



310C-1/2
AMATEUR EXCITER

INSTRUCTION BOOK

INSTRUCTIONS

310C-1 AND 310C-2 AMATEUR EXCITER

14348-1

520 9344 00
WSUPY

FEB 22 1950



310C-1 and 310C-2

INSTRUCTIONS FOR 310C-1 & 310C-2

1. GENERAL DESCRIPTION.

The Collins' Type 310C Exciter embodies features seldom obtainable in a single compact unit. The frequency stability and accuracy of calibration of this exciter are outstanding. The output is sufficient to drive a buffer or frequency multiplier. About 0.2 watts output is available in the frequency range 3.2 to 4.0 mc.

The Collins' PTO (Permeability Tuned Oscillator) is used to give the high degree of frequency stability and accuracy of calibration characteristic of the 310C Exciter. The slide-rule dial, calibrated directly in frequency, makes it possible to accurately set your frequency without the use of an external frequency standard. The 310C-1 Exciter requires an external source of filament and plate voltage, while the 310C-2 Exciter includes its own power supply.

2. INSTALLATION.

There are a number of ways to couple the exciter to your transmitter. It is anticipated that the 310C Exciter will be used, in a great many instances, in place of 80 meter crystals in existing transmitters or the exciter may be used to drive a buffer or frequency multiplier such as an 807. The exciter output is approximately 0.2 watt, ample power to drive an 807 as a frequency multiplier. It has been observed that coupling the exciter into the crystal socket causes some crystal oscillator tubes to oscillate as tuned-grid tuned-plate oscillators. By inserting a small capacitor (10 to 20 mmf) in series with the center lead of the concentric line that is used to couple the output of the exciter to the crystal socket, this problem has been solved in every case in which it occurred.

(a) Connections.

All connections except the r-f output are brought out to a terminal strip on the side of the exciter mounting plate. A length of concentric feed line is supplied for the r-f output connection to your transmitter. If you have the 310C-1 Exciter, a power supply capable of supplying 300 volts d.c. at approximately 40 ma and 6.3 volts at 1.0 amp is required. If you have the 310C-2 Exciter the only external connections that are required are the r-f and control connections to the remainder of your transmitter and the connection to a 110 V, 50/60 cps power source.

It is recommended that the concentric feed line supplied with the exciter be used to connect the output of the exciter to the crystal oscillator socket or to the frequency multiplier circuits. The concentric line will keep the backwave (signal heard in receiver with key up) below an objectionable level on all frequencies above 4.0 mc. On 80 meters the backwave may be objectionable when working on your own frequency but if such is the case the oscillator can be turned off by operating the control switch to the MO OFF position.

The concentric cable that is supplied with the exciter is near the maximum length that will work satisfactorily with this exciter. The capacity of the concentric feed line is between 20 and 30 mmf per foot. Assuming a cable five feet long, the total capacity across the exciter output circuit is approximately 140 mmf. Since the 6AG7 tank capacitor, C101, will not tune the frequency range 3.2 to 4.0 mc with a minimum capacity of greater than 160 mmf, it is necessary to keep the minimum capacity of the circuit below this value. Another point to be remembered is that the longer the cable the greater the capacity and the smaller the r-f voltage available for driving the multipliers.

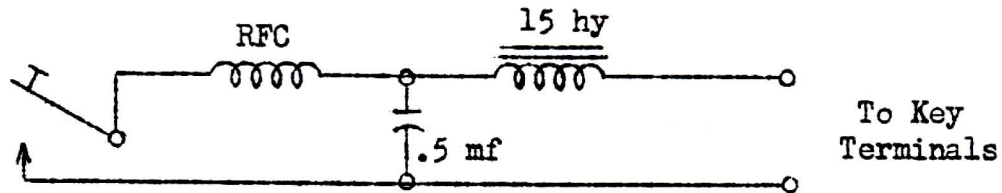
A section of the control switch on the exciter is connected to the terminal strip so that connections may be made to disable the remainder of the transmitter during standby periods. The switch may be used to control relays, etc. The control circuit is open when the control switch is in any position other than the SEND position.

3. OPERATION.

The operation of the 310C Exciter is comparatively simple but a few words of explanation may be in order. The dial is calibrated to indicate the output frequency of the exciter or frequency multiplier. In the 80 meter band, the dial will indicate the output frequency of the exciter. While the output of the exciter is always in the frequency range 3.2 to 4.0 mc, the frequency of the output of your transmitter can be read directly from the exciter dial by keeping in mind the band to which the final amplifier output circuit is tuned.

