

INSTRUCTIONS
for
WIRING and ASSEMBLY

Philmore

NOVICE TRANSMITTER KIT
including

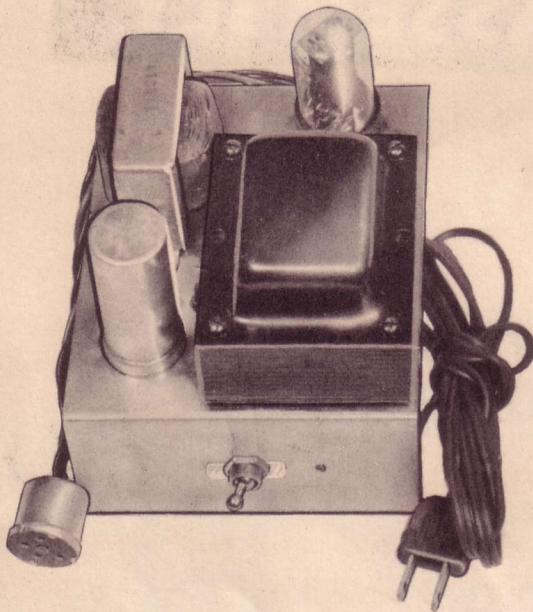
POWER SUPPLY KIT and KEY

MODEL
NT-200

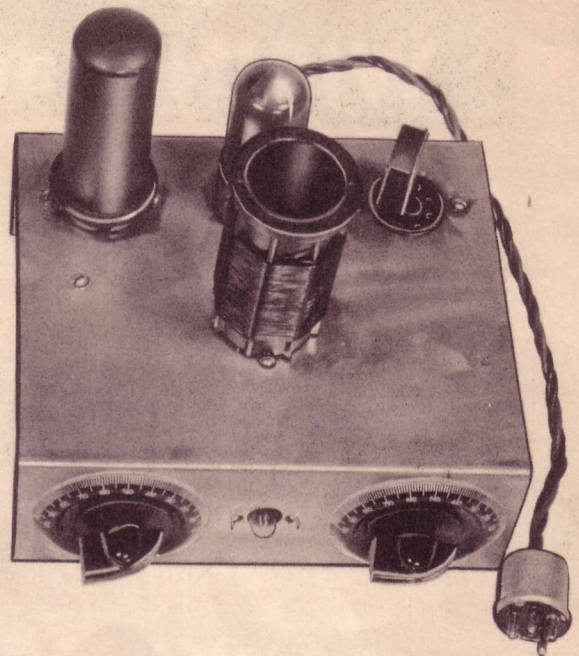
C O M P L E T E
*With Pictorial Diagrams
and Easy - To - Follow
Step-By-Step Instructions*



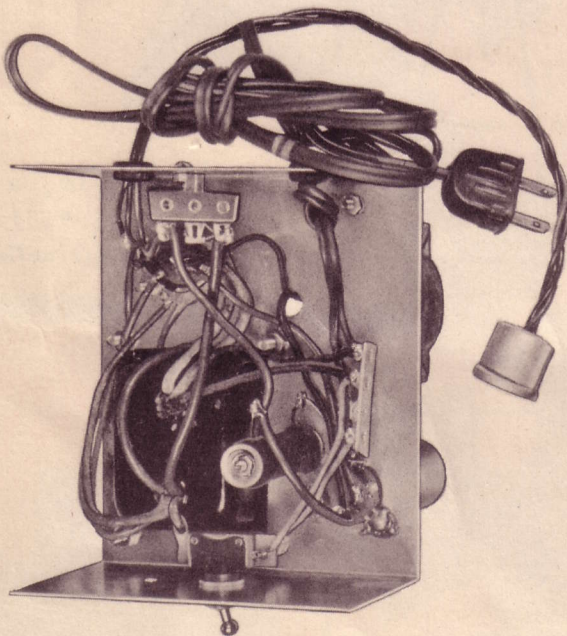
PHILMORE MANUFACTURING CO., INC. NEW YORK 3, N. Y.



