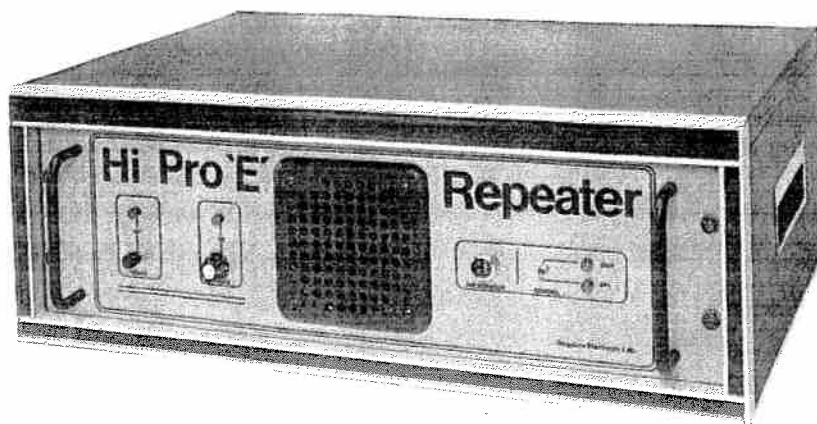


MAGGIORE ELECTRONIC LABORATORY

Hi Pro OPERATING AND MAINTENANCE MANUAL



Hi Pro "E" Repeater

610-384-7555

DESCRIPTION

The **Hi Pro "E"** is an extremely rugged completely solid state repeater designed for continuous operation.

State of the art devices are engineered into tight knit straightforward electronic design throughout both transmitter and receiver. Reliable, low current demand, compactness, unexcelled performance and ease of operation are the net result.

The dual conversion receiver with its FET front end and extremely high-Q circuits boast low noise and sensitivity of better than 0.2 uv or less. Signal gain of 90 db or more is accomplished from the IF amplifier along with a very low noise floor. Regulated oscillators, amplifiers and squelch circuits produce unmatched stability. Audio reproduction is of an unusually high order of distortion free clarity. Advanced squelch prevents chopping most prevalent in other repeater systems. The overall result is a receiver well suited for harsh RF environment.

The transmitter section produces a very clean, stable signal, designed for continuous operation. A well regulated crystal oscillator and audio amplifier is employed for initial frequency stability along with well selected components insure a high degree of stability. High-Q RF shielded stages provide minimum interstage spurious reaction and maximum isolation. A low pass filter is placed at the output to further insure undesirable frequency products not being emitted. The excellent audio characteristics from the receiver are carried over to the transmitter and passed on and rebroadcast to the antenna.

The **Hi Pro "E"** is constructed in a series of modules which are easily removable for servicing. The design lends it self to easy expansion and addition after purchase. Placement of components was carefully selected to insure cool operation and efficient operation.

A modern style, small size and low profile compliment the whole repeater system.

SECTION 1 INSTALLATION

- 1.1 Unpacking.
Carefully remove your Repeater from the packing carton and examine it for signs of shipping damage. Should any shipping damage be apparent, notify the delivering carrier immediately, stating the full extent of the damage. It is recommended you keep the shipping carton in the event storage, moving, or reshipment becomes necessary.
- 1.2 Location.
Placement of the Repeater is not very critical and should be governed by convenience and accessibility. Since the unit is so compact, many possibilities present themselves. BE SURE TO PROVIDE PLENTY OF VENTILATION BOTH ABOVE AND BELOW THE REPEATER. A FAN MOUNTED IN THE REAR OF THE REPEATER WITH AIR FLOW DIRECTED TOWARD THE HEAT SINKS WOULD BE ADVANTAGEOUS, BUT NOT NECESSARY IF TEMPERATURES REMAIN BELOW 100° FARENHEIT.
- 1.3 Power Requirements.
The Standard Repeater is supplied ready to operate from any 110v AC 60cy source. A 12 volt negative ground, battery backup system may also be used. The "E" is also available less AC power supply and can be used with an external power source. Some precautions must be taken however to the condition of the electrical system. Items such as low battery, poor voltage regulation, etc., will impair operation of your repeater system.

