

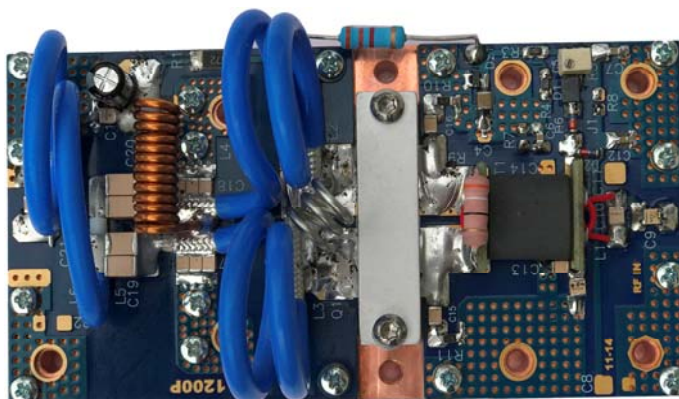
MD1K AR50 is the latest addition to the HAM product family. This pallet completes the range of amateur radio devices. The exceptional technical features make it amongst best on the market at the present state of art.

MD1K AR50 allows an easy and complete assembly of a “SSPA” (Solid State Power Amplifier). In order to assemble the product, all that is required is the following: 1 aluminium radiator, 2 cooling fans, 1 power supplier of adequate size, 2 RF connectors.

The item must be installed on the finned heat sink, which is able to dissipate around 500 W without exceeding 40°C by forced ventilation.

The power supplier must supply a stable voltage of 48,5V and at least 28 A.

This module does not require manual bandwidth tuning in the range of 49-55 MHz. Great linearity makes it suitable for use in SSB-EME.



Dimensions: (L x W x H) 115 X 60 X 40 mm

- Rf Device : FREESCALE MRF1K50H
- Frquency range : 49 - 55 MHz
- Operating mode : ALL OPERATING MODES
- DC power supply : 47 - 50 Volt
- Impedance Input / output : 50 Ω
- P_{out} : ≥ 1100 W
- Gain : ≥ 22 dB
- Working class : AB or C (adjustable)
- ALC input , inhibit (ENABLE)
- 9,5 mm Thick Copper Base
- TEFLON laminated pc board

ABSOLUTE MAXIMUM RATING (T case = 25 °C)

Symbol		Value	Unit
V _s	Drain Voltage Supply	50	V dc
I _s	Supply Current (total)	30	A dc
VSWR	Load Mismatch (all phase angles, T _c = 40°C @ 300 W)	65 : 1	
T _{bp}	Base Plated Operating Temperature	80	°C
T _{stg}	Storage Temperature Range	- 20 + + 70	°C

ELECTRICAL SPECIFICATIONS (T case = 38 °C, 50 Ω loaded, Vs = 48.5 V, Id = 30 A, bias = 1.3 A total)

