THE COMMUNICATION RECEIVER

EDITED BY
William Fizette, K3ZJW
RD 1, Box 55, Henryville, PA 18332
All correspondence requires SASE for reply.

THE BRETING 14 COMMUNICATIONS RECEIVER

By Lawrence L. Rosine, W0OG
13719 Alhambra, Leawood, KS 66224

INTRODUCTION

At one time or another anyone who has attempted to restore to working condition one of the vintage communications receivers has run into a problem that seem unsolvable. Not infrequently, it boils down to the fact that we are working with erroneous information, no matter how official the source. Further, many of the circuits in use in the 1930s were nonstandard because manufacturers introduced variations in an attempt to outdo the competition. In this story, one of the authorities on early communications receivers describes just such an event. The receiver, the Breting 14, is one of the little known products of the Breting Radio Mfg. Co. of Lost Angeles, CA. The Riders reference is 8-1-2. —Ed.

The Breting 14 reminds you of a pretty girl in a gunny sack dress. The chrome-plated chassis and combination mirror/drum tuning dial are something to behold, and the cabinet is one of the most hideous structures I have ever seen on a communications receiver. And the lack of marking on the panel is frustrating. (Not uncommon on 1930s receivers, as witness the HRO and the RME-69, to name just two. —Ed.)

The set does not use a Lamb-type noise silencer, push/pull audio, at least one state of RF on all bands, and two stages of IF. However, it appears that these receivers were not mass produced, as they differ slightly in mechanical construction. On some of the 14s holes were factory redrilled on the beautiful chrome plate so that components would fit properly.

Many of these sets are out of commission and cannot be repaired because the schematic printed in both Volume B of Riders and the operator's manual contain errors. If wired as shown, these receivers will never work properly, and I can say positively that this is a difficult receiver to restore without proper background information. Having access to four of these, and having repaired others, I was able to piece together the quirks introduced by Breting.

The following notes will give you an idea of the problems encountered.

V1, the first RF amplifier stage, is used only on band 4. The bandswitch normally connects the antenna directly to the primary of coils 1, 2, 3, and 5 feeding V2, the 2nd RF stage. On band 4, the switch grounds the primary of the coil in the grid of V1,

Breting 14 Voltage Readings

		Pin #							
	GRI	#1	#2	#3	#4	#5	#6	#7	#8
V1 6K7 RF AMP	0		6AC	275	110	4	NC	6AC	4
V2 6K7 RF AMP	-0.3		0	275	110	4	NC	6AC	4
V3 6J7 MIXER	0	0	0	275	100	6	NC	6AC	4
V4 6J7 OSC	-20	0	6AC	250	100	0	NC	0	0
V5 6K7 IF-AMP	-0.3	0	0	270	110	4	NC	6AC	4
V6 6L7 IF-AMP	-0.3	0	6AC	280	55	-0.4	NC	0	2
V7 6B8 DET-AMP		0	0	200	-3	-3	70	6AC	0
V8 6K7 ANL-AMP *		0	6AC	280	55	6	NC	0	6
V9 6H6 ANL *		0	0	-0.4	0	-0.4	NC	6AC	0
V10 6J7 S MTR **		0	6AC	270	150	2	NC	0	2
V10 6J7 BFO **		0	6AC	270	160	6	BC	0	6
V11 6F6 AUDIO		0	0	270	270	-23	NC	6AC	0
V12 6F6 AUDIO		0	0	352	352	-42	NC	6AC	0
V13 6F6 OUT		0	0	352	352	-42	NC	6AC	0
V14 5Z3 RECT		352	AC	AC	352				

* --> Noise Silencer: Switched on and control at zero.
--> Communication Switch: Turned clockwise.
--> Audio Volume Control: Turned counter-clockwise.
--> Crystal Phasing Switch: Turned off, counter-clockwise.
--> Band Selector: Broadcast band, high end.
--> Tone Control AC Switch: Clockwise.
--> RF Gain: Clockwise.
** --> BFO Switch: Off for S meter readings, on for BFO readings.
--> BFO Tone: Not applicable.
--> Note: Those marked ìno connectionî (NC) may be used as soldering tie points and may show a reading but should be ignored.
--> Pins 3 and 4 of the 5Z3 measure 350 volts AC to ground.

thus placing that stage into use. Apparently any loss in the primary of this coil (LX) was considered negligible by the designers when it is in series with the primaries of L1, L2, L3, and L5. This design could be detrimental to band 5 operation.