- 1.3 High noise generation or low power output and hum can usually be traced to a power source deficiency. Low voltage while under load will not produce satisfactory results from your Repeater system and performance will be greatly impaired.

CAUTION: Excessive voltage (above 130 / 240v AC - 15v DC) will cause damage to your repeater. Be sure to check the source voltage before connecting any power to your repeater. Do not defeat ground pin on the power cord. Always Use A Grounded Outlet.

- 1.4 Antenna.
The most important single item that will influence the performance of any communication system is the antenna. For that reason, a good high quality gain antenna of 50 ohms impedance is recommended. The antenna should be free from mechanical joints and clamps to reduce the possibility of poor connections generating noise in the system. When adjusting your antenna, by all means, follow the manufacturer's instructions. There are some pitfalls to avoid. For example, do not attempt to adjust an antenna for lowest VSWR with the repeater transmitter. NEVER try any adjustments while connected to the duplexer. Rather use a low power transmitter and an in line watt meter similar to the Bird 43 with the proper connections and slug. Use hardline or double shielded cable and avoid long runs. Avoid using adapters to match cables and connectors on the Repeater, antenna or duplexers.

SECTION 2 OPERATION

- 2.1 Initial Preparations.
- Connect the antennas or duplexer cables to the Repeater coaxial connectors. Make sure the coax are the right impedance of 50 ohms and that neither is shorted or open circuited.
 - Make sure the function switch is in the simplex position. This prevents the transmitter from being in the repeat mode.
 - If an auto patch is to be used then connect the phone line at this time.
 - Connect to a proper power source.
- 2.2 Operation.
Turn on the power by pushing the pushbutton on the front panel. The LED above the switch will light. When the function switch is set to simplex position, the repeat mode is disabled. Keying the optional local microphone will be the only way to operate the transmitter. When the switch is placed in the repeat mode the transmitter will operate in the normal repeat mode.
- 2.3 Reception.
- Adjust the volume control on front panel to a comfortable listening level. This control will not effect the repeat audio level. DO NOT adjust the master volume control on the rear panel as this will upset all repeat and auto patch audio levels.
 - The squelch control on the rear panel has been set at the factory and should not require any further adjustment.
- 2.4 Transmitting.
- The transmitter power output has been set at the factory and should not be increased. Little benefit would be realized and the increase in power may result in premature failure of the power amplifier.
 - In the event that you may want to decrease the output of the power amplifier, a control on the exciter board has been provided. The maximum decrease in power should not exceed one third of maximum power output. This will insure maximum stability of the amplifier.

SECTION 3 MAINTENANCE.

- 3.1 The necessity of completely realigning the repeater is unlikely. The most common cause of breakdown is component failure due to lightning strikes. It is felt that the average owner would not have the necessary equipment or facilities to accomplish realignment in any case. If in the event it is necessary we do provide pertinent instruction to realignment.

Great care and precision are employed in its manufacture and warranty service is provided to insure that it meets specifications. Adjustments not outlined herein should not be undertaken unless the owner is skilled as a technician.

