of AVC with the BFO on is used the actual degree of signal fluctuation at the antenna greatly exceeds the actual limiter compression.

No comment on the filter is necessary other than to note that it is connected in the "range" position. Many surplus houses still offer these units at reasonable prices.

The only front panel controls required are an on-off switch and a send-receive switch. The meter and monitor phone jack complete the front panel assembly. A terminal block on the rear of the unit may be provided for incoming signals and converter DC output to teletype.

Operational notes: Three basic adjustments are required. Once made, these require no further attention.
1) Adjust keyer tube plate tap on power supply bleeder for 30 ma reading. This is a satisfactory value for machines using standard WE-215 or WE-255 line relays. The relay bias current (from the printer's own DC supply) should be set to 15 ma. The plate supply bleeder is marked R3.
2) With the printer line relay connected and the switch in the "receive" position, tune in a steady carrier. Rock tuning back and forth and adjust R1 until the 1020 cps bandpass action is clearly defined in the monitor phones. Plate current on the keyer tube should be cut off within this range. Slowly advance R1 until the range is narrowed to approximately 100 cps either side of the resonant frequency.
3) Open the send-receive switch and turn the printer on. If the printer runs open reverse the polarity of the line, or the bias signal. Tune in an FSK teletype signal and carefully adjust the BFO for (in the case of 850 cps shift which is normal) a 1020/1870 cps condition. No audio oscillator is needed. The 1020 cps tone will be heard in the monitor phones. Turn the switch to "receive". If the mark-space sense is correct the machine should print with fair fidelity. If the machine appears to run open every few pulses and printing is obviously garbled, return BFO to reverse the first 1020/1870 condition. Once the machine is printing try changing the value of R2, selecting the value which gives the most accurate copy. This should be between 100K and 250K.

A strong signal from the receiver is required and it may be necessary to use the speaker output. Experiment to find out, but don't worry about overloading the circuit.

Stability is the keynote of successful teletype reception. Few present day receivers possess the required degree of high frequency oscillator stability to permit more than mediocre results. The Collins 75A2 is an exception, provided it is in good condition. To cope with this problem commercial practice is to use crystals for the high frequency oscillator. This is fine where operation is confined to known frequencies. In amateur work an ultra-stable VFO is called for. The HC-221 and LM type freq meters have possibilities as have the oscillator sections of the SCR27LN Command Transmitters. The best system is to use the stable oscillator in place of the receiver high frequency oscillator. A somewhat less effective means is to beat the incoming signal with the suitable oscillator and thus not use the receiver BFO. This system will cause the beat to fluctuate and be attenuated by the FSK signal's changing signal strength.

- W60WP -
The usual polar relays used in teletype equipment are electro-mechanical affairs, with their attendant troubles of contact adjustments and noise. These relays may be at times fractions and difficult to adjust properly with available harness knowledge and equipment. The electronic relay circuit is designed to accomplish the same function of switching from mark to space or vice versa as a polar relay does. The circuit uses an Eccles-Jordan flip-flop stage. This kind of direct-coupled multivibrator is by itself incapable of self-oscillation, but, nevertheless, possesses the remarkable property of locking itself to the mark side or to the space side, but never to both at the same time, for each of its two outputs. In this respect the circuit may be compared to a double-pole double-throw switch of the toggle variety. This switching action is positive and dependable, even if the input signal is not quite "up to par" in strength or quality. As a result it has been found to be very helpful in copying weak or noise buried RTTY signals in which the "toggle" action cleanly defines the mark and space transitions in the signal.

The flip-flop is driven by the mark and space rectifier outputs, as shown in the diagram ARTT 4034. Since the outputs (mark and space) from the flip-flop are at a positive potential with respect to ground, NE-2 neon lamp "voltage steppers" are employed to throw the output signals into the proper operating voltage range for the VT keyer circuit. This signal swing is adjusted by the potentiometer feeding power to the flip-flop circuit so that each output shall swing from about -50 volts (cutoff bias on VT keyer grids) to +30 volts (to turn on the VT keyer).

