RTTY

W0IQC

RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY

NEWS OF AMATEUR RTTY

APRIL, 1957
25 Cents
Vol. 5, No. 4

HORSE TRADES

This page of the Bulletin is for use of amateurs who have RTTY EQUIPMENT FOR SALE OR TRADE and those looking for equipment to buy or trade. It is a free service and may be the means of getting someone on the air

- WANTED: Model 14 TD W7JLF
- FOR SALE: 1-A Xmit Head-Reperforator and Distributor with Sync Motor W2MIB
- WANTED: Cover only for Model 14 Non-Typing Reperf. Model with reel in top W6DOU
- FOR SALE: Oiled Wheatstone Perforator Tape Sixe 15/32" wide W6DOU
- WANTED: Feb., Aug. and Sept. 1953 RTTY's W1RR
- FOR SALE OR TRADE: AC governed motor for Model 15, comp with lamp and switch, Brand new. Make offer W4EHU
- FOR SALE: 10-A Reperf. WU tape head and WU motor driven (DC) combination Xmtr and Rec. Distributor W2CFT
- WANTED: Model 14 Typing Reperf. W2PEE
- FOR SALE: Model 12 Reperf and Xmting and Rec. tape distributor with 1-A tape head W2PEE
- WANTED: 1-A tape head and perforator W7RZY
- FOR SALE: Model 14 tape distributor with Sync Motor W6WOC

RTTY, Inc.
372 WEST WARREN WAY
Arcadia, California
Return Postage Guaranteed

PASADENA CALIF. JUL 5 3 30PM 1957 2

A Crystal Controlled Tone Generator

BY ELWIN J. O'BRIEN, W6LDG

The crystal controlled tone generator was developed to provide a frequency standard for the 2125 and 2975 cycle TTY tone frequencies. Continued development produced a keyer circuit for AFSK operation. The Pierce oscillator with a channel 41 surplus crystal (446. 395 kc fundamental) drives a one to six frequency divider circuit[1] to 74. 3991 kc which in turn is divided by five to 14.8798 kc.

Next, two frequency dividers with both inputs driven at 14.8798 kc are used. One to divide by seven for the Mark tone of 2125.69 cycles and the other to divide by five for the space tone of 2975.96 cycles.

Although these frequencies are a fraction of a cycle high no attempt has been made to adjust the crystal for exact tones.