The control switch has four positions. In the MO OFF position the plate voltage is removed from the oscillator and amplifier tubes. This switch does not control the filament voltage. The toggle switch on the rear of the 310C-2 Exciter controls the filament voltage while an external switch must be provided to control the voltage if your exciter is a 310C-1. When the control switch is in the MO ON position, plate and screen voltages are applied to the oscillator and amplifier tubes and r-f output is obtained from the exciter. Operating the switch to the STAND BY position breaks the cathode circuit of the 6AG7, disabling the amplifier but leaving the oscillator operative. If you are working someone on your own frequency on 80 meters and the backwave is bothersome, operate the switch to the MO OFF position instead of the STAND BY position when receiving. On frequencies higher than 4.0 mc, the backwave should not cause any trouble. Refer to INSTALLATION. Operating the switch to the SEND position completes the 6AG7 cathode circuit to ground and closes the transmitter control circuit. The 6AG7 plate tank circuit should be kept tuned to resonance by operating the TUNING control.

In event objectionable key clicks or thumps are encountered, the circuit shown below can be used very effectively in eliminating same without seriously altering the character of the keying. RFC is a 2 mh radio frequency choke while the 15 hy choke shown is an ordinary AC-DC receiver type filter choke. Both can be of approximately 50 ma rating. The .5 mfd capacitor can be rated at 400 WV.



4. MAINTENANCE.

The best components available have been used in the construction of the 310C Exciter and very little maintenance except the usual amount of tube replacements will be required. It is important that the plate and screen voltage of the oscillator tube be kept at a low enough value to prevent damage to this tube. DO NOT APPLY OVER 300 VOLTS D.C. TO THE TERMINAL STRIP. Replacing an oscillator requires the breaking of the seal around the shield and it will then become necessary to reseal the shield. If it becomes necessary to replace an oscillator tube, use a glyptal cement or a generous portion of Duco cement to reseal the shield.

A silica-gel tube is mounted on the top of the oscillator shield. The silica-gel absorbs moisture from within the oscillator and aids in retaining the oscillator calibration. Moisture causes the color of the silica-gel to change from blue to pink. The silica-gel tube is screwed into a hole in the shield. The plastic tube should be replaced by a new tube of silica-gel when all of the material within the tube has changed from blue to pink. New tubes of silica-gel may be ordered from the Collins Radio Company.