The 4 megohm resistors, fed by the VT keyer bias supply, are necessary to "keep alive" the NE-2 lamps, and incidentally, keep a negative bias on the VT keyer signal lines whenever VT keyer operation is not desired. The components arc generally non-critical with the exception of the NE-2 lamps. Some such lamps are very variable in voltage drops from lamp to lamp, but the great majority of lamps will have stable 50 volt drops. Such may be checked by passing 3 ma of current through the neon lamp under question, using, say, a 250 volt power supply and a 500,000 ohm resistor in series. The drop across the lamp is measured with a VTVM or a high resistance (20,000 ohm per volt) meter, and should be within several volts of the nominal 50 volt value.

The outputs are fed directly into the receiving distributor-VT keyer circuit. The old polar relay is removed or else used to key some other equipment. If the polar relay is removed entirely, the power tubes can also be removed and a 6H6 installed in place to give "DC restorer" action in the mark and space rectifier system. This will result in a 100 ma current saving and the power supply for the AFSK converter can be smaller.

This circuit has been in use at W6NRM for nearly two years and has never given any trouble. The system practically enables one to copy almost anything on the air that at least kocks up the receiver AVC.

W6NRM, op at W2X, sent along data for those that want to decipher the weather symbols of that station, mentioned a couple months ago.

**Sky Coverage**
- **Wind Direction** "LGA 60;15" **OSL/65/23x18/968"**
  - Clear
  - Scattered Clouds
  - Broken Clouds
  - Overcast Sky

**Visibility** 15 mi plus (" is plus)

**Temperature**
- East Temp 65°, dewpoint 23, wind NW 35 mph

**Hygrometer**
- SE 18 mph, alt: 29.60 inches Hg.

These WX broadcasts start at 30 min after hr. 5930 ke nites, 17155 days.

**LGA LaGuardia**
- Here is another decoding:
  - **LGA Washington** LGA 130,250, 9001/50/2604/976/ 820 0366
  - **N2B Atlantic City** LaGuardia, est ceiling 13,00 broken, broken clouds at
  - **PHL Philadelphia** 25,000, visibility 9 mi. temp 50, dewpoint 28, wind
  - **HOA Roanoak** 35 mph, altimeter 29.76 °C

Understand?
This circuit is used in combination with the electronic relay (ARTT 4034) to key directly a diode FSK modulator (see April '52 CQ) in a transmitter exciter, without the use of any polar relay. A 6SL7GT DC amplifier cathode-follower is driven by the flip-flop stage through a polarity switch, which gives normal or inverted FSK signal output. (i.e. mark high or low)

The only addition required to the FSK circuit is a diode. This can be the other section of the duo-diode tube installed for frequency-shifting the exciter unit. The purpose of the additional diode is to act as a clamper to restrict the upward (positive) input signal swing to not more than 55 or 60 volts, the level of the NE-48 lamp.

**Electronic Driver**

In operation, this system effectively aids in clean keying the diode modulator and at the same time solves the noise problem of polar relay contacts; there being none in the system presented. For instance it is perfectly feasible to retransmit directly a received RTTY signal provided that the receiver and the transmitter frequencies are sufficiently separated so that the receiver blocking is not caused by the local transmitter signal. If the received signal is good there will be little or no telegraph distortion (bias) and hence regenerative repeaters should not be necessary except possibly during multi-relaying of a RTTY signal. This is a point to be explored at a later time.

During transmission from keyboard or tape this electronic driver delivers a signal to the FSK modulator that is clean from relay noise, contact chatter, and other evils attributed to polar relays.