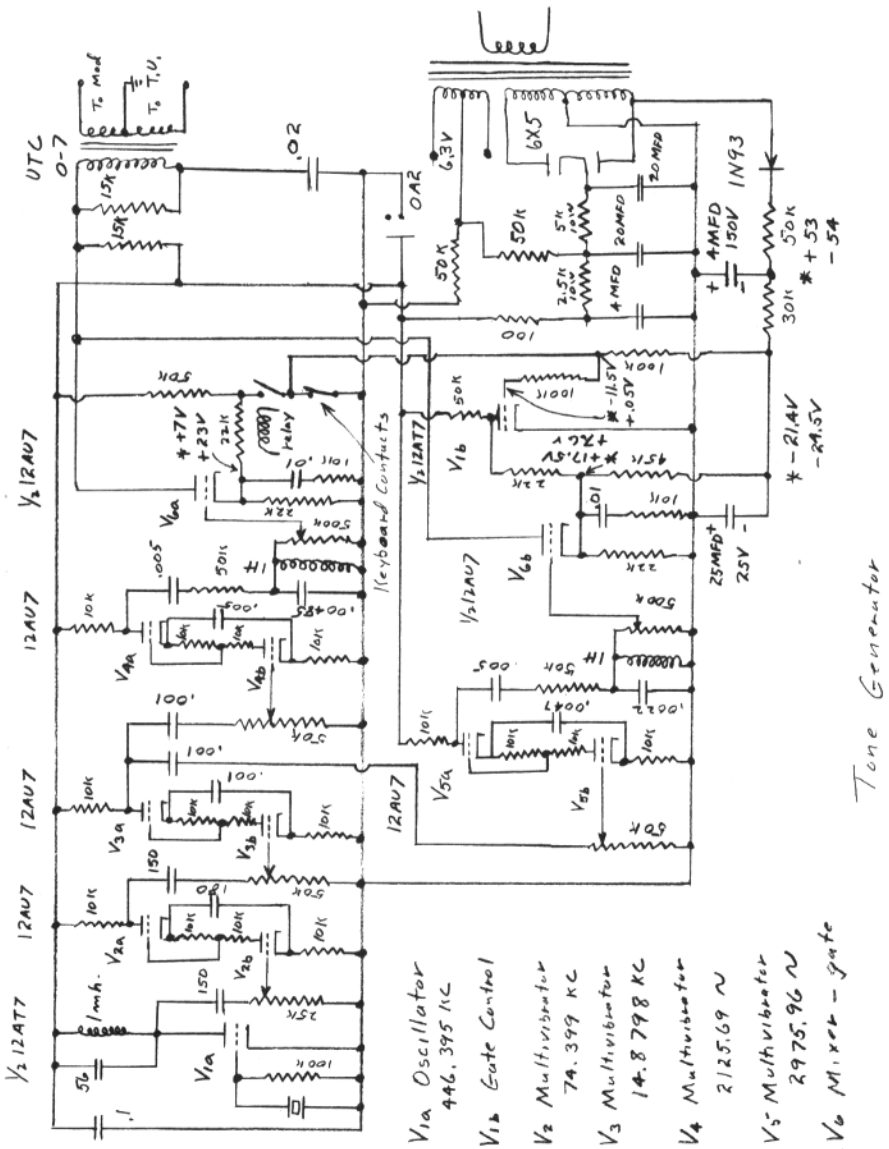
Following the dividers are ringing circuits to reshape the wave to sine waves. A keyer circuit then gates the output of a mixer amplifier to select the desired tone. In the stand-by operations position the open relay allows cut off current to flow in both cathodes of the mixer tubes (V6a, V6b) and the tones are blocked from the output. When the stand-by relay and keyboard contacts are closed the junction of the 22K and 50 K resistors in the cathode of the first mixer tube (V6a) is at ground potential placing normal bias on the tube and the Mark tone (2125) is passed to the output. At the same time cutoff bias is on the grid of the gate control tube, (V1b) cutting off this tube and allowing cutoff bias current to flow in the cathode resistor of the second mixer tube (V6b) blocking the space tone (2975).

When the keyboard is open, blocking bias is again on the first mixer tube (V6a) and the Mark tone is removed. At the same time approximately zero bias is on the grid of the gate control tube (V1b) and with the tube conducting the plate is at near ground potential which allows the second mixer tube (V6b) to have normal bias and the Space tone (2975) is passed to the output.

The circuit diagram shows the gating circuit DC voltages for typical operating conditions.

In order to remove keying transients and to prevent simultaneous transmission of both tones during the keying interval, suppressor resistors and capacitors are placed across the cathodes of the mixer amplifier tubes, (V6a and V6b).

1. Cascode Multivibrator, NAA Patent No. 2,710,918.



Power Supply for 2-A Perforator

BY R. B. STEVENS, W6ILW

Recently I came into possession of a WU Model 2A (iron horse) perforator and proceeded to construct a small DC power supply such as some of the boys are using, employing one of the new 500 ma. Silicon rectifiers which is very small and which may be placed together with its condenser, etc., directly under the base of the machine. After burning up one rectifier by overworking same, and two more through my own foolishness I was forced to make some observations as follows:

1—Holding a key down too long will take out the rectifier.

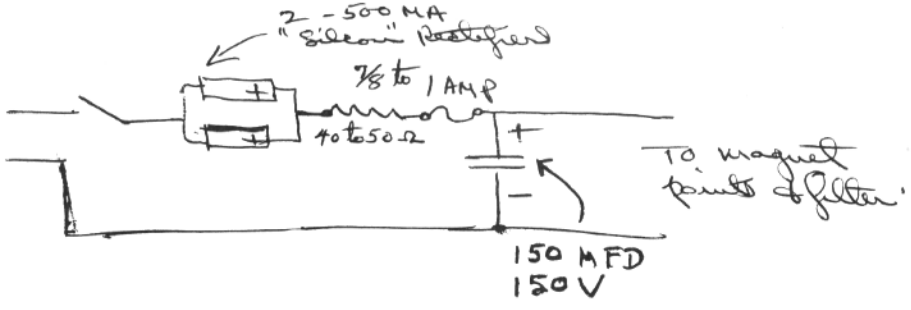
2—The rectifier quits passing DC but will pass AC like mad.

