

THE AN/FGC-1 RADIOTELETYPE TERMINAL EQUIPMENT FILTERS

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5 Hansell Road, Murray Hill, New Jersey 07971

Very little information has ever been published on the filters used in the old workhorse terminal unit known as the AN/FGC-1 and described in Army Technical Manual TM 11-356.

These filters possess certain characteristics which might be considered to make them desirable for average amateur radioteletype communications using the normal 850 Hz shift. They are quite flat topped with good skirt cutoff characteristics allowing reasonable drift or mistuning with no appreciable change in response level.

Reproduced herewith are the schematic diagrams of the input bandpass filter (Figure 1) and the mark and space channel filters (Figure 2). The configuration of the mark and space channel filters is identical so only one schematic is shown. The original component values for all three filters are given in the tables.

The response characteristics of these filters as well as that of the Mainline TT/L bandpass input filter are all shown plotted on one graph (Figure 3). The curve for the Mainline TT/L filter was made from actual measurement on a unit built in exact accordance with the schematic shown on page 11 of the April 1965 issue of RTTY. The curve for the AN/FGC-1 input bandpass filter was made from actual measurement on a homebrew version of the original circuit and is in very close agreement with the curve published in the Army Technical Manual. The mark and space channel filter curves were merely copied directly from the tech manual. It is interesting to note that these curves are plotted on a linear frequency scale rather than the more familiar logarithmic scale. The linear presentation has more meaning for amateur RTTY purposes as drift and mistuning both cause linear errors in frequency. The curves shown are plotted over more than a two octave spectrum and if these were shown on logarithmic frequency scales the margin for drift on the upper frequency side would appear to be much less than that on the lower side.

For anyone wishing to duplicate these filters the mark and space channel filters contain inductors which are not easy to obtain but the input bandpass filter has some very interesting possibilities. The secret lies in juggling the designed characteristic impedance. A filter designed for any particular characteristic impedance may be changed to any other impedance by merely multiplying

the values of the inductors and dividing the values of the capacitors by a single constant. This constant is merely the desired impedance divided by the existing impedance. This fact leads us to the scheme used to design filters which end up using the readily obtainable 88 millihenry toroidal inductors. You design the filter and then work backwards by changing the characteristic impedance by the factor that makes the inductors come out to be 88 millihenry.

Now if we look at the AN/FGC-1 input bandpass filter we notice that there are three inductors having a value of 94.99 mH. This of course is for a characteristic impedance of 600 ohms. If we want to use 88 mH coils in place of the 94.99 mH coils we will have to multiply the values of all the inductors by $88/94.99$ or $.9264$. This also means that the new characteristic impedance is going to be $.9264 \times 600$ which gives us 556 ohms. Scanning the values of the other inductors we find that there are two that are exactly half the value of the 94.99 mH inductors at 47.495 mH. Now the new value for these turns out to be 44 mH, which is also readily available! All we have left is two inductors. These were 16.597 mH, and the adjusted value turns out to be 15.38 mH. Now remember that the inductance changes as the square of the number of turns on a coil so one-half of an 88 mH coil is 22 mH. (That is one of the two windings on a typical load coil.) One winding on a 44 mH coil would be 11 mH. The easiest way to get 15.38 mH will be to remove turns from one winding of an 88 mH coil and use only that reduced winding. The other winding should be left open with the leads either taped or cut off. The techniques of setting the exact value of the inductor and adjusting all of the capacitors in the filter will depend on the test equipment available. Some good leads on these problems are given in Irv Hoff's article "Checking RTTY Shifts" in the May 1966 issue of QST. A source of unusual value toroids is given in the article by W3NQN under the sub-heading of "Components" on page 19 of the July 1966 issue of QST.

In regard to our new characteristic impedance at the ends of the filter there are two general approaches to the solution of the problem. First we might search for a transformer which would match whatever we wished to use to drive or terminate the filter

Continued...

AN/FGC-1 FILTERS

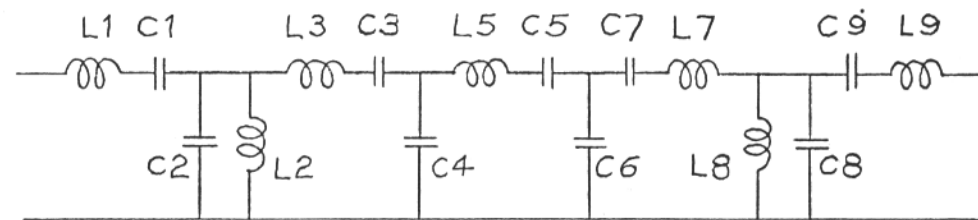


FIG. 1 INPUT BANDPASS FILTER

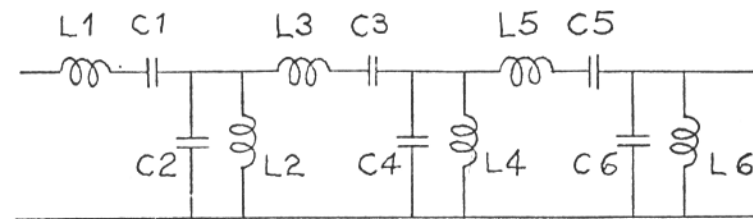


FIG. 2 MARK OR SPACE CHANNEL FILTER

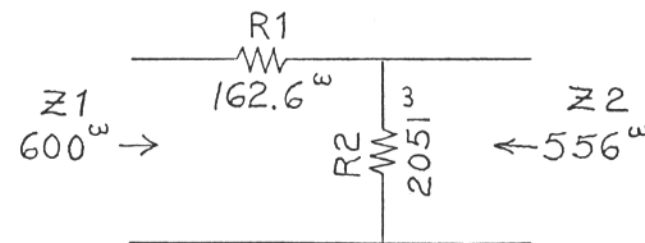


FIG. 4 "MINIMUM LOSS" MATCHING PAD
(LOSS = 2.43 db.)

THE AN/FGC-1 FILTERS (Continued) . . .

to the filter impedance itself or we might use an impedance matching pad. The latter method in this case appears most desirable if we are going to be near five or six hundred ohms. If we have a six hundred ohm source (the output of a receiver) we can readily place a minimum loss matching pad between the 600 ohm source and the input to the filter. Such a pad is shown in figure 4. This pad would have a loss of only 2.43 db and would tend to improve any impedance irregularity as seen looking back into the receiver. At the terminating end of the filter we normally drive a high impedance load such as a vacuum tube grid and in such a case the optimum method of termination is merely to place a resistor of the proper value across the end of the filter. In this case a standard 560 ohm resistor would be fine.

