

Price: \$5.00

INSTRUCTION MANUAL

AEA Morse-Baudot-ASCII Reader/Code Converter

Model MBA-RC

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AEA Morse-Baudot-ASCII Reader/Code Converter

Model MBA-RC

Congratulations on your decision to purchase the AEA Morse-Baudot-ASCII Reader/Code Converter. This equipment is extremely versatile and will provide many hours of enjoyment to you.

The MBA-RC has two primary functions. It will read Morse code, Baudot and ASCII RTTY (Radio Teletype). It will also allow you to transmit Morse, Baudot or ASCII via hand key, electronic keyer, or a keyboard.

There are a number of secondary functions available. You may transmit cross mode. For example, if you have only CW capability you can still work a RTTY station either via Baudot or ASCII.

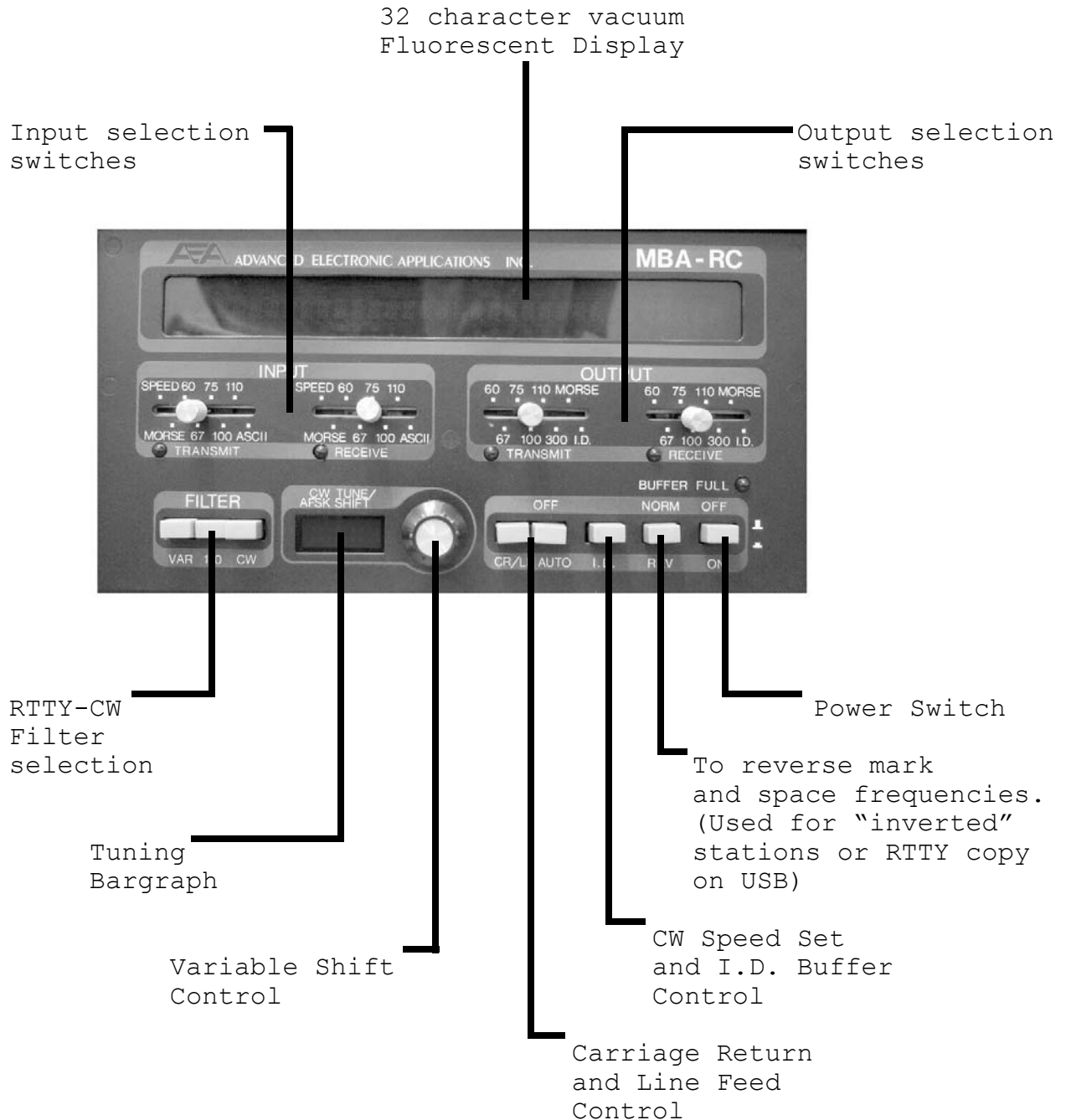
The MBA-RC provides a visual monitor for your message transmissions as well as visual copy of stations received on a communications receiver.

The unit is compact and easily assimilated into an average amateur station. It requires only 13 VDC at approximately 1.5 Amps for operation, making it ideal for both fixed and portable two-way RTTY operation.

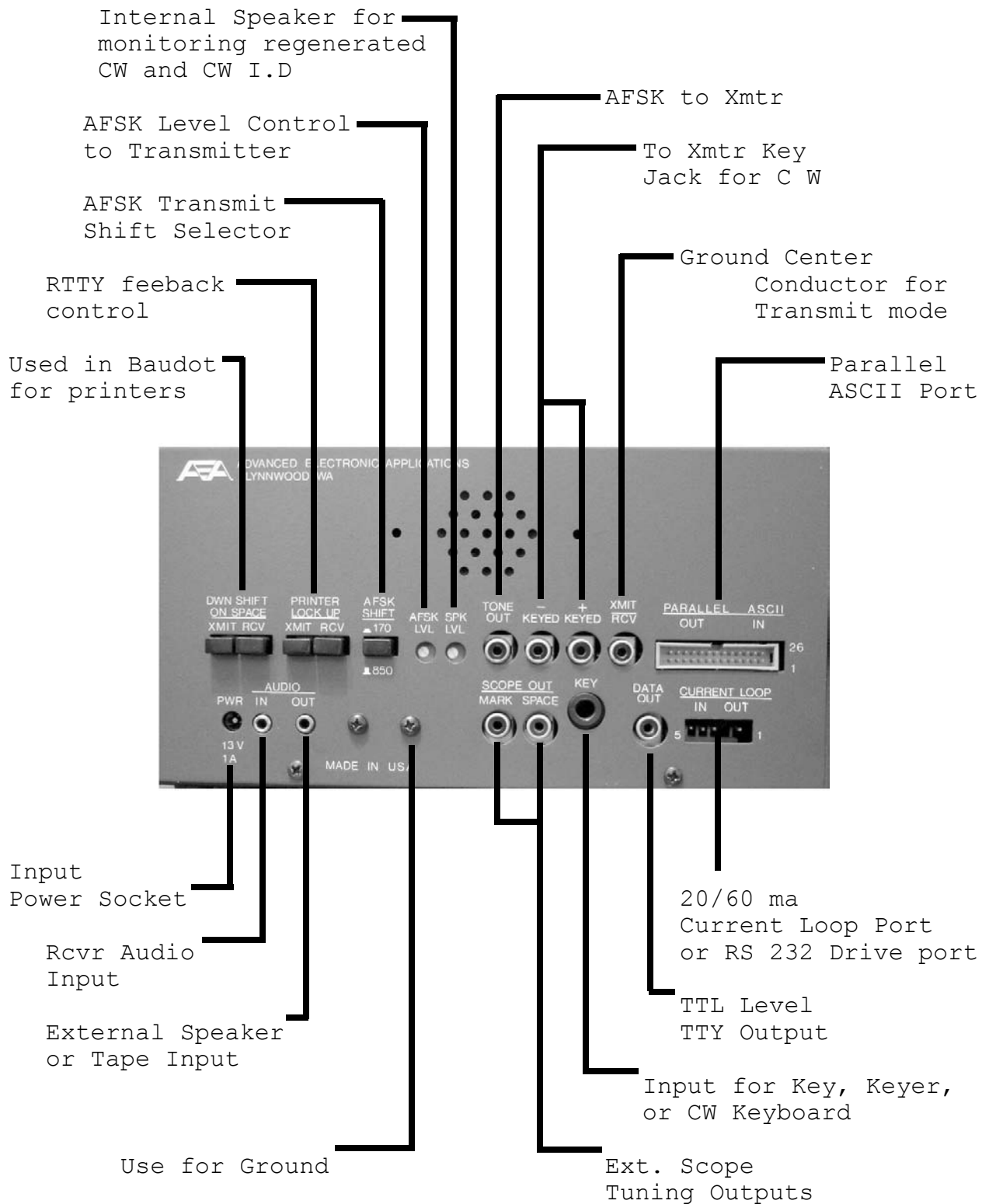
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FRONT PANEL DESCRIPTION



REAR PANEL DESCRIPTION



Hook Up Instructions (Rear Panel Connectors)

POWER

The MBA-RC requires a 13 ± 3 VDC, well filtered power source capable of supplying 1.2 amperes. The power connector is a 2.1 mm center pin coaxial type, the center pin is positive.