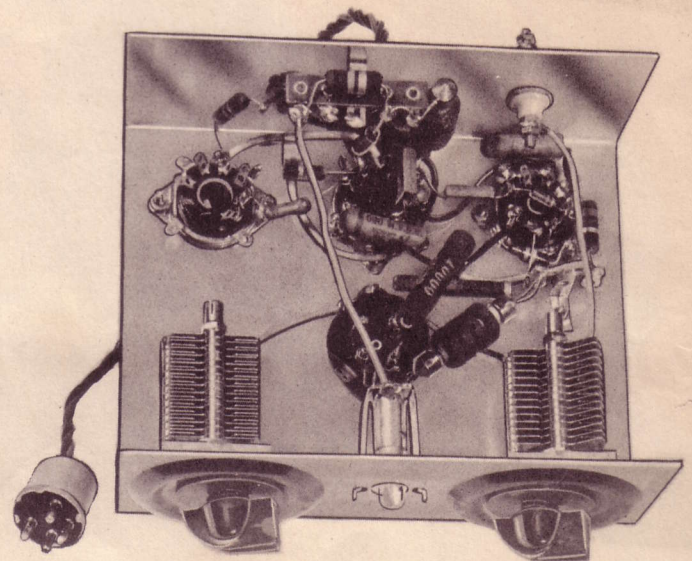
POWER SUPPLY
COMPLETELY ASSEMBLED



TRANSMITTER
COMPLETELY ASSEMBLED



BOTTOM VIEW
POWER SUPPLY
WIRED



BOTTOM VIEW
TRANSMITTER
WIRED

AMATEUR TRANSMITTING is a scientific pastime and the new regulations permitting the issue of a "Novice" license after passing an elementary examination gives opportunity to many enthusiasts to commence transmitting on low power and enables an amateur to gain practical experience which should make the passing of the regular Amateur License examination quite easy.

Transmitting is one of the most fascinating fields in electronics. The greatest thrill any veteran amateur can recall is that first experience way back in the beginner stages when working with low power, in many cases only a few watts, his call was responded to by another station which upon identification proved to be several thousand miles away.

Day after day new contacts are established: new friends are made; calls are scheduled and a new circle of friends is established scattered all over the world. When you sit down at your Transmitter you feel that you are calling "open sesame" to another world.

AMATEUR RADIO HAS A BRILLIANT PUBLIC SERVICE RECORD

As this is being written the record shows that an amateur in Ceylon made a call to England for a top Brain Specialist to come to the aid of the stricken Prime Minister of Ceylon. This call was followed up by the British Broadcasting Company which quickly placed its facilities at the disposal of the Specialist for direct phone communication with the doctors in Ceylon.

Quick action necessary during fires, floods and tornadoes has often depended upon the help given by amateurs which proved to be the only fast and available means of communication between stricken districts and the outside world.

PHILMORE PIONEERS ECONOMY KITS

As one of the pioneers in economy type kits for radio reception ranging from the simplest Crystal Set Receivers up to the best types of Television Receivers, we now feel that we can move into the transmitting field with Kits to facilitate the work of the transmitting novice.

We surveyed the field and found that with few exceptions, the general advice available to the novice by means of magazine articles and some commercial kits was of a limited type. With this in mind, Philmore Engineers set off with the basic idea that a Novice Kit should be based on simplicity, economy, and efficiency. Ease of operation, simple tuning and simple antenna system was the basis for the new transmitter, which we designed. Furthermore, we wanted the completed job to have the appearance of a factory-built job.

From our own engineers' experience, we knew that the amateur is a born experimenter, bound to try out different circuits. So we therefore planned the construction of the chassis so as to make it easy for the amateur to continue experimenting and thereby enable him to expand his knowledge of different circuits. In the Philmore Kit you will find that these requirements are easily carried out.

MANY TYPES OF CRYSTAL OSCILLATOR CIRCUITS

There are many types of Crystal Oscillator Circuits. For the novice we selected the Untuned Pierce type which will oscillate freely with any type of Crystal.

Regulations provide that you must use Crystal controlled Transmitters in order to stay within the restricted bands. These Crystals have the basic property of setting up mechanical vibration at a frequency determined by the angle of cut from the optical axes, thickness and shape. Certain frequency ranges determine the combination of these factors most suitable for the purpose.

The Crystal functions as a series resonant combination represented by a high inductance to capacity ratio with very high "Q" and consequent selectivity factors, or narrow band response, whichever you like to call it.

So by using a Crystal your Transmitter is held very close to frequency and will not drift outside the band.

Crystals for amateurs are made by several manufacturers of long experience and a reputable maker's type should be used. Surplus types may or may not be suitable.

We decided that the untuned type of Crystal Oscillator together with a tuned output circuit would give more flexibility than the single tube tuned novice oscillator.

The maximum power input for the single tube Novice circuit is around 11 watts with much less actual power output into the antenna. Also the use for the 11 Meter band by tripling is too low for practical use.

