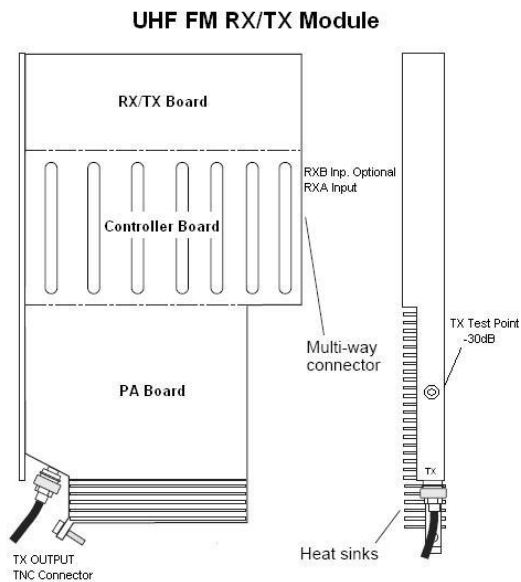


# 430...440MHz

D-Star UHF Packet

<1>  
<2>

<2>



TX VCO,

RX VCO  
IC MB1502,  
Full-Duplex.

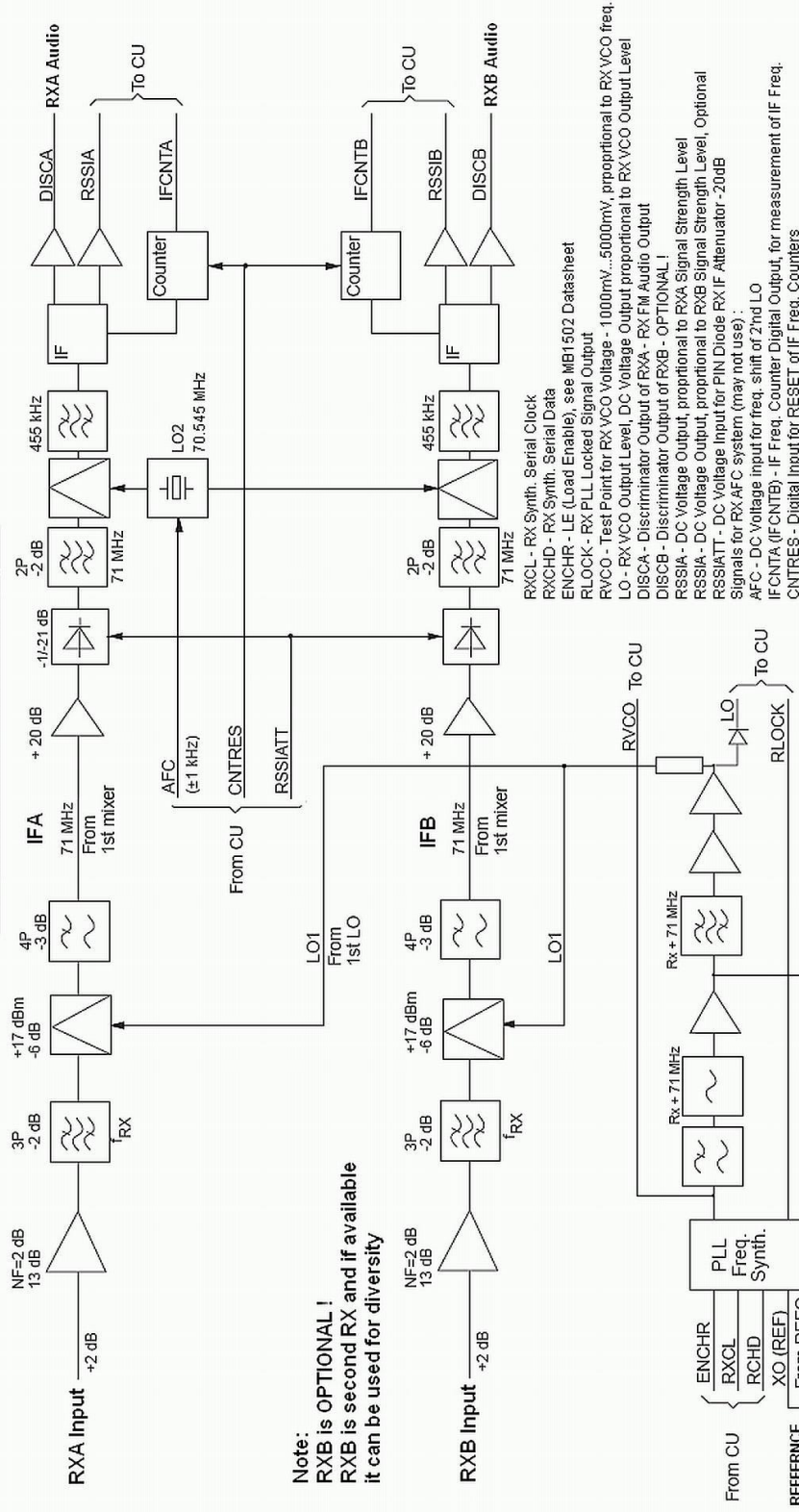
430...440MHz ( 460 Hz):  
12,5kHz/25kHz, -120dBm (220nV)  
: F3E (FM),  
: +45dBm (~32W @ 50 Ohm, 24V DC),  
30...40W 24...26V DC.  
<1>: 20W 13,8V DC, 60W ( ! ) 28V DC.  
<2>: 20W 13,8V DC, 45W ( ! ) 28V DC.  
: ~3A @ 12V, .3.3A @ 13.8V, 4.2...4.4A @ 26V, max.5A @ max.28V.