3.2 Transmitter Crystal Alignment.

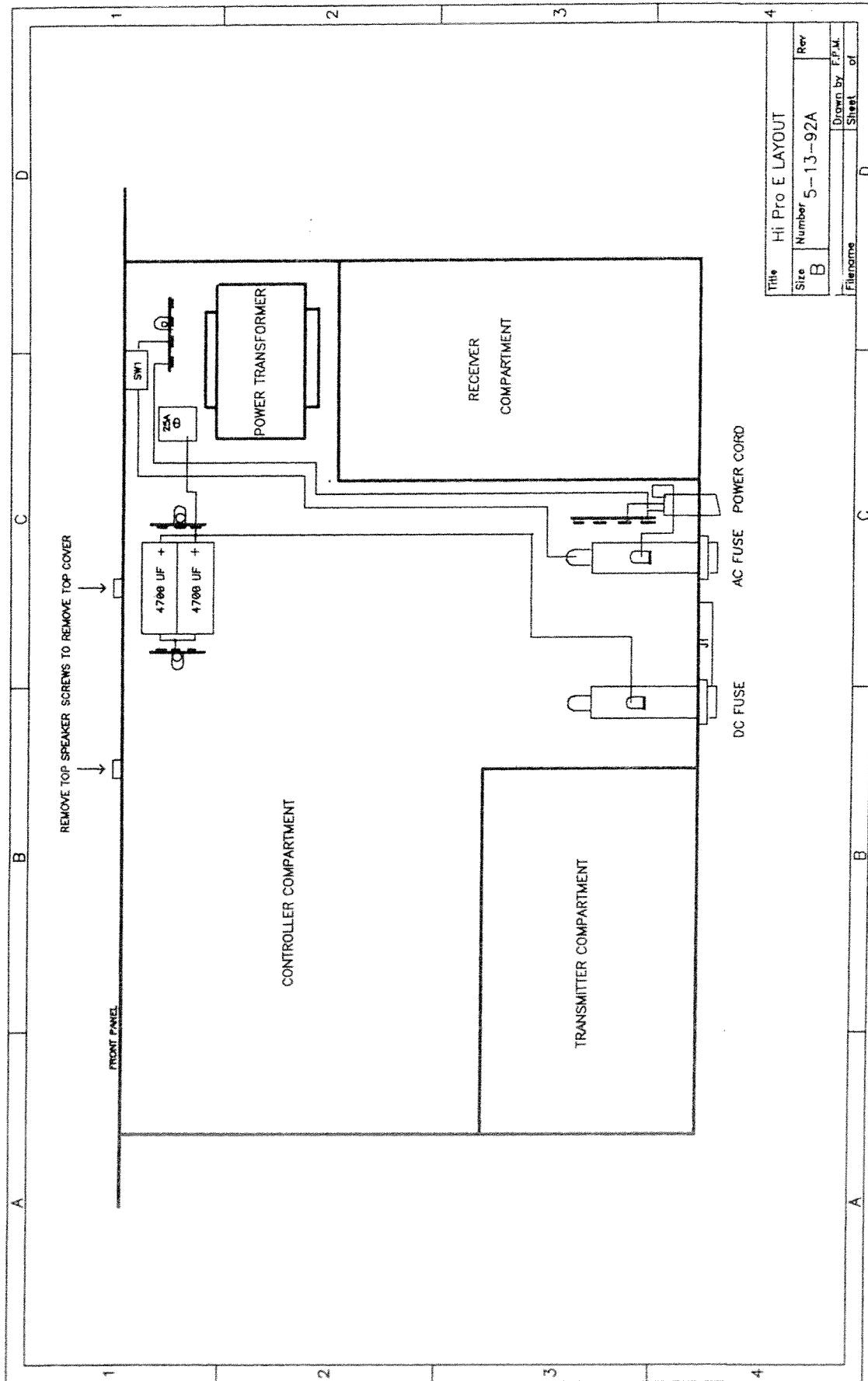
- a. Connect a 50 ohm dummy load to the transmitter output of the repeater.
- b. Key the repeater transmitter and slowly adjust the trimmer capacitor located next to the transmitter crystal, until the desired frequency is achieved. Do not attempt to do this without a proper high quality frequency monitor.