In some receivers the cathodes of V1 and V2 are tied together. In others, the cathode of V1 is grounded. While it was common practice for amateurs to modify their receivers, in these particular sets the wiring appears to be original, from the manufacturer.

Not shown on the original schematic is a switch on the noise limiter control that turns on the heaters of V8 and V9 when the limiter is used. Thus it takes a few seconds for these tubes to warm up and the limiter to operate.

V10, the 6J7 BFO, serves as a meter amplifier (a cathode follower) when the BFO is off. This amplifies the AVC signal and applies it to the S-meter. This is also missing from the original schematic, leaving one to wonder if Breting didn't want its competitors to know this design trick.

The correct circuit, shown in Fig. 2, uses a 5000 ohm resistor connected in series with the bottom of V10's 100K ohm grid resistor. The junction of these two resistors connects to the AVC line, and the other end of the 5K resistor to the 0.01 mF capacitor at the bottom of the V10 grid coil. The BFO switch shorts this connection to ground, turning on the BFO. The current through the S-meter drops and it goes to the zero position (tricky).

While not shown, the bottom of the audio gain control is grounded.

The trimmers on the RF, mixer, and oscillator stages are in different physical locations on some receivers. You will have to experiment to determine your particular receiver's trimmer positions when aligning the set.

I have seen three different factory-installed vernier drives on the main tuning control, while one set had no vernier drive at all.

On most of the Breting 14s, the BFO tuning capacitor is mounted vertically and the shaft protrudes down through the bottom plate. The manufacturer suggests soldering a piece of wire to the shaft of this control to adjust it manually. However, on some receivers the BFO capacitor is mounted normally and is controlled with a knob.

Additionally, on some of the sets the BFO "on" switch is mounted vertically like the BFO control and is switched with a lever protruding under the chassis.

Breting 14 Resistance Readings

		Pin #							
	GRI	#1	#2	#3	#4	#5	#6	#7	#8
V1 6K7 RF AMP *	0	0	0.8	50K	30K	200	NC	0	200
V2 6K7 RF AMP	6K	0	0	50K	30K	200	NC	0.8	
V3 6J7 MIXER	4	0	0	50K	1M	5K	NC	0.8	5K
V4 6J7 OSC	30K	0	0.8	50K	140K	0	NC	0	0
V5 6K7 IF-AMP	260K	0	0	50K	30K	400	NC	0.8	390
V6 6L7 IF-AMP	6k	0	0	50K	160K	125K	NC	0.8	300
V7 6B8 DET-AMP	1.5M	0	0	300K	245K	245K	2M	0.8	0
V8 6K7 ANL-AMP	6K	0	0.8	50K	160K	16K	NC	0	28K
V9 6H6 ANL		0	0	120K	0	120K	NC	0.8	0
V10 6J7 BFO	100K	0	0	50K	150K	500	NC	0.8	0
V11 6F6 AUDIO		0	0	50K	50K	560K	NC	0.8	0
V12 6F6 AUDIO		0	0	50K	50K	550	NC	0.8	0
V13 6F6 OUT		0	0	50K	50K	550	NC	0.8	0
V14 5Z3 RECT		50K	505	505	50K				

Resistance readings taken with the following front panel controls settings:
--> Noise Silencer: Switch on and control at zero.
--> Communication Switch: Turned clockwise.
--> Audio Volume Control: Turned counter-clockwise.
--> Crystal Phasing Switch: Turned off, counter-clockwise.
--> Band selector: Broadcast band.
--> Tone Control AC Switch: Clockwise.
--> RF Gain: Clockwise.
--> BFO Switch: On.
--> BFO Note: Not applicable.
Note: Those marked ìno connectionî (NC) may be used as soldering tie points and may show a reading, but should be ignored.
* Some receivers have the cathode of V1 connected to ground, while others have this cathode tied to the cathode of V2.

You may find that different versions of the Breting 14 have different front panel layouts. Evidently this was not perceived as a problem since Breting didn't believe in lettering the control functions on the panel.