The general design formulae for the minimum loss matching pad are as follows:

Z1 is the higher of the two impedances to be matched and is expressed in ohms.

Z2 is the lower of the two impedances to be matched and is also expressed in ohms.

R1 then equals $Z1 \sqrt{1 - \frac{Z2}{Z1}}$

$$R2 = \frac{Z2}{\sqrt{1 - \frac{Z2}{Z1}}}$$

If you wish to calculate the loss of the attenuator in decibels this will be:

$$\text{Loss in db} = 10 \log \left(\sqrt{\frac{Z1}{Z2}} + \sqrt{\frac{Z1}{Z2} - 1} \right)^2$$

APPENDIX

For those who are interested in design details of the AN/FGC-1 filters the following are the actual numerical values of various nominal characteristics used in the original design of these filters:

All of the filters are designed with a characteristic impedance of 600 ohms.

For the bandpass input filter the lower cut-off frequency is 1604.6 Hz, the upper cut-off frequency is 3615.2 Hz and the mid-frequency is 2405 Hz. The specified component tolerance is $\pm 0.6\%$ for all inductors and $\pm 0.5\%$ for all capacitors.

For the mark channel filter the lower cut-off frequency is 1715 Hz, the upper cut-off frequency is 2525.9 Hz and the mid-frequency is 2082 Hz. The component tolerance of L2 and L4 is specified as $\pm 1.0\%$, the remaining inductors $\pm 0.6\%$ and all capacitors $\pm 0.5\%$.

For the space channel filter the lower cut-off frequency is 2537.58 Hz, the upper cut-off frequency is 3443.59 Hz and the mid-frequency is 2956 Hz. The component tolerance of L2, L4 and L6 is $\pm 1.0\%$, the remaining inductors $\pm 0.6\%$ and all capacitors $\pm 0.5\%$.

AN/FGC-1 FILTER COMPONENT VALUES

(See Figs. 1 & 2)

INPUT BANDPASS FILTER
600 Ohm In and Out

L1 & L9	=	47.495 mhy.
L2 & L8	=	16.597 mhy.
L3, L5 & L7	=	94.99 mhy.
C1 & C9	=	.092207 mfd.
C2 & C8	=	.26386 mfd.
C3 & C7	=	.063805 mfd.
C4 & C6	=	.101635 mfd.
C5	=	.103569 mfd.

INPUT BANDPASS FILTER
556 Ohm In and Out

L1 & L9	=	44.0 mhy.
L2 & L8	=	15.38 mhy.
L3, L5 & L7	=	88.0 mhy.
C1 & C9	=	.0995 mfd.
C2 & C8	=	.2845 mfd.
C3 & C7	=	.0689 mfd.
C4 & C6	=	.1096 mfd.
C5	=	.1118 mfd.

MARK CHANNEL FILTER
600 Ohm In and Out
(2125 Hz. Bandpass)

L1	=	165.05 mhy.
L2 & L4	=	8.922 mhy.
L3 & L5	=	235.78 mhy.
L6	=	17.844 mhy.
C1	=	.035405 mfd.
C2 & C4	=	.65495 mfd.
C3 & C5	=	.024783 mfd.
C6	=	.327477 mfd.

SPACE CHANNEL FILTER
600 Ohm In and Out
(2975 Hz. Bandpass)

L1	=	141.56 mhy.
L2 & L4	=	4.9506 mhy.
L3 & L5	=	210.8 mhy.
L6	=	9.9013 mhy.
C1	=	.019646 mfd.
C2 & C4	=	.585554 mfd.
C3 & C5	=	.013752 mfd.
C6	=	.292777 mfd.

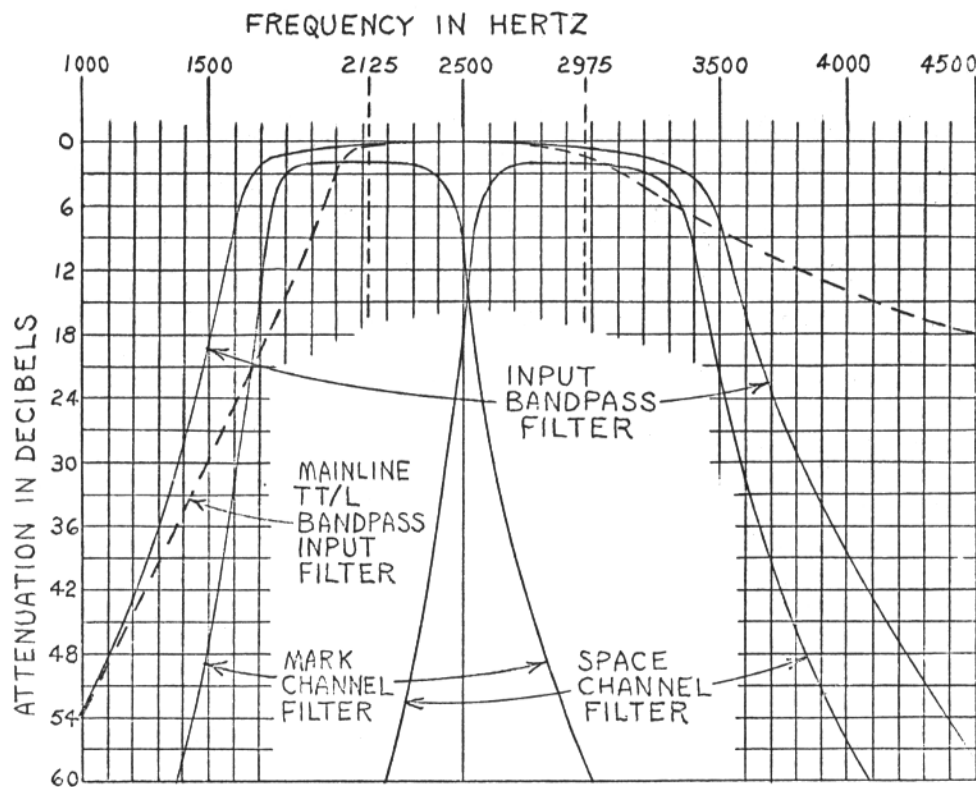


FIG. 3 AN/FGC-1 FILTER CHARACTERISTICS

TWO TRANSISTORIZED AFSK OSCILLATORS

FANTI Dott. FRANCO, IILCF
via A. Dallolio n.19, Bologna, Italy

I think will be very good for the beginner in RTTY this two transistorized AFSK oscillators, that not are unusual and revolutionary, but are easy, have a low cost and start immediately.

