

# **RF CONCEPTS**

**RFC 4-110**

**440 MHZ  
POWER AMPLIFIER**

## RFC 4-110

Thank you for buying the RF CONCEPTS RFC 4-110. This amplifier represents the "fourth generation" of solid state power amplifiers built for amateurs. The RFC 4-110 features a "state of the art" GaAs-Fet preamp, variable SSB delay, "High SWR" protection, over temperature protection, automatic or remote keying and remote control capabilities. The RFC 4-110 is designed to work with all modes of transmissions including, FM, CW, and SSB.

### SPECIFICATIONS

Frequency Range .....	430-450 MHz
Power .....	Input range: 200 mw to 15 w Output*: 100 W with 10 w in
Maximum Input .....	15 Watts
Duty Cycle .....	Intermittent
Modes .....	FM, SSB, and CW
GaAs-Fet Preamp .....	Noise Figure: 2 to 3db Gain : 12db nominal
SWR Protection .....	Automatic shut down with approximately 3:1 SWR
Temperature Protection .....	175 degrees F
Keying .....	1. Automatic - RF sensing 2. External - Ground or Plus 3-12 Vdc at J3 - user option - unit supplied with "plus voltage" keying
Input-Output Impedance .....	50 Ohms
Voltage Requirement .....	13.8 VDC
Current Requirement .....	22 Amps
Fuse .....	35 Amp
Size .....	11.5 x 6 x 3 inches
Weight .....	5 lbs

\*output may vary by .75 db

### WARNING

The RFC 4-110 was designed to work with radios having 15 Watts maximum output. If your radio puts out more than 15 Watts you should use an RF CONCEPTS RFC 4-310 which is designed for a higher input power.

High power output also means high heatsink temperatures. Keep the heatsink clear of any obstructions and provide adequate ventilation.

## INSTALLATION

The RFC 4-110 can be mounted with the "L" brackets, supplied. It should be placed to provide maximum ventilation around the heat sink.

Heavy gauge wire should be used to connect the RFC 4-110 to the battery or power supply. For medium distances use #10 wire and for longer distances use #8 wire. To connect the amplifier to the antenna, RG-8A/U or equivalent coax is recommended.

For best performance, the antenna should be adjusted for an SWR of less than 1.5:1.

## OPERATION

The power amplifier is connected between the radio and the antenna. The RFC 4-110 will boost the power of a 10 watt radio to 100 Watts or more. The GaAs-Fet receiver preamp will improve copy on weak or marginal signals. When either the power amplifier or the preamp are "on" they automatically switch in and out of the circuit, by sensing the RF from the radio. The "TX" LED will light during transmit.

The automatic switching is ok for FM, but on SSB the relays may drop out during pauses. Therefore, it is highly recommended that the external keying feature be used with SSB. Please see the "EXTERNAL KEYING" section.

## FAULT CONDITIONS

During normal operation the "TX" LED will light when the power amplifier is activated.

The RFC 4-110 has a special circuit that senses return power (SWR) from the antenna. If this returned power exceeds approximately 25 Watts, the amplifier automatically shuts off, lighting the "SWR" LED and turning off the "TX" LED. In order to reset the amplifier, the power on-off switch must be switched off for 2 seconds then turned back on. **WARNING! CHECK OUT THE ANTENNA SYSTEM BEFORE OPERATING THE AMPLIFIER AGAIN.**

If the heat sink temperature exceeds 175 degrees F. the internal thermostat will open, shutting down the power amplifier. The "TX" LED will go out. The thermostat will automatically reset when the heatsink cools down.

## FUNCTIONS

The functions of the RFC 4-110 are controlled by the three front panel switches.

POWER ..... This switch activates the power amplifier section, as well as resetting the SWR protection circuit.

FM-SSB ..... In FM, the amplifier has a fast dropout when the carrier is removed. In SSB, this dropout is

delayed, so the relays do not "chatter" while on SSB. (see "DELAY ADJUST")

PREAMP ..... This switch turns on the GaAs-Fet preamp. It can be used even when the power amp section is off.

#### REAR PANEL CONNECTIONS

4 PIN "JONES".. Power is supplied thru this connector. This allows quick removal of the amplifier, if needed.

FUSE ..... A 35 Amp fuse provides protection in case of an internal short circuit.