AUDIO

The audio IN-OUT jacks are 3.5 mm phone jacks and are paralleled in the MBA-RC. The IN (input) jack is used to provide receiver audio, CW or RTTY signals to the MBA-RC. Receiver audio can be taken from the headphone jack or by tapping the speaker leads. The audio OUT (output) jack is provided for an external speaker or tape recorder.

KEY

The key input is a contact closure input for CW. A standard two conductor $\frac{1}{4}$ " plug is used. It may be connected to a hand key, keyer POSITIVE keyed output, or keyboard output.

SCOPE OUT

The mark and space filters output are provided at these connectors for tuning RTTY signals with the aid of an X-Y scope.

KEYED + AND -

The + and - keyed outputs are for CW keying of the transmitter. The + keyed output is for use with transistor and cathode keying, and the - output is for use with transmitters using blocked grid keying.

DATA OUT

The Data Out jack is a TTL level teletype output and is active only in teletype modes. The output level is low during MARK.

CURRENT LOOP

The current loop input and output may be used with 20 or 60 mA teletype loops. Warning! The Teletype Current Loop Supply must be externally limited to 60 mA maximum. Optical couplers isolate the current loop input and output from the rest of the MBA-RC electronics.

PARALLEL ASCII

The parallel ASCII input and output are provided on the right and left sides of the 26 pin parallel connector. The parallel output is Centronics compatible parallel and may be used with Centronics, Epson and other parallel input ASCII printers. The parallel input is seven bit ASCII, TTL Level, high true with a low true strobe.

TRANSMIT/RECEIVE

The XMIT/RCV input requires a contact closure during transmit to select the front panel transmit mode switches. This input provides automatic switching of the input and output modes when switching between transmit and receive if activated with an auxiliary set of contacts on your transmitter.

TONE OUT

The Tone Out connector is the AFSK tone output and is 2125 Hz Mark and 2295 Hz space on 170 Hz Shift, and 2125 Hz Mark and 2975 Hz Space on 850 Hz shift. This input may be connected to the microphone or phone patch input of your transmitter for RTTY operation. The AFSK Output Level of the AFSK tone is set with a screwdriver at the adjustment pot.

TRANSMISSION OF BAUDOT-RTTY

WARNING.....WARNING.....WARNING.....WARNING.....WARNING

During RTTY transmissions your transmitter operates in a key-down mode. Most amateur transmitters can be damaged by continuous operation at their normal CW input power levels. It will be necessary to reduce input power when using AFSK teletype to about 40% of the normal CW input power. Consult the Owner's Manual for the transmitter you are using.

AFSK SHIFT

The AFSK Shift push switch selects 170 Hz (In position) or 850 Hz (Out position) AFSK output.

SPEAKER LEVEL

Spk Lvl set adjustment pot for CW monitor tone level.

DOWNSHIFT ON SPACE

The two Down Shift on Space switches are used for Baudot teletype reception and transmission. With the Down Shift on Space-RCVR switch OUT, an automatic downshift is generated when a space character is received for reducing the amount of garbled print. To reduce transmission errors, it is recommended that you operate with the Down Shift on Space-Xmit switch in the IN position.

PRINTER LOCK UP

Printer Lock Up On Receive push button has two functions. When the MBA-RC is used with a current loop input, the switch in the OUT position prevents input to the MBA from the keyboard when in the receive mode. This allows local loop operation without 'feedback' through the input and output of the MBA-RC.

PRINTER LOCK UP ON XMIT

The Printer Lock Up On Xmit push switch, when in the OUT position, prevents operation of the printer by the MBA-RC when transmitting. These two lock up functions are particularly useful during mode conversion operation, e.g., Baudot transmit and receive while using an ASCII teletype machine.

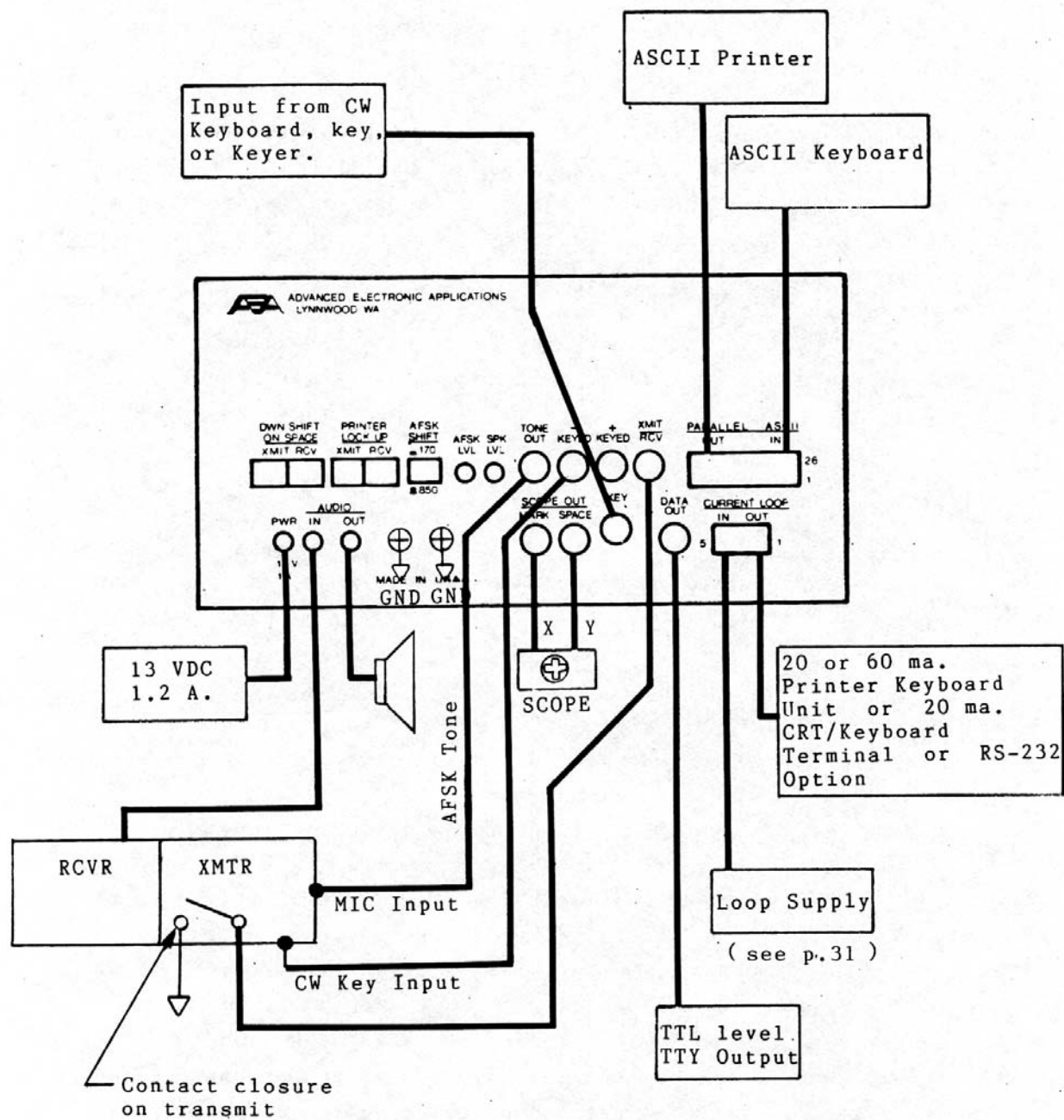
REAR PANEL CONNECTOR GUIDE

REAR PANEL CONNECTIONS	2.1 mm COAXIAL	3.5 mm	RCA	1/4" STANDARD 2 CONDUCTOR	CURRENT LOOP 3 PIN CONNECTOR	PARALLEL ASCII IN/OUT PLUG
POWER PLUG	X					
AUDIO IN		X				
AUDIO OUT		X				
SCOPE MRK SPACE			X			
KEY				X		
DATA OUT		X				
CURRENT LOOP					X	
Parallel ASCII						X
XMIT/RCV		X				
- KEYED		X				
+ KEYED		X				
TONE OUT		X				

WARNING:

All interconnecting cables should be shielded and the equipment properly grounded, use one of the two screws on the rear panel (see Rear Panel Description, page 2). Extra care in this regard will payoff in proper performance of your equipment. If you have questions about grounding procedures please refer to the Amateur Radio Handbook published by ARRL.

REAR PANEL CONNECTIONS
BLOCK DIAGRAM



FRONT PANEL CONTROLS

The front panel controls may seem somewhat confusing because of the tremendous flexibility of the MBA-RC. Therefore it is extremely important that you read and understand this section thoroughly.

Immediately beneath the display there are two switching areas marked Input on the left and Output on the right. This needs explanation since the two switches under each refer to transmit and receive. The Input refers to inputs to the MBA-RC and Output refers to outputs from the MBA-RC.