3—The condenser blows up.

4—A condenser failure will take out the rectifier, etc.

5—Fuses are much less expensive than rectifiers and condensers.

In self defense I finally set up the following circuit. I have also learned to hit the key and get it over with, as holding down or "rocking" will be bad for the 1-amp SloBlo fuse.



PHASE SHIFT TELETYPE

BY JOHN HUNT, WØYBE, KØEXI*

Communication via RTTY using only a single tone is now possible. If the present trend in reducing the frequency shift continues the ultimate result will become a single tone. The Mark-Space information must then be phase shifted to convey the information. The advantages offered by such a system are tremendous and lead the way to even greater utilization of our already crowded radio spectrum. This system has been demonstrated to provide 8-10 DB improvement in signal-to-noise performance over standard FSK.

The principle used to achieve these results is rather simple but the techniques used are a little more complicated. For an example let us take a single tone of 1,000 cycles. A Mark condition will be represented as a sine wave. A space will also be a sine wave but 180° out of phase with the Mark. This is illustrated in Figure 1,

The transmitter would consist of a tone generator, 180° phase shift network and some means to select either of the two conditions according to the DC input information. A block diagram of the transmitter is shown in Figure 2. The tone output for the letter "Y" is shown in Figure 3. The output is then fed into the audio input of a single sideband transmitter, The phase of the tone is maintained in its conversion to R. F. and also in its reconversion in the receiiver to audio.

For reception it becomes necessary to split this information according to its correct phase. A phase detector can be used satisfactorily; however with the use of two mechanical resonators preceeding the phase detector, an improvement of 8-10 DB can be realized over FSK. The energy is fed into the resonator and stored. They are gated alternately such that the response of the resonators would look like Figure 4. By opening the gate of one resonator the signal energy builds up whereas the noise tends to remain at a low level. The noise is random and therefore will contribute very little energy at the resonate frequency. Just before the end of the 22ms period the energy is sampled and a high signal-to-noise ratio is obtained. The gate on the second resonator is opened at the start of a second 22ms period. It is first quenched of all previous energy by a feedback loop and then allowed to be driven again. By having two resonators the phase of one element can be compared with that of the other. A receiver block diagram is shown in Figure 5. The output of the phase detector contains positive and negative pulses of information according to Mark and Space inputs. This output would