So we designed the Philmore Novice Circuit using the Untuned Pierce Oscillator together with a Tuned Output Amplifier, with simple tuning, requiring no meters for tuning and loading the antenna.

In the interests of economy we selected easily obtained receiving tube-types, 6V6 for the Oscillator and 6L6 for the Amplifier Tube.

For the Power Supply we rejected the Selenium type Rectification in favor of the more reliable and more trouble free Power Transformer and Rectifier Tube. The Tube type being 5Y3, and the output approximately 370 volts under full load on the antenna.

The tuned output circuit selected is the familiar "Pi" type which allows one side of each of the Tuning Condensers to be at ground potential and is efficient in loading the simplest type of antenna, such as the single wire type, with no critical factors as to length.

The Single Wire Antenna may consist of 125 feet for full size, for the 80 Meter band, measured from the Transmitter to the far end of the Antenna, including lead-in thru the house to the Transmitter. Shorter lengths may be used and if no outside space is available, an indoor antenna may be installed in the attic or around two or three rooms near the ceiling. The range may be restricted with short lengths and inside antenna. As much length as possible should be as high as practicable for best range.

TESTING

After the wiring is completed and checked, the Power Pack alone should be connected to the AC Supply and switched on. See that the 5Y3 lights up. At Lug Strip C Lug 1, with no load the DC voltage should show around 425 volts. Strip C Lug 3 should show around 6.5 volts AC.

Connect Transmitter Plug to Power Supply Socket. See that the Tubes light up. If Metal Tubes are used, feel if they warm up. Check for B plus voltages at the points shown on the circuit diagram, where the voltages will be approximate until the Transmitter is tuned, but will indicate Circuit is in operating condition.

TUNING

In order to facilitate your understanding of the tuning of Transmitters with the least confusion, hook up a simple dummy Antenna for testing, consisting of about 10 feet of Insulated Wire in series with a 25 Watt Lamp and in series again with a small, mica condenser with a capacity of around 270 Mmfd. (not critical) and to Chassis.

Turn both C1 and C2 to full maximum capacity. Watch the Pilot Lamp in the Chassis and turn C1 backwards until Lamp dims. Turn C2 until lamp dims and then gets bright again. Watch the brightness of the 25 Watt Lamp while doing this and juggle C1 and C2 until maximum glow is obtained in the 25 Watt Lamp. This will familiarize you quickly with what is taking place as you tune.

Check your voltages once again with the Voltmeter at the points shown on the Circuit Diagram and they should be approximately correct if Tubes and Crystal are O.K. As the Output Amplifier is driven close to maximum, the Pilot Lamp is shunted with a small Resistor to reduce current in Lamp.

COILS

One required for each band. Wiring instructions are shown on diagram together with 2nd Harmonic Wave Trap if required.

For the 11 Meter band, tripling of the Crystal frequency

is required. The Crystal should be within the limits of one-third of the band frequency. Crystals with special harmonic output can be obtained which are most suitable for this purpose. The dummy for experimental tuning can be about 6 feet of Insulated Wire; with a 10 Watt Lamp substituted for the 25 Watt Lamp.

It is recommended that initial transmission should be carried out on the 80 Meter band until you are familiar with the handling of the Transmitter.

When connected to the Antenna, indication of the loading may be obtained by placing a small Neon Lamp NE2 1/25th Watt near the top of the Coil. Its glow indicates loading. Pilot Lamps and other Lamps tacked on to the antenna for indication may be used, but they absorb power, which is not desirable in low power Transmission. The Wiring Diagrams are the most complete we have ever designed. All salient information is incorporated right where you have it under your observation during construction.

When completed you will have a professional-looking outfit at a price probably less than a breadboard setup, and a Power Pack useful in many applications.

2nd HARMONIC RADIATION

With some antenna lengths, particularly around 35 to 50 feet, harmonic radiation may occur. Test, if possible with some other station within about 25 miles for a check on this.

A Wave Trap can be used to correct this if necessary. This is shown on the Coil Diagram.

— CAUTION —

Voltages around the Transmitter are high, and care must be taken in handling the Chassis while operating. This, of course, refers to placing the fingers amongst the wiring while voltages are present.