There are basically three ways you can transmit using the MBA-RC, CW using a hand key or paddle via a keyer, Baudot or ASCII TTY using a keyboard, or TTY machine. Input is usually from two sources:

1. The station you hear via your receiver.
2. Your key/keyer, keyboard, TTY machine or terminal.

For input from the receiver, the slide switch will be set on the Receive side for the mode and speed being received. For input from your key/keyer, keyboard, etc. you will set the input transmit switch to the proper speed and mode desired.

Under the Output area there are again two switches, one for transmit and one for receive. In this case you will be setting the switches to do two things:

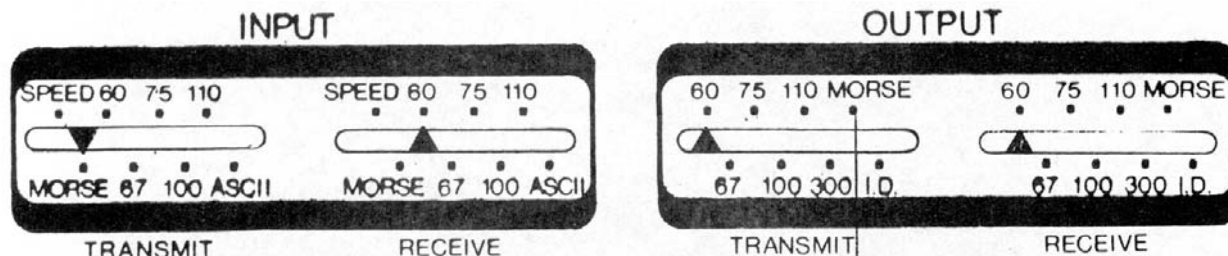
1. Set the MBA-RC to transmit a particular mode.
2. Set the receive switch at the Output mode and speed desired when receiving the other station. This is the switch used to select the proper output for generating printer hard copy of received signals.

If this is still confusing, some examples of the Input/Output transmit and receive switch settings are given for various modes of operation. These illustrations cover settings used in the Input and Output controls and controls on the rear panel.

ILLUSTRATION 1

CONDITION:

Your Station: Working Morse Code-using 32 character display
 Other Station: Working Baudot, 60 WPM



You are input-
 ting Morse to
 MBA-RC with key,
 keyer, or CW
 keyboard.

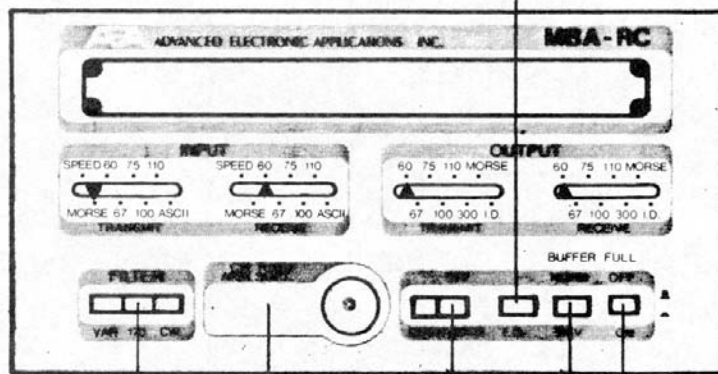
You are receiving
 Baudot at 60WPM
 On 32 character
 display.

The MBA-RC is out-
 putting Baudot at
 60WPM to your Xmtr.

This setting
 is for use to
 drive your own
 current loop
 printer.

NOTE: SEE PAGE 21 AND
 PROGRAM " DE _____ "
 (your call letters)
 INTO THE I.D. BUFFER.

Place transmit output
 switch in Morse and
 push ID button at end
 of transmission.



In

On

On

With your receiver
 tune for Max.
 closure with no
 flickering.

Norm (Tune
 Receiver into
 LSB position)

ILLUSTRATION 1 (con't.)

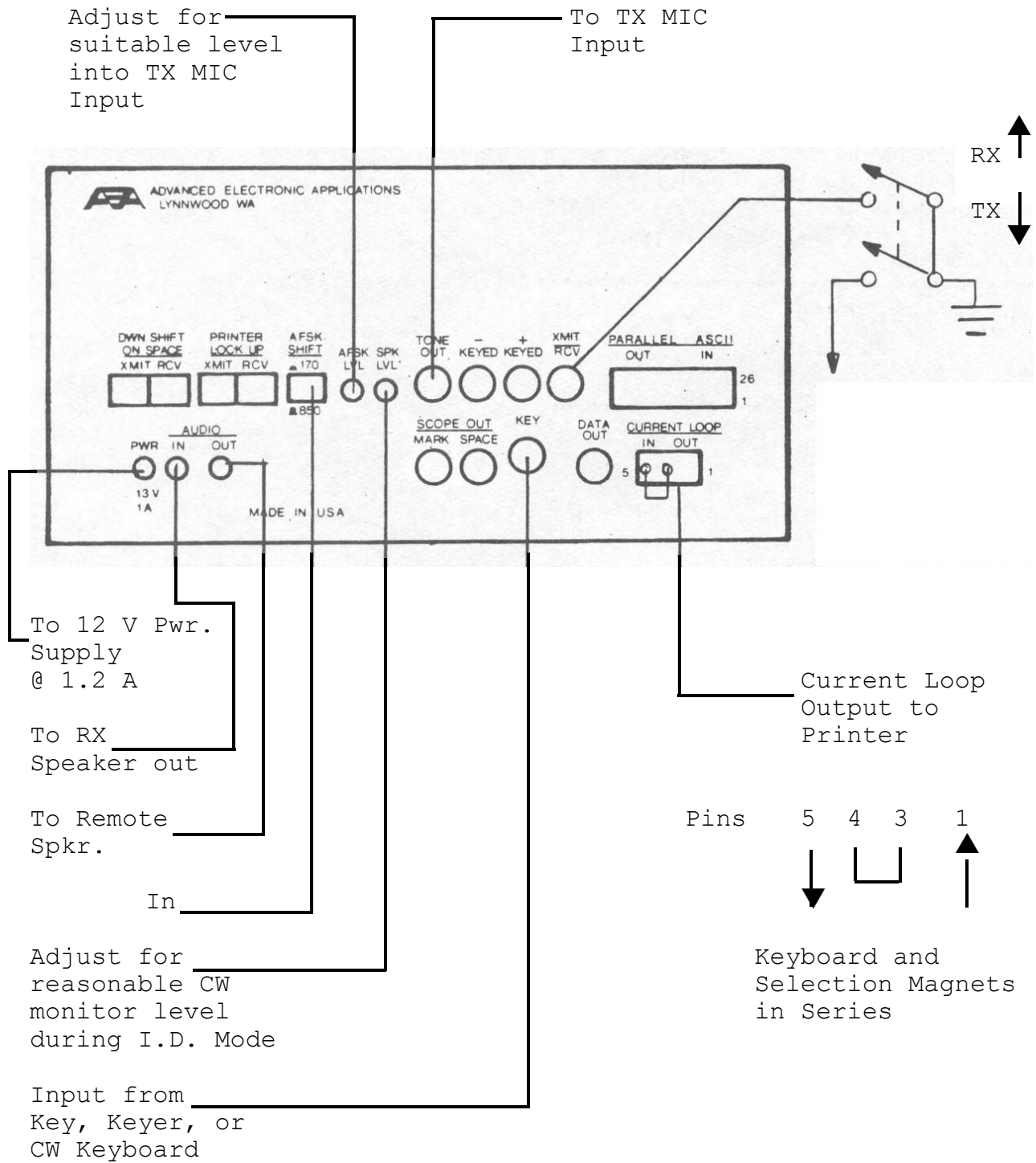


ILLUSTRATION 2

CONDITION:

Your Station: Working Baudot 60 WPM-using Model 15, 19, 26, etc.
 Other Station: Working ASCII 110 Baud.

