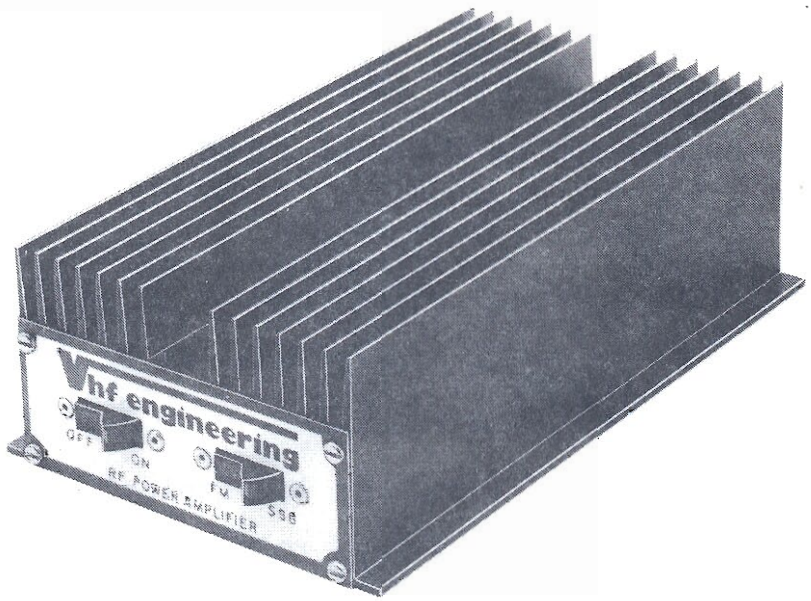
INSTRUCTION MANUAL

PRICE - $2.00



BLC 2/70 BLC 10/70

INSTRUCTION MANUAL

#5011215 REV.00

Vhf engineering
DIVISION OF BROWNIAN ELECTRONICS CORP.
320 WATER ST. / BINGHAMTON, N.Y. 13901 / Phone 607-723-9574

SPECIFICATIONS	BLC 10/70	BLC 2/70
Frequency Range	143-150	143-150
Power Gain		
Class C	8.5 dB nominal	15 dB nominal
Class AB	8-9 dB typical	15-16 dB typical
Class C (Nominal Values)		
70 rms output	10W rms input	2 rms input
90 rms output	15W rms input*	3 rms input*
35 rms output	5W rms input	1 rms input
Class AB (Nominal Values)		
70W PEP output (rated)	10W PEP input*	3W PEP input*
55W PEP output	8W PEP input	2 3/4W PEP input
35W PEP output	5W PEP input	1 1/2W PEP input
20W PEP output	3W PEP input	3/4W PEP input
DC Input Voltage	12-14 volts negative ground 15 volts maximum	Same as BLC 10/70
DC Input Current	12 amperes nominal	15 amperes nominal
Fuse Rating	20 amperes	20 amperes
Insertion Loss	Less than 1dB typical	Less than 1dB typical
Standby Current	Less than 10 MA	Less than 10 MA
Duty Cycle	50% (90% with fan) for a maximum keyed time less than 10 minutes (See Installation Section)	Same as BLC 10/70

*These powers are the maximum recommended input powers, do not exceed.

The enclosed warranty card must be filled out and returned within 10 days of purchase.

Units are warranted for 90 days from purchase date. VHF Engineering's liability is limited to the repair, adjustment or replacement of units of the original consumer purchaser that are proven defective. R.F. power devices are warranted to be within 1dB of specification. Units modified or operated in a manner not consistent with the instructions in the manual will not be covered by this warranty.