* Collins Radio Company,
Cedar Rapids, Iowa

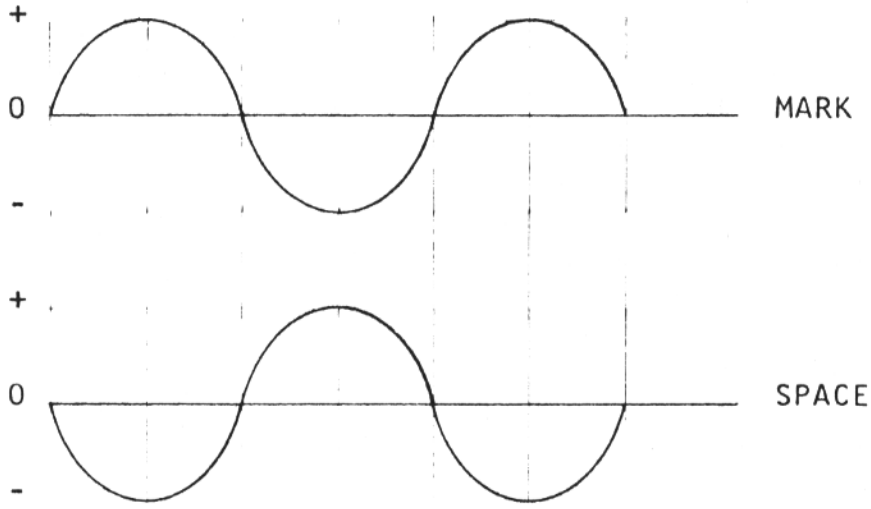


FIGURE 1

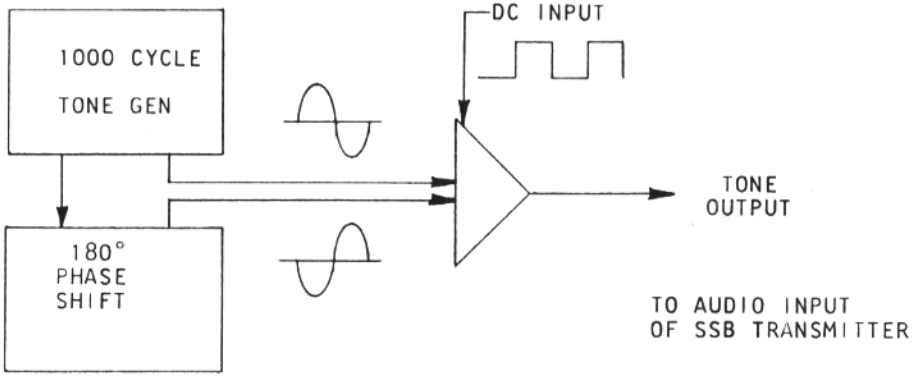


FIGURE 2

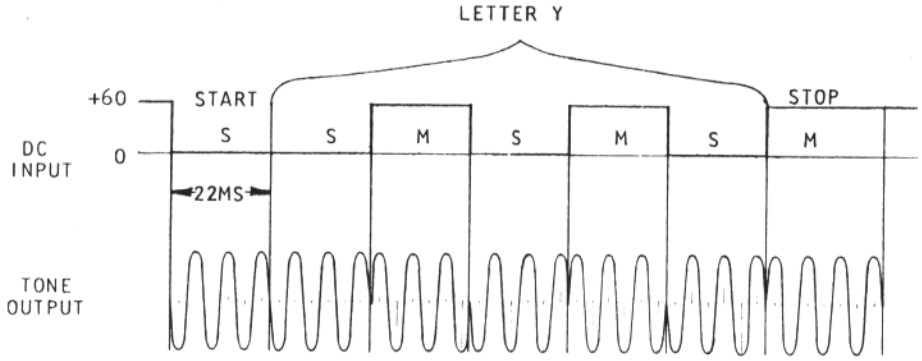


FIGURE 3

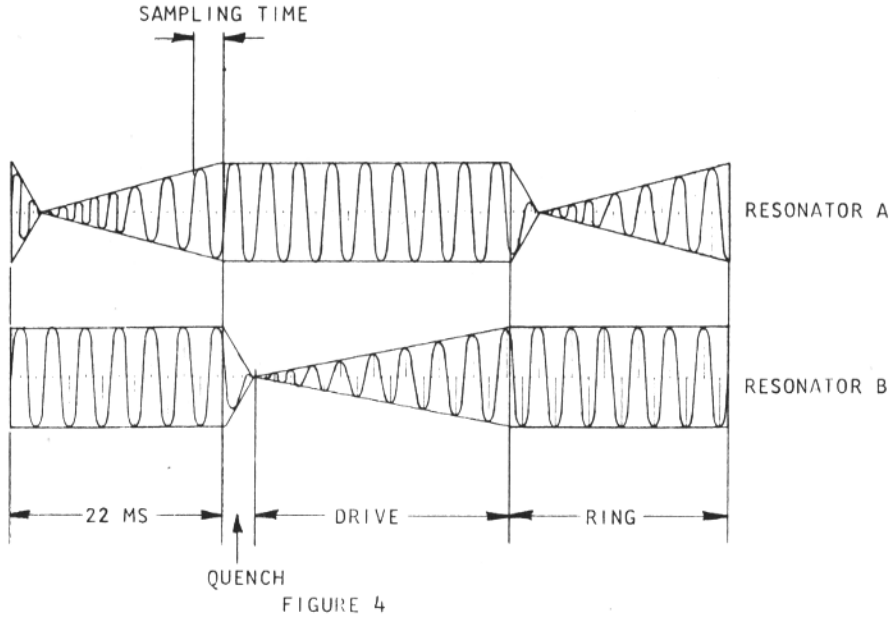


FIGURE 4

then drive a standard Keyer-Printer set-up.