IC1 ; IC3A ; IC3B ; IC4 ; IC5 ; IC10 - DC Voltage Regulator - LP2951  
IC2 RX; IC11 TX - Serial Input PLL Frequency Synthesizer - MB1502  
DBM1A ; DBM1B - Surface Mount Mixer - ESMD-C2HX2-1  
IC6A ; IC6B - Double-balanced mixer and oscillator - SA602A  
IC7A ; IC7B - High performance low power FM IF system - SA604A  
IC8A ; IC8B - CMOS Dual Operational Amplifier - LMC662  
IC9A ; IC9B - 14 Stage Binary Counter - MM74HC4060  
LNA1A ; LNA1B - made with NPN 7GHz wideband transistor - BFG135

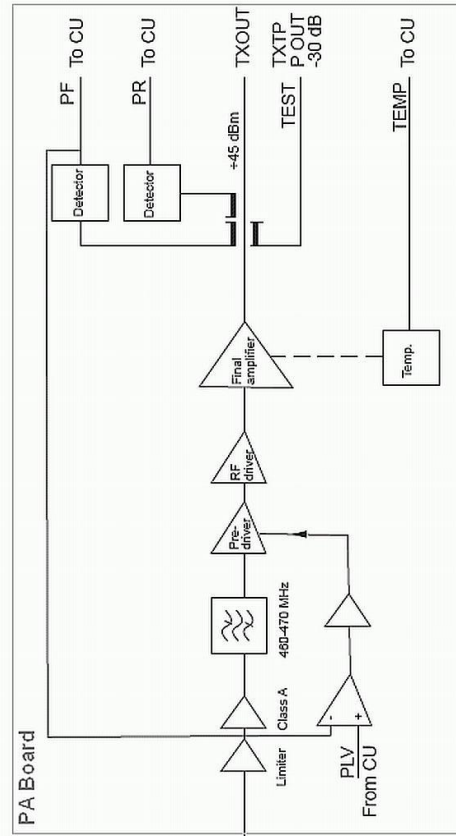
IC1 - Low Power Quad Operational Amplifiers - LM224  
Class A preamplifier Transistor - BFG135  
PRE-Driver Transistor - 20204 or TP5002S or SD1390  
RF Driver Transistor - 20203 or TP5051R or SD1391  
Final Amplifier transistor - 20200 or TP5051 or SD1393