Defective units must be returned to the factory at the address below with a description of the difficulty and the date of purchase. VHF Engineering is not liable for any damage occurring in shipment, so the unit should be packed properly. The customer must pay all shipping costs. Further information may be obtained by calling VHF Engineering's Customer Service Department at (607) 723-9574 (collect calls will not be accepted) or writing:

Customer Service Department
VHF Engineering
320 Water Street
P.O. Box 2019
Binghamton, New York 13901

The consumer must pay all shipping costs

No other warranties are expressed or implied. VHF Engineering is not responsible for damages which result as a consequence of or incident to using this unit.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

BLC 2/70 BLC 10/70

INSTRUCTION MANUAL

TABLE OF CONTENTS

I. DESCRIPTION

The BLC 10/70 and BLC 2/70 are solid state VHF amplifiers designed for fixed or mobile operation. They are unique because they are operable in class C for FM or class AB for SSB or AM. The BLC 10/70 provides a nominal 70 watts RMS output power for an input power of 10 watts RMS, while the BLC 2/70 requires only 2 watts RMS. TR switching is done by RF sensing circuitry, eliminating external switching connections to the transceiver. Microstripline design eliminates tuning and permits operation over the entire band. Rugged balanced emitter RF power transistors insure long life and high SWR protection.

II. INSTALLATION

The BLC 2/70 and BLC 10/70 are high power VHF amplifiers requiring proper mounting and termination to assure maximum transistor lifetimes. The MRF 245 and the 2N6081 are extremely rugged devices; however, their lifetime is closely related to the operating temperature. The cooler they are operated, the longer they will last. Lifetimes of properly cooled transistors can approach 100,000 hours.

For this reason, the duty cycle should be taken into consideration when mounting. The unit should be mounted with sufficient free air space above the heatsink fins to allow convection cooling. This should satisfy the cooling needs for short duty-cycle operation. For high duty-cycle operation (over 50% for maximum keyed time of 10 minutes) forced air cooling is necessary. Tests have shown a downward directed muffin fan of a capacity of 100 CFM or more placed directly on the heatsink fins midway between the ends of the amplifier will provide the required cooling for most RTTY or repeater operation.

CAUTION

Heatsink temperatures of up to 100 degrees C can be reached during extended short duty cycle operation using only convection-cooling. Care must be taken to mount the amplifier in a location where accidental contact with personnel is not possible. Even in repeater or RTTY operation, forced air cooling has resulted in heatsink temperatures of 50 degrees Centigrade or less.

The DC current requirements of the amplifier make the use of #12 gauge or larger wire for supply connections a necessity. Connect the red wire to the positive terminal and the black wire to the negative terminal of the supply. For mobile use, the D.C. connections should be made directly to the 12V battery: connecting the power cables to the ignition switch or other wiring could cause serious damage. These units are for use only in negative ground systems.

VHF amplifiers are sensitive to impedance variations at the input and output terminations. To assure maximum power transfer and minimum power reflections, we recommend the use of good quality con-

nectors and 50 ohm coaxial cable. Lossy cable, when used with high power at 140-150MHz, can cause overheating of the coax. RG 58 A/U is usually sufficient for the input connections, while RG 8 A/U or better is recommended for the output transmission line length and poor solder connections can contribute to total power loss.

Since there is a large capacitance across the amplifier's supply lines, a large spark may be made when connecting to the power supply.

III. OPERATING INSTRUCTIONS

FM or CW OPERATION

1. MODE switch to FM.

2. On-off switch to ON.

When in this mode of operation the on-off switch will light when drive power is applied. The MODE switch will remain unlit.

AM and SSB OPERATION

1. MODE switch to SSB.

2. On-off switch to ON.

Care must be taken to avoid over-driving the amplifier. Spurious outputs will be generated by driving the amplifier into a non-linear operating region. For this reason it is desirable to use a wattmeter between the amplifier and the antenna for adjustment purposes. While it is possible to adjust the drive to the amplifier experimentally by having another station check for splatter while adjusting the exciter drive and/or audio level controls, the following methods are preferred.

AM OPERATION

Connect a good quality wattmeter between the amplifier output and the antenna. Adjust the output level of the exciter so that the amplifier output is ¼ of the "rated output" as given in the specifications. When the unit is 100% modulated, the PEP output power will be the rated power. If the drive to the amplifier is properly adjusted, the output power will fluctuate very little when the exciter is modulated. If the drive power is too high, the output power will fluctuate significantly when the exciter is modulated. If the AM carrier output of the exciter cannot be adjusted and the drive level appears to be too high (significant output power fluctuation during modulation), then the exciter microphone gain may be decreased to the point where the output power does not fluctuate. The positions of the microphone gain and output controls of the exciter should be marked for future reference.

