The MT100 RF Module, Final Power Stage

The RF amplifier section provides to amplify the RF signal coming from the RF control circuit.

It is composed by:

- 2 way 90 deg. hybrid splitter
- driver stage
- final stage
- 2 way 90 deg. hybrid combiner

The **2way splitter** is made by a 90 deg. Hybrid structure and provides to split in quadrature the input signal. Below, the technical specifications:

Frequency	87.5 – 108 MHz
Input power	50W Max
Return Loss (S11)	<-17 dB
Return Loss (S22 ed S33)	<-15 dB
Isolation (S32)	>15 dB
Insertion Loss (S21=S31)	<0.6 dB

The **driver stage** provides the first step of amplification of minimum 14dB gain in order to correctly drive the final stages. It is composed by a pair of SINGLE END stages operating in class AB. Below, the technical specifications:

VCC	28V
Idq	50 mA per section
Frequency range	FM (87.5-108 MHz)
Gain	> 16 dB typ.
Output Power	> 5 W

The **final stage** is an amplifier stage for FM signal operating in band II (87.5 – 108 MHz), with nominal output power of 100 Watt CW.

Normally it works up to 150 Watt, in order to win the Insertion loss of the circuitry that follows the amplifiers, as the 2 Way Combiner, Directional couplers, and Low Pass Filter.

It is a balanced amplifier, including a pair of "push – pull" sections, each one using a medium power MOSFET with the input / output matching network, and balancing to unbalancing transformer (balun). The RF MOSFET's bias are integrated on this printed circuit board. The polarization is in class B, with a 25 mA quiescent current per section.

VCC	28V
IDC (@ Full Power)	7 A typ.
Idq (total per 2 sections)	50 mA typ.
Frequency range	FM (87.5-108 MHz)
Power Gain	> 17 dB typ.
Output Power	> 100 W

The **2 way Combiner** is a 2 way in quadrature structure, and it provides to sum each two final stage sections to have 250 W power at the common port. One unbalancing 50 Ohm resistor warranties the isolation between the input ports, in order to maintain the Transmitter on duty, in case one of the final stages will be on fault (- 6dB derating).

Below, the technical specifications:

Frequency	87.5 – 108 MHz
Power handling	400 W Max
Return Loss (S11)	<18 dB
Return Loss (S22 ed S33)	<18 dB
Isolation (S32)	>18 dB
Insertion Loss (S21=S31)	< 0.4 dB