The main tuning capacitor has two sections for each stage. On the BC band both sections are used to tune the stages. The capacitor is mounted on very long standoffs, which leads to mechanical instability. The oscillator stage is at the back, away from the tuning mechanism, an example of poor design practice. The combination of the play introduced by the long mechanical distances, the standoffs, and poor vernier drives leads to tuning backlash. Of the four examples I had to work with, the best operating set in this respect had no vernier drive, while the second best used a belt drive vernier.

Breting scrimped on solder tie points by using inactive tube socket terminals as ties and also by just connecting components together and soldering them. This leaves parts hanging in midair which certainly doesn't enhance the under-chassis appearance.

The manufacturer suggests that this set's audio section can be used as a driver or a modulator for the transmitter. Thus the 200 ohm output is switched in by the communications switch. To use it as a modu-

lator, another 200 ohm to high impedance transformer is connected to the existing one.

RESTORATION COMMENTS

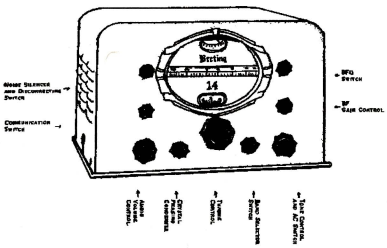
Do not remove the dial drive cords unless absolutely necessary. Considerable time and frustration are involved in restringing them.

The gimmick between the two IF coils may be changed to affect the bandpass coupling. The IF frequency is 432 kc. (Note: This will vary with the frequency of the IF crystal, and when aligning the set, it is necessary to peak the IF on this crystal frequency. —Ed.)

The decrease current drain on the transformer, 6K6s may be used in place of the original 6F6 audio tubes.

Tables 1 and 2 list the average voltage and resistance measurements taken from three properly operating receivers. The V1-V14 tube designations were assigned by the writer: they are not listed on the manufacturer's diagram.

In closing, the Breting 14 is a fairly hot receiver when it is operating properly. If you undertake a restoration project, good luck. I will attempt to answer any inquiries accompanied by an SASE.



A pen and ink drawing of a Breting 14.