PHONE JACK .... This jack is the external keying input. By changing a jumper inside the amplifier, keying may be accomplished by either a ground or a positive voltage of +3 to +15 at 1 MA or less. See "EXTERNAL KEYING".

NOTE: The unit is factory set for "plus voltage" keying.

5 PIN DIN ..... This jack is used for remote control of the amplifier. See the diagram "REMOTE CONTROL".

RADIO ..... This coax connector is the input from the transmitter or transceiver.

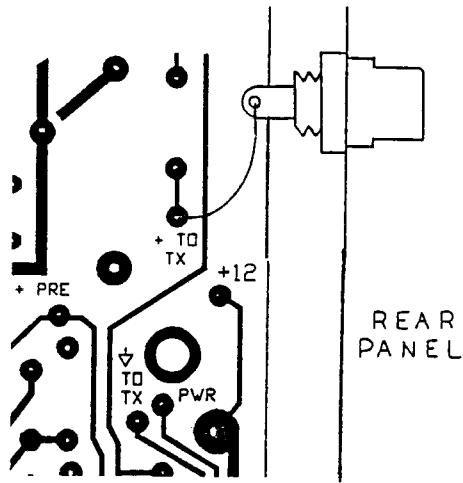
ANTENNA ..... This is connected to the antenna.

#### INTERNAL CONNECTIONS AND ADJUSTMENTS

DELAY ADJUSTMENT . The "SSB delay" is varied by changing the potentiometer, accessible through the hole in the cover on the left side of the unit.

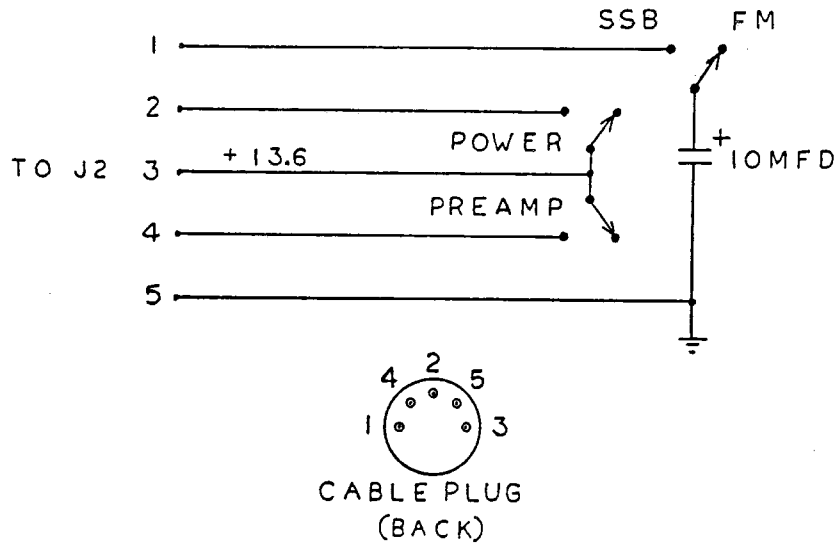
EXTERNAL KEYING .. The amplifier is factory set for "plus keying" keying. Most transmitters do not provide a "ground" during transmit, but most do have a positive voltage available at their back panel. You must consult your instruction manual, for your particular radio, to locate this voltage. This is then connected to the phono jack on the amplifier.

To change the amplifier from "plus" keying to "ground" keying you must remove the cover and move the wire connected to the phono jack from the "+ TO TX" pad to the "∇ TO TX" pad. (see sketch page 4)



EXTERNAL KEYING - "JUMPER" POSITION

REMOTE CONTROL ... The 5 pin DIN connector allows remote control of any of the functions of the amplifier. Below is a diagram of a typical remote control hook up. This can be built from commonly available parts, to fit your own needs.



#### WARRANTY

RF CONCEPTS, Division of Kantronics, warrants this product to be free from defects in material and workmanship for 5 years from date of purchase, with the exception of the RF power transistors, which are warranted for 6 months.

The unit must be returned to the factory, freight prepaid. The warranty card must have been submitted within the 15 days after purchase. Any unauthorized repair or changing of the internal adjustments may void this warranty.

RF CONCEPTS will provide, free of charge, both parts and labor, as necessary, to correct any defect occurring within the warranty period.

This warranty applies to the original owner only.

