



PARTS LIST — HETRODYNE EXCITER

S_{1B}, S_{1P}.....5-position, 1-pole ceramic rotary tap switch wafers (Part of GP-50 bandswitching tuned circuit).
S₂.....5-position, 1-pole non-shorting type ceramic rotary tap switch wafer (Centralab type "X" section) and 30-degree index assembly (Centralab P-123).
S₃.....5-position, 2-pole 1-section rotary tap switch (Mallory 3226J).
X₁ to X₈.....Quartz frequency control crystals; see TABLE III for exact frequencies.

TUNABLE OSCILLATOR: (for 12 Mc. output):

C₁₀₁...10 — 140-mmfd variable, double bearing type (Hammarlund MC-140-S).
C₁₀₂, C₁₀₃...0.0025-mfd. silvered micas.
C₁₀₄...100-mmfd. silvered mica.
L₁₀₁...0.5 uh., 7 turns, No. 18 enameled wire, spacewound 1 inch long on ½-inch diameter iron slug-tuned ceramic coil form (CTC LS-7).
L₁₀₂...5 to 9 uh., 22 turns, No. 18 enameled wire, closewound 1 inch long on same type form as L₁₀₁.
RFC₁₀₁ 1.0-mh. 3-pi wound RF choke (National R-50, or equivalent).

POWER SUPPLY:

C₂₀₁, C₂₀₂...125-mfd., 450-volt DC can type electrolytic (G. E. XC1-15).
C₂₀₃...80-mfd., 450-volt DC tubular type electrolytic (G. E. QT1-21).
C₂₀₄, C₂₀₅...0.1-mfd., 250-volt AC working feedthrough type paper capacitors with screw terminals.
F₂₀₁...5-ampere, 125-volt 3AG fuse and chassis type fuse holder.

L₂₀₁...9-henry, 150-ma., smoothing choke.
L₂₀₂...17-henry, 60-ma., smoothing choke.
PL.....½-inch green jeweled pilot lamp bracket, with miniature socket for 6.3-volt lamp.
PL₂...½-inch red jeweled pilot lamp bracket with candelabra socket for 115-volt lamp.
S₂₀₁...3-position, 1-pole progressive shorting tap switch (Centralab PS-1 wafer and P-121 index assembly).
T₂₀₁...High voltage transformer, 400 volts each side of center tap at 200 ma., 115-volt primary.
T₂₀₂...6.3-volt, 4 ampere filament transformers, 115-volt primary.
T₂₀₃...6.3-volt, 5-ampere filament transformer, 115-volt primary.

KEYER SECTION:

C₃₀₁...0.02-mfd., 400-volt paper.
C₃₀₂, C₃₀₃...20-mfd., 150-volt DC tubular type electrolytic (G. E. QT1-13).
D₃₀₁, D₃₀₂...400-volt peak inverse, 100-ma. silicon rectifiers.
R₃₀₁, R₃₀₂...500,000-ohm linear-taper composition type potentiometer.
R₃₀₃...100,000-ohm linear-taper 2-watt composition type potentiometer.
R₃₀₄...250,000-ohm linear-taper composition type potentiometer.
RFC₃₀₁, RFC₃₀₂...7 uh. midget RF chokes (Ohmite Z-50, or similar).
S₃₀₁...SPST push-button switch.
T₃₀₁...Power transformer, 125-volt, 50 ma., winding, 6.3-volt 1.5-ampere heater winding, 115-volt primary (Stancor PA-8421).