: <http://sites.google.com/site/uhfrtx>

**UHF FM RX/TX Module Block Diagram**



**Note:**  
 RXB is OPTIONAL!  
 RXB is second RX and if available  
 it can be used for diversity



**Note:**  
 CU - Controller Unit (the middle board of RX/TX Module)  
 is not included in this Block Diagram

TMOD - TX FM modulation input  
 TXCL - TX Synth. serial Clock  
 TXCHD - TX Synth. serial Data  
 ENCHT - LE (Load Enable), see MB1502 datasheet  
 TLOCK - TX PLL Locked Output  
 TVCO - Test Point for VCO Voltage - 1000mV...5000mV.  
 UFGT - TX VCO Output Level, DC Voltage Output proportional to TX VCO Output Level  
 PLV - Power Level Voltage - DC Voltage input to control TX Output Power Level  
 P. Out - Forward Power - DC Voltage Output for SWR measurement  
 PR - Reflected Power - DC Voltage Output for SWR measurement  
 TEMP - Temperature of final transistor heat sink - DC Voltage Output

TXON: +5V

PLV:

: PLV=1.9V TX Pout=5W, 2.7V->10W, 3.3V->15W, 3.7V->20W, 5.0V->30W, 6.2V->40W

PF/PR:

-> PF=PR=0.03V,

Pout=18W -> PF=3.6V).

TEMP:

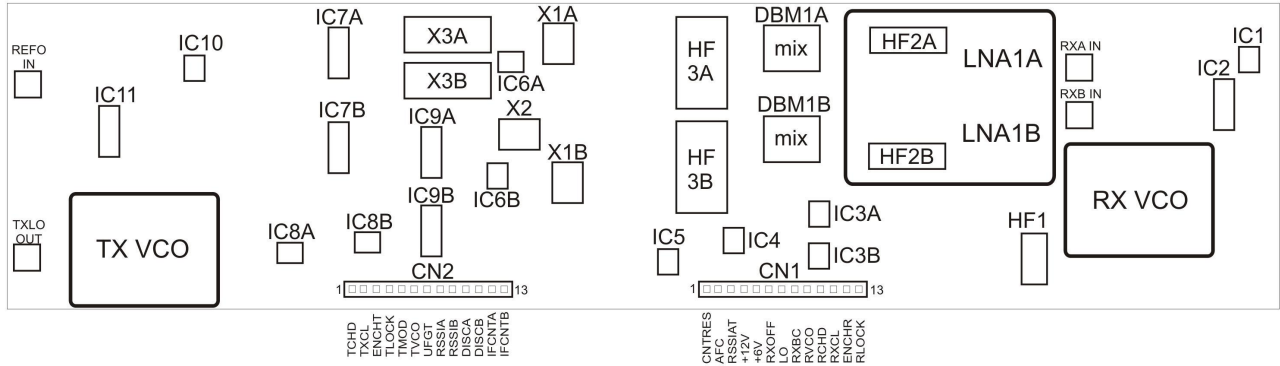
(2.4V @ 20°C, 4.7V @ 100°C).

RSSIATT: 0V(GND)

20dB

+5V

# UHF FM RX/TX BOARD



Note: Components marked with "B" at the end are not soldered in TYPE<1> Modules  
 For pinouts description please refer to the Block Diagram of UHF FM RX/TX Module