One of this is a modification of a similar published on RTTY (without the description for the setting up, exist in RTTY also the beginner—hi—, and with 150V reg. that, for me, not are good for a transistorized equipment) and the second that is also a very easier oscillator.

This two oscillators, as you see in the Fig. N1 and N2, generates two audio tones: 2975 cycles for the space and 2125 for the mark, that are selected from your automatic transmitter or from your printer.

In the microphone socket of the TX, you introduce the audio output of this equipment, that is very good on VHF AM or in your SSB TX.

Also for the beginner, is necessary a little description of this easy circuits.

In the photo n. 1 you see the realization of the Fig. N1, and in the photo n. 2 the Fig. N2.

In the first I have used one 12V transformer, because this was on my hand, but 6.2 reg. is sufficient, as you see, and also is possible with 4.5V battery.

The instrument that you see in the Photo n. 1 is because I have introduced in this one strength field for my TX.

The second is realized with 9V battery. For the inductance I have used the familiar

88 mhy toroid telephone loading coil.

The others elements are usually, and for the final, please take note that C1 and C2 will be find with experiments, but I think that will be not distant from the shown nasures.

ADJUSTMENT

For the setting up of this two oscillators is necessary an oscillator standard generating 2975-2125 cycles (and for this is excellent one fork standard, or much better the 2-3K audio oscillator published on RTTY) and one oscilloscope as you see in the Fig. N 3.

From this two oscillators you have a note sufficient sine-wave and when you get in the oscilloscope the notes from the audio standard and from this oscillators you will obtain an oval figure (Lissajous figures). You start with 2975 cs with the standard oscillator, and, if C1 is correct, you see the oval in the oscilloscope. If not find this, change the capacity.

I have noted up that is very good for this the audio oscillator variable cycle for cycle, because with this procedure is much easier to find the exact capacity.

When you have setting up the 2975 tone, strap the point (1) (2) or introduce the printer keyboard. With C2 now, or arranging this, you will obtain the oval in the oscilloscope.

Finished this adjustment, introduce the output in the socket of the microphone of your TX and, in transmission, make an adjustment of the audio gain.

And with this, good QSO and SK SK SK.

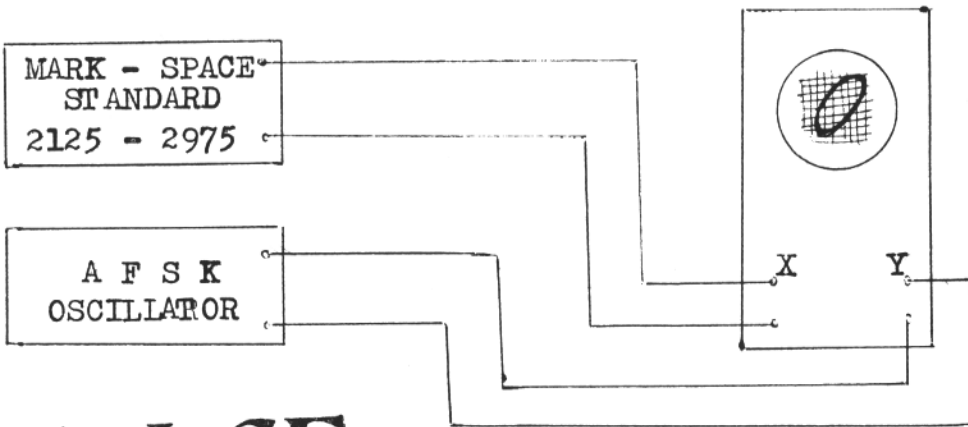
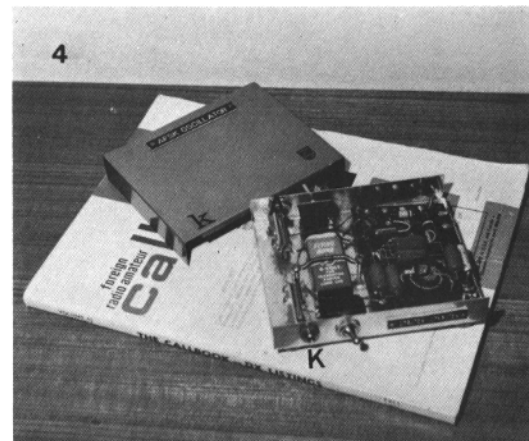
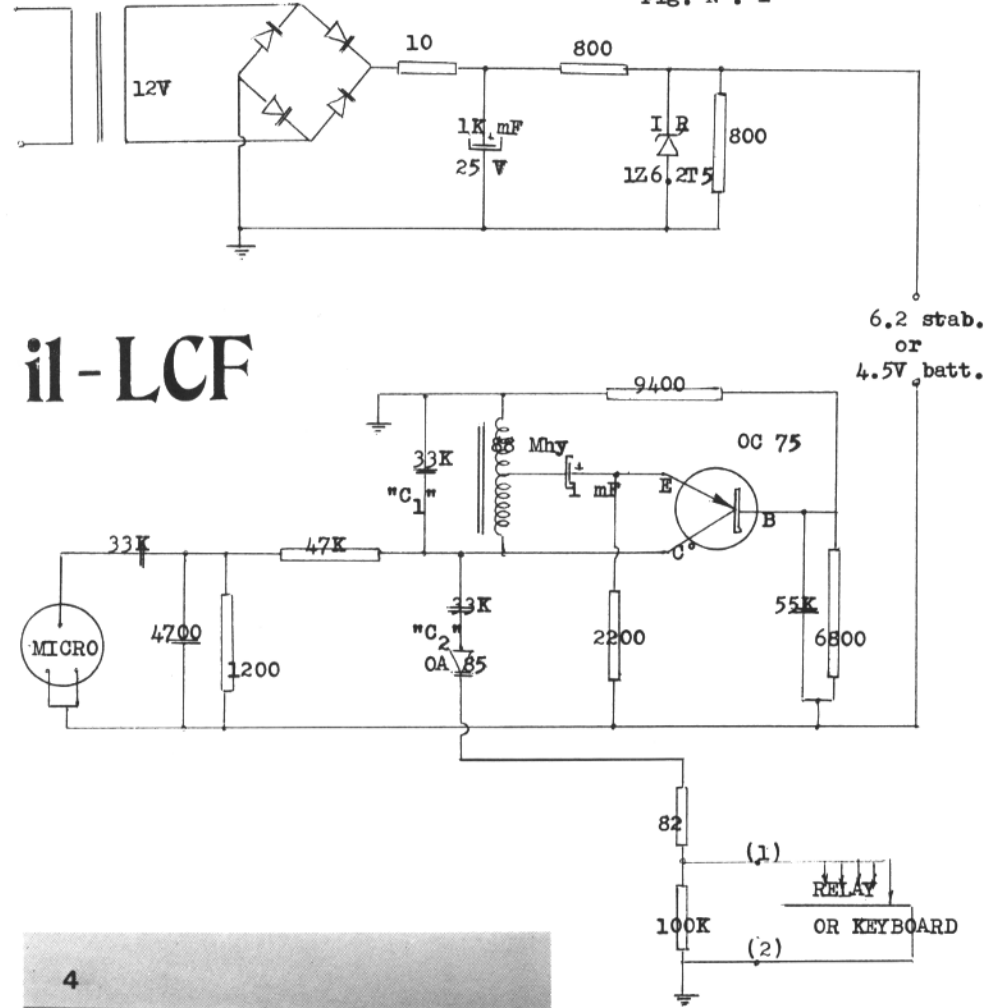