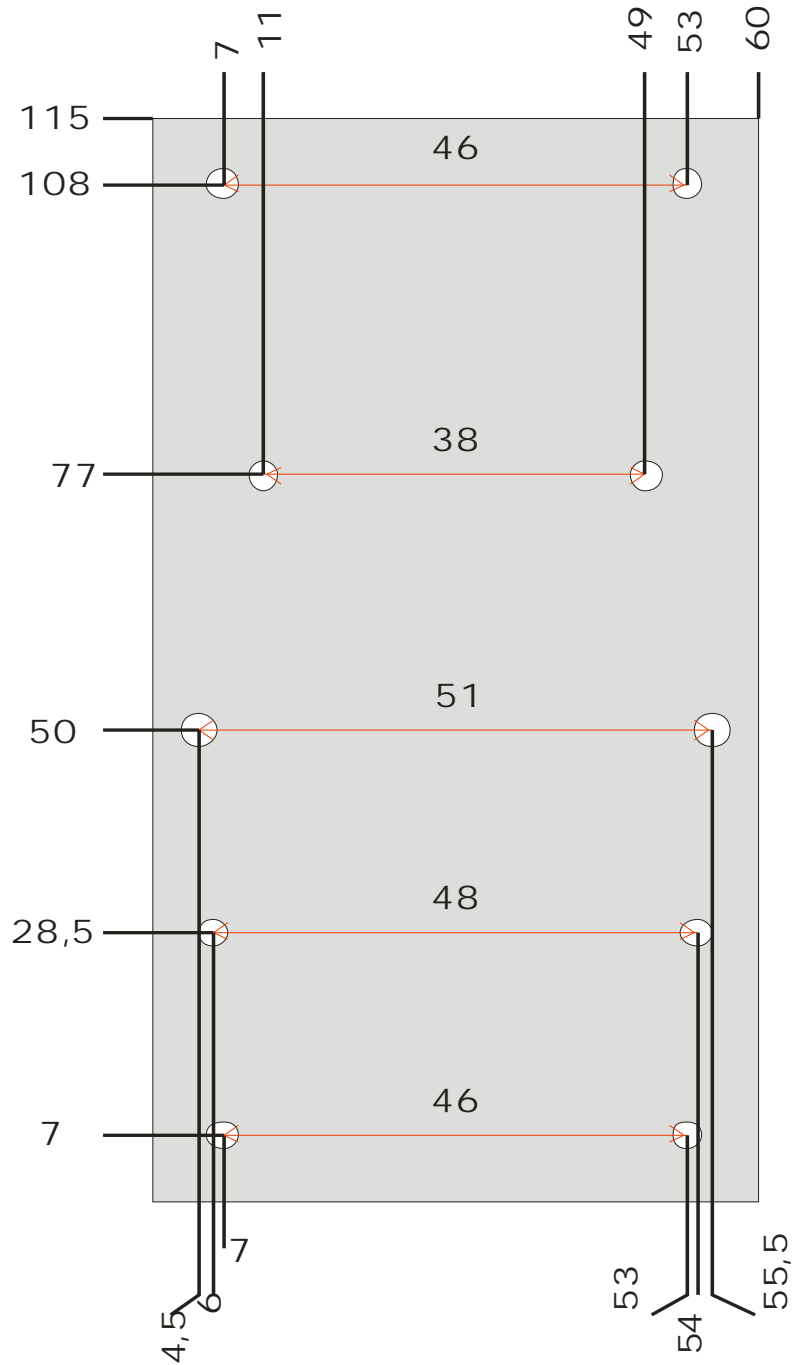
Characteristics	Min	Typ.	Max	Unit
Operating Frequency Range	47	50	55	MHz
Power Input	6	7	8	Watt
Power Gain	21	22	23	dB
Power Output (fundamental)	1100	1100	1300	Watt
Drain Efficiency (load 50 Ω)	85	88	89	%
Input VSWR	1.5:1	≥1.6:1	1.7:1	
Insertion Phase Variation (Unit to Unit)	±2	±3	±4	Degrees
Power Gain Variation (Unit to Unit)		±1		dB
F2 Second Harmonic	- 50	- 45	- 40	dBc
F3 Third Harmonic	- 15	- 13	- 22	dBc

TIPICALLY OPERATION Vs = 48,5 V, Bias = 1200 mA, Copper Base Temperature= 30°C

Frequency MHz	Power In Watt	Power output Wat	I.A	F2 Third Harmonic	F3 Third Harmonic	Efficiency
49,100	5.8	1000	23	≥ - 40 dBc	≥ - 13 dBc	≥ 85 %
50.100	6.8	1000	22,7	≥ - 40 dBc	≥ - 13 dBc	≥ 85 %
54	7,5	1000	23,7	≥ - 40 dBc	≥ - 13 dBc	≥ 85 %

* The above data is purely indicative, Italab may vary them without any warning

Fixing Base Plate



TEST PROCEDURE

Recommended Test Tools

- 1) Power Supply 40 ÷ 50 Volt, 30 A.
- 2) Dummy Load 50 Ω minimum 1 KW
- 3) Spectrum Analyzer
- 4) Wattmeter
- 5) Adequate Coaxial cable (Teflon)
- 6) Solder with grounding
- 7) Amperometer 30 A f.s.