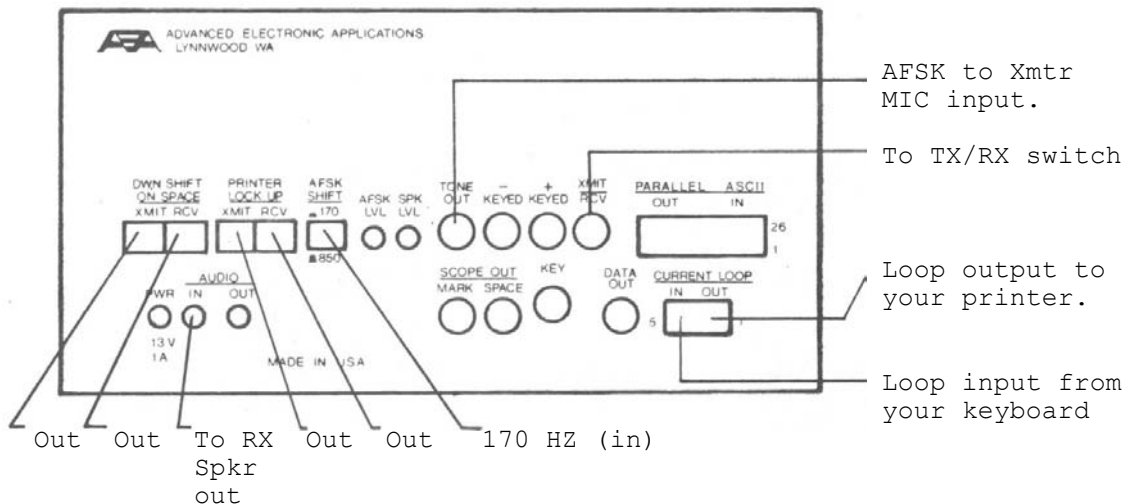
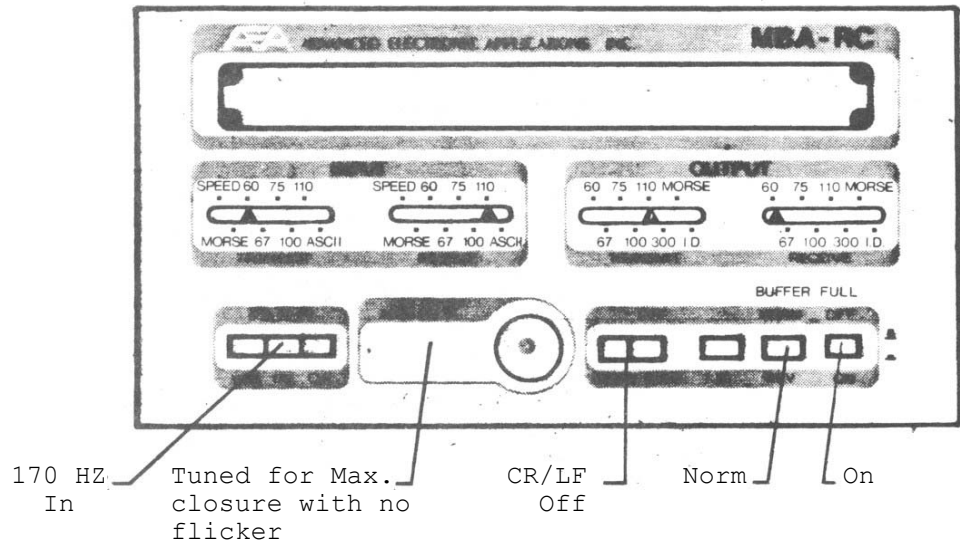
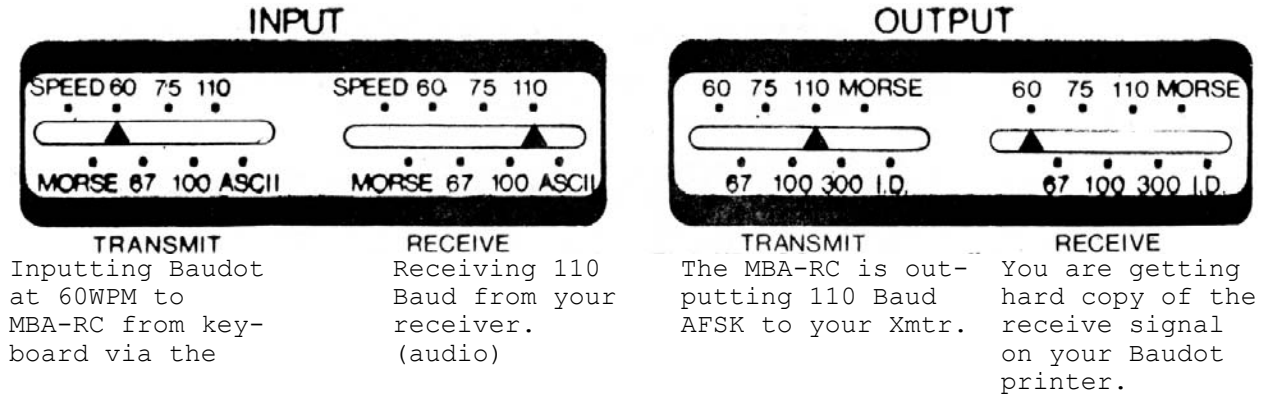


ILLUSTRATION 3

CONDITION:

Your Station: Working 110 Baud ASCII-using ASCII printer or CRT terminal.
 Other Station: Working Morse Code.

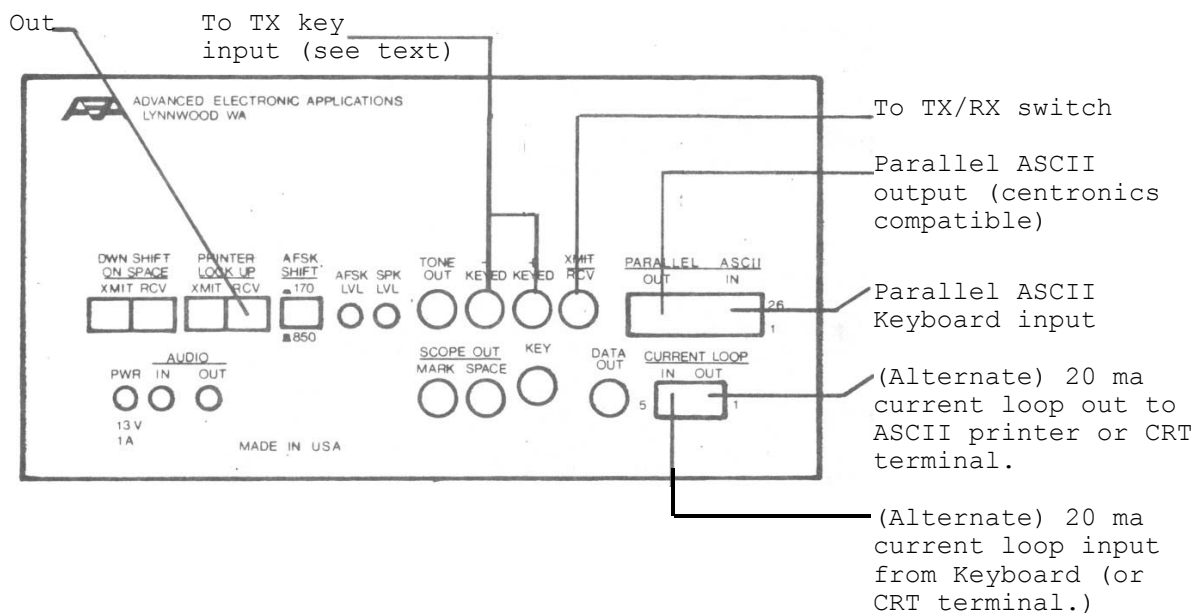
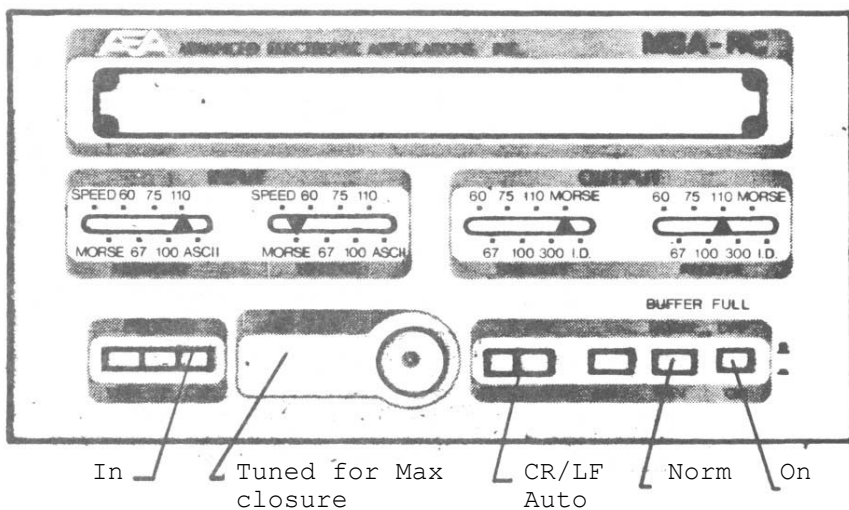
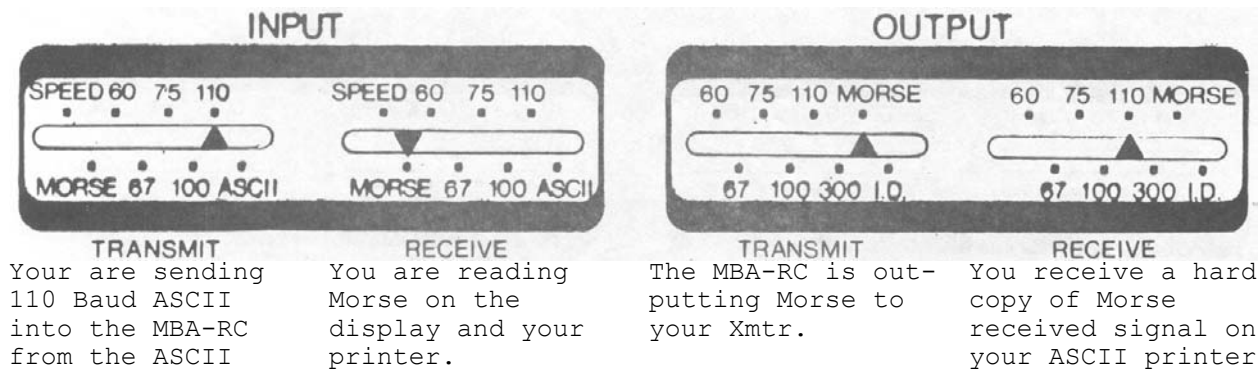
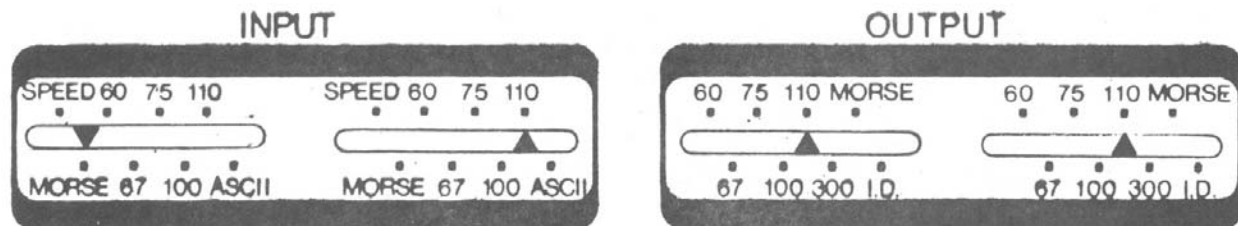