SSB OPERATION

Connect a good quality wattmeter between the amplifier output and the antenna, or as an alternative, observe the output of the amplifier on a field strength meter. Set the exciter gain to its minimum setting.

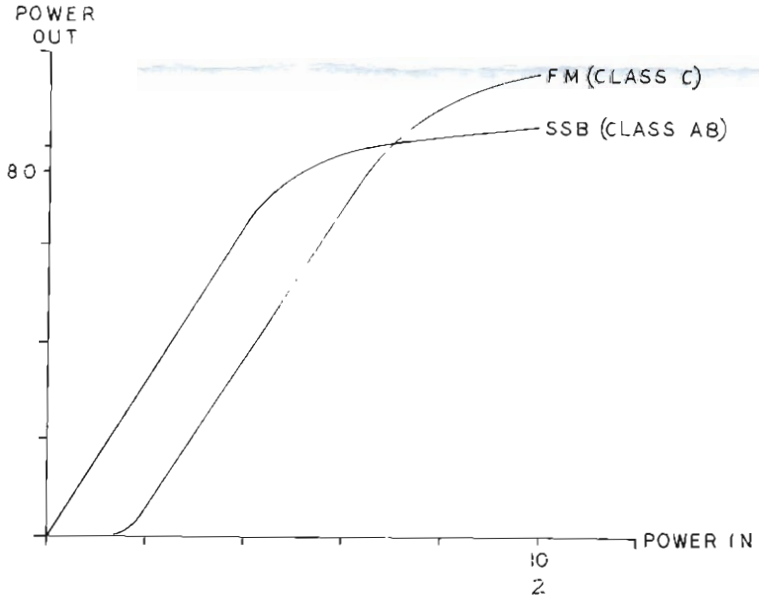
While whistling into the microphone or speaking a loud constant sound into the microphone, increase the exciter microphone gain while observing the output indication on the wattmeter or field strength meter. The output will increase significantly as the gain is increased. At some point, the output will not increase or will begin to increase much more slowly. At this point (the clipping point), the amplifier will be operating in the non-linear region. The exciter gain should now be decreased slightly, by lowering the gain of the exciter so that the power reading is 10% lower than the clipping point. The position of the microphone gain control of the exciter should be marked for future reference.

When the amplifier is in the "SSB" mode, the MODE switch will light when drive is applied. In this mode a built-in delay is provided to prevent the loss of words or syllables.

IV. THEORY OF OPERATION

The BLC 2/70 and BLC 10/70 are wideband high power VHF amplifiers. Solid state devices and microstripline construction assure high performance and reliability. The input and output impedances of each transistor is brought to 50 ohms by microstripline transformers. These computer optimized, impedance matching networks minimize spurious parasitic oscillations and suppress carrier harmonics. The BLC 10/70 uses a single transistor amplifier, while an additional transistor is provided in the BLC 2/70 to allow lower drive powers for the same output power capability as the BLC 10/70.

When the mode switch is in the FM position, the amplifier is biased for class C operation. Class C operation requires a minimum input drive power to obtain useful power. In the SSB position, a DC bias is applied to the transistors allowing linear, class AB, RF power amplification.



TYPICAL POWER RESPONSE

In standby the output connector is connected to the input by a 50 ohm line, providing a low loss transmission of signals from the antenna to the receiver. If the RF drive is applied while the amplifier is in standby, the TR switching circuitry, which features RF detection and a high gain Darlington device, provides fast, sensitive activation of the relay. The relay, when activated, applies the drive to the input of the amplifier and connects the amplifier output to the output termination. After the relay is activated, positive feedback through R-6 will aid in holding the relay. This will result in hysteresis - the power level required for drop out of the relay will be lower than that required for its activation. In addition, for the SSB mode C-36 is switched across C-12 to provide a delay in the return to standby. This prevents chopping or losing parts of words.

If the power is disconnected or the unit is switched to the off position, one may receive and transmit through the amplifier.

V. TUNE UP PROCEDURES

The BLC 2/70 and BLC 10/70 are designed with broadband microstripline techniques. Consequently, the amplifiers need not be tuned by the customer.