Collins Radio Company has now developed a Teletype system which used the phase shift principle for its operation. This system is called "Kineplex;" a name given to it because it makes use of kinematic (mechanical filter) filtering and is generally used for providing multichannel or multiplex operation. Each tone contains two channels of information by shifting the second channel 90° from the first. By spacing tones only 110 cycles apart it is possible to get 40 Teletype channels for transmission of data up to 100 words per minute in a single 3 KC voice channel. This system has excellent performance in both land line and radio link applications.

While more complicated circuitry is involved the S/N improvement obtained is well worth it. Phase shift Teletype for the radio amateur should become practical in the not too distant future.

Subscription Rate $2.50 Per Year

RTTY is the Official Publication of the

RTTY Society of Southern California

and is published for the benefit of all RTTY Amateurs and Experimenters
Permission to copy is granted provided credit is given.

For Information Regarding the Society Contact the Following:

W6CLW—Ed Simmons
W6AEE—Merrill Swan
W6SCQ—Lewis Rogerson

For Traffic Net Information:
W6FLW W6IZJ

For "RTTY" Information:
W6CL W6DEO W6AEE

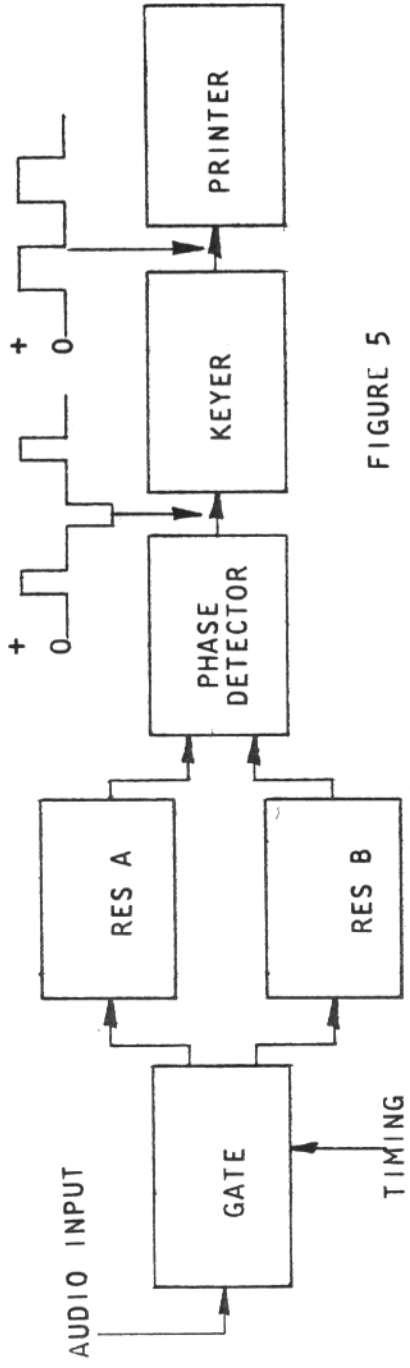
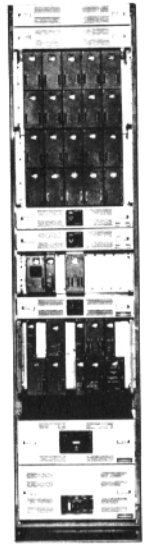
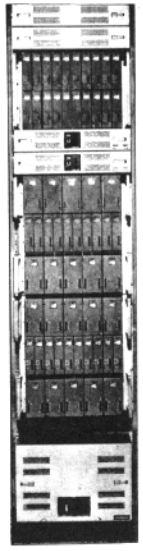


FIGURE 5



FRONT



REAR

Collins

TE 202
KINEPLEX
DATA SYSTEM

APPLICATION:

The Kineplex Data System is a flexible, high capacity synchronous data system for transmission of binary information such as teleprinter, business machine telemetering, supervisory control, and facsimile signals over radio, wire line or microwave facilities when used with a suitable data converter system. It provides for transmission of data up to 3000 bits per second in a 3 KC band. The data inputs and outputs are composed of 40 parallel circuits each operating synchronously at 75 bits per second.