TABLE III — COIL TABLE AND ALIGNMENT CHART

OUTPUT BAND MC. (F ₃)	TUNABLE OSC. RANGE, MC. (F ₁)	CRYSTAL FREQ., MC. (F ₂)	FREQ. CONV. IN MIXER	CAP C ₃ & C ₄ (mmf.)	L ₇ & L ₈ IND. TURNS, WIRE SIZE, SPACING & FORM	ALIGNMENT FREQS., MC.	
						L ₇	L ₈
3.5 — 4.0	12.0 — 12.5	X ₁ = 8.5	F ₃ = F ₁ — F ₂	50	26 Uh., 63 T., No. 28 En. C.W. on PLS-7 form	3.65	3.85
7.0 — 7.3	12.0 — 12.3	X ₂ = 5.0	F ₃ = F ₁ — F ₂	30	10 Uh., 28 T., No. 28 En. C.W. on PLS-7 form	7.1	7.2
14.0 — 14.35	12.1 — 12.45	X ₃ = 1.9	F ₃ = F ₁ + F ₂	30	2.5 Uh., 14 T., No. 24 En. C.W. on PLS-5 form	14.1	14.25
21.0 — 21.45	12.0 — 12.45	X ₄ = 9.0	F ₃ = F ₁ + F ₂	20	1.8 Uh., 12 T., No. 24 En. C.W. on PLS-5 form	21.15	21.3
28.0 — 28.5	12.0 — 12.5	X ₅ = 16.0	F ₃ = F ₁ + F ₂	None	1.5 Uh., 11 T., No. 24 En. C.W. on PLS-5 form	28.5	—
28.5 — 29.0	12.0 — 12.5	X ₆ = 16.5	F ₃ = F ₁ + F ₂	None	Same as 28.0 Mc.	—	—
29.0 — 29.5	12.0 — 12.5	X ₇ = 17.0	F ₃ = F ₁ + F ₂	None	Same as 28.0 Mc.	—	29.2
29.5 — 29.7	12.0 — 12.2	X ₈ = 17.5	F ₃ = F ₁ + F ₂	None	Same as 28.0 Mc.	—	—

See block diagram (Fig. 2), and schematic diagram (Fig. 3) for F₁, F₂ and F₃. Uh. = Microhenries; T. = Turns; En. = Enameled Wire; C.W. = Close Wound; PLS-5 = CTC type ⅜-inch diameter ceramic coil form with red dot iron tuning slug. PLS-7 = CTC type PLS-7. ½-inch diameter ceramic coil form with red dot tuning slug.

FIG. 3. COMPLETE SCHEMATIC DIAGRAM of the hetrodyne exciter constructed by W2FBS. Only five tubes are required for RF section, including two oscillators, mixer, and two amplifier stages. A direct frequency type SSB generator (B & W Model 51-SB, or Heathkit SB-10) can be inserted between the 12BY7-A amplifier and the 7581 power amplifier, using short leads. Only one each of the mixer plate and buffer amplifier plate tuned circuits have been shown; see the detail Fig. 4, for complete coil wiring diagram. Resistances are in ohms, ½ watt unless otherwise specified. Capacitances are in mmf., or mfd., as marked near each capacitor. Critical capacitance values are given in TABLE II — PARTS LIST. Metering of circuits through switch S₃ is given in the text. High voltage on meter (M₁) and meter switch (S₂) can be eliminated by moving 8-ohm resistor and connections to position "C" on S₃ to cathode circuit (pin 8) of 7581 amplifier stage.

The chassis top deck should be laid out and drilled first, including the 4¼ x 8-inch cutout for the VFO unit. Locations for all major components on W2FBS's model are given in the chassis layout diagram, Fig. 5. Next, cut and drill all holes in the front panel; use the panel layout diagram, Fig. 6, as a guide, unless a different panel layout is desired. Then use the panel as a template to drill matching holes in the front of the chassis.

Make two small angle brackets from ⅛-inch thick sheet aluminum 2 x 2 inches (plus a ½-inch wide mounting flange), also the interstage shield 4 inches wide and 2½ inches high (plus a ½-inch wide mounting flange). Drill holes for the bandswitch in each plate. Temporarily assemble the GP-50 tuner and the switch wafer on the rear of the chassis (S_{1A} and S_{1B}), with these

plates slipped onto the ¼ x ⅛-inch thick bandswitch shaft, and drill mounting holes for the angle brackets into the chassis.

Next, carefully center the two switch wafers over the switch shaft holes in the angle brackets (S_{1A} and S_{1B}) and drill mounting holes for them in the brackets. It's a good idea to elongate these mounting holes, so that each wafer can be rotated slightly to insure that all switch rotor contacts are fully engaged in the same contact position on each wafer when the detent on the GP-50 tuner switch is in position.

A ¼-inch diameter brass rod about 2 inches long is slotted ⅛-inch wide at one end, and the flat switch shaft is soldered into this slot. The flat shaft, and the ½ and ¾-inch long spacers which space the switch wafers from the angle brackets and chassis rear