

# CQ Reviews: The Yaesu FL-2100F Linear Amplifier

BY HUGH PAUL\*, W6POK

The Yaesu FL-2100F linear amplifier is the current version of the basic design that has been on the market for a number of years. Rated at 1kW input on c.w. and 1200 watts p.e.p. input on s.s.b., the FL-2100F covers 80 through 15 meters. Designed to match the styling of the FT-101 transceiver, this linear is small in size, measuring 13-1/2" by 11-1/2" by 6". A good portion of its 41 pounds is taken up by the power transformer which has a dual primary winding that may be strapped for operation from either 117 v.a.c. or 220 v.a.c. Plate voltage supplied to a pair of 572B zero bias triodes operating Class B is 2200 v.d.c. at full load with 220 v.a.c. primary power and 1900

v.d.c. with 117 v.a.c. primary power. 100 to 120 watts of driving power is required for maximum rated input. Drive power is coupled to the directly heated cathodes of the 572B's through tunable pi-networks for each band.

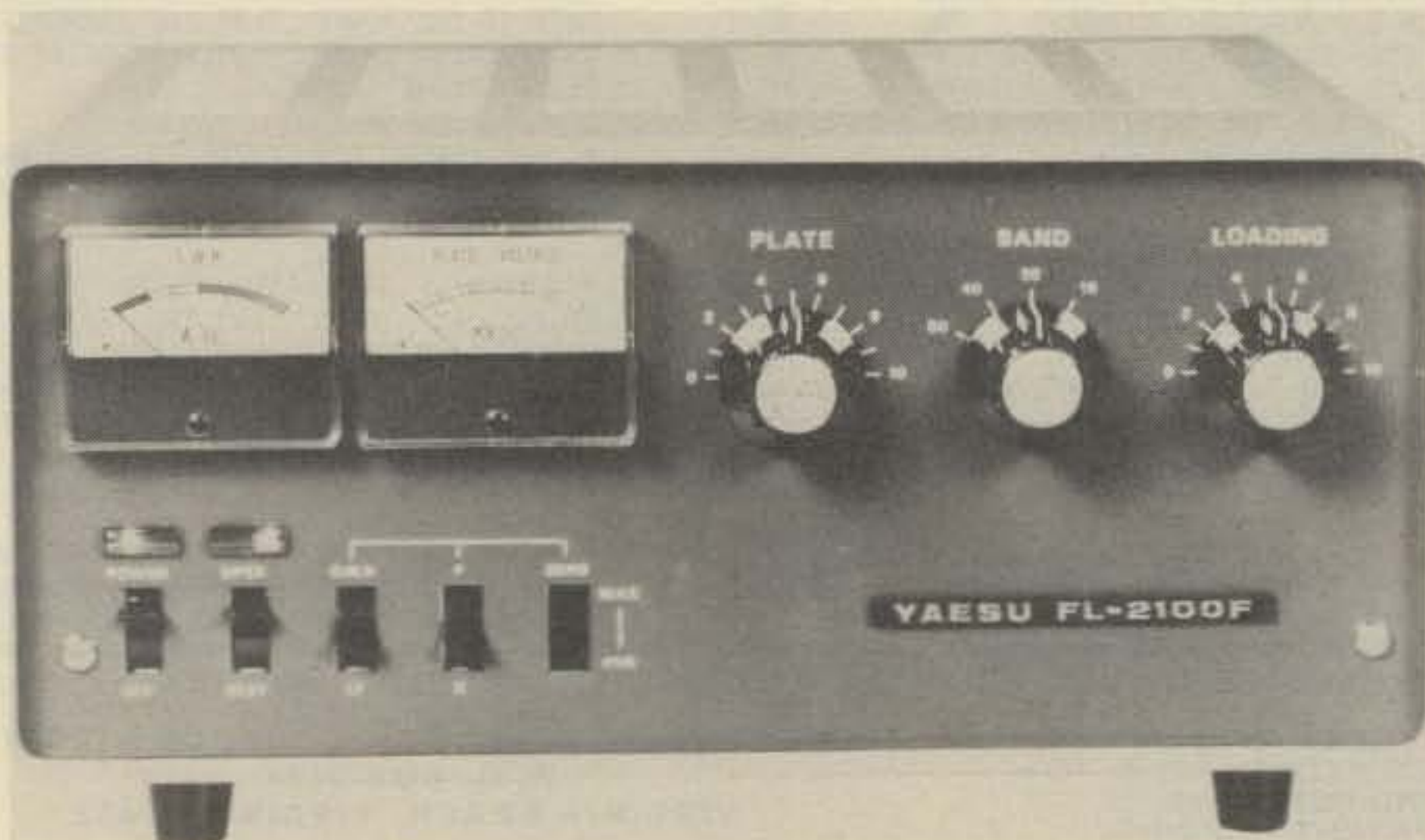
A.I.c. voltage is provided by a pair of diode rectifiers that sample the r.f. on the grids of the 572B's. A.I.c. voltage is not adjustable, but worked well with several makes of transceivers used to drive the amplifier. When the amplifier is in *standby*, the tubes are biased off for protection and to prevent diode noise generation which, if severe enough, could be heard in the receiver.