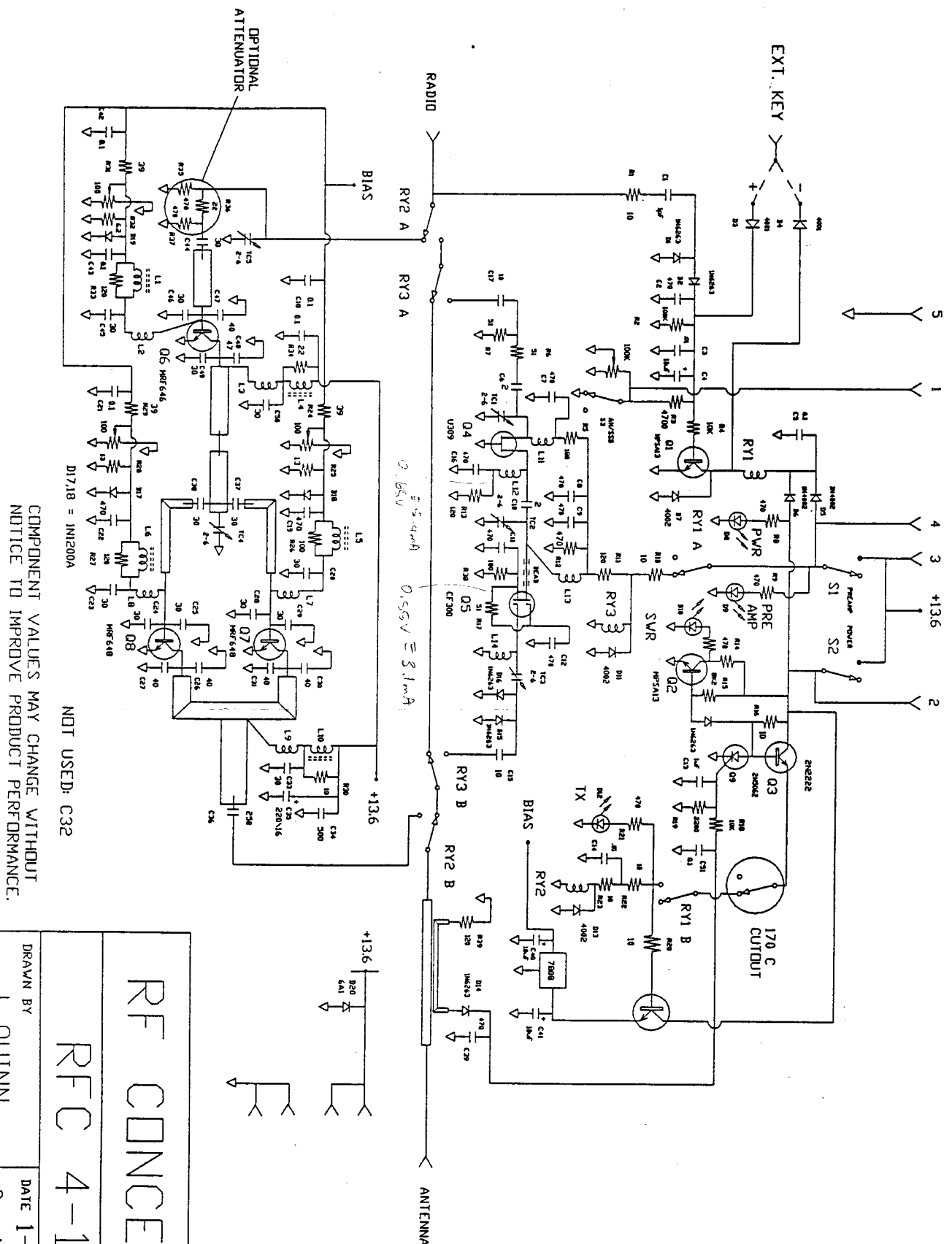
This warranty applies only to those units that fail during normal operation. Any units that have been overdriven, overvoltaged, modified, accidentally damaged or misused will not be covered.

USE OF THIS UNIT IN REPEATER SERVICE WILL VOID THE WARRANTY.

RF CONCEPTS will not assume any responsibility for damage to any antenna, radio, or accessory connected to this product.

This warranty is in lieu of all other warranties expressed or implied, and no representative or person is authorized to assume for RF Concepts any other liability in connection with the sale of its products.

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COMPONENT VALUES MAY CHANGE WITHOUT NOTICE TO IMPROVE PRODUCT PERFORMANCE.

DI718 = IN1200A

NOT USED: C32

RF CONCEPTS	
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