Additional Components

- 1) Conductive paste
- 2) N° 10 high resistance screws (e.g. M3 x 18 mm)
- 3) Radiator suitable for dissipation (see application picture)
- 4) Fan (2 recommended)
- 5) Adequate section power supply cable

Instructions

Firstly lay a thin quantity of conductive paste, rivet the Pallet to the radiator previously pierced and filleted for 10 screws. See pierced "cover" (page 2), we recommend to check that the radiator is perfectly rectified , tighten the screws, wait 10 minutes and repeat this operation.

Solder the RF input and output connector, ensure the use of an adequate section of coaxial cable, must be in Teflon for the output.

We recommend to use RF connectors of best quality on the market (Amphenol or others of the same type) **Do not use connectors of dubious quality** as they might not respect the impedance and might also not have any Teflon insulation.

Solder the d.c. cable (see diagram page 5). Interpose a current measuring device between the power cable and power supply.

Connect the Generator (Transmitter) to RF input of the Pallet, connect the RF output of the pallet to the dummy load through a precision Wattmeter. (**do not test by connecting to an antenna**)

At this stage, adjust the power supply to 48,5 Volt and limit the power to 2 A, connect to RF pallet and check that the Bias power is in the range (1200 mA \pm 10% @ 48,5 Volt), in case it is not exact, adjust by the Trimmer. Once the "Bias" check is terminated, **adjust the power limit to 30 A** and continue testing.

Firstly adjust the output power of the Generator to **0 Watt**, switch it on and adjust to **100 mW**, now the output Wattmeter will indicate that the Pallet is amplifying, increase the input power to obtain the requested output power (not superior to 1100 W with fan, care to check the temperature of the Mosfet (60°C max measure on the Mosfet press).

We recommend to test RF with working fans .

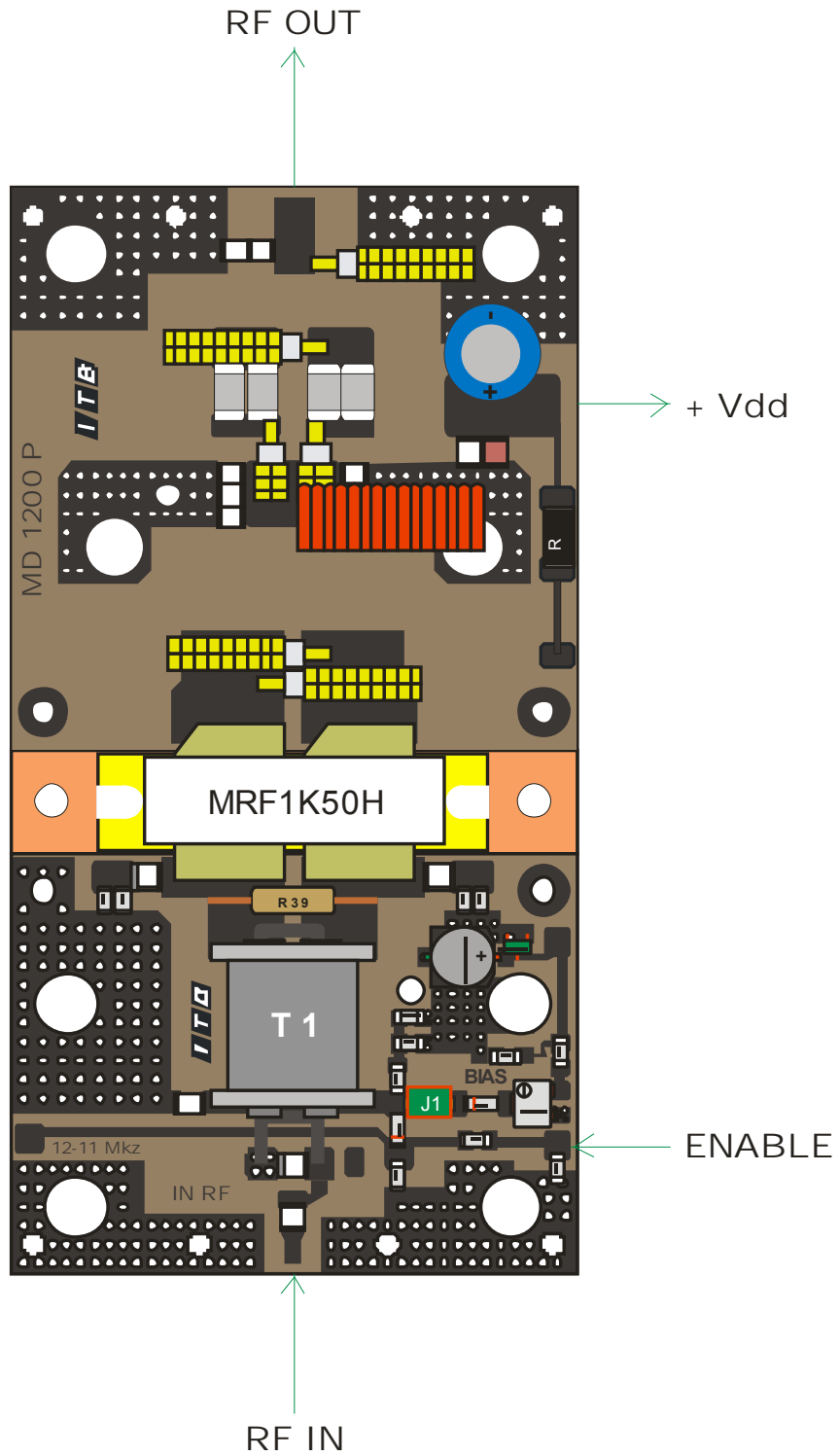
We recommend to use adequate **Low Pass Filter** as the harmonic products might interfere other services.