The amplifier is well metered. The left hand one has a dual function, plate current and s.w.r. readout from

the built-in bridge circuit, while the right one displays plate voltage. The internal changeover relay connects the antenna directly to the exciter, when the amplifier is off or in *standby* mode. Since the s.w.r. bridge is connected to the antenna side of the changeover relay, it continues to function as an s.w.r. indicator for the exciter.

Cooling off the 572B tubes is accomplished by two quiet high-speed fans, each mounted beneath one of the tubes. Air is drawn in from beneath the unit and exhausted out the top. The components used in the FL-2100F are more than adequate for their intended use, but the amplifier is not designed for continuous duty. Yaesu recommends limiting key-down time at full input to ten seconds, in order to protect the 572B's. I recommend you learn proper tuning procedure if you wish to avoid arc-overs in the final tank.

It is important that in any high power intermittent duty amplifier to tune the final plate tank circuit to resonance and insert some loading, with minimal drive applied. This is no different from the tuning procedure recommended by most transceiver manufacturers and is the reason transceivers have a "tune" position. The final amplifiers of all transceivers are rated for intermittent duty only. The life cycle of the 572B's in the FL-2100F will be just as good as the finals in a transceiver, if you observe the proper tuning procedure. I owned an earlier model of this Yaesu amplifier and used it extensively for

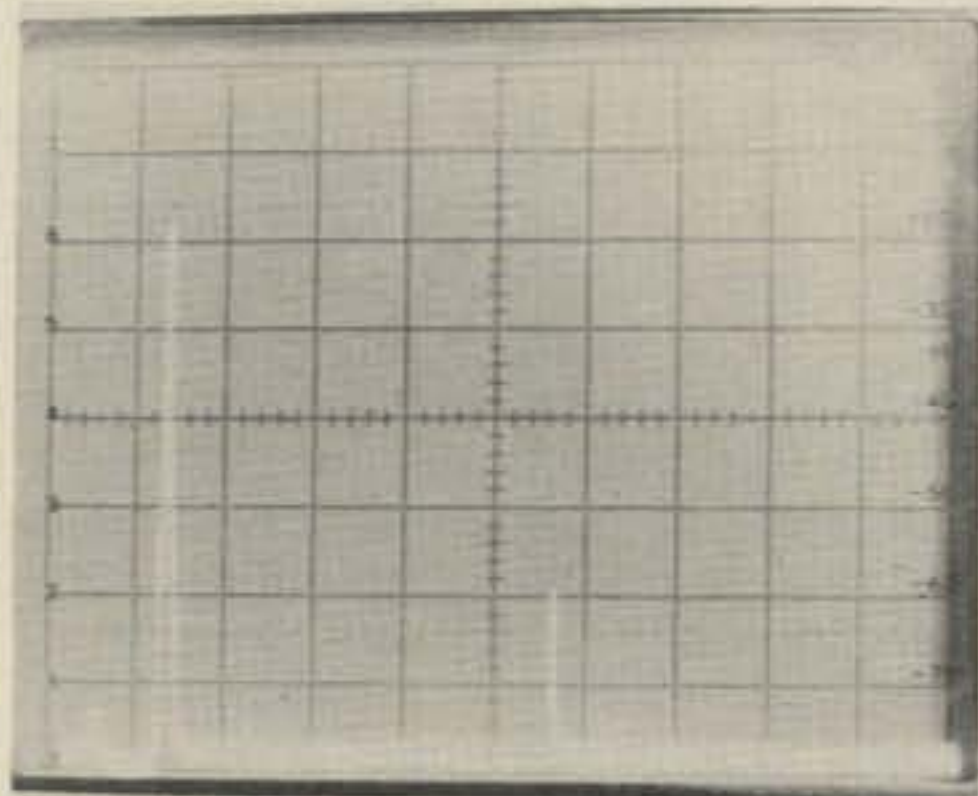


The Yaesu FL-2100F linear amplifier.



contest and DX work. After two years there had been no failure of any component and the power output was almost identical to that measured when the unit was new.