ILLUSTRATION 4

CONDITION:

Your Station: Working Morse Code-using 32 character display

Other Station: Working 110 Baud ASCII

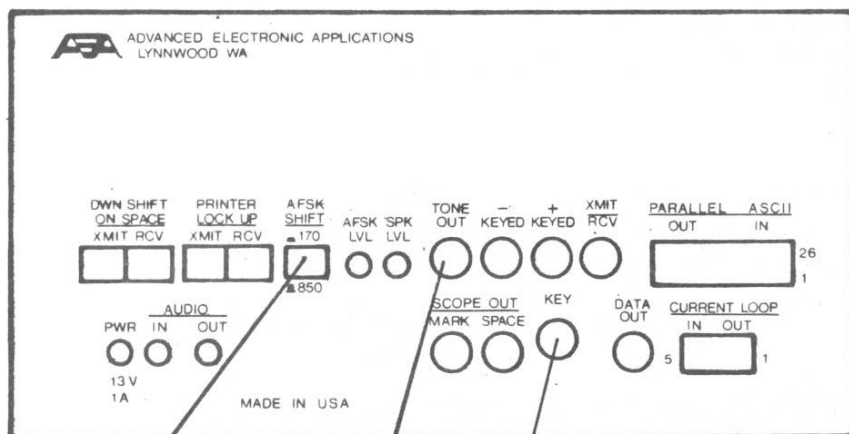
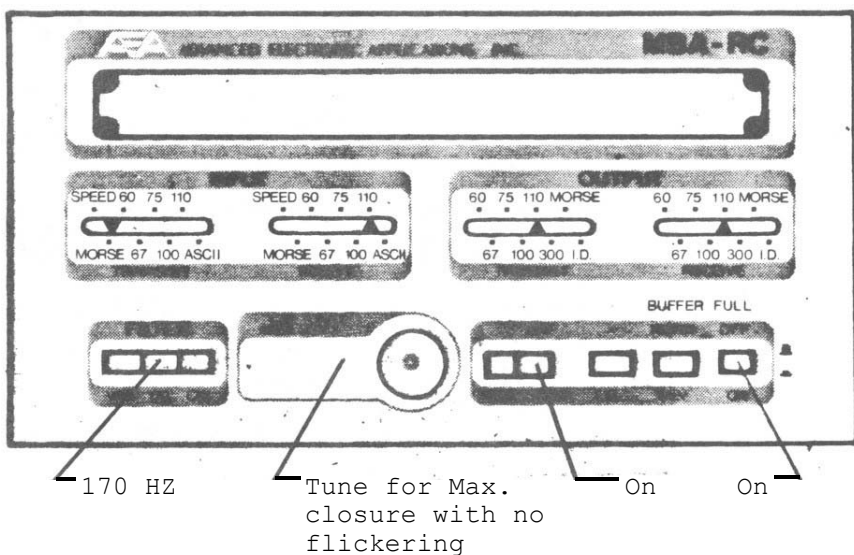


TRANSMIT
You are inputting Morse to the MBA-RC from a key, keyer or keyboard.

RECEIVE
You are reading 110 Baud ASCII on the 32 character display.

TRANSMIT
The MBA-RC is outputting 110 Baud ASCII, AFSK to your Xmtr.

RECEIVE
You are reading from display so use 110 Baud ASCII position so buffer will not overflow.

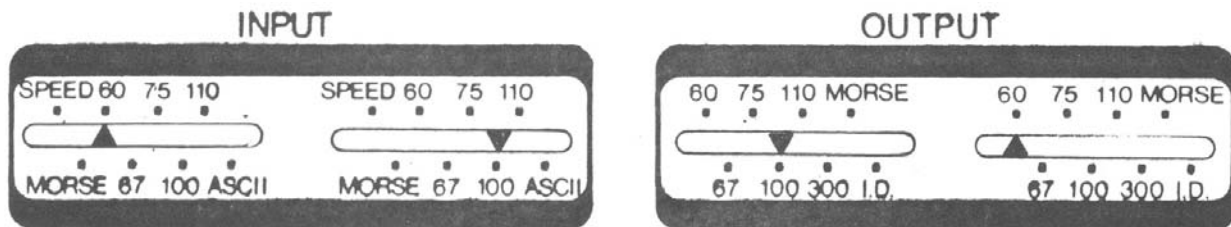


In — AFSK to Xmit MIC input — From key, keyer, or CW keyboard

ILLUSTRATION 5

CONDITION:

Your Station: Working Baudot 60 WPM- using current loop Baudot printer.
 Other Station: Working Baudot 100 WPM.

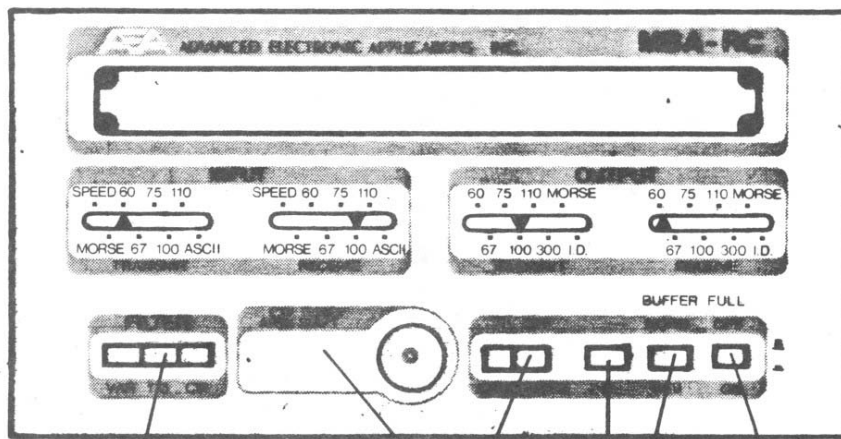


TRANSMIT
 You are out-putting 60WPM Baudot into the MBA-RC from a keyboard via the Loop Port Input.

RECEIVE
 You are receiving Baudot at 100 WPM

TRANSMIT
 The MBA-RC is out-putting Baudot at 100WPM, AFSK to your Xmtr.

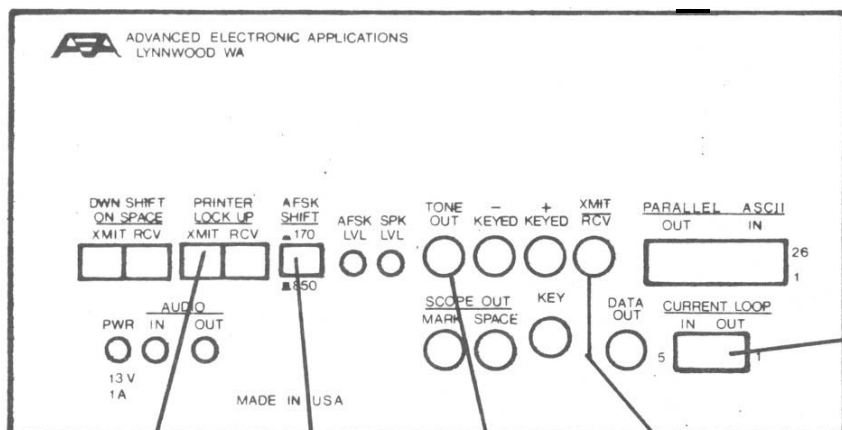
RECEIVE
 You are out-putting the received signal to your Baudot 60WPM printer via the current Loop Port.