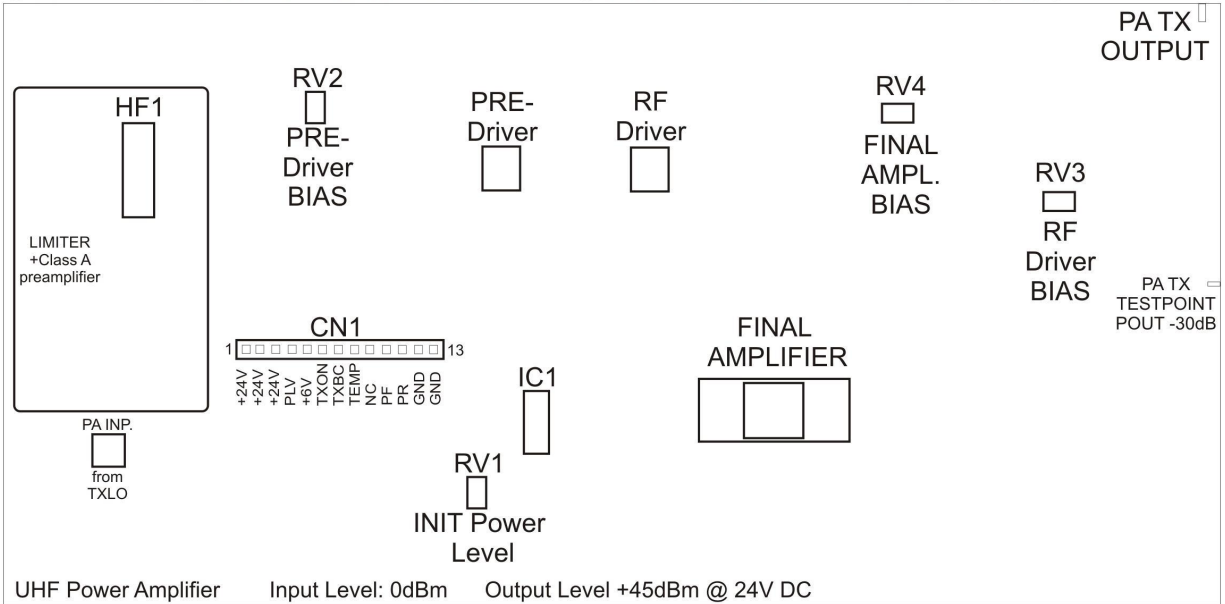
**CN2 pinouts:**

- 1 - TCHD TX Synth. Serial Data
- 2 - TXCL TX Synth. Serial Clock
- 3 - ENCHT TX Synth. LE, see MB1502 datasheet
- 4 - TLOCK TX PLL Locked Output
- 5 - TMOD TXFM Modulation Audio Input
- 6 - TVCO TX VCO Control Voltage, 1000mV...5000mV (TP)
- 7 - UFGT TX VCO Output Level, DC Voltage Output (TP)
- 8 - RSSIA RXA Signal Strength Level, DC Voltage Output
- 9 - RSSIB RXB Signal Strength Level, DC Voltage OPTIONAL!
- 10-DISCA RXA Discriminator Output, RXA Audio Output
- 11-DISCB RXB Discriminator Output, RXB AF Out. OPTIONAL!
- 12-IFCNTA IF Freq. Counter Digital Output, for AFC
- 13-IFCNTB IF Freq. Counter Digital Output, OPTIONAL!

**CN1 pinouts:**

- 1 - CNTRES Digital Input for RESET of IF Freq. Counters
- 2 - AFC DC Voltage Input for Freq. Shift of 2'nd LO
- 3 - RSSIATT Input for Swich 20dB Attenuator with PIN diodes on 1'st IF
- 4 - VCC12V +12V DC stabilized
- 5 - VCC6V +6V DC (5.5V...7V)
- 6 - RXOFF Digital Input, RX VCC SHUTDOWN if 5V, connect to GND
- 7 - LO RX VCO Output Level, DC Voltage Output (TP)
- 8 - RXBC Output (GND when RX Board is Connected)
- 9 - RVCO RX VCO Control Voltage, 1000mV...5000mV (TP)
- 10-RCHD RX Synth. Serial Data
- 11-RXCL RX Synth. Serial Clock
- 12-ENCHR RX Synth. LE, see MB1502 datasheet
- 13-RLOCK RX PLL Locked Output