Fig. N 3

i1-LCF

OSCILLATOR AFSK

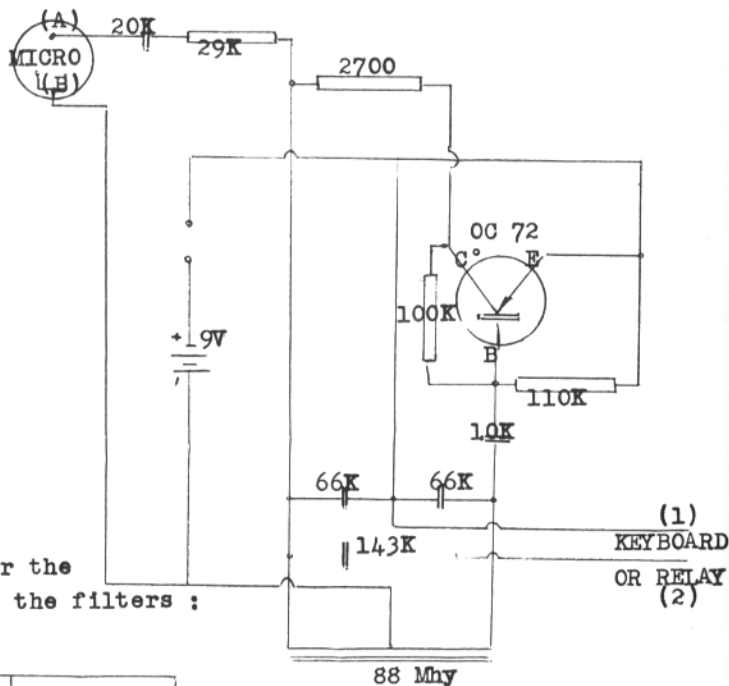
Fig. N . 1



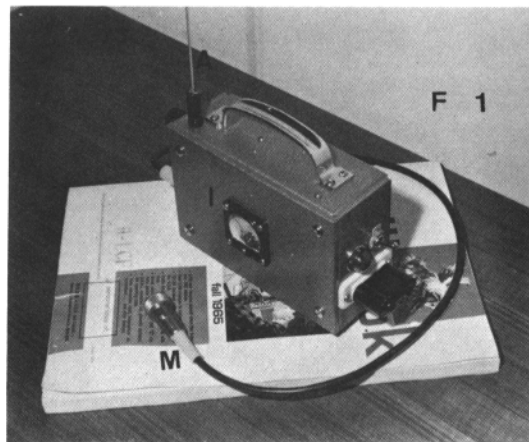
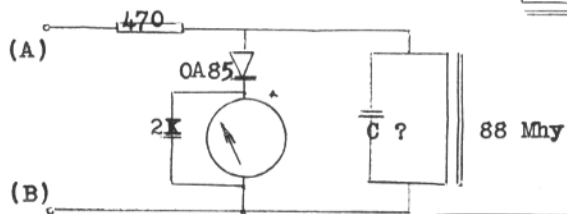
i1-LCF

OSCILLATOR AFSK

Fig. 2



Using this for the adjustment of the filters :



OPEN LETTER TO RTTY FROM NEW PUBLISHER

October 6, 1966

Mr. Merrill Swan
RTTY, Inc.
Arcadia, California

Dear Merrill:

In taking over as publisher of the RTTY Bulletin I wonder how many subscribers appreciate the time, worry, work and even money that you have spent as editor for the past 14 years. In assuming your job we feel like a novice swimmer in rather deep water. With enthusiasm, patience and the gaining of experience we hope to continue the Bulletin with the standards you have set. In this letter I would like to outline briefly a few of our present ideas, subject to change, as we gain experience and survey comments from readers.

As the summer months are low on activity on RTTY we have decided to combine the July and August issues. With eleven issues a year we plan on making the basic subscription rate \$3.00 per year. We will have a rate chart for publication in next month's issue, but as the January issue will be one of transition from the west coast to the mid-west, and time may be short, we will mail the January issue to all subscribers regardless of whether they are paid up or not.

The magazine will be strictly for RTTY, other publications cover the general fields. We

have no axes to grind or pet theories to promote, only ideas for the promotion, improvement and enjoyment of RTTY will be included.

We hope for a wide variety of articles, something of interest for all, beginners, advanced, experimentors and those who enjoy rag-chewing. The DX column will be continued by ED, K3GIF, assisted by Bud, W6CG, as in the past. We also hope for some type of honor roll listing for DX fans. Contests and awards will be promoted in any way possible. We hope to add several special departments. One for 2 and 6 meter operators is a possibility.

To a great extent we hope that the readers will send comments and suggestions and we will welcome them at all times. We may not be able to answer all letters but all ideas will be appreciated and carefully considered. Only by giving the subscribers what they want can we hope to continue the Bulletin in the successful manner that you ran it Merrill.