3.3 Receiver Crystal Alignment.

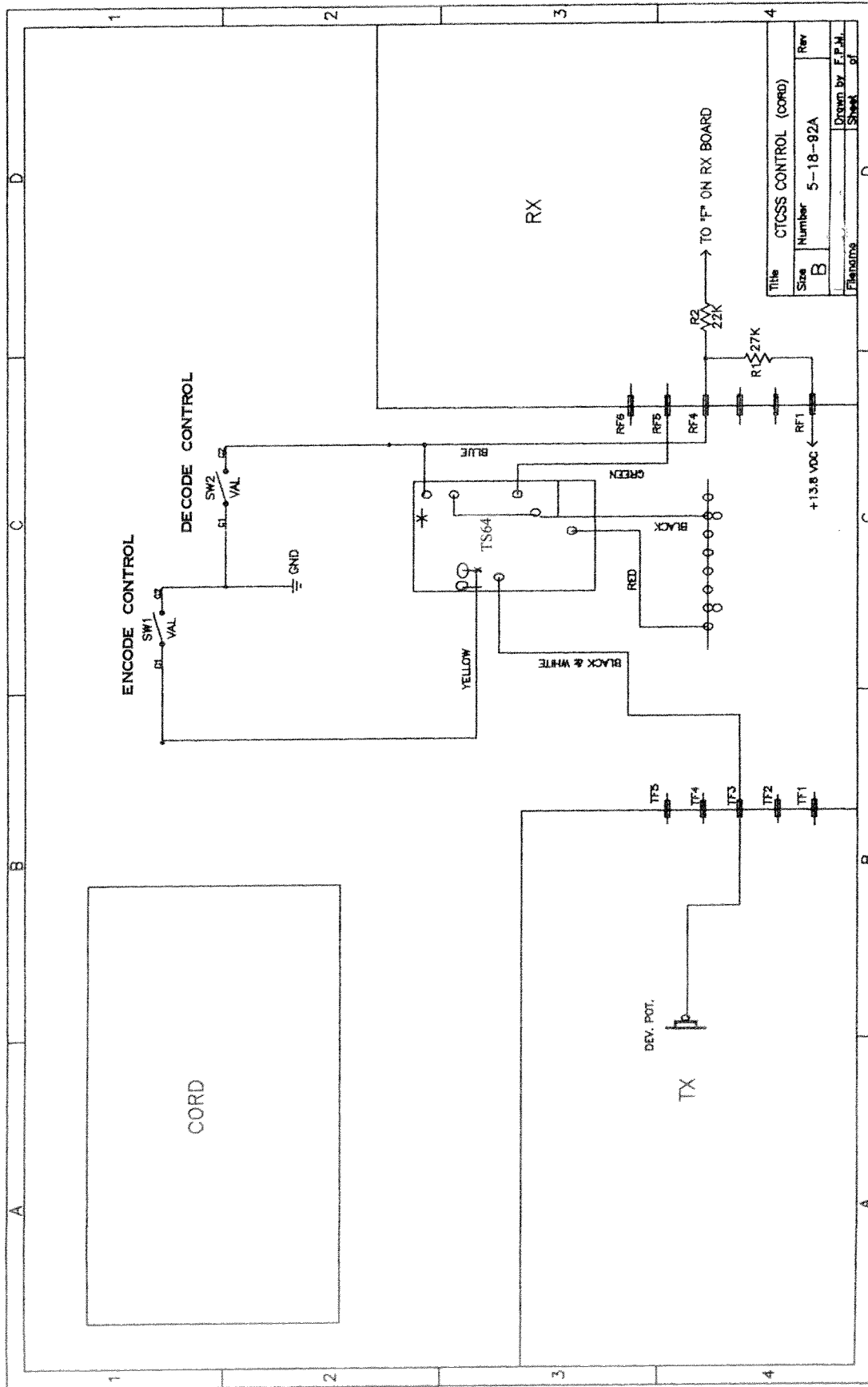
- a. Place Repeater in simplex mode.
- b. Connect test oscillator to the receiver coaxial connector and set to the proper receiver frequency.
- c. Slowly adjust the trimmer capacitor located next to the receiver crystal, until the desired frequency is achieved.

SAFETY INSTRUCTIONS

1. READ ALL THE INSTRUCTIONS BEFORE OPERATING THE EQUIPMENT.
2. RETAIN ALL INSTRUCTIONS AFTER READING FOR FUTURE REFERENCE.
3. HEED WARNINGS IN THE OPERATING INSTRUCTIONS.
4. DO NOT PLACE EQUIPMENT NEAR OR IN WATER OR MOISTURE OR CLOSE TO CONTAINERS THAT MAY SPLASH ONTO THE EQUIPMENT.
5. REPEATER SHOULD NOT BE PLACED ON OR NEAR ANY HOT EQUIPMENT.
6. ONLY USE POWER SOURCES RECOMMENDED BY THE MANUFACTURER.
7. POWER CORDS SHOULD BE ROUTED SO THAT THEY ARE NOT LIKELY TO BE CRUSHED OR PINCHED BY ITEMS PLACED UPON OR AGAINST THEM. PAY PARTICULAR ATTENTION TO CORDS AND THERE CONDITION AND KEEP AWAY FROM HEAT AND FLAME.
8. CARE SHOULD BE TAKEN TO PREVENT OBJECTS AND LIQUIDS FROM FALLING OR SPILLING INTO THE ENCLOSURE.
9. DAMAGE REQUIRING SERVICE.
 - A. THE POWER SUPPLY OR PROTECTION CIRCUITS ARE DAMAGED.
 - B. LIQUIDS OR OBJECTS ENTERING THE CABINET.
 - C. EQUIPMENT DOES NOT APPEAR TO OPERATE NORMALLY OR EXHIBITS MARKED CHANGE IN PERFORMANCE.
 - D. THE ENCLOSURE HAS BEEN DAMAGED.
10. THE USER SHOULD NOT ATTEMPT TO SERVICE THE EQUIPMENT. REFER ALL REPAIRS TO A QUALIFIED TECHNICIAN.