DESCRIPTION:

The Kineplex Data System consists of one rack with equipment mounted on both sides. Articulated swing-out hinges and plug-in modular construction are employed to permit easy access to all equipment. No vacuum tubes are used, all functions are accomplished with transistors and magnetic amplifiers. Channelling equipment may be added in multiples of two (2) channels to a maximum of 40. The basic system provides wiring and mounting for 40 channels. One channel will handle 75 bits per second and channels may be connected in a series-parallel and parallel-series arrangement to provide for transmission of data up to a maximum of 3000 bits per second. Synchronous data from a converter system are converted to audio tones with two (2) channels per tone. Twenty (20) tones are spaced 110 cps apart and cover the range 605 to 2695 cps. The separate tones are combined for transmission to the voice frequency transmission equipment.

At the receiving equipment, these tones are distributed to the detector circuits for detection. When diversity receiving is required, the outputs of two (2) detectors are combined in the Detector Sampling Unit. Completely regenerated synchronous data are transmitted to the converter system.

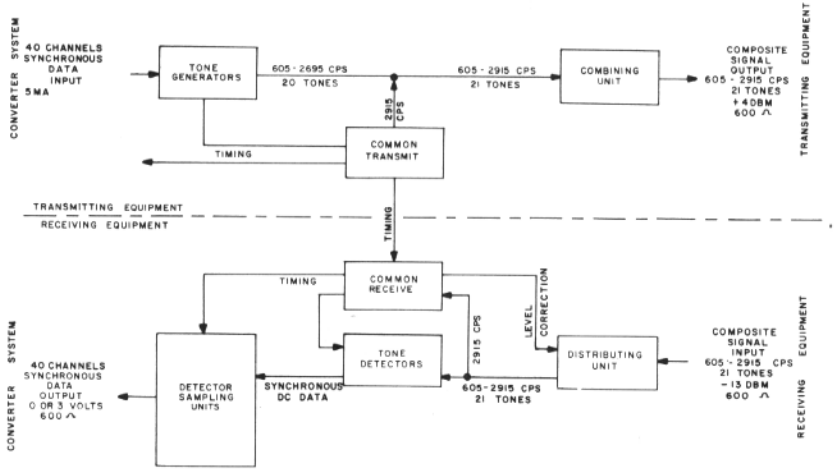
The synchronization of the transmitting and receiving timing circuits may be accomplished by the use of a 2915 cps synchronizing tone or a Frequency Synthesizer may be provided to derive all timing from a precision frequency standard (Collins 40K-1), eliminating the need for continuous transmission of synchronizing information.

FOR INFORMATION ONLY—Not an advertisement

EQUIPMENT SPECIFICATIONS

WEIGHT:	Approximately 400 lbs.
DIMENSIONS:	86 1/8" high, 20 1/2" wide, 20" deep
FREQUENCY RANGE:	605 to 2915 cps
SIGNALS:	
TRANSMIT INPUT:	Synchronous DC data, +5 ma for a "mark", −5 ma for a "space", balanced ungrounded.
TRANSMIT OUTPUT:	Composite signal, 20 tones, one (1) tone per two (2) channels, 600 ohm impedance, balance, ungrounded, +4 DBM power level.
RECEIVE INPUT:	Composite signal, 20 tones, one (1) tone per two (2) channels, 600 ohm impedance, balanced, ungrounded, −13 DBM power level (two inputs required for diversity receiving).
RECEIVE OUTPUT:	Synchronous DC data, 23 volts for a "mark", 13 volts for a "space", unbalanced, grounded.
SYNCHRONIZATION:	2915 cps on-off tone
CHANNELS:	40 channels (3000 bits per second) maximum
POWER INPUT:	615 watts 115 volts 60 cps single phase
OPERATING CONDITIONS:	Fixed station 0-45°C ambient, humidity to 95%
STABILITY:	
TIMING:	Synchronization of transmit and receive timing is accomplished by a synchronizing tone. Timing may be derived from a frequency standard with an accuracy of 1 part in 10^{7} per day.
FREQUENCY:	Tone generation and detection is accomplished by mechanical resonators with a frequency stability of ±0.5 cps, 0-65°C.
FREQUENCY CONTROL:	No automatic frequency control is required for use with Collins Integrated Communication System equipment. Automatic frequency control is provided for use with other transmission equipment where required.