Our mail address will be: P.O. Box 837, Royal Oak, Michigan. By next month's issue I hope to send you a full subscription rate list and further details so that the change of publishing with the January issue will cause as little confusion as possible.

73,
F. "Dusty" DUNN
W8CQ

teaching at Bernard College, and working here on the nervous system hi.

I have been told that for this type of circuit, an operational amplifier is not necessary since it is all A.C. coupled anyway. So another project is to try to replace the Operational Amp. with a simple one tube amplifier that the RTTY gang could put right into the TT/L using existing voltages, etc. I don't know if anything will come of this thought but it would be nice.

73,
TOM PERERA, K2DCY

You might be interested to know that I have been using the filter in the A.M. section of my TT/L converter with great success. I simply used a 600 ohm pot after the bandpass filter and dividing network and this seems to give just the type of control needed to bring the filter into line with the commercial fixed filter which I use for the fixed frequency channel. There seems to be no need to attenuate the output of the Operational Amp. BP filter as the lower the input signals are, the further it is from saturation. What I am trying to say is that the input pot is all that is needed to make it completely compatible with the TT/L. I did stick in a 2 meg isolating resistor between it and the Triode AM amplifier stage for good measure but I am not sure that is necessary.

This is how the circuit looks.

I think that the next step is to try to figure out a way to make the filter stable at narrower bandwidths where the gain increases so rapidly with slight change in frequency. This is what I am doing in my spare time while trying to complete my dissertation for Ph.D.,

This may not be very legible. As I lay "flat on my back" in a hospital bed, I had a rather severe heart attack on Sept. 30. Have been here ever since. Have three or four more weeks before I can go home for eight more weeks of recuperation... Please pass along my 73 to my many RTTY friends and hope that I will be able to work them again soon.

TERRY BEELER, W4FU1
Rt. 2, Box 260
Candler, North Carolina

"CATS"

WØEPY/2, K3NIO (with Jon), KØKBY, KØOJV, WA2GVP, K8ERV, K3YZF, Etc. This is W8SDZ, Royal Oak, Mich. Msg. nr. one. 1915 EST Monday, Oct. 3, 1966.

Good evening, everyone. This message is to inform you about the happenings at the Annual "CATS" meeting in Chicago yesterday.

There were about 85 people there. The first speaker was Burt Jaffe, K9BRL. He spoke about design of channel filters using the simple formulae and tables in "Simplified Modern Filter Design," a book written by Gaffe and published by Rider Press. His discussion was quite interesting to all and was kept on a relatively simple level which is provided by the book and its prototype designs.

Bert gave a practical design for a simple three-pole Butterworth Bandpass input filter for 600-ohms, 850 cycle shift.

Ron Larsson of the Teletype Corporation's engineering department told about the various pieces of tape perforators and reperforators and readers that Teletype Corporation has sold. He started with the old Model 14 hand perforator and ended with the new "BRPE" (called Burpy) 600-word per minute tape gear.

Ron then discussed Teletype's policy of providing parts and manual sales to amateurs. Ron said that Teletype Corporation will sell to any individual. He went on further to say that they are not set up to answer questions about their machines. They do not service their own equipment. Manuals can be provided usually at no cost or minimal cost. Requests for manuals should be addressed:

Ed Perchek
Department 1132
Teletype Corporation
5555 Touhy Avenue
Skokie, Illinois 60076

Telephone OR. 6-1000, Extension 6270.
Ron also pointed out that the prices of any

machines sold by Teletype Corporation are the same to anyone. There is no price break for quantity. Everyone gets the same price as if he were buying 10,000 machines. He added that Model 32's are for sale quite reasonably and may appeal to amateurs. The 32KSR sells for about \$450 now. The 32ASR as about \$570 now. (I might add here that I recently learned that the 32 and 33 equipment have been improved and instead of being rated for light-duty service — two hours per day — as it had been originally, they are now rated for 8-hours per day. Certainly more than any amateur would use them.)

Keith Petersen, W8SDZ, then gave a short ten minute talk telling of his free list of modifications and notes for the TT/L. He also mentioned that page paper is available, new, for only 63 cents a roll when bought in five case lots. This was news to quite a few of the fellows who had been used to paying 90 cents a roll. The paper is available from nearly any large paper supply house in any city.

Keith also spoke briefly on the need to run the receiver gain high enough so as to keep the signals well above the internal hum and noise of the audio amplifiers. He recommended that a level of zero to plus five decibels be used.

Dave Chapman, W9DPY, then spoke about using polar relays to clean up the transmitted signals of defective keyboard contacts and distributors in tape transmitting equipment.

Dave created considerable interest in his next subject which was design of stable variable frequency oscillators. Group questions were prevalent throughout this discussion indicating keen interest.

The program ended with drawings for the door prizes.

End msg. To all stations, this is W8SDZ, Royal Oak, AR

K. B. PETERSEN
1418 Genesee
Royal Oak, Mich. 48073



IIAMP/M1

to RTTY, Inc.

Dear Sirs:

I am associated to your Magazine that I appreciate very much.

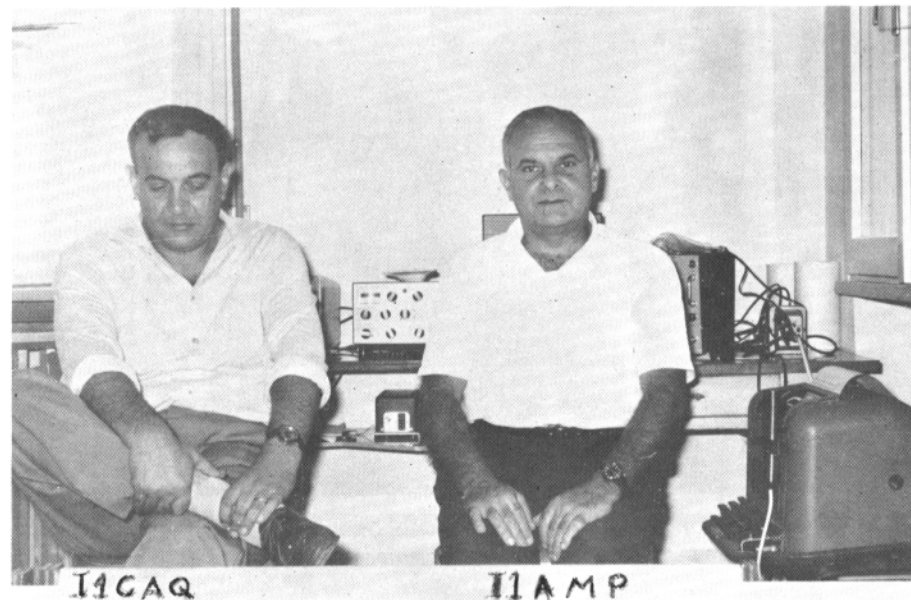
Together with I1CAQ, Alfonso and I1SGS, Gerardo, I made the first RTTY expedition to San Marino Republic.