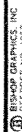


Title Hi Pro E LAYOUT			
Size B	Number 5-13-92A	Rev	
Filename		Drawn by F.P.M.	Sheet of

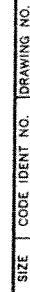


Maggiore Electronic Lab.

VAC
POWER CORD



Maggiore Electronic Lab.



SHEET 001

BISHOP GRAPHICS, INC.
DESIGN & PRINTING

Hi Pro

Maggiore Electronic Lab.

TS1	1	Tx Audio	160	32	TS7	30	TS8	30
	3	I.D. L.E.D. RED/BLACK	150	31		20		20
	4	+13.8 VDC Supply	140	30		10		10
	5	Keyed +13.8 V RED/WHITE	130	29			TS9	1 2 3 4 5
	6	Time-Out L.E.D WHITE/GREEN	120	28				
	8	Aux. #2 INPUT WHITE	110	27	J1A			
	9	Aux. #1 INPUT BROWN	100	26	1	BLACK Ground		
	11	Aux. #2 Out GREEN/BLACK	90	25	2	Aux. #1 out YELLOW		
	12	C.O.S BLUE	80	24	3	Aux. #2 out GREEN/BLACK		
	13	Aux. #1 Out YELLOW	70	23	4	Aux. #3 out ORANGE/BLACK		
	14	Local (mic) P.T.T. PURPLE	60	22	5	Aux. #4 out WHITE/BLACK		
	16	C.O.S. Switched BLUE	50	21	6	+13.8 VDC RED		
	17	Rx Audio GREY/WHITE	40	20	7	Aux. #5 out WHITE/PURPLE		
TS2	20	P.L. Active BLUE/YELLOW	30	19	8	Rx Signal Level YELLOW/BROWN		
	21	Tx P.L. On BLACK/WHITE	20	18	9	Aux. Rx C.O.S. WHITE/BLUE		
	22	Tel. Line Ring GREEN	10	17	10	I.D. L.E.D. RED/BLACK		
	24	Tel. Line Tip GREEN/WHITE			11	Aux. #6 out YELLOW/RED		
	25	Rx Active L.E.D. WHITE/RED			13	Rx Active L.E.D. WHITE/RED		
	27	Aux. C.O.S. WHITE/BLUE			14	Tx P.L. on BLACK/WHITE		
	28	Aux. #6 YELLOW/RED			15	Discriminator WHITE/ORANGE		
	29	Aux. #5 WHITE/PURPLE			16	Keyed +13.8 VDC RED/WHITE		
	30	Aux. #4 WHITE/BLACK			17	Time out L.E.D. WHITE/GREEN		
	32	Aux. #3 ORANGE/BLACK			19	Rx Audio GREY/WHITE		
TS3	1	WHITE/BROWN/ORANGE			20	Tx Audio GREY		
	3	ORANGE			21	Aux. #1 IN BROWN		
					22	Aux. #2 IN WHITE		
TS4	1	13.8 VDC SUPPLY RED			23	Local (mic) P.T.T. PURPLE		
	2	Ground			24	Aux. Rx C.O.S. BLUE/WHITE		
	3	Aux. Audio in, GREY/BLACK			25	Aux. Audio in GREY/BLACK		
	4	Reset BROWN/WHITE			26	Rx C.O.S. BLUE		
	6	Aux. C.O.S. WHITE/BROWN			27	Tel Line Tip GREEN		
	8	Aux. RX C.O.S. WHITE/BLUE			28	Tel Line Ring GREEN/WHITE		
					29	Aux. C.O.S. WHITE/BROWN		
					30	P.L. Active BLUE/YELLOW		
					31	Reset BROWN/WHITE		
					32	Aux. Rx P.L. WHITE/BROWN/ORANGE		