The April issue of the Federated Purchaser (just out) has a writeup of the W2XSD teletype shack. Say, regarding the Thursday evening 75M skeds, every week somebody new turns up. Recently talked to W2AXO, W3ODP, VE3RH, W2J10, WZHWV, W1PGZ, W8HP, W3OB, W3NIT, W3PKP, on these skeds. Call in at 8 pm EDT, or 10 & 11 pm EDT on 6100 W3CK. I'll try to be there with my kilowatt, and the latest news, Merrill Swan, W6AEF stopped by for a quick visit while passing through and I sure enjoyed meeting him. The more of the California gang I meet the more I wish I was living out there. Darn, Joe Doane came to NY for a weekend and spent most of it talking to John and me about RTTY. Joe is from South Bend and has been working with TT for years. Whatever he doesn't know about it he can figure out in a hurry. I just remembered a hint he passed along: you can make new felt washers from old hats, Slick, eh? While I am telling you about what is going on here I had better put in a bit of a commercial about the Karlson loudspeaker enclosure. This is a new invention that John Karlson and I are putting on the market which should make quite a change in the high fidelity business. This enclosure actually matches a loudspeaker to a room over the entire audio spectrum. I have a demonstration setup here at home and promise to astound any of you that drop in for a visit. Bring lots of money. We should have an article in Audio Engineering soon and ads too. If these boxes don't sell the bank will be on two meter teletype.

W3PW wants to sell his model 12 which is in the same condition as when received from AP, $55. "Also include 4 X 13 X 17 chassis with 11 tubes including rectifier tube. Mica cond. used in osc and filters. Filter cost $16 (from John). Will sell 125 VDC for $3 extra. The #12 types perfect as typewriter will also copy recording, but poor radio copy (noise I suspect). Also include all instructions and bulletins. Also a single spacing gear on the machine." (sounds like a bargain).

W8HWR has several SCR-522 transceivers without accessories which he would like to swap for a model 12 or perhaps a 21-A. 522's are new. Bruce will be released from durance vile (Navy) June 21 and is real anxious to get back in the swing of TT.
WLEV: "Am having some of the number 3331 new style ribbon throw cans made up. This batch is costing 90¢ each. If any of the gang want some I will be glad to have more made. If we can order at least 200 for the first order we can get them for about half a buck. The shop said that they would make up a die for a punch so that they could punch them out the same as the original cam. The present order is going to be milled out and will be case hardened. Anyone wanting one could let you or I know. I hope we can get enough to have the die made, though a buck won't hurt anyone." (If that is true then why have so few of you sent me one for the bulletin?)

W1KJB (ex W25TY) has purchased W1EOE's printer and panel.
W1HBO has moved into his new QTH at last and will be back on the air soon again. He and W1EVZ worked TT over the phone lines in interim.
W1RIA is still sweating over his panel.
W280I sent in a list of the regular commercial "G" codes for TT and herewith are some of the more applicable: GNA-Please connect reper to circuit. GXD-Will you please relay. GXK-Please repeat. GXM-W? Does garbling transmission appear to be due to local trouble at my station? GXM-You are garbling occasionally; GXXW-Garbling frequently; GXXS-Garbling badly; GXXD-You are running open. GXY-Send RY. The wire line fellows have a "bell code" which doesn't apply to our problems. I therefore suggest that we adopt the following: 2 bells- Roger (yes); 3 bells - "SK"; 4 bells - "this is the end of a tape." What you think of all that?

W20FT is in Rome (Italy) on a vacation and will be back July 1. He is the only one excused from writing the FCC about docket 10073.

After giving the books a good searching audit I have some data for you on how things are coming moneywise. The answer is that the money ain't coming. Almost to a man you are dragging your heels. Considering the time and all other factors involved in putting out this bulletin and answering letters each month the average expense per person is about 50¢. Figuring the, after all, this is a hobby and should not be considered a straight commercial venture (go ahead and starve to death), suppose we figure just half of that number, 25¢. That is almost as much as CO costs, but then there is no advertising to cut down expenses, noSA, hungry, underpaid, wage-slares to type, fold, address, mail, etc. That is what it costs gentlemen, so, if you must insult me with money, don't make it a light one.

Wayne Green, W2HSD
1379 East 15th Street
Brooklyn 30, N.Y.

Forwarding & Return
Postage Guaranteed

JOHN SHEETZ
13212 SUPERIOR AVE
EAST CLEVELAND 12
OHIO