Unfortunately, we had to come back a few days because of professional and familiar leit-motiv; anyway we were able to collect with 50 stations. We have also sent immediately the QSL card to those radio amateurs who sent us their QSL card at the following address: Casella Postale 22, Salerno, Italy.

I'm sending you two personal photos. I made in the room of the hotel where we were staying in. Please, if possible, try to publish my photos on your Magazine RTTY. I would appreciate it very much. Unfortunately, as already said, we couldn't remain for a long time; we hope to take our apparatus RTTY in a new country the following year: we shall be first in the world.

I remain, sincerely
Via Giovanni De Filippis 12
Mario Primicerio, I1AMP
Salerno, Italia

30 September 1966



REPUBLIC OF SAN MARINO

i1CAQ/M1	i1AMP/M1	i1SGS/M1
Al Rosa Rosa	Mario Primicerio	Gerardo Saggesi

FIRST RTTY EXPEDITION

Confirming QSO of Local Time

RST Working Condition: TR 4 - R 4 - Linear

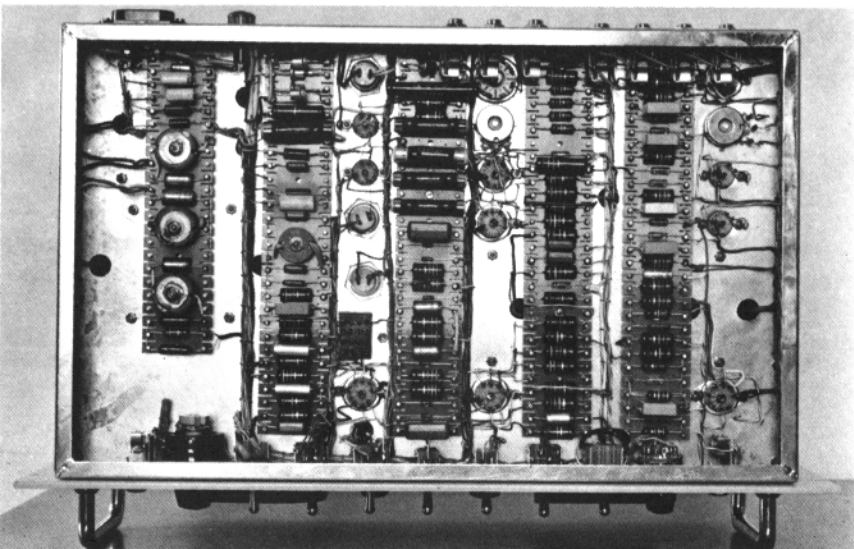
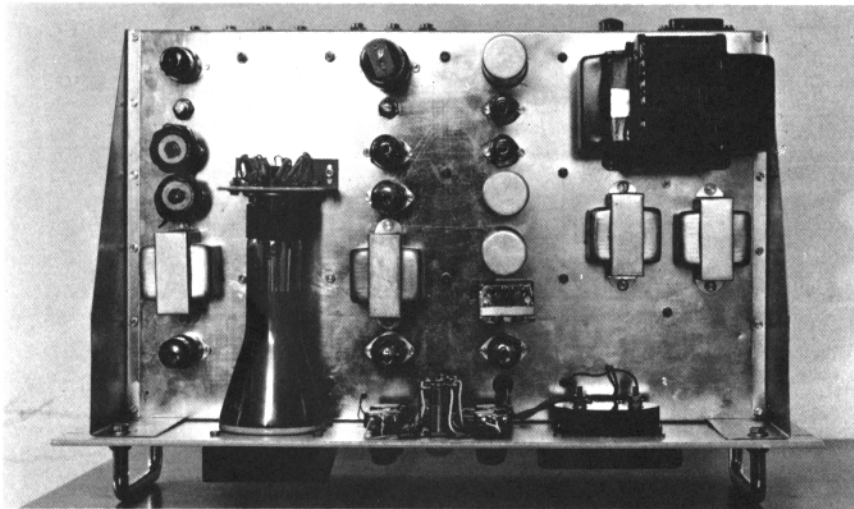
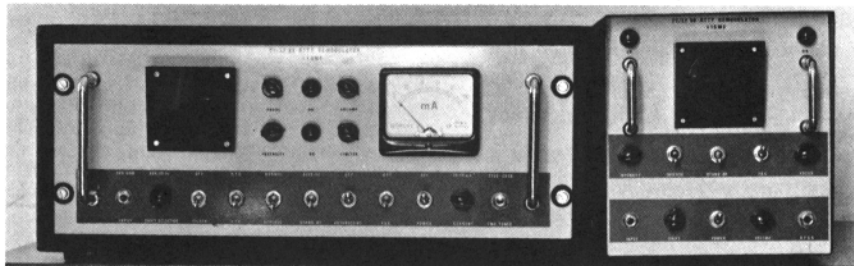
TU i1GMF Kleinschmidt TT 4 A/TG - Dipole Antenna

Tnx QSL - 73

PO Box 22
SALERNO - ITALY

GIULIANO FAURO IIGMF

16, VIA MATTEOTTI, AZZATE (VARESE) ITALY



WESTERN COMMUNICATIONS REGION (AFCS)

MTS PROGRAM — 6E2

TELEPRINTER GEAR SPEED IDENTIFICATION

For those wishing to identify the operating speed of their equipment, or alter the speed thereof, the following is submitted:

TELETYPE CORPORATION

Mod. 15 and 19 Left hand pinion (drive) gear			Model 14 TD Left hand pinion		
74912	7T 60	@ 1800	80164	6T 40	@ 1800
74913	30T 60	1800	80163	45T 40	1800
74505	7T 60	2100	87371	6T 50	1800
74151	35T 60	2100	135062	34T 50	1800 metal clutch
84018	7T 60	1500	123717	8T 50	2100
84018	25T 60	1500	135069	53T 50	2100 metal clutch
91286	7T 75	1800	80166	9T 60	1800
91287	24T 75	1800	80165	44T 60	1800
84105	8T 75	2100	135036	44T 60	1800 metal clutch
114460	PT 66	1800	87222	44T 60	1800 TT26 no clutch
114461	PT 66	1800	77034	7T 60	2100
			77036	40T 60	2100
Mod. 14 Reperf. Right hand pinion			135068	40T 60	2100 metal clutch
78510	7T 60	1800	84357	40T 60	2100 TT26 no clutch
78509	30T 60	1800	91131	13T 60	1500
71974	7T 60	2100	91132	53T 60	1500
73106	35T 60	2100	135067	53T 60	1500 metal clutch
84064	7T 60	1500	136582	13T 65	1800
84065	25T 60	1500	136583	60T 65	1800 metal clutch
94267	7T 75	1800	116767	11T 66	1800
88945	24T 75	1800	135065	50T 66	1800 metal clutch
7082	8T 75	2100	123711	10T 66	2100
6991	32T 75	2100	135065	53T 66	2100 metal clutch
110876	16T100	1800	91285	12T 75	1800
110877	42T100	1800	136525	47T 75	1800
110881	14T100	2100	136525	47T 75	1800 metal clutch
110882	43T100	2100	91283	7T 75	2100
Model 28 Printer			135064	32T 75	2100 metal clutch
	60T nylon mainshaft gear		110883	12T100	1800
151129	48T	Steel intermed. gear	135035	36T100	1800 metal clutch
151130	96T 60		77025	10T100	2100
151131	96T 60		135061	35T100	2100 metal clutch
148085	14T 60	ASR	104579	7T 60	1800 TT25 rcvg TD
159278	14T 60	NYLON SET	104580	30T 60	1800 TT25 rcvg TD
159279	96T 60	NYLON SET	104659	9T 60	2100 TT25 rcvg TD
151132	17T 75	FIBER SET	104558	45T 60	2100 TT25 rcvg TD
151133	93T 75	FIBER SET			
159281	17T 75	NYLON SET			
159282	93T 75	NYLON SET			
158083	17T 75	ASR			
151134	20T100	FIBER SET			
151135	84T100	FIBER SET			
158181	20T100	ASR			
159284	20T100	NYLON SET			
159285	84T100	NYLON SET			

(TT25 is rcvg TD, turns at rcvg speed)
(TT26 dual-chan. trans. TD, no clutch)

MOTORS: 14-15-19 generally 1800 sync. or 2100 gov. (set by "87.6 vps" fork). Note 1500 & 1800 gov., and dual-speed gov. may occasionally be found.

28: both sync. & gov. are 3600 rpm. gov. set by 120 vps. fork.

Sent in by W7QCN/Ø, 1610 Shasta Dr., Colorado Springs, Colo. 80910

DX-RTTY

BUD SCHULTZ, W6CG
5226 N. Willmonte Avenue
Temple City, California 91780

Hi DX'ers:

Thanks to good ole Ed Clammer, K3GIF, for taking over the DX chores last month while I was taking some time away from the keyboards here on the Coast. On my return here I was disappointed to find conditions so poor on the DX spectrum. By the time this reaches the mail I sincerely hope things have perked up for all of you.

As this is being written there is still no word to this desk as to how Jean, FG7XT, came thru Hurricane Inez and all of the gang are still watching for his usual outstanding signals to return to the bands. Judging by the many inquiries received here — Jean should know how many friends he has thru-out the World. Ed, K3GIF, supplied me with a copy of the following received via RTTY from Arthur, ON4BX. "The International Ham Convention at Knokke, Belgium was very well attended due to the dynamic efforts of the Knokke group of hams including ON4UM, ON4IB, ON4LV and ONL1322. About 600 different call letters were present with an additional 200 YLs. The attendees came from 17 different countries including the USA. Widely separated prefixes as OK, VE, SM, SU, PJ, W2, and W8 were present. Technical meetings covered such varied subjects as meteor scatter and parametric amplifiers. The conference and some interviews were transmitted via amateur television on 435 Mcs due to special permission granted to ON4RT and ON4LP members of the Amateur Television Association. DJ4ZC was presented with the Compte Lippens Trophy for his back breaking work in releasing a translator-carrying balloon every Sunday, thus permitting tracking and scatter tests to be performed weekly thru-out the year. ON4BX received an award of a crystal cup for outstanding DX activity during the past year. He placed second in the recent Alexander Volta RTTY DX Contest." Hope all of you will join me in offering Arthur congratulations on winning this fine award!

Here are some other DX snippets gleaned from Ed, K3GIF: UG6LR, who is Tola (short for Antola?) in Armenia is the latest DX plum from the USSR. LX1BA, Andre, is the newest RTTY operator from Luxembourg. Don, F7DS, will operate from LX-land with his USA cal/LX during the RTTY DX Contest. W3KDF reports working Chris, ZS6BCT on CW and Chris will be back on RTTY shortly. John also notes that VK2EG is beginning to come thru to the USA on long path for short periods of time each day. CX8BM says that

CX2AY is equipped for RTTY using an Olivetti Machine but operates on 80 meters only. New Russian stations are coming on weekly in such numbers that it is impractical to list them all. Except for UG6LR most of these are in Europe. Ed also comments that fifteen meters opened up early in October. A number of Northern Europeans were heard working the States around 1400 to 1500 GMT with strong signals. This band is open to South America almost from dawn to dark at this time. Let's have some RTTY activity on fifteen meters for a change. It used to be one of the best bands for new RTTY countries and there is no reason it should not still be quite fruitful.

Here are some quotes from Bill Corbin, SV0WL: "I have begun operation from the Island of Crete. Have made several contacts so far and hope to operate at least every week-end. All operation so far is 14090 ± 10 Kcs. My home call sign is W3CJK — please print this as my QSL address." This should be a real good new one for you DX'ers.

Here are the final tabulations on the Alexander Volta Contest as received here this week. Congrats to the winners!