The pallet is equipped with " **enable** " input , at this stage you can connect a negative voltage from 0 to 5 V max and adjust both the output power and the operation of the relevant protections (SWR, Overange Power out , excessive temperature etc.etc).

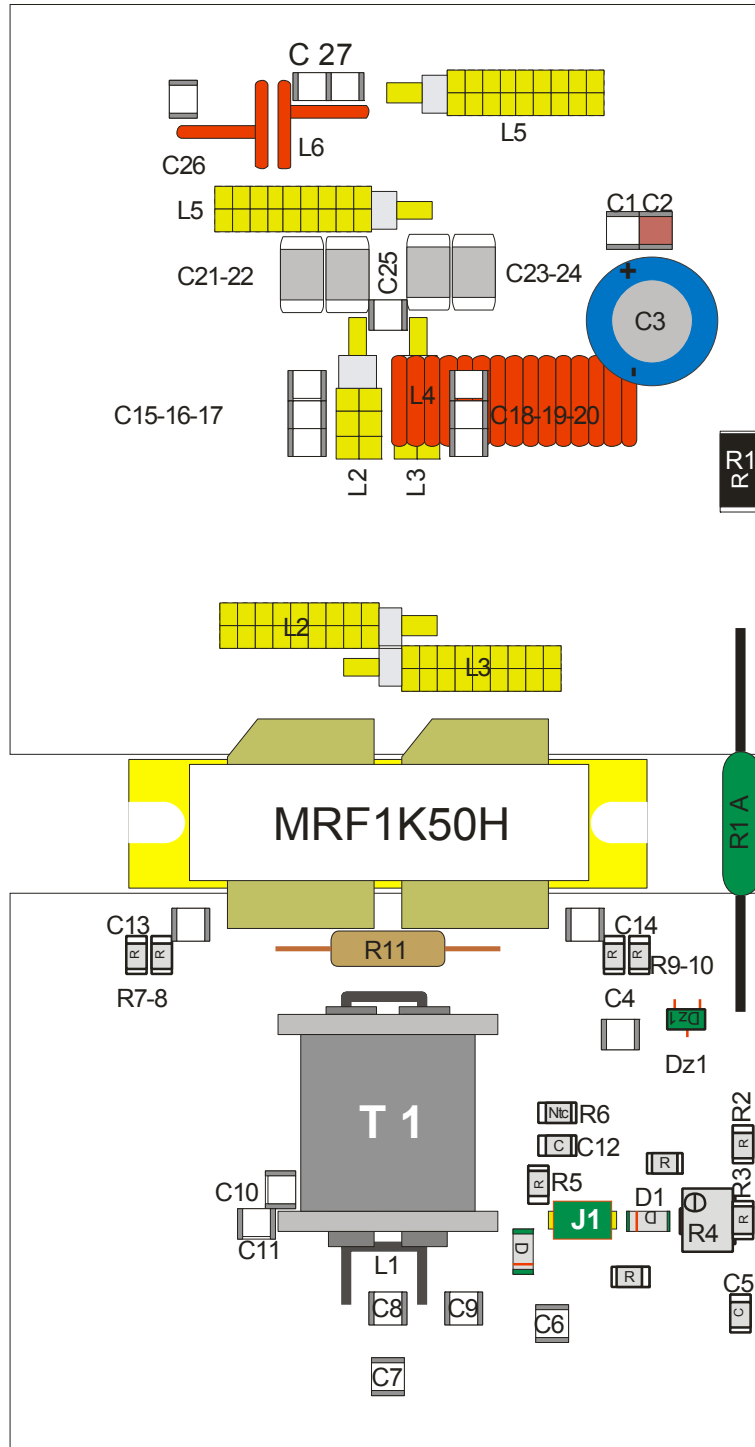
Cooling System



CONNECTIONS



MD1K AR 50 – COMPONENTS MAP



COMPONENTS LIST

LATEST REVISION : 07/04/2017

TITLE			NOTE
R	1	SMD RESISTOR 3.3 K Ω , 1 W	
R	1A	RESISTOR 100 Ω - 2 W ANTINDUCTIVE	
R	2	SMD RESISTOR 1.5 K Ω , 0. 25W	
R	3	SMD RESISTOR 10 K Ω , 0. 25W	
R	4	TRIMMEER 11 TURNS SMD 5 K Ω	
R	5	SMD RESISTOR 8.2 K Ω , 0. 25W	
R	6	SMD TERNISTOR 10 K Ω ,	
R	7	SMD RESISTOR 1.5 Ω , 0. 25W	
R	8	SMD RESISTOR 1.5 Ω , 0. 25W	
R	9	SMD RESISTOR 1.5 Ω , 0. 25W	
R	10	SMD RESISTOR 1.5 Ω , 0. 25W	
R	11	RESISTOR 39 Ω - 2 W ANTINDUCTIVE	
C	1	ATC CAPACITOR 100B, 1Kpf - 150 Volt	
C	2	SMD CAPACITOR 10K Pf, 100 Volt	
C	3	ELETTRILITIC 10 μ f 100 Volt	
C	4	ELETTRILITIC 2.2 μ f 50 Volt	