In order to provide a more realistic evaluation of the amplifier's performance, spectrum analysis was made of both the exciter used to drive the FL-2100F and the amplifier output under full load. If you look at the 21 MHz output of the exciter you will see that the second harmonic is 41 dB down from the fundamental. This level just meets F.C.C. specifications. Now look at the photo of the amplifier output and you will see that the sec-



Spectrum analysis of the 21 MHz output of the driver. Scaling is 5 MHz per division.

ond harmonic is 50 dB down from the fundamental.

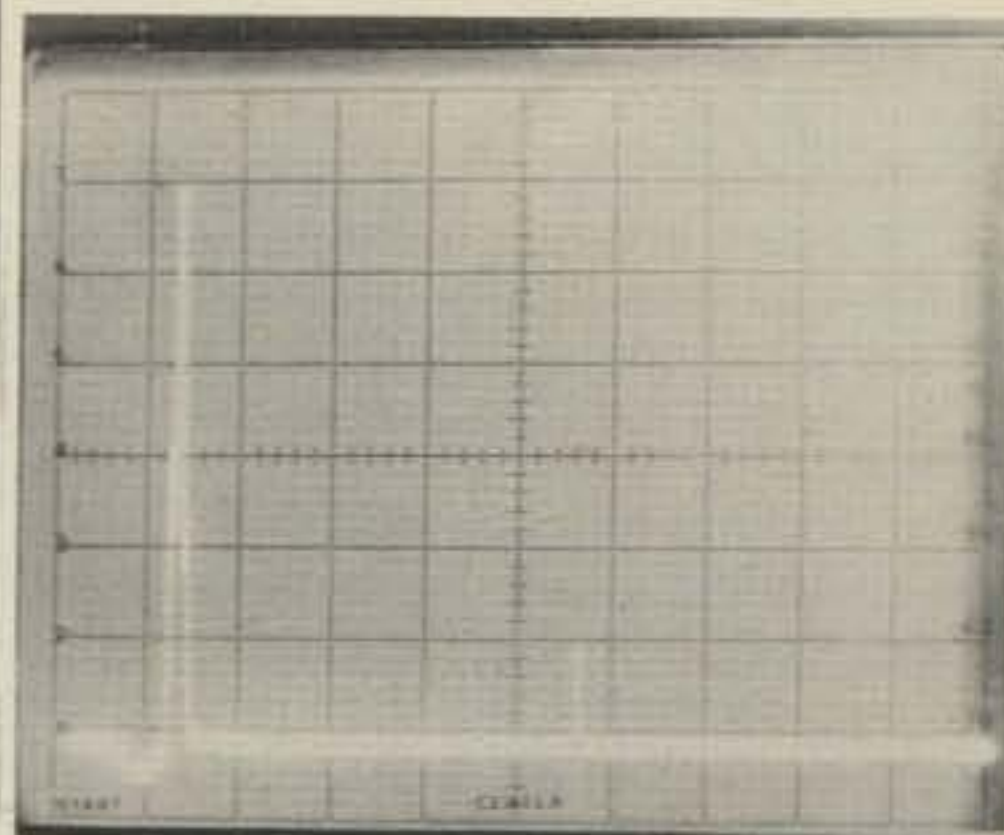
Spectrum analysis to determine third order distortion products was made of the driving transceiver. With two audio frequencies of the same amplitude applied, third order products measured 28.5 dB below the single tone level of a two-tone test. This would be 34.5 dB below full output. With two tones applied the output level is 6 dB greater than with a single tone applied. With the amplifier operating, third order products measured the same as was realized with the transceiver along. The same test was repeated with another transceiver exhibiting third order products 32 dB below a single tone of a two-tone test. With the amplifier in operation, third order products measured -32 dB. The FL-2100F is a clean amplifier. Photographs of the analyzer display of third order products are not included here because our analyzer does not have phase-lock, nor display storage, thus making it difficult to obtain clear photos of this particular test. This, of course, does not affect the measurement - only the ability to photograph the measurement. We are working on ways to rectify this and soon hope to be able to show you photos of third order distortion products.

To determine the efficiency of the

amplifier we adjusted the exciter output and amplifier loading for maximum power out without exceeding 1 kW input. Efficiency was calculated after subtracting driving power from the total output power. Results were as follows:

Band	Power Out	Drive Power	Efficiency
80 m	630 watts	110 watts	52%
40 m	610 watts	110 watts	51%
20 m	620 watts	110 watts	51%
15 m	600 watts	100 watts	50%

For more information, contact Yaesu Electronics Corp., 15954 Downey Ave., Paramount CA 90723. ☐



Spectrum analysis of the 21 MHz output of the FL-2100F. Scaling is 5 MHz per division.

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