FUNCTIONAL BLOCK DIAGRAM



COLLINS RADIO COMPANY CEDAR RAPIDS, IOWA

11 West 42nd Street, NEW YORK 36, NEW YORK
1028 Connecticut — N. W., WASHINGTON 6, D. C.
77 Metcalfe Street, Ottawa 4, ONTARIO, CANADA
1930 Hi-Line Drive, DALLAS 2
2700 West Olive Avenue, BURBANK

Printed in U. S. A.

FOR INFORMATION ONLY—Not an advertisement

EQUIPMENT LAYOUT FRONT

COLLINS TE-202 KINEPLEX DATA SYSTEMS

FRONT

JUNCTION PANEL

JUNCTION PANEL

1	3	5	7	9
2	4	6	8	10
11	13	15	17	19
12	14	16	18	20
21	23	25	27	29
22	24	26	28	30
31	33	35	37	39
32	34	36	38	40

FUSE PANEL

FUSE PANEL

COMMON TRANSMIT

FUSE PANEL

COMMON RECEIVE

COOLING VENT

AFC POWER SUPPLY 526L-1

POWER SUPPLY 526H-1

TONE GENERATORS 773E-1

COMMON TRANSMIT

COMBINING UNIT 572B-1	ON OFF GENERATOR 288D-1		TONE BASE TRANS. 772H-1	

COMMON RECEIVE

DISTRIBUTING UNIT 787A-1	SYNC. UNIT 776F-1		TIMING OSCILL. 368B-1	TIME BASE REC. 772D-1	SIX VOLT CONV. 501B-1	
TIME POWER AMP. TRANS. REC. 548E-1	TIME POWER AMP. REC. 548B-1		ERROR DETECTOR 778G-1	MODULATOR A.F.C. 365Q-1	OSCILLATOR A F C 368D-1	

A Light for the Model 26

Harold S. Roth (Si) WØLFH, 602 W. Nebraska, Algona, Iowa

I had trouble with the light on the paper of my 26 and after vibration burned out several regular lamps I hit on this idea.

I obtained the 8 watt florescent tube and ballast from a small discarded sign but they can be obtained commercially from any electric supply house.

Originally the tube was fired by holding down the start button till the gas had fired but the addition of the FS12 starter eliminates this and it will lite automatically when AC is applied. I have mine connected to the AC in the TU so that when the TU is turned on there is lite in the printer.

A small piece of 500 Wiremould 13 inches long can be obtained from any electric shop in their scrap box. To dress it up the moulding may be painted black as the moulding has a prime coat on it.

The entire page from side to side is lit up regardless of the position of the paper.

After experimenting as to the location after drilling several holes in the plastic I find that the given location for the lite gives best results. Any higher and there is a shadow on the printing line and any lower covers too much of the printing from the operating position at this location 7 lines are visible which is as long as my memory is anyhow.

It does cover a few more lines when standing above the machine but who operates RTTY standing up??

WIRE MOULD 500—8 WATT
FLORESCENT TUBE

If Wiremould is spread slightly the tube will slip inside easily. Lead wires from left end can be run through the points marked at X with plastic hook-up wire.

I leave the starter hang on the right end and then the other two AC wires are brought through a male female plug to the paper compartment in the 26 and then to the ballast and AC line. Use flexible leads so door may be opened. The starter can be taped to the wires to keep it away from the carriage. Solder wires to the starter button instead of using socket to make it smaller if you want.

Wire mould should be tapped for 6-32 to make mounting easier and besides nuts will break tube. Use bolts just long enough to go through metal.