170 HZ — Tune for Max closure with no flicker.

Off — Norm — On

For ID at end of Xmission (with Xmit output switch in Morse position)



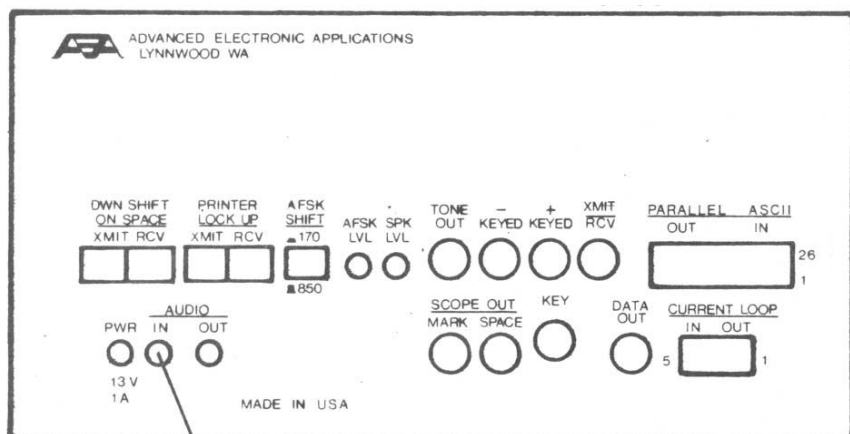
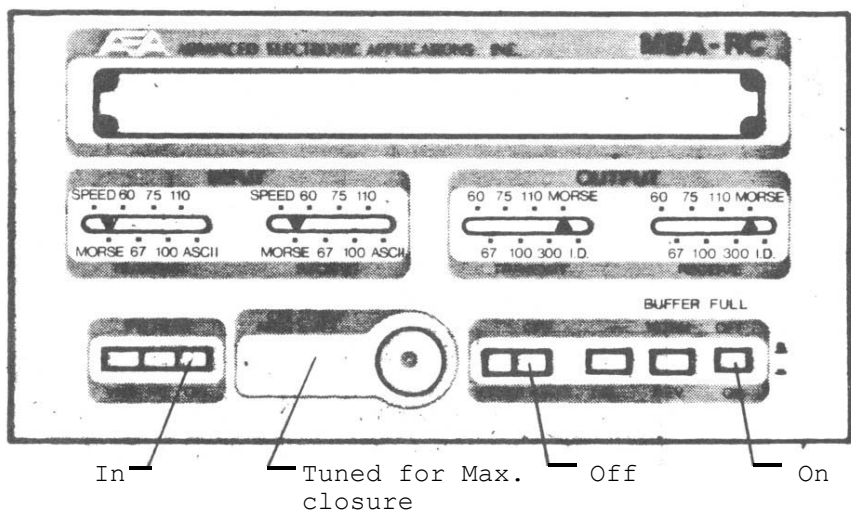
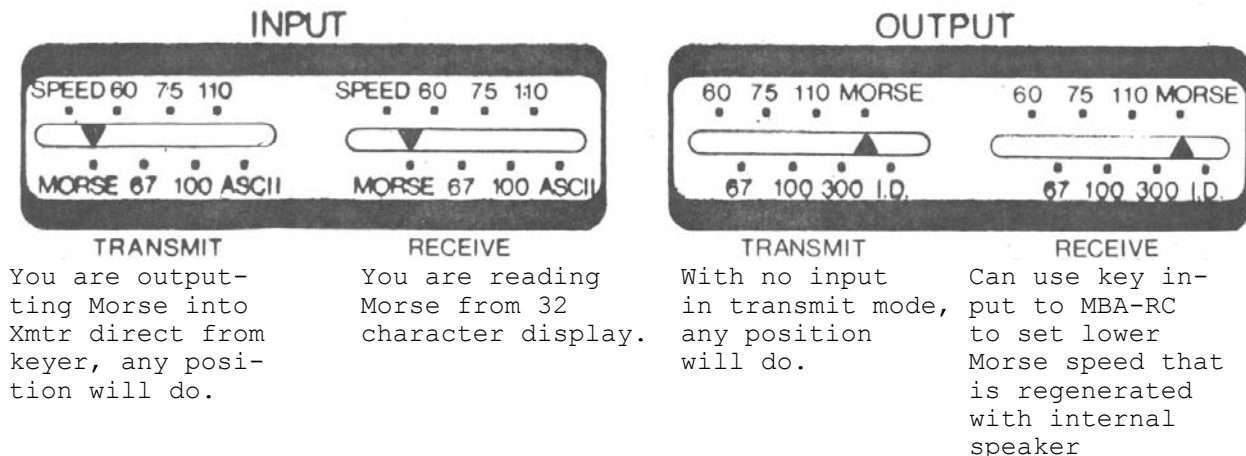
In — 170 Hz — AFSK to Xmit MIC input — To TX/RX switch input

Keyboard printer hookup.

ILLUSTRATION 6

CONDITION:

Your Station: Working Morse-using 32 character display.
 Other Station: Working Morse

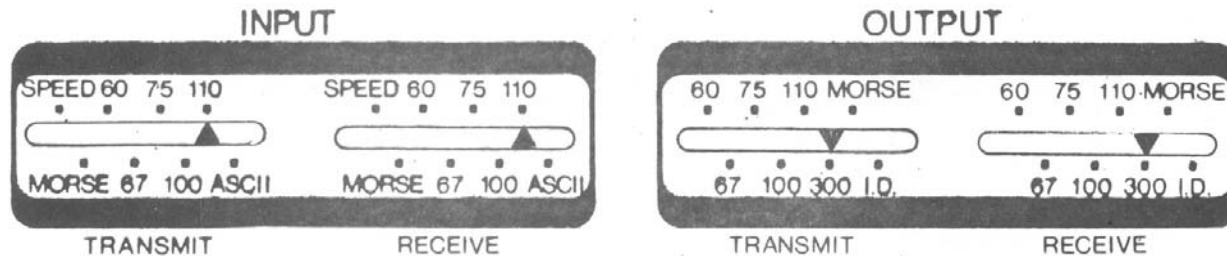


From RX speaker output

ILLUSTRATION 7

CONDITION:

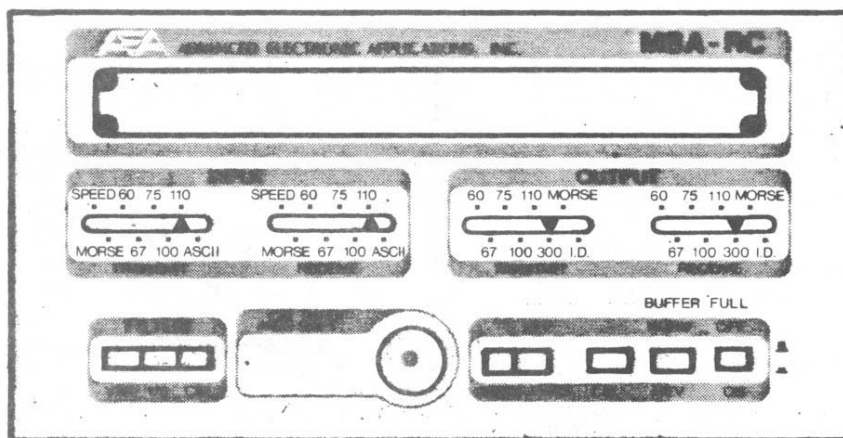
Your Station: Working 110 Baud ASCII- using 300 Baud ASCII printer.
 Other Station: Working 110 Baud ASCII.



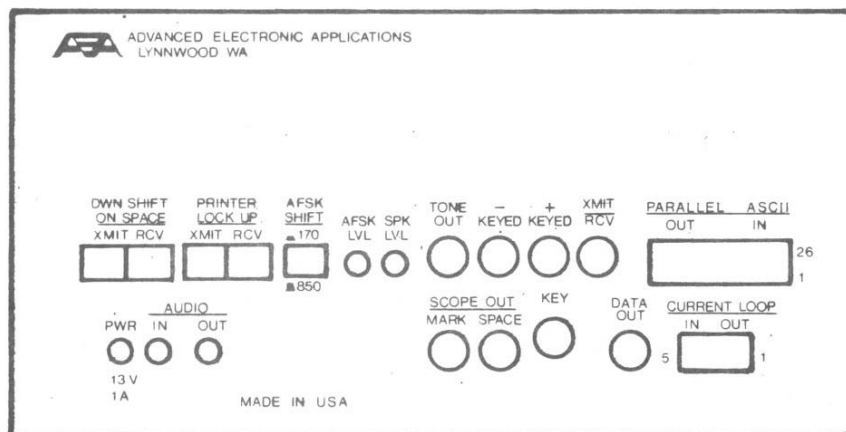
NOTE: You cannot input 300 Baud to MBA-RC.