PHILMORE NOVICE TRANSMITTER AND POWER SUPPLY KITS—TWO BANDS

General Instructions

DATA

Power Input	25 Watts.
Bands	3.7 to 3.75 Megacycles. (80 meters) 26.96 to 27.23 Megacycles (11 meters)
Tubes	Transmitter: 1-6V6 1-6L6 Power Supply. 1-5Y3
Power Supply	370 Volts DC under load 425 Volts DC no load
Operating Voltages	Indicated on Circuit Diagram at salient test points.
Coils	One for each band. Low Loss Plug-in Type.
Tuning	2-100 Mmfd. Variable Condensers.
Circuits	Oscillator. Untuned Pierce type starting easily with any Crystal. Tuned Output. "Pi" type enabling use of simple antenna.
Dimensions	Transmitter: 7" wide x 5 1/2" deep x 2 1/2" high. Overall height mounted, 6 1/3". Weight: 2 lbs. Power Supply: 4 3/4" wide x 5 1/2" deep x 2 1/2" high. Overall height mounted, 6". Weight: 6 lbs.
Assembly	Power Pack: Power Transformer, Electrolytic Condenser and Filter Choke are mounted on top of the Chassis in positions shown on the diagrams. The 20,000 ohms Wire-wound Resistor is mounted under the Chassis with the long screw provided. Transmitter: All parts are clearly shown on the diagram. Be sure that all mounting bolts and nuts are tightly screwed down, particularly those mounting the sockets where the socket saddle is fitted with Lugs for ground connections.
Wiring	Philmore special type Pictorial Diagrams are designed to make each connection easy to follow. Close parallel lines which are confusing are avoided. Mark each connection along with red pencil or crayon as it is completed. Any missing connections will stand out in white outline and be conspicuous. When completed, check also against the circuit diagram for recheck. Wiring steps are printed in large, easy to read type on the same diagram. Rule a red line across each as completed.
Resistors and Condensers	A simplified color code is included on the circuit diagram.
Hook Up Wire	Plastic covered wire is recommended, either No. 20 or No. 22 solid.
Solder	Use Rosin Core Solder.

PHILMORE NOVICE TRANSMITTER KIT

Parts List

CAREFULLY CHECK THIS OVER AND REPORT ANY SHORTAGE TO YOUR DEALER

PARTS FOR POWER PACK CHASSIS

- 1 Power Supply Chassis
- 1 S.P.S.T. Toggle Switch, including Mounting Nut
- 1 "On" and "Off" Plate for Toggle Switch
- 1 6 ft. Line Cord with Plug
- 1 90 MA. Power Transformer *700V.*
- 4 8/32 Nuts for Mounting Power Transformer
- 1 90 MA. Filter Choke
- 2 ea. 6/32 Screws, Nuts and Lockwashers for Mounting Filter Choke
- 1 10/10 Mfd. 450 Volt Electrolytic Condenser (Can Type)
- 2 $\frac{3}{8}$ " Rubber Grommets
- 1 8 Prong Octal Moulded Socket
- 2 ea. 6/32 Screws, Nuts and Lockwashers for Mounting Octal Sockets
- 1 5Y3GT Tube
- 1 2 Lug Terminal Strip
- 1 ea. 6/32 Screw, Nut and Lockwasher for Mounting 2 Lug Terminal Strip
- 1 3 Lug Terminal Strip (Mounted to Filter Choke)
- 1 20 K ohm 20 Watt Wirewound Resistor
- 2 Dish Washers for Assembly of Wirewound Resistor
- 1 ea. $2\frac{1}{2}$ " x 6/32 Screw, Nut and Lockwasher for Assembly of Wirewound Resistor
- 1 4 Prong Female Plug and Cover