# UHF TX POWER AMPLIFIER BOARD TYPE<2> Modules

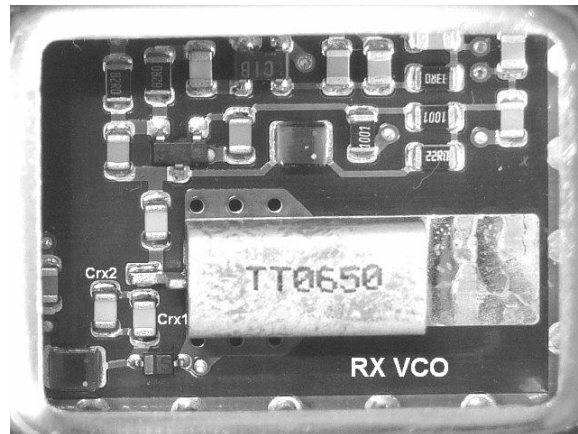
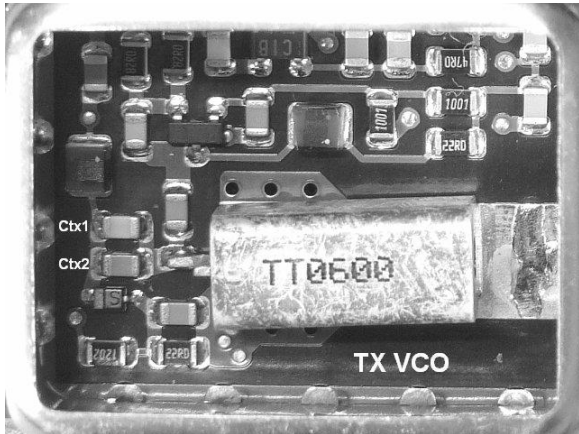


UHF Power Amplifier    Input Level: 0dBm    Output Level +45dBm @ 24V DC

Note: PA Boards of TYPE<1> Modules have some different components and areas, but generally they have the same functions and pinouts, except lack of last two pins - 12 and 13.  
 For pinouts description please refer to the Block Diagram of UHF FM RX/TX Module

**CN1 pinouts:**

- 1 - PRE-Driver Supply Voltage +24V DC (24V...26V, work on 12V with reduced output power)
- 2 - FINAL AMPLIFIER Supply Voltage +24V DC (24V...26V, work on 12V with reduced output power)
- 3 - RF Driver Supply Voltage +24V DC (24V...26V, work on 12V with reduced output power)
- 4 - PLV - Power Level Voltage, DC Voltage Input to control TX Output Power Level
- 5 - VCC6V +6V DC (5.5V...7V), Supply Voltage for Class A, Limiter and Biases
- 6 - TXON Digital Input to Enable TX of PA (?PTT)
- 7 - TXBC TX Board Connected, ( TYPE<2> resistor 22k to GND ; TYPE<1> 180R to GND)
- 8 - TEMP Temperature of Final Amplifier heat sink, DC Voltage Output
- 9 - TYPE<2> NC Not Connected ; TYPE<1> RF Power Level of RF Driver
- 10-PF Forward Power, DC Voltage Output for SWR Measurement
- 11-PR Reflected Power, DC Voltage Output for SWR Measurement
- 12-TYPE<2> GND ; TYPE<1> Not Used
- 13-TYPE<2> GND ; TYPE<1> Not Used



Ctx1/Ctx2 : 0805 SMD TX VCO, RX VCO.  
 <1> 1206, +/- 0.1pF ( 3.3pF. Crx1/Crx2 3.3pF. 3.3pF.  
 Ctx1 Ctx2 Crx1 Crx2.  
 <2>: Ctx1=2.7pF ; Ctx2=8.2pF ; Crx1=6.8pF ; Crx2=3.3pF.

O

: HF1 ; HF 2A ; HF 2B  
 : HF1  
 RSSIA(B) RX PF TX.

IC MB1502 OH8RO  
 10 Hz ( 12.8MHz)  
 (thx to OH8RO) : <http://sites.google.com/site/uhfrtx>

30m3/h.

MB1502, 10 Hz

CW ID, ( ), CTCSS 1750Hz, PTT,  
 RS-232 USB  
 Squelch, PTT Audio PC Echolink,  
 <2> ( ).

Squelch, PTT, Audio MB1502,

PC. Echolink

PDF  
[http://sites.google.com/site/uhfrtx/datasheets/UHF\\_FM\\_RX\\_TX\\_Module\\_BG\\_rev1.0.pdf.rar](http://sites.google.com/site/uhfrtx/datasheets/UHF_FM_RX_TX_Module_BG_rev1.0.pdf.rar)

<http://sites.google.com/site/uhfrtx>