C	5	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	6	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	7	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	8	ATC CAPACITOR 100B, 33 pf - 500 Volt or similar	
C	9		Not Used
C	10	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	11	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	12	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	13	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	14	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	15-20	ATC CAPACITOR 100B, 1Kpf - 500 Volt or similar	
C	21-24	ATC CAPACITOR 100c, 1Kpf - 1000 Volt or similar	
C	25	ATC CAPACITOR 100c, 47pf - 500 Volt or similar	
C	26		Not Used
C	27	ATC CAPACITOR 100B, 47pf - 500 Volt or similar	
D	1	SMD DIODE TYPE BAT 42	
D	2	SMD DIODE TYPE BAT 42	
DZ	1	SMD ZENER 7.5 Volt, 0.125 W	
L	1	24 AWG (7/32) L= 165 mm	
L	2	10,7 Ω COAXIAL CABLE	
L	3	10,7 Ω COAXIAL CABLE	
L	4	13 TURNS ON THE WIRE DIAMETER 4.5 enameled 1.5 mm	
L	5	50 Ω COAXIAL CABLE	
L	6	3rd HARMONIC SUPPRESSION	options
T	1	ITB ORIGINAL PART	
Q1	1	DUAL MOSFET FREESCALE MR1K 50H	
CS1	1	PC BOARD TEFLON 1.6 mm	