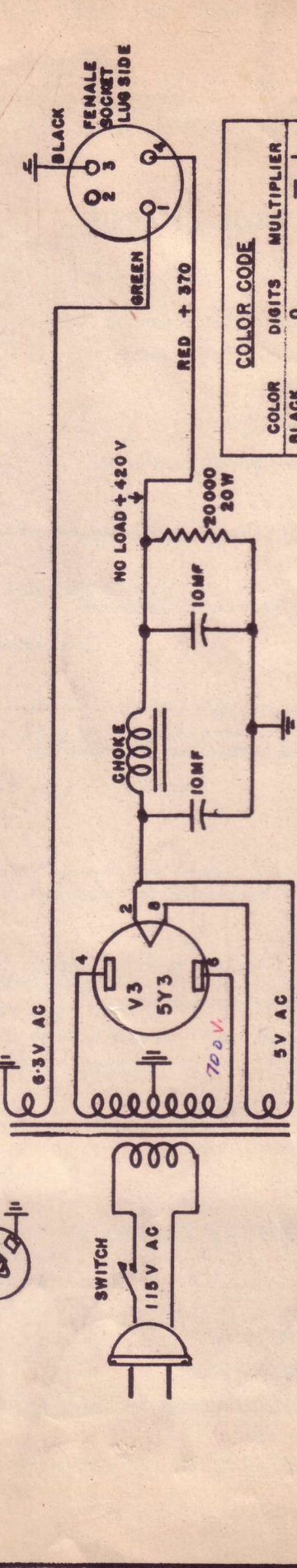
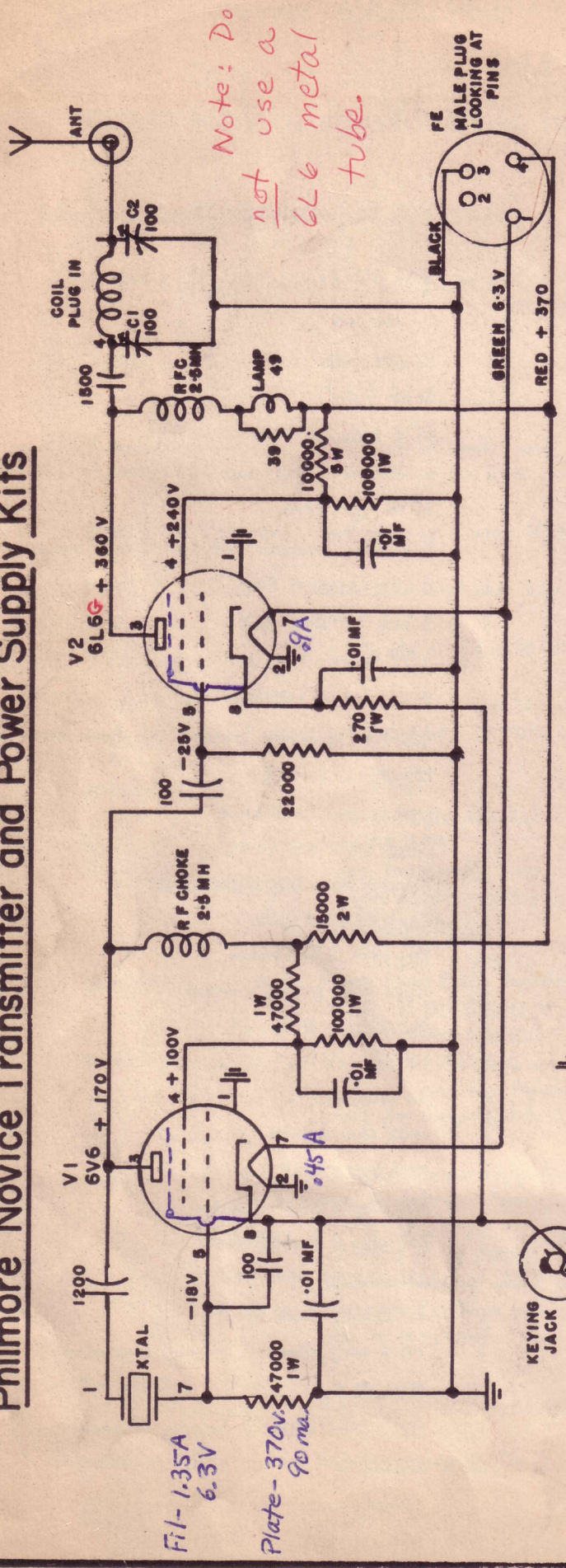
PARTS FOR TRANSMITTER CHASSIS

- 1 Chassis
- 1 4 Prong Wafer Socket
- 3 8 Prong Octal Moulded Sockets
- 8 ea. 6/32 Screws, Nuts and Lockwashers for Mounting Sockets
- 2 4 Prong Coil Forms
- 25 ft. #20 P.E. Magnet Wire for 4 Prong Coil (80 meters)

PARTS FOR TRANSMITTER CHASSIS (Cont.)