You could work the other station if you set your ASCII keyboard to 110 Baud.

You can get hard copy of the received signal on a 300 Baud ASCII printer.



N.A.



N.A.

ILLUSTRATION 8

CONDITION:

Your Station: Working 60 WPM-using Teletype Machine

Other Station: Working Morse.

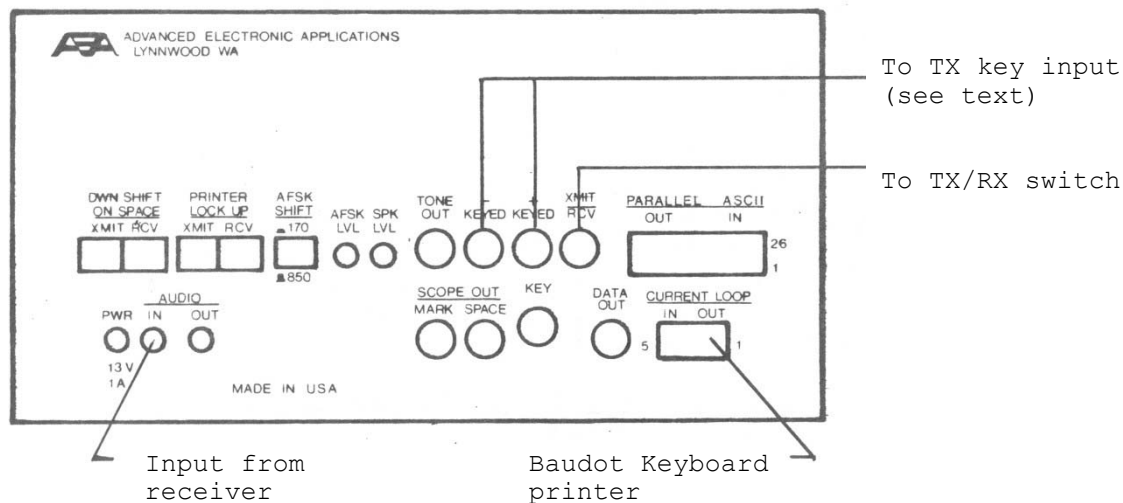
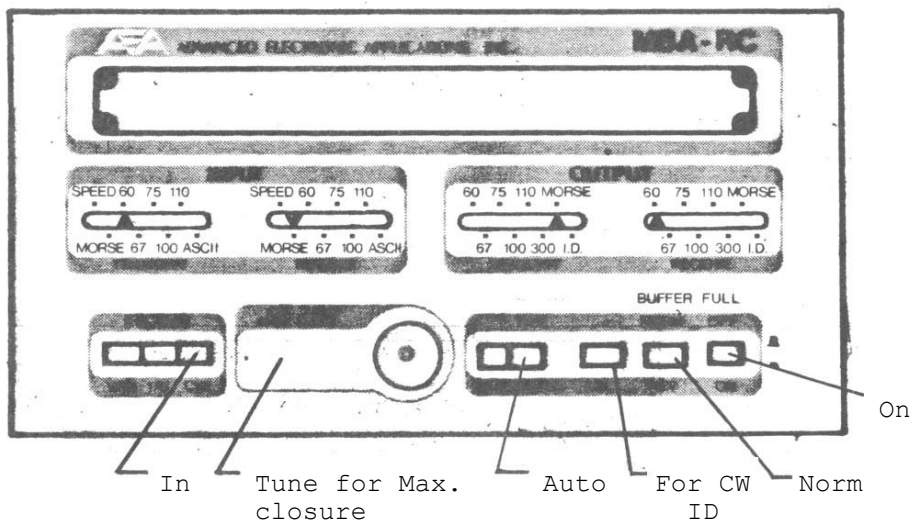
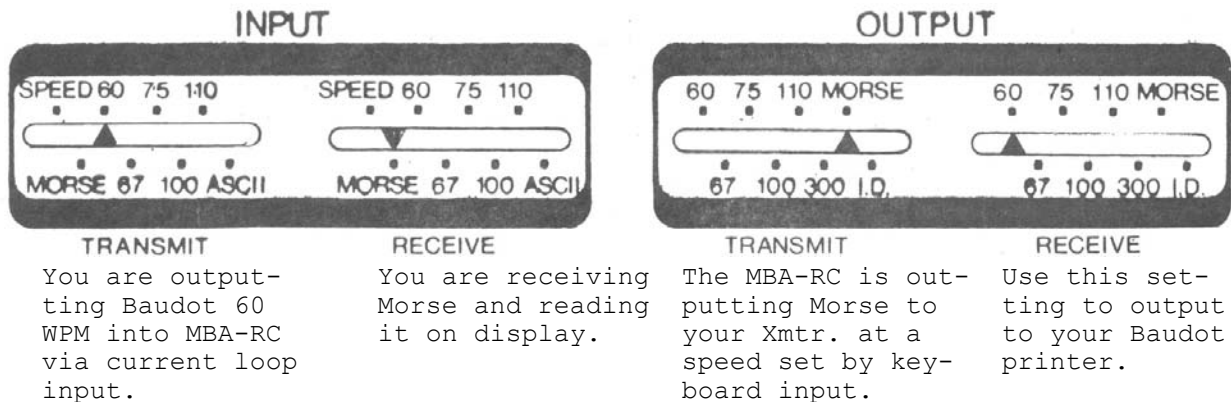
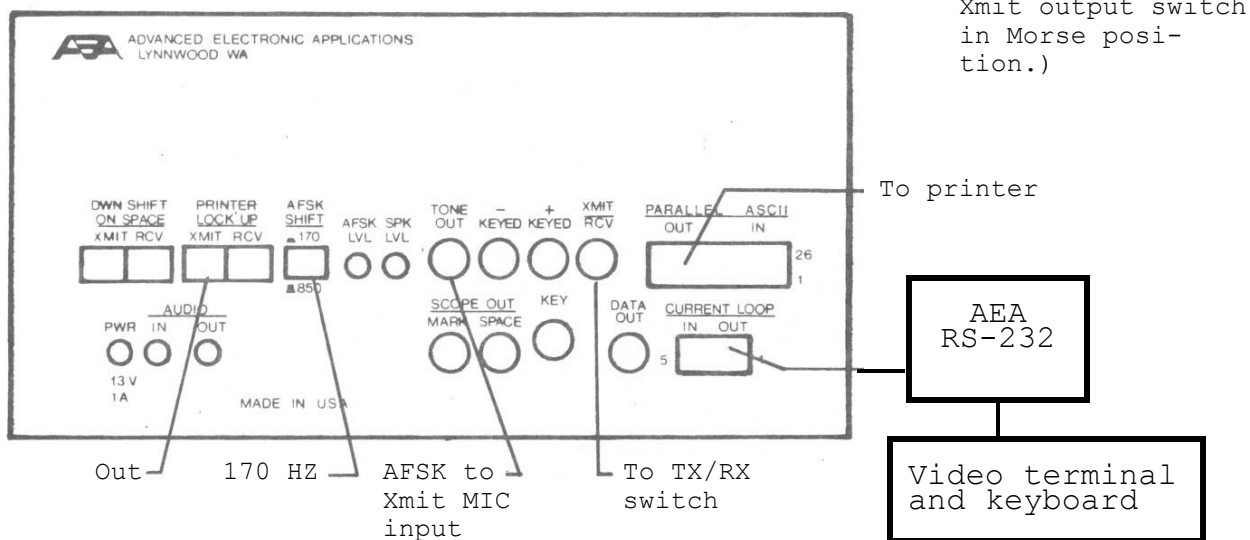
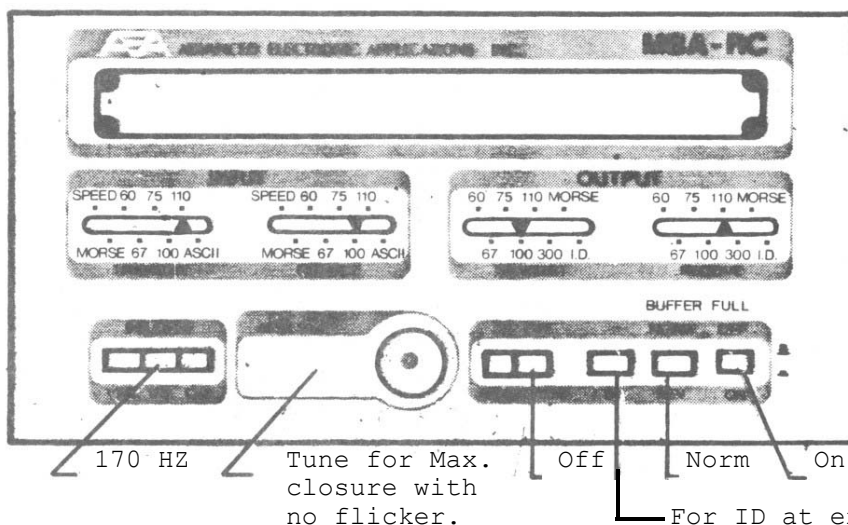
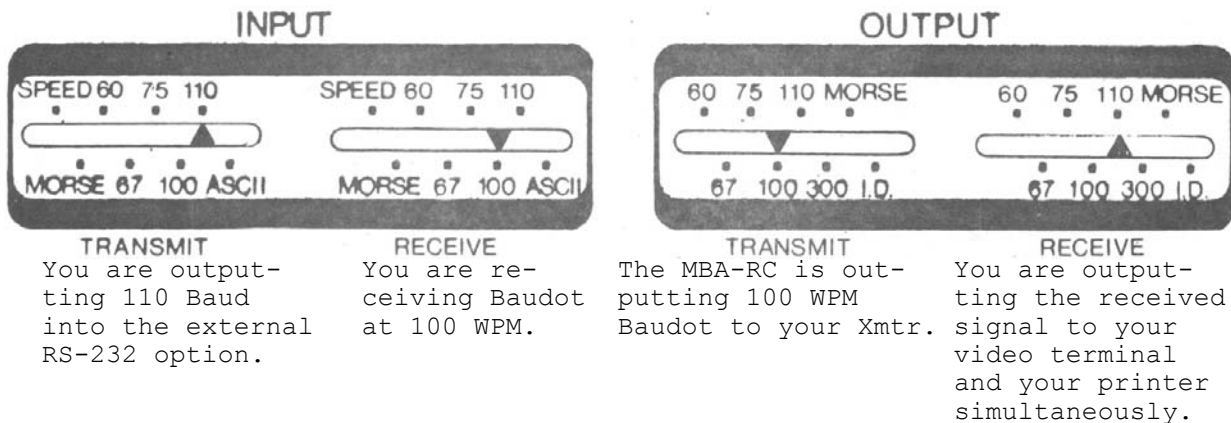