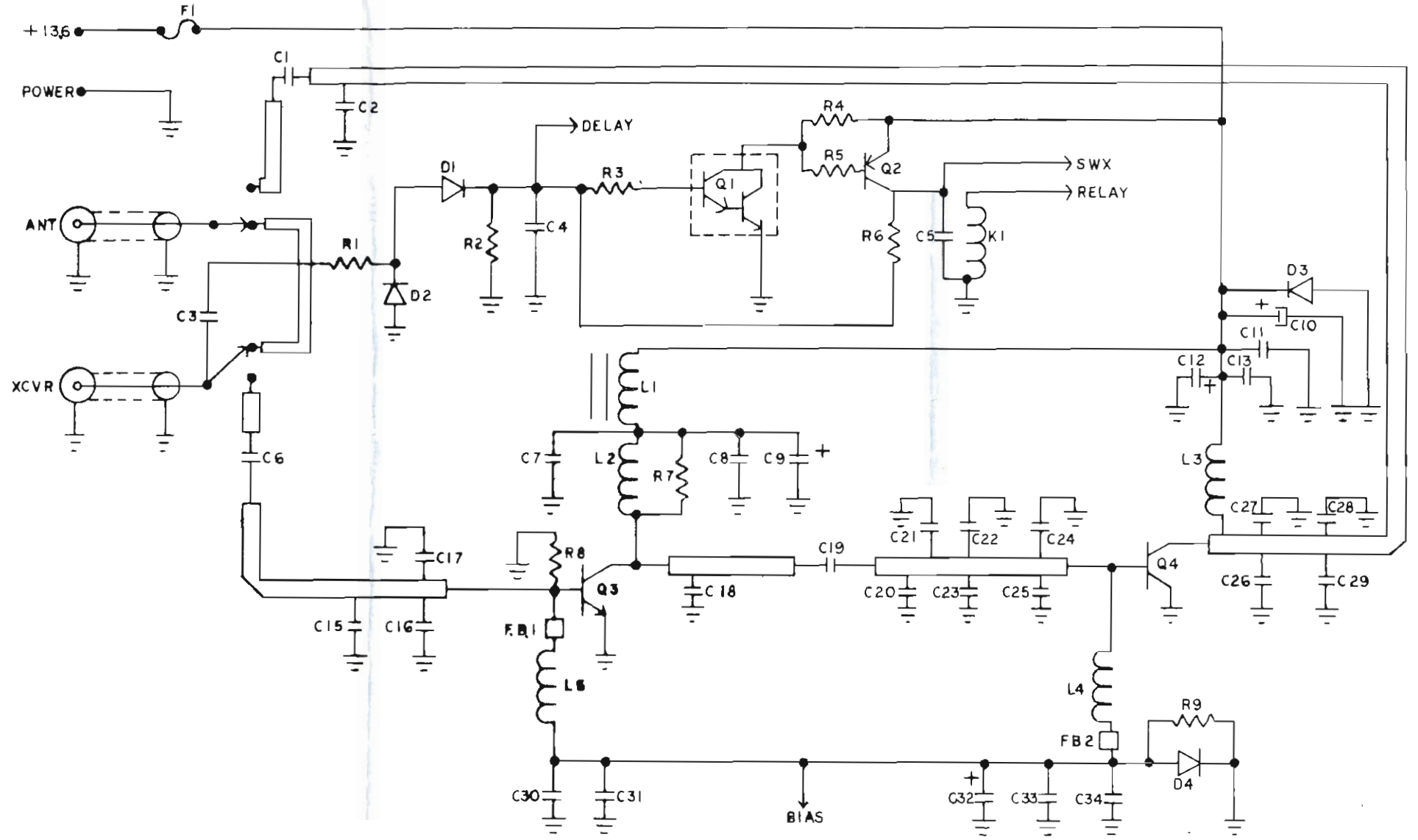
VI. SERVICING

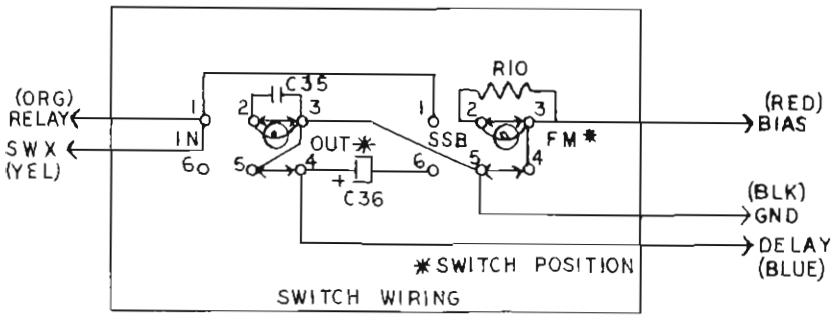
For 90 days from purchase date, the unit will be covered by the limited warranty, unless modified or obviously misused. Check limited warranty for details. Units not covered by warranty may be returned to the factory for repair or alignment for a nominal charge, plus parts and shipping costs.

VII. CUSTOMER SERVICE

VHF Engineering's Customer Service department will assist customers with technical problems concerning all VHF Engineering units. If you have a query, please contact the Customer Service department at (607) 723-9574. Units having serious problems may be returned postpaid to the factory without authorization for evaluation and repair estimates with a note detailing the difficulty. Units qualifying for warranty service will be covered according to the warranties detailed in their manuals. For units not covered by a warranty, a nominal service fee plus parts and return postage will be charged. Units returned for service should be sent to:

Customer Service Department
VHF Engineering
320 Water Street
Binghamton, New York 13902





BLC 2/70 BLC 10/70

SCHEMATIC DIAGRAM

BLC 2/70 BLC 10/70

PARTS LIST

CAPACITORS

C1	220pf SM	(2010300)
C2	33pf UM	(2010170)
C3	10pf	(2010070)
C4	.022	(2010430)
C5	.022	(2010430)