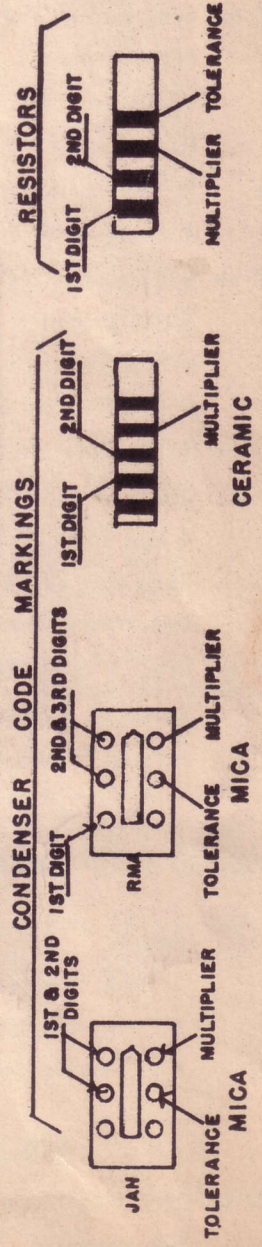
- 5 ft. #16 P.E. Magnet Wire for 4 Prong Coil (11 meters)
- 1 6V6GT Tube
- 1 6L6G Tube
- 1 RCA type Pin Plug and Jack
- 2 ea. 6/32 Screws, Nuts and Lockwashers for Mounting RCA type Jacks
- 1 Feed Thru Insulator with Mounting Hardware
- 1 2 Lug Terminal Strip
- 1 4 Lug Terminal Strip
- 2 ea. 6/32 Screws, Nuts and Lockwashers for Mounting 2 and 4 Lug Terminal Strips
- 2 100 Mmfd. Single Transmitting Condensers with Mounting Hardware
- 2 Dials, 100-0 Calibration
- 2 Small Black Bar Knobs
- 1 Bayonet Base Pilot Light Socket
- 1 Type 49 Pilot Bulb
- 2 $2\frac{1}{2}$ MH. R.F. Chokes
- 2 .0001 Mfd. Mica Condensers
- 1 $\frac{3}{8}$ " Rubber Grommet
- 1 10K ohm 10 Watt Wirewound Resistor
- 4 .01 Mfd. 600 Volt Tubular Condensers
- 2 100K ohm 1 Watt Resistors
- 2 47K ohm 1 Watt Resistors
- 1 15K ohm 2 Watt Resistor
- 1 270 ohm 2 Watt Resistor
- 1 22K ohm $\frac{1}{2}$ Watt Resistor
- 1 39 ohm $\frac{1}{2}$ Watt Resistor
- 1 .0015 Mfd. Ceramic Tubular Capacitor, 2500 W.V.
- 1 .0012 Mfd. Ceramic Tubular Capacitor, 600 W.V.
- 1 4 Prong Male Plug and Cover
- 1 Telegraph Key

Philmore Novice Transmitter and Power Supply Kits



COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1000
YELLOW	4	10000
GREEN	5	100000
BLUE	6	1000000
VIOLET	7	10000000
GRAY	8	100000000
WHITE	9	1000000000