1. 11KG	25,760	26. W4GJY	3,729
2. ON4BX	25,236	27. W1AW	3,685
3. 11ORS	23,427	28. DM0GST	2,763
4. DJ6ZBA	22,800	29. K5OLU	2,403
5. G3MWI	21,906	30. SM5CLW	2,050
6. K2DCY	19,530	31. LA6OI	1,960
7. W9EWC	17,200	32. 11KBT	1,809
8. K8MYF	16,608	33. W7CBY	1,620
9. W3KDF	15,998	34. WA2IUP	1,539
10. 11RRE	13,008	35. W3MHD	1,296
11. VE3AYL	12,996	36. UB5UN	1,210
12. WA6WGL	12,384	37. K4VDM	1,056
13. LA6J	11,680	38. K2YEQ	1,020
14. W8CQ	11,492	39. W6AEE	1,014
15. VK3KF	9,960	40. VE3IR	750
16. W1GKJ	9,435	41. G6VF	728
17. W6CG	7,392	42. VE4FG	444
18. WA4GTA	7,238	43. 11SAB	290
19. KL7BAJ	7,073	44. 11LCF	270
20. K3GIF	4,693	45. W6IWO	207
21. VK2EG	4,536	46. LA1SH	174
22. ON4HW	4,416	47. F3PI	90
23. HB9P	4,125	47. K5QBU	90
24. W3IZR	3,926	48. PA0FB	69
25. K9QNV	2,905	49. K9DBU	14

According to the results the highest number of countries worked was 21 by K2DCY which is really an excellent achievement because under the Volta Rules each country could only

Continued ...

DX-RTTY (continued) ...

be counted once regardless of the number of bands used.

That's thirty for this time, but hope to see you all for a final burst from here next month. Let's hear from you!

73

Bud, W6CG

FLASH — Last minute news item from W3KDF, GI3HCP, Desmond in Bangor, North Ireland, EL2AL, Don, Monrovia uses model 15 FB signal but upside down. G8DD, Bob, one of the BARTG committee, F3CX, Gary, also SM0PL heard on 21 mcs. Also heard LA1K club station at Trondheim. A big thanks to John for this late minute idea. Ed.

FOR SALE: Sealed Philomom tuning forks, J-400-K-N4058. 400 cycles, 0.01% with data sheet, \$5.00 postpaid. K8ERV, 1066 Larchwood Road, Mansfield, Ohio.

TRADE: Have model 28 ASR keyboard, will trade for model 35 keyboard. John Riley, 914 North Cordova, Burbank, California. Phone 213-845-3880.

FOR SALE: Teletype Regenerative Repeaters TT-63A helps received biased, distorted, fading signals. Also may be used as receiving converter. 19" rack panel mounting, \$23.00. Power supply, little, light, solid state 120VDC at 800 ma, enough to run the entire loop, \$8.00. Model 14 typing reperfs, sync motor, \$40.00. Saturn six halo with matching transformer, \$9.00. Teletype roll paper, standard 8½" yellow. Packed 12 rolls to the case, new, \$8.00. NOTE only a couple of dozen cases left. 11/16" reperf tape for 14 and 28, etc., 10 rolls to case, \$3.00. Teletype gear manuals, listing all gears by number for all popular machines, \$2.00. Send stamp for list. W2DLT, 302R Passaic Avenue, Liriting, N. J. 07980.

SERVICE: Cleaning and repair of Teletype machines. Have in stock every part for Model 14, 15, 19s and many parts for 12, 26, 32, 33, 35s. Can obtain any parts needed. Manuals for 14, 15, 28s and most oddballs. Teletype machines all models in any style and all special features. Must sell: 11/16" reperf tape, 10 rolls to box, \$2.00. 40 rolls to case, \$7.00. Will buy or trade for Teletype parts, and machines. Call or write Martin Geisler, 8926 Kester Avenue, Van Nuys, California 91402. Phone 213-892-0685.

FOR SALE: 88 mhy toroids, 5 in can, uncased, \$1.75 postpaid. 44 mhy same price. ESSCO W2JAV TU's AFSK units. Model 14, 15 and 28 Teletypes. Send stamped envelope for list. W6VPC, 1067 Mandana Blvd., Oakland, California 94610.

FOR SALE: 2125 and 2975 CPS dual tuning fork assembly, \$33.00. 05% stability, 68" to 86" F. Transistor fork drive circuit kit, \$10.00; assembled circuits, \$16.00. Data available. RIVERBANK LABORATORIES, P.O. Box 65, Geneva, Illinois 60134.

WANTED: YOUR SUBSCRIPTION TO RTTY FOR THE YEAR 1967, \$3.00. Address RTTY, 116 West Fourth, Royal Oak, Michigan 48067 (P.O. Box 837).

WANTED: Wrecked 8 level BPPE or punch block for same. **FOR SALE:** Frequency shift exciter O-39C/TRA-7 with manual and connectors, \$35.00. Local deal only. John Riley, 914 N. Cordova, Burbank, California. Tel. 845-3880.



HORSE

TRADES

FOR SALE: AN/FGC-1 TU, AN/FRR-3 diversity TU and Receiver, Johnson Viking Desk KW, Central Electronics 100V, Model 14 TD, Model 14 typing reperf, all in excellent condition, with manuals. Sorry, no delivery. W6YNS, 10462 Orange Park Blvd., Orange, California. Phone 714-633-1037.

FOR SALE: Teletype parts and machines. Send SASE for list, W4NYF, 405 N.W. 30th Terrace, Ft. Lauderdale, Florida 33311.

FOR SALE: 88/44 mh Toroids, 5/\$1.75 PP. 255 A Polar relays with sockets, \$2.00 ea. PP. 276 F Merc wetted relays, \$1.50 ea. PP. Aluminum extruded heat sinks 1 x 4½ x 1¼ in. mounting area 1 x 1½, 5/\$1.50. W9FTE, 566 N. 38th St., Milwaukee, Wisconsin 53209.

FOR SALE: Collins 32V3, excellent condition. See June 1966 RTTY for easy conversion for RTTY. Not a scratch and all new tubes. Price \$150.00. Elmer Shafer, W8MSG, 3479 Kersdale Rd., Cleveland Ohio.

FOR SALE: Model 28KSR, excellent condition. Model 32ASR table model. Model 19. MXD-6 head TD. Collins S-line transmitter. W6NSS, killed in plane crash. Mrs. Al Browdy, 1962 S. Stearns Dr., Los Angeles 34. Phone WE 5-2537.

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