PARTS LIST

310C-1 and 310C-2 EXCITER

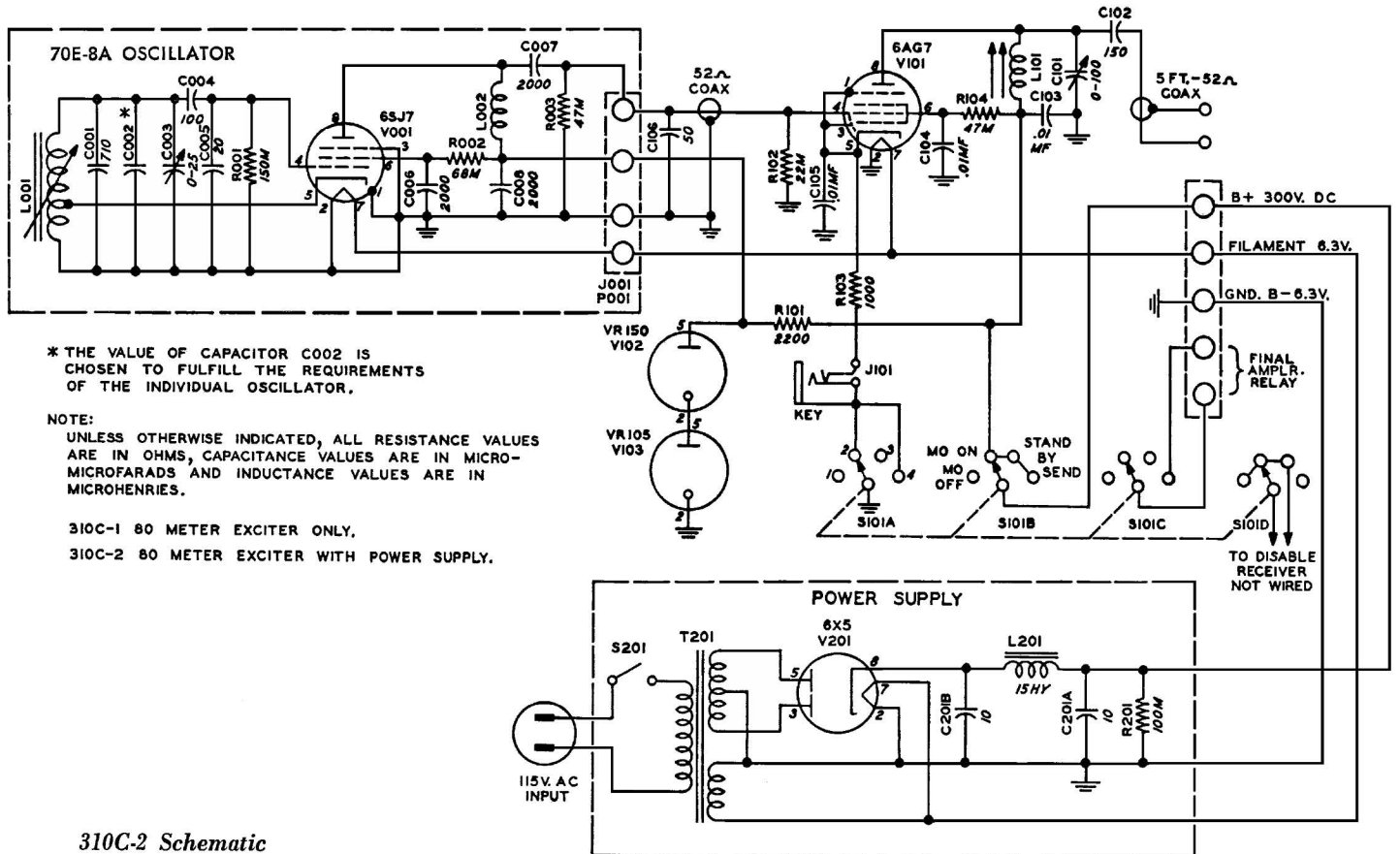
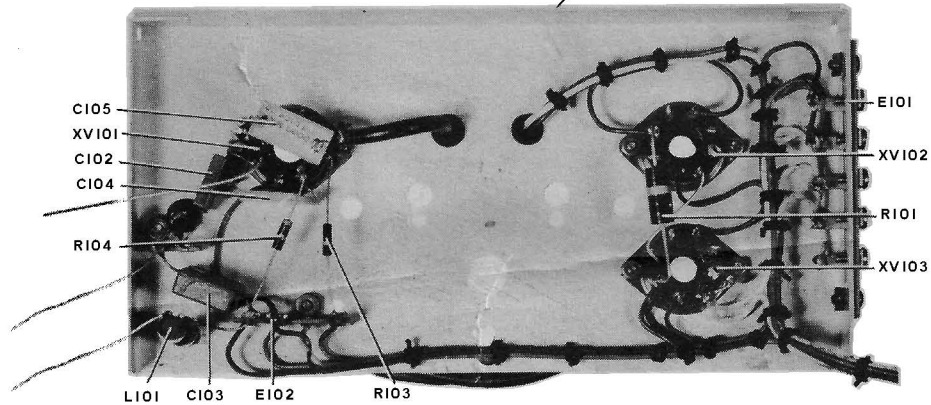
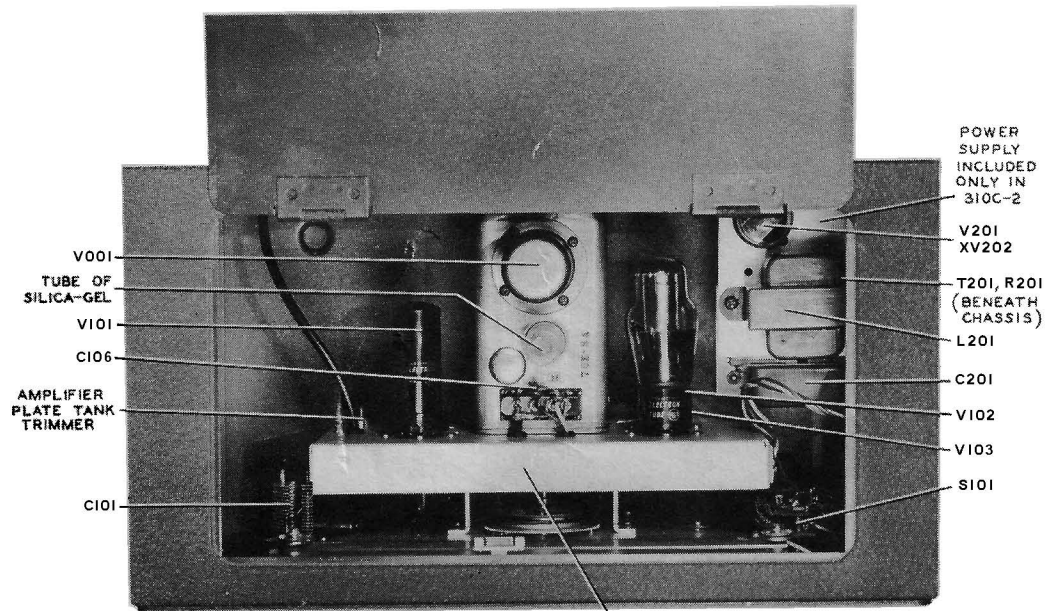
ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
	70E-8-A OSCILLATOR:	This unit has been dehydrated and hermetically sealed, and should be returned to Collins Radio Company, if servicing is required.	
C101	Amplifier plate tuning	CAPACITOR: 7.5 - 102.7 mmf	922 0028 00
C102	Exciter output coupling	CAPACITOR: 150 mmf $\pm 10\%$; 500 WV	935 0113 00
C103	Amplifier screen voltage filter	CAPACITOR: 10,000 mmf $\pm 10\%$; 300 WV	935 2117 00
C104	Amplifier screen bypass	CAPACITOR: 10,000 mmf $\pm 20\%$; 350 WV	913 0106 00
C105	Amplifier cathode bypass	CAPACITOR: 10,000 mmf $\pm 20\%$; 350 WV	913 0106 00
C106	Oscillator decoupling	CAPACITOR: 50 mmf ± 1 mmf; 500 WV	913 0059 00
	Exciter connector strip	BOARD, TERMINAL: 5 screw term on bakelite strip	367 1800 00
	Wiring strip	BOARD, TERMINAL: 1 mtg, 3 wiring lugs on bakelite strip	306 2230 00
	Control switch and TUNING control knobs	KNOB: Skirted; phenolic	281 0004 00
	Exciter frequency control knob	KNOB: Phenolic	281 0018 00
I101, I102		LAMP: Bulb; 6.3 v; .15 amp; min bayonet base	262 3240 00
I103		LAMP: Bulb; 6.3 v; .15 amp; min bayonet base	262 3240 00
J101	Key jack	JACK: Phone; midget; 2 circ	360 1090 00
L101	Amplifier plate tank coil	COIL ASSEM: 32 T #32 enam wire CCRE: Powdered iron; w/ 4-40 stud	503 4218 002 286 1046 00
P001	Oscillator connector	CONNECTOR: 4 banana term on phenolic board	502 6686 002