C6	200pf SM	(2010300)
C7	.022	(2010430)
C8	500pf UM	(2010320)
C9	1 MFD Tan	(2010460)
C10	100 MFD	(2010540)
C11	500pf UM	(2010320)
C12	1 MFD Tan	(2010460)
C13	.022	(2010430)
C15	47pf UM	(2010200)
C16	150pf UM	(2010280)
C17	150pf UM	(2010280)
C18	150pf UM	(2010280)
C19	220pf SM	(2010300)
C20	68pf UM	(2010230)
*C20	22pf UM	(2010130)
*C21	47pf UM	(2010200)
C22	100pf UM	(2010240)
C23	47pf UM	(2010200)
*C23	68pf UM	(2010230)
C24	200pf UM	(2010290)
C25	200pf UM	(2010290)
C26	200pf UM	(2010290)
C27	150pf UM	(2010280)
C28	100pf UM	(2010240)
C29	100pf UM	(2010240)
C30	500pf UM	(2010320)
*C30	33pf UM	(2010170)
C31	.022	(2010430)
C32	150 MFD Tan	(2010560)
C33	.022	(2010430)
C34	500pf UM	(2010320)
C37	33pf UM	(2010170)

RESISTORS

R1	1K, ½W	(2020220)
R2	56K	(2020400)
R3	100K	(2020410)
R4	2.2K	(2020260)
R5	150	(2020130)
R6	1 Meg	(2020470)
R7	100, 1W	(2020110)
R9	3.3	(2020587)
R10	47 ohm, 5W	(2020584)
R11	Factory Selected	

SEMICONDUCTORS

Q1	MPS A13	(1020186)
Q2	MJE 170	(1020187)
Q3	2N6081	(1030070)
Q4	MRF 245	(1030009)
D1	IN34	(1010010)
D2	IN34	(1010010)
D3	V350	(1010090)
D4	V350	(1010090)

ADDITIONAL

L1	VK200	(2040090)
L2	12 turns #20 SP on R7	
L3	5 turns #16 SP ¼" ID	
L4	.15uH	(2030010)
L5	.15uH	(2030010)
FB1	Ferrite bead	(3050220)
FB2	Ferrite bead	(3050220)
K1	DPDT relay	(3020030)
F1	20 amp fuse	(3040070)

*PARTS USED ON BLC 10/70 ONLY