



# THE RF CONCEPTS 4-110 AMPLIFIER ON ATV

The RF Concepts 4-110 all-mode 70cm amplifier from P.C. Electronics has been specially designed to not only work with CW, SSB and FM but also ATV. Despite all mode claims by other manufacturers, few have the proper additional capacitors required for low power supply and bias supply impedance at all video frequencies up to 5 MHz. Without wideband video amplitude modulation in mind when an amp is designed and tested, the result can be color shift, distorted sync and low color and sound subcarrier output.

The RFC 4-110 input power and linear gain curve properly matches the P.C. Electronics 10 Watt TC70-10 or TXA5-70/PA5 modules for full output or the KPA5, TX70-1, TC70-1 & TXA5-RC 1.5W ATV transmitters for over 40 Watts p.e.p. . With 13.8Vdc applied, typical fully driven peak envelope power at the video sync tip plus sound is 100 Watts. The blanking pedestal must be set to about 60% (see waveform sketch below) of maximum output to maintain the proper video to sync ratio. Typically this is about 60 Watts out when driven by 10 Watt transmitters (3 Watts at pedestal) and 25 by 1.5 Watt transmitters. The sync stretcher circuit in the transmitter modulator found in all P.C. Electronics ATV transmitters compensates for the last 3 dB of output change nonlinearity (gain compression) found in most amateur linear amplifiers. The amp FM/SSB switch only affects automatic T/R dropout time, not amp linearity - SSB is normal for ATV.

You must do the setup procedure one time before operation to match your particular transmitter, amp and power supply. Once the blanking pedestal has been set in the transmitter modulator, the proper video to sync ratio will be automatically maintained regardless of camera scene or video gain changes. You need only do the setup again if the applied voltage is changed by more than .5 Volts such as going from a base station power supply set to the nominal 13.8 Vdc to a mobile or portable application where the battery may drop to 12.6 Vdc. Readjustment may also be necessary when changing frequency. The sound subcarrier injection may also have to be reset (decreased).

Do not drive the RFC 4-110 with more than 15 Watts input in any mode or you may damage the amps first transistor. Remember that the sync stretcher may still pull the sync up over 15 Watts output even if you can reset the blanking pedestal low enough without video applied. Excessive drive from any video modulated source will result in a distorted picture. ATV is an AM mode which must have the video waveform preserved by driving each amplifier within its linear range. The preamp is normally switched off for ATV.

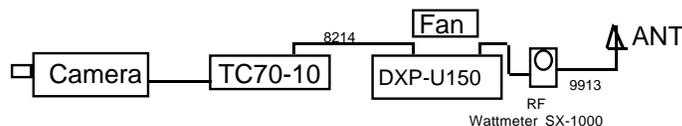
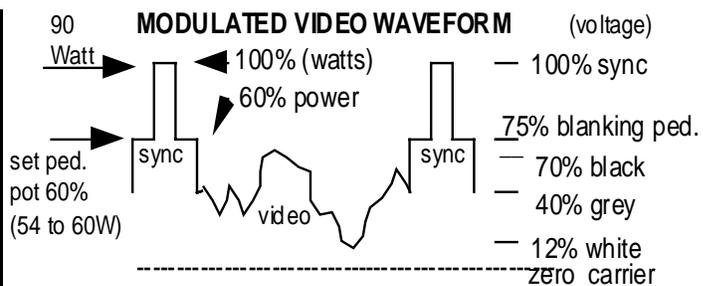
Normal all mode duty cycle for the 4-110 is 5 minutes on and 5 minutes off. For ATV it is 10 minutes on since the normal average power is about half the peak power. However this will vary depending on the heat dissipation. Therefore it is best placed where free air can come in from the sides and rise up from the heatsink fins. A fan (Radio Shack has both 12 Vdc and 120 Vac) blowing across the fins will help lengthen the duty cycle a little as well as life time. If at any time the thermal relays shut down the amp while in operation, this says that your duty cycle is too long and cooling insufficient. While this protects the amp initially, any repetition can only stress and weaken the parts and PC board in the amp.

The 50 Ohm coax between the driver and amp as well as to the antenna must be of good quality and at least 95% shielding. Saxton 8285, Belden 8214 or 9913 are suggested. Take no shortcuts when putting together the coax and connectors as small bumps in the coax line can cause a VSWR (10% reflected max) at UHF and possible stray RF getting into your camera or mic. See the ARRL Handbook for proper connector assembly. Do not use any right angle connectors, and minimize any adaptors or extensions to keep losses down.