PARTS LIST

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
R101	Oscillator voltage dropping	RESISTOR: 2200 ohm $\pm 10\%$; 2 w	745 5100 00
R102	Amplifier grid	RESISTOR: ^{22K} 91 ohm $\pm 5\%$; 1/2 w	745 1142 00
R103	Amplifier cathode	RESISTOR: 1000 ohm $\pm 10\%$; 1/2 w	745 1086 00
R104	Amplifier screen	RESISTOR: 47,000 ohm $\pm 10\%$; 1/2 w	745 1156 00
S101	Exciter control switch	SWITCH: 4 pole; 4 pos; 2 sect	259 0223 00
S101A		SWITCH: Part of S101	
S101B		SWITCH: Part of S101	
S101C		SWITCH: Part of S101	
S101D		SWITCH: Part of S101	
V101	Amplifier tube	TUBE: Type 6AG7 Power Amp Pentode	254 0120 00
V102	Voltage regulator	TUBE: Type 6D3/VR150	257 0001 00
V103	Voltage regulator	TUBE: Type 6C3/VR105	257 0002 00
XI101, XI102	Sockets for I101, I102	SOCKET: Pilot light bkt; min bayonet base	262 1210 00
XI103	Socket for I103	SOCKET: Pilot light bkt; min bayonet base JEWEL: Red faceted	262 0060 00 262 2110 00
XV101, XV102, XV103	Sockets for V101, V102, V103	SOCKET: Tube; std octal; bakelite w/ mtg plate	220 1851 00
<u>POWER SUPPLY for 310C-2 only</u>			
C201A, C201B	Filter capacitor	CAPACITOR: Dual sect; 10/10 mf ± 50 -10% ; 450 WV	183 1085 00
L201	Filter choke	REACTOR: Filter; 15 hy $-0 +40\%$; 40 ma	668 0040 00
P201	Power input connector	PLUG and CORD ASSEM: AC; std 2 prong plug w/ cord 6' lg	426 1003 00