J1A

TS6

SIZE	CODE IDENT NO.	DRAWING NO.
	Hi Pro E	9C0190
SCALE	V3603	SHEET 003

BRAND GRAPHICS, INC.
BOSTON, MA 02117

Hi Pro

Maggiore Electronic Lab.

HI PRO E
Standard Power Supply
Has Transformer With
Four Terminal
Connections Only,
117 VAC Shown on
Sheet 002 on the
Left Side.

TS9 2 } WHITE
4 } BLACK
GREY

TS5 2
3 GROUND

4 +13.8 VDC From Reg. RED
5 +24 VDC Unreg. RED

TS6 1 WHITE Wire From Power Cord
and WHITE/BLACK/GREY
3 Ground GREEN

TS7 1 } Ground
2 }

TS8 1 +13.8 VDC RED
2 Ground BLACK
3 RED/BLACK

TS9 117 VAC or 220 VAC
1 YELLOW
2 RED and ORANGE
3 Ground
4 BROWN

T5 Tx Audio GREY
T4 Mic Audio Shielded
T3 Tx Pwr. Level BLACK/WHITE
T2 Keyed +13.8 VDC RED/WHITE
T1 +13.8 VDC Supply RED

TRANSMITTER

J2A

TS5 1 2 3 4 5
TS6 4 3 2 1

TS7 3 2 1

TS8 3 2 1

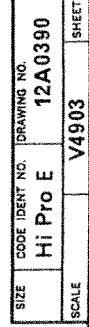
TS9 1 2 3 4 5

RECEIVER

R6 0
R5 0
R4 0
R3 0
R2 0
R1 0

R1 +13.8 VDC SUPPLY RED
R2 Rx Audio GREY/WHITE
R3 P.L. Control
R4 C.O.S. WHITE/BLUE
R5 Discriminator WHITE/ORANGE
R6 Signal Level YELLOW/BROWN

SIZE	CODE	IDENT NO.	DRAWING NO.
	HiProE	9DI190	
SCALE	V3817		
	SHEET 004		



Hi Pro

Maggiore Electronic Lab.

CONNECTIONS FOR EXT. CONTROLLER

ARCOM R2210

RLC 2

To pin 4 on DB9

Tx Audio Grey

Aux.

Aux.

To pin 3 on DB9

P.T.T. Purple

Aux.

Aux.

To pin 7 on DB9

Rx C.O.S. Blue

Aux.

Aux.

Aux.

Aux.

Aux.

To pin 2 on DB9

Rx PL White/Brown/Orange

No Connection

No Connection

No Connection

No Connection

No Connection

NOTE: J1 SHOWN FROM WIRING SIDE.

20	1
21	2
22	3
23	4
24	5
25	6
26	7
27	8
28	9
29	10
30	11
31	12
32	13
33	14
34	15
35	16
36	17
37	18
	19

Black Ground To pin 9 on DB9

Aux.

Aux.

Aux.

Aux.

Red 13.8 VDC

Aux.

Yellow/Brown Rx Signal Level

Aux.

Aux.

Aux.

No Connection

Aux.

Aux.

White/Orange Discriminator

Red/White 13.8 VDC Keyed

Aux.

No Connection

Grey/White Rx Audio To pin 5 on DB9

SIZE	CODE IDENT NO.	DRAWING NO.
	HI Pro E	9E1790
SCALE	V3712	SHEET 005

CONNECTIONS FOR EXT. CONTROLLER

Maggiore Electronic Laboratory

ADDENDUM

Battery Backup

J1 (Pin #37 connector on rear of repeater).

Pin #36 and Pin #37 positive trickle charge to battery.

Pin #34 & Pin #35 negative side of battery.

Red and black cable coming out of repeater is dc to battery. A relay must be put between these two to switch from charge to backup.