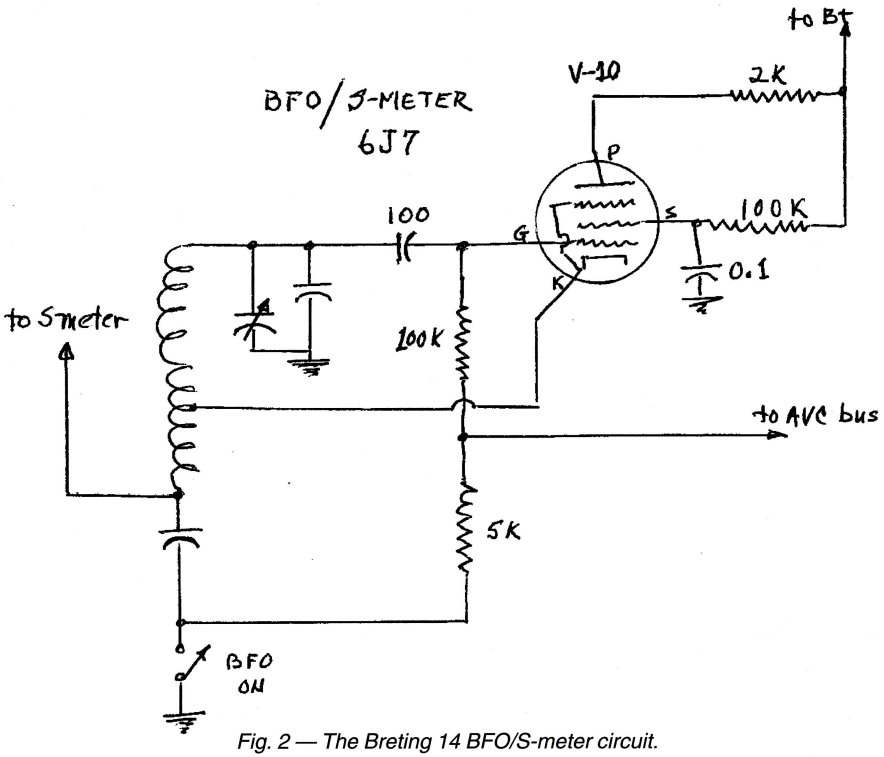
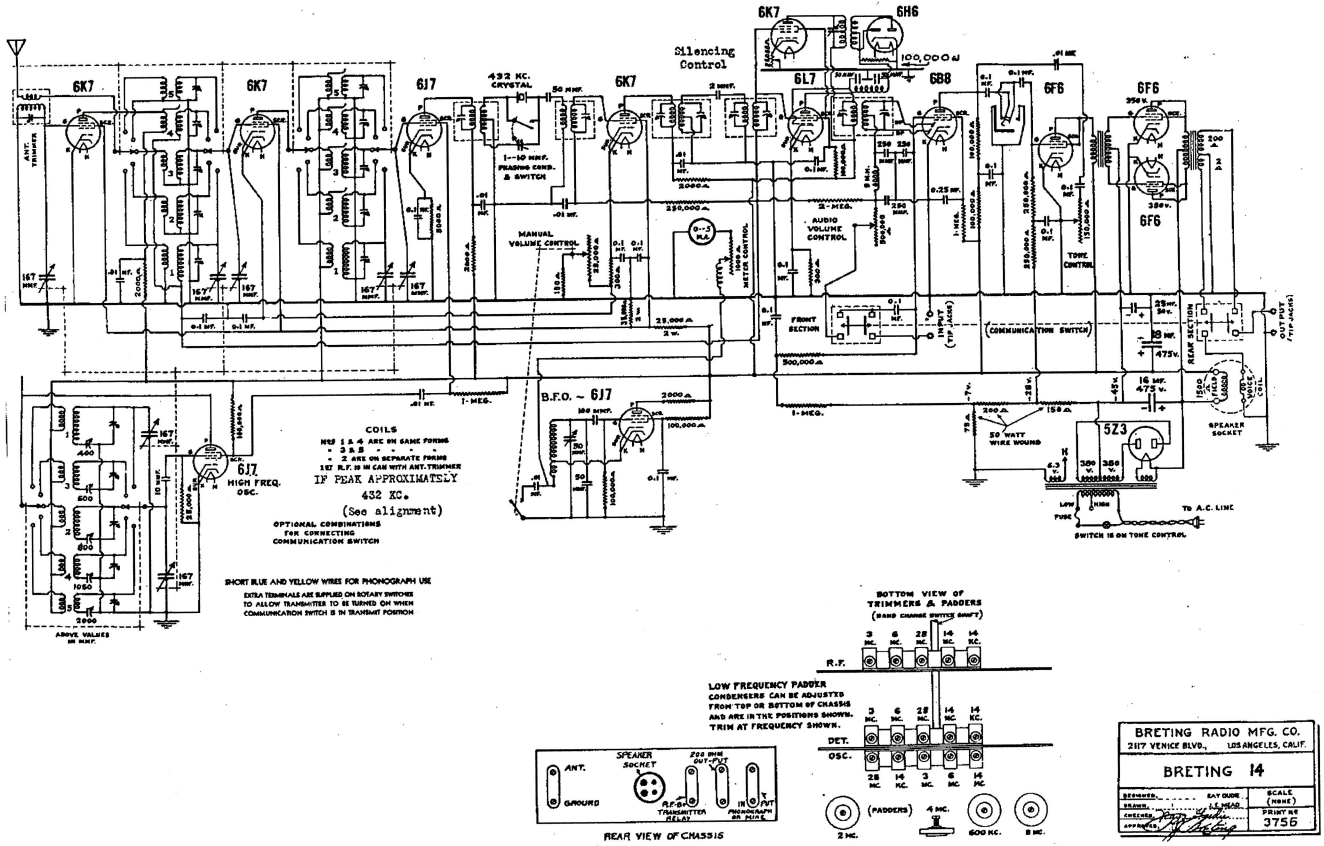


Fig. 2 — The Breting 14 BFO/S-meter circuit.



BRETING RADIO MFG. CO.
2117 VENICE BLVD., LOS ANGELES, CALIF.

BRETING 14

DESIGNED	RAY DUDE	SCALE (NONE)
DRAWN	I.S. HEAD	
CHECKED		PRINT NO 3756
APPROVED		