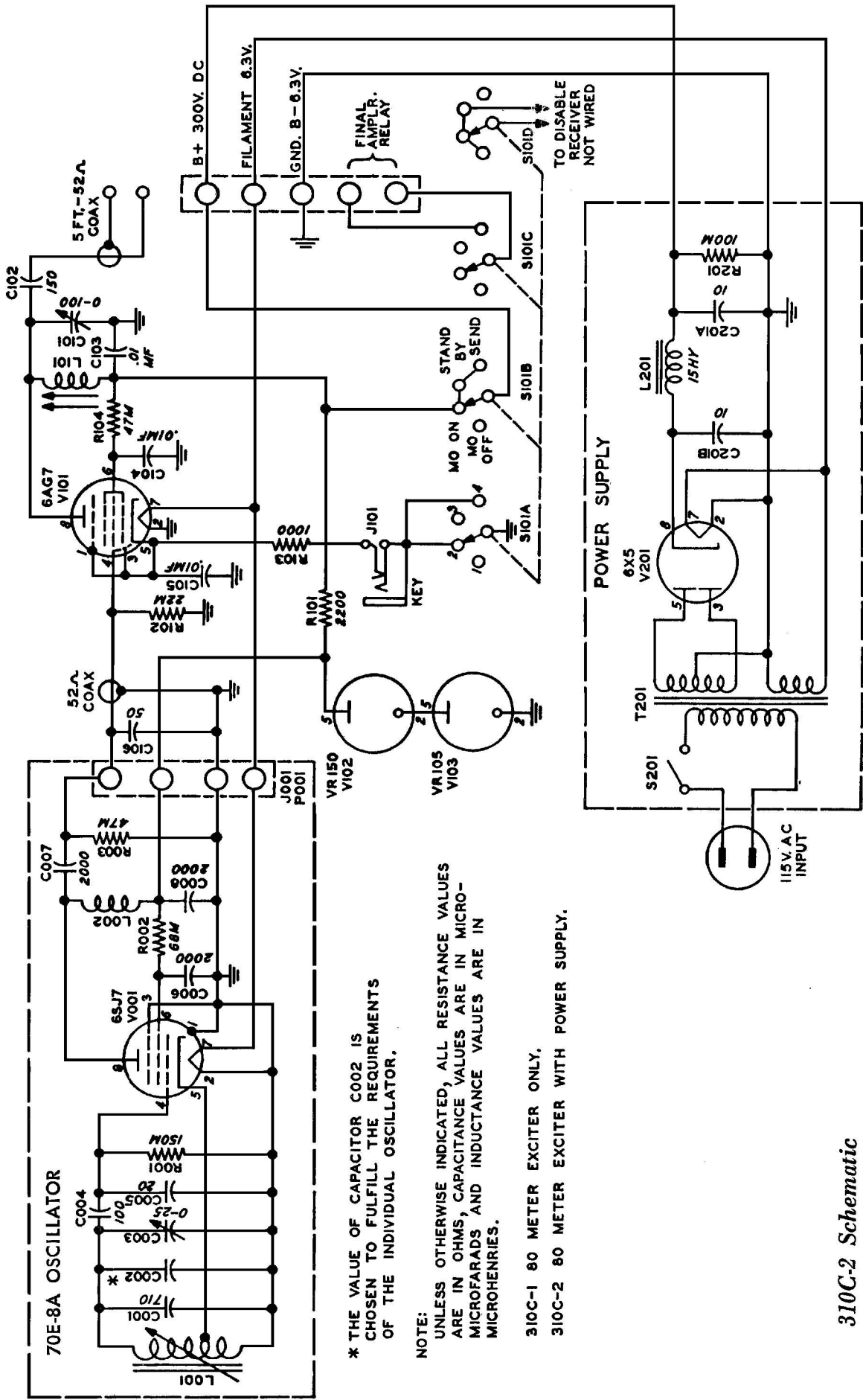
PARTS LIST

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
R201	Bleeder	RESISTOR: .10 megohm $\pm 10\%$; 2 w	745 3170 00
S201	Primary power switch	SWITCH: SPST toggle; 25 amp	266 1040 00
T201	Plate and filament supply	TRANSFORMER: Power; 50/60 cps; pri: 110 v; sec#1: 300 v CT; 40 ma; sec#2: 6.3 v; 3 amp	662 0039 00
V201	High voltage rectifier	TUBE: Type 6X5	254 0201 00
XV201	Socket for V201	SOCKET: Tube; std octal; bakelite w/ mtg plate	220 1851 00



310C-2 Schematic

310C Exciter



* THE VALUE OF CAPACITOR C002 IS CHOSEN TO FULFILL THE REQUIREMENTS OF THE INDIVIDUAL OSCILLATOR.

NOTE:
UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICRO-MICROFARADS AND INDUCTANCE VALUES ARE IN MICROHENRIES.

310C-1 80 METER EXCITER ONLY,
310C-2 80 METER EXCITER WITH POWER SUPPLY.

310C-2 Schematic