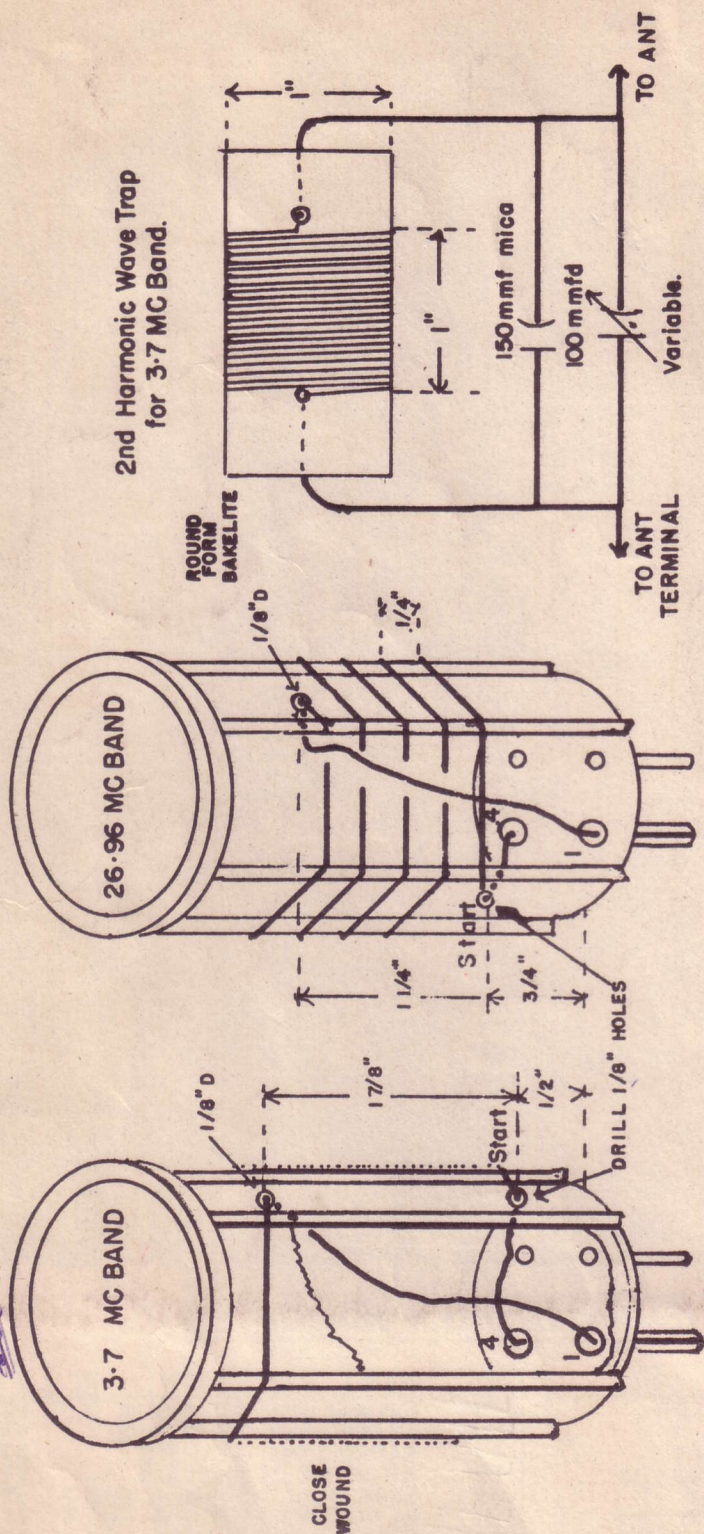
TOLERANCE ON RESISTORS & CONDENSERS
 GOLD 5% SILVER 10%
 NO MARK 20%



NOTE. OPERATING VOLTAGES AT SALIENT TEST POINTS ARE MEASURED WITH A 20,000 OHMS PV METER. READINGS MAY VARY WITH VARYING A.C. LINE VOLTAGES, CRYSTALS & ANTENNA LOADING.

Philmore 3/18/52

COIL WINDING DATA.



No 20 PLAIN ENAMEL
49 TURNS CLOSE WOUND

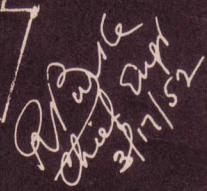
No 16 PLAIN ENAMEL
4 1/3rd TURNS
SPACED 1/4" APART

