

VIKING INVADER
FINAL PERFORMANCE TESTS

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MAR 27 1962

EQUIPMENT SET-UP.

- A1. Connect a 50 ohm 150 watt shielded dummy load to output of transmitter.
- A2. Couple oscilloscope to dummy load.
- A3. Connect audio generator to microphone jack.

OPERATING TESTS.

- B1. Tune and load transmitter in normal manner in CW mode at 14.2 mc. All controls should react in a stable manner.
- B2. Record control settings of EXCITER, AMPLIFIER and LOADING controls.
- B3. Make the following tests at this frequency.
 - (a) Check that EXCITER tunes within "20" on EXCITER tuning dial.
 - (b) Keying: Key transmitter and observe and listen to output signal.
 1. The scope should indicate a rounded leading and trailing edge and there shall be no clicks or frequency shift evident on the output signal.
 2. The output indicator should be variable from 0 to full scale.
 - (c) AM: Observe waveform in am.
 1. RF LEVEL should be adjusted to obtain an output indicator reading of 50.
 2. Increase audio level until a two tone waveform is obtained
 3. The cross-overs should be sharp and the waveform should be approximately a sine wave.
 - (d) SSB: Observe waveform in SSB.
 1. The ripple on the waveform should be barely noticeable.
 2. There should be adequate gain so that saturation of plate current can be obtained at full AUDIO gain settings.
 3. Adjustment of the RF LEVEL should not adjust the carrier on USB or LSB.
- B4. Tune and load transmitter at the middle of the 80, 40, 15, 10LO, 10MID, and 10HI bands. On each band check to see that:
 - (a) CW: Adequate RF LEVEL is available to provide saturation of the output.
 - (b) SSB: Saturation is obtained at full audio gain settings.
 - (c) Record settings of EXCITER, AMPLIFIER and LOADING controls on each band.
 - (d) Insert dummy Invader 2000 grid load into J9. Turn loading control to AMP and tune AMPLIFIER control for maximum output. Plate current shall be between 215 and 240 ma.

← NOTE: RDC

CONTROL CIRCUITS CHECKS.

C1. Equipment set-up.

- (a) Connect test jig for 240-302 to Invader as follows:
 1. Phono type plug to J7.
 2. 2 pin ceramic plug to J5 (with violet mark up).
 3. 5 pin plug to J2.
 4. 11 pin plug to J4.

- (b) Connect AC plug of test jig to 115 V line.
- (c) Controls on test jig as follows:
 1. Meter switch S6 to Position 2.
 2. SW1, SW2, SW3, SW4, DOWN.
 3. SW5 on.
 4. Ground pin 7 of 11 pin plug in power supply.
- (d) Connect an audio VTVM to the binding posts and to black, hot to red.
- (e) EXT-INT switch on Invader to INT.
- (f) Invader OPERATE switch to STBY.
- (g) MODE switch to LSB.

C2. Control tests.

- (a) INT control functions. (Tests bias through MODE switch SW3c, RY1 and SW6 (in INT position).
 1. METER should read 2.3 ma.
 2. S6 to position 1 meter should read 2.7 ma.
 3. OPERATE to MAN.
 4. Meter should read 2.55 ma.
 5. Pos. 2 meter should read 1.5 ma.
 6. MODE to CW.
 7. OPERATE to STBY.
 8. Meter should read 2.3 ma.
 9. OPERATE to MAN.
 10. Key up. Meter should read 2 ma.
 11. Key down. Meter should read 1 ma.
- (b) EXT control functions. (Tests RY1 contacts 10,11,12 and SW6 in EXT position).
 1. INT-EXT switch to EXT.
 2. SW1 to position 1.
 3. With OPERATE switch in MAN, lights #1 and #3 should be lit at decreased brilliance in all positions of the MODE switch.
 4. With OPERATE switch in any position but MAN or OFF, lights #3 and #2 should be lit at decreased brilliance. (VOX gain at min.)
- (c) Switched AC to amplifier. (Applies power through pin 1 of plug to operate contactor.)
 1. Light #4 should be on whenever INVADER is on, regardless of MODE or OPERATE (except OFF) positions.
- (d) Plate contactor AC. (Tests contacts 7 and 8 of RY1).
 1. Light #5 should be on at all times when MODE switch is in LSB USB.
 2. Light #5 should be on in AM and CW only when VOX relay is energized.
- (e) Antenna relay jack.
 1. Light #6 should be on whenever VOX relay is energized, regardless of MODE switch position.
- (f) Invader 2000 meter continuity.
 1. Light #7 should be on at all times test jig is on, regardless of any switch positions and if the plate meter is okay and in the circuit in the Invader 2000.
- (g) Screen lead and meter continuity. (Test jig applies voltage to meter through pin 5 of plug in reverse polarity).
 1. Turn meter switch on Invader to CCW one position.
 2. Meter will read in reverse.
 3. Remove ground from pin 7 of 11 pin plug on power supply.

2. Invader meter should read full scale.
- (i) Filament and PA on Pilot Lamp checks.
 1. Throw SW2 to UP position.
 2. White neon jewel should light.
 3. Throw SW3 to UP position and SW2 in DOWN position.
 4. Amber neon jewel should light.
- (j) P. T. T. Check.
 1. OPERATE switch to VOX-PTT.
 2. Depress red button SW7.
 3. VOX relay should close and red neon light should come on.

ANTI-TRIP AND VOX CIRCUIT CHECKS.

D1. Equipment set-up.

- (a) Remove all test jig cables from Invader, except 5 pin receiver control cable.
- (b) Connect D-104 microphone to Invader.
- (c) Tune Invader for optimum output on any band.
- (d) Set output level control to obtain reading of 100 on output meter.
- (e) MODE switch to LSB.
- (f) OPERATE switch to MAN.
- (g) VOX, T.D. and A.T. controls to MAX CCW.

D2. Test procedure. (Tests relay RY1 contacts 4, 5, and 6).

- (a) Place microphone on bench 2' from test jig speaker.
- (b) Speak into microphone in normal voice from 3 to 5 inches from mike.
- (c) Increase AUDIO gain until peaks of 50 are obtained on the output meter.
- (d) OPERATE to VOX-PTT.
- (e) Increase VOX gain until voice operate circuits are energized.
- (f) Adjust T.D. control to obtain medium delay, about a half second.
- (g) SW4 on test jig to "up" position.
- (h) Advance speaker gain on test jig to obtain .3 volts on VTVM.
- ~~(i) The audio from the speaker entering the microphone will tend to operate the VOX circuits.~~
- (j) Advance the A.T. control until the audio tone from the speaker will not energize the transmitter.
- (k) OPERATE to MAN.
- (l) SW4 on test jig to "down" position.
- (m) .8 volts should be indicated on VTVM.
- (n) The above test must be made in a quiet location.

MISC. TESTS.

1. Audio quality, check AM and both SB audio using Collins receiver.
2. Check for variation in drive during AM operation on heat run.
3. Check VFO for drift using crystal oscillator which has been warmed up at least one hour.

THIS COMPLETES THE TESTING OF THE INVADER.

Date: March 7, 1962 F.M.H.