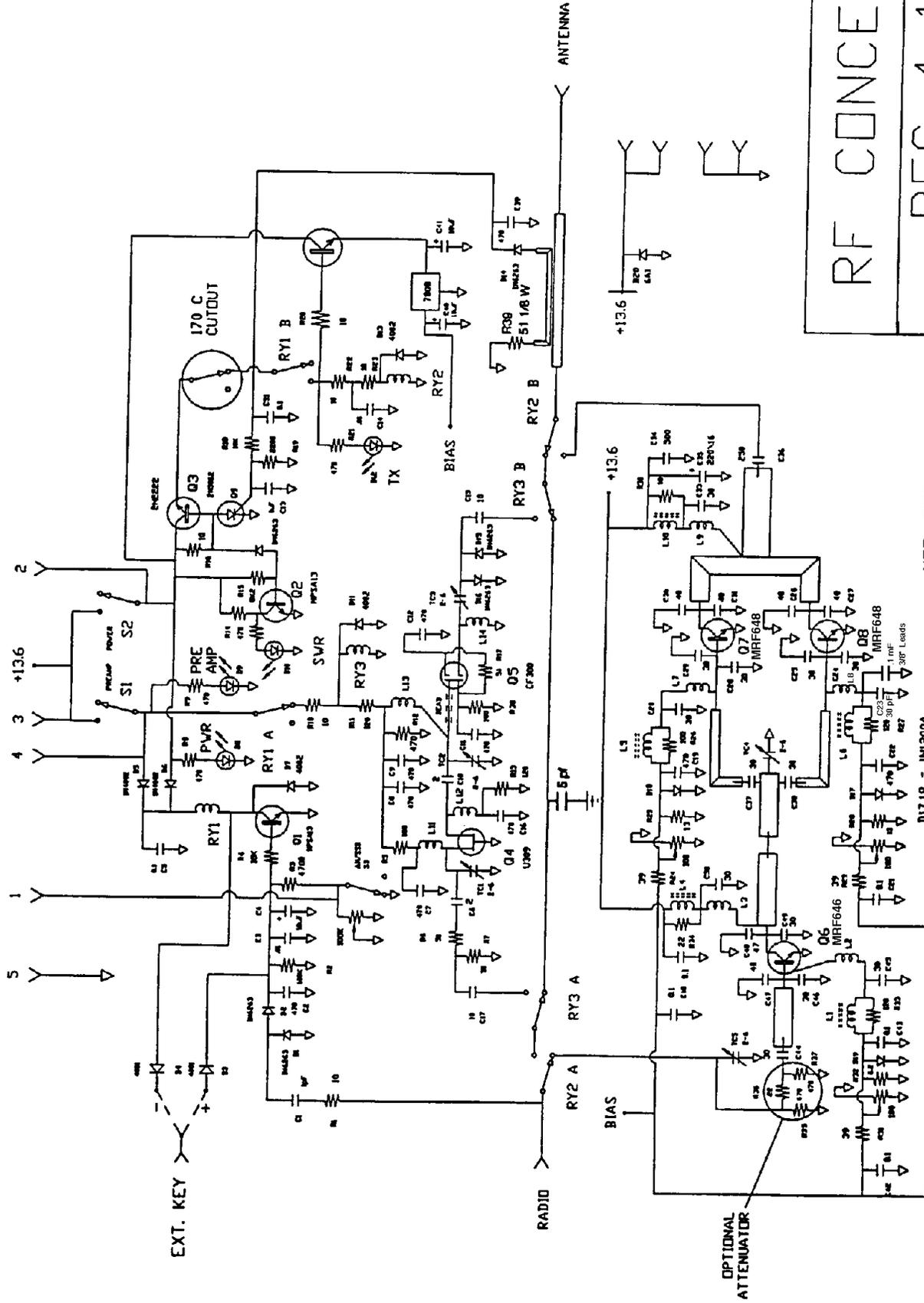
©1997 4-110 PC EL

### SET UP:

1. Connect to a separate regulated 13.8Vdc supply capable of 26 Amps. Keep leads short and direct to the power supply.
2. Connect a thru-line RF power meter (Diamond SX-1000) capable of reading up to 100 Watts on 70cm at the amp output.
3. With no video connected to the transmitter, turn the pedestal pot for maximum RF output. Set the RF drive pot for 90 Watts. This is your peak envelope power on the sync tip. Next, turn the blanking pedestal pot to 54 to 60 Watts.
4. Remove the power meter from the antenna line as it has no further relevance under video modulation. Except for special RF watt meters used by broadcast TV, most RF wattmeters do not read accurate average power with AM modulations above 50 kHz. Your peak (sync) power will be constant at the maximum you set, 90 Watts, with no video applied and pedestal pot wide open during video modulation due to the modulator pedestal clamp and sync stretcher.
5. Connect up your camera or other video source and have a distant station talk in your video gain level to the point just before white clipping or smearing - don't over modulate. If excessive crosshatch is noted with color video, the reduce sound subcarrier injection level and check the frequency is 4500 kHz +/- 2 kHz .



System Block Diagram with RF wattmeter for initial setup. Antenna must be a resonant 50Ω broadband 70cm type such as KLM 440-16X or Rutland FO22-ATV etc. Please read the RFC 4-110 booklet that comes in the bag with the amp, and also fill out and mail the warranty card to RF Concepts. If you have any problems call (601) 323-9715, then ship it to them at 300 Industrial Park, Starkville, MS 39757



NOT USED: C32

COMPONENT VALUES MAY CHANGE WITHOUT NOTICE TO IMPROVE PRODUCT PERFORMANCE.

Reprinted by P. C. Electronics 4/2002

.1 disc cap with 3/8" long leads added in parallel with C23.

D17.18 = IN1200A

# RF CONCEPTS

## RFC 4-110

DRAWN BY  
J. QUINN

DATE 1-25-89  
Rev. A 6-16-89