12 TURNS No 18 PLAIN ENAMEL
SPACED OVER 1".
COIL & MICA CONDENSER CAN
BE WIRED ON TO VARIABLE
CONDENSER TERMINAL LUGS

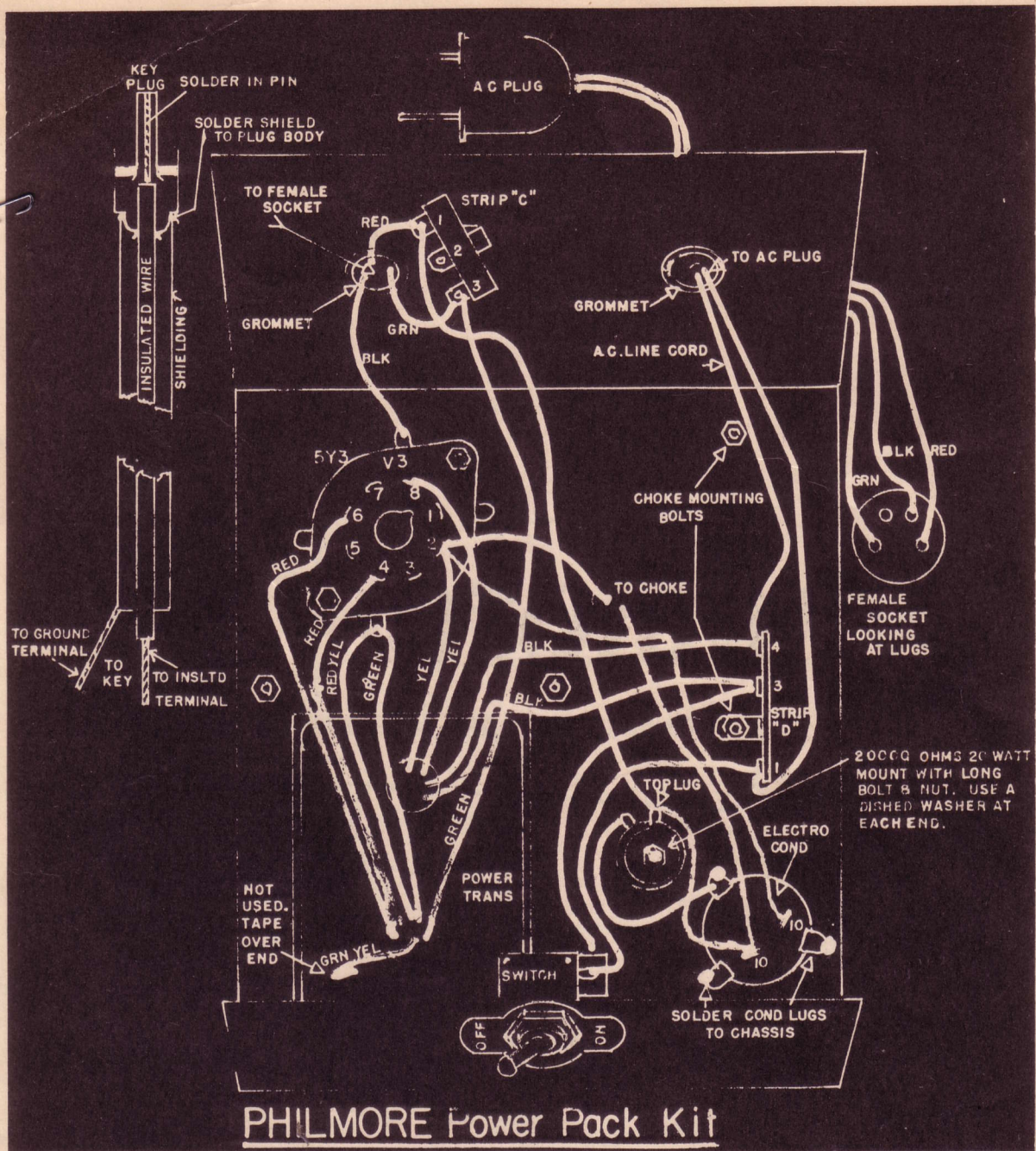
NOTE - IN CONNECTING WIRE ENDS INTO PINS BE SURE TO CLEAN ENAMEL OFF THOROUGHLY.
TIN WIRE ENDS. USE A HOT IRON AND MAKE CERTAIN THAT SOLDER FLOWS INTO PIN.
BAD CONTACTS AT THESE POINTS CAUSE HEAVY POWER LOSSES

WAVE TRAP - IF TESTS SHOW THAT YOU HAVE 2nd HARMONIC RADIATION IN TESTS WITH ANOTHER
STATION ABOUT 25 MILES AWAY. CUT ANTENNA LEAD NEAR TRANSMITTER AND
WIRE IN TRAP IN SERIES. TUNE VARIABLE COND UNTIL TEST STATION
REPORTS ELIMINATION.

NOTE: - Where several connections are shown at the same point do not solder until last connection is made.



PICTORIAL WIRING DIAGRAM



PHILMORE Power Pack Kit

STEPS WIRING POWER PACK KIT

1	YELLOW	POWER TRANS	V3 PIN 2
2	YELLOW	" "	V3 PIN 8
3	RED	" "	V3 PIN 4
4	RED	" "	V3 PIN 6
5	RED YEL	" "	V3 GRND LUG
6	GREEN	" "	V3 " "
7	BLACK	" "	STRIP D LUG 4
8	BLACK	" "	STRIP D LUG 3
9	BLACK	CHOKE	V3 PIN 2
10	BLACK	CHOKE	ELECTRO 10 MF
11	BARE WIRE	ELECTRO GND LUG	20000 BTM LUG
12	BLACK	STRIP D LUG 3	SWITCH BTM LUG
13	BLACK	STRIP D LUG 1	SWITCH TOP LUG
14	RED	ELECTRO 10 MF	20000ohm TOP LU
15	RED	V3 PIN 2	ELECTRO 10 MF
16	GRN YEL	NOT USED	TAPF
17	LINE CORD	AC PLUG	STR
18	LINE CORD	AC PLUG	STR
19	RED	STRIP C LUG 1	
20	GREEN	STRIP C LUG	
21	BLACK	V3 GRND LU	
22	RED	STRIP C L	
23	GREEN	POWER TR	

Black = Y
Red = blue
Green = V3

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