ILLUSTRATION 9

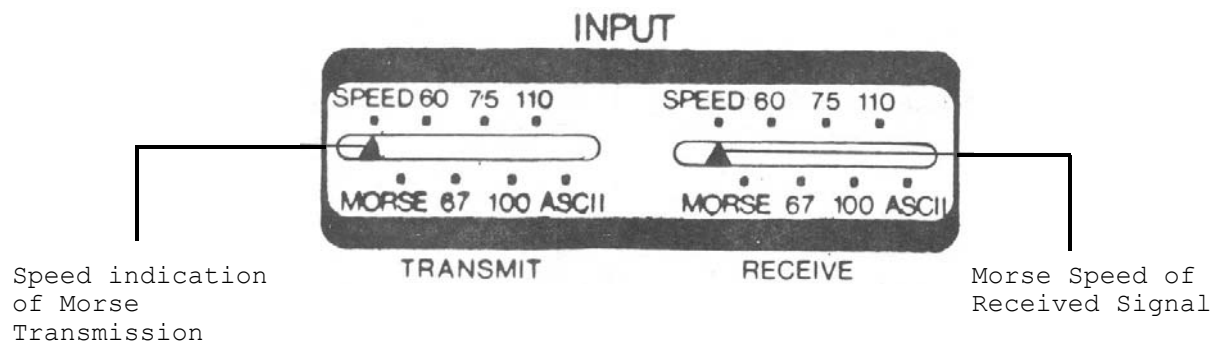
CONDITION:

Your Station: Working ASCII 110 Baud-using video terminal and printer.
 Other Station: Working Baudot 100 WPM.



Review these illustrations until you can quickly set up the MBA-RC for the type of contact you wish to make.

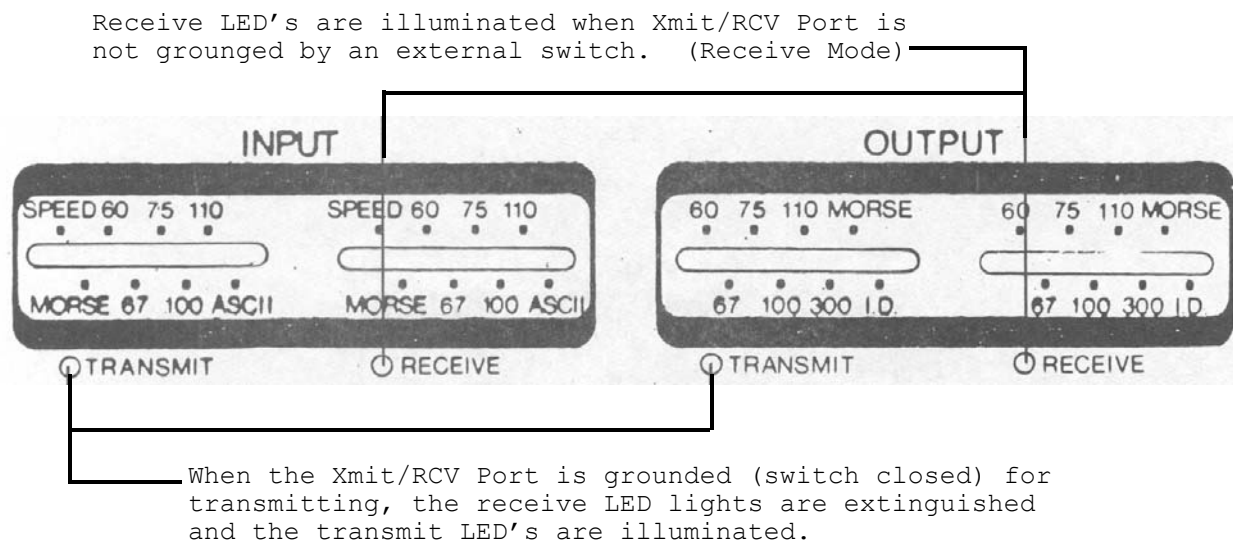
For Morse operation you can monitor the receiving speed. See illustration for this setting. Similarly you may monitor your Morse sending speed. (See illustration). The input and output Morse speeds will appear on the extreme right side of the display.



Morse Code Speed Shown On Display



When in the receive mode for Input and Output, you will see two LED's as shown:

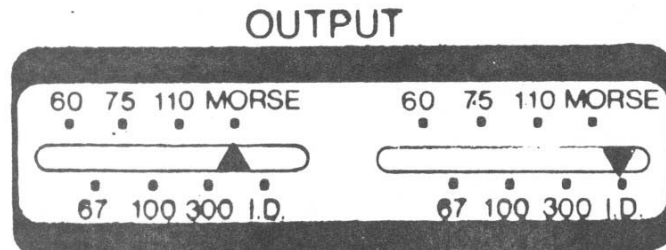


On the Output Side, the two slide switches each have an I.D. setting. In addition there is an I.D. push button beneath this Output area.

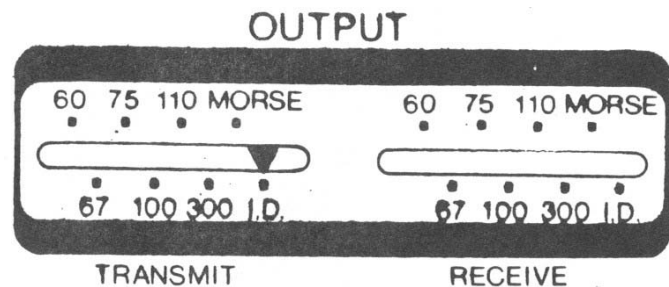
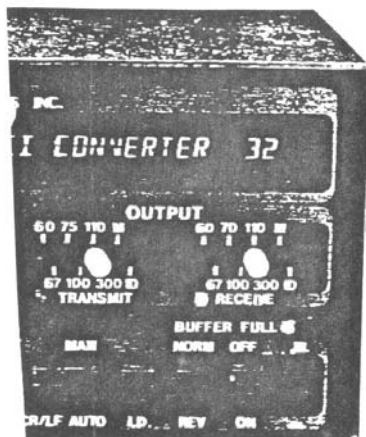
The I.D. function has two uses. First for loading an identification message such as "K6RFK" and two, changing the CW output speed. If the MBA-RC I.D. is not programmed, the CW output will be at 20 WPM. Higher or lower speeds can be programmed as follows:

Using a Keyboard: If a keyboard input of any type, Baudot, serial or parallel ASCII is being used, the Output mode switch must be in 'Morse and the speed change is accomplished by typing

the Bell function followed by a two digit speed. On ASCII keyboards, the BELL function is generated by Control G. On Baudot keyboards, the BELL function is generated by figures "S".



If a keyboard is not being used, place the mode switch in I.D. and press and release the I.D. button, then send the two digits by key or paddle. If there is a word space delay between the two digits on the display, the entry will not be accepted. To try again, move the mode switch from I.D. to Morse and back to I.D. and again press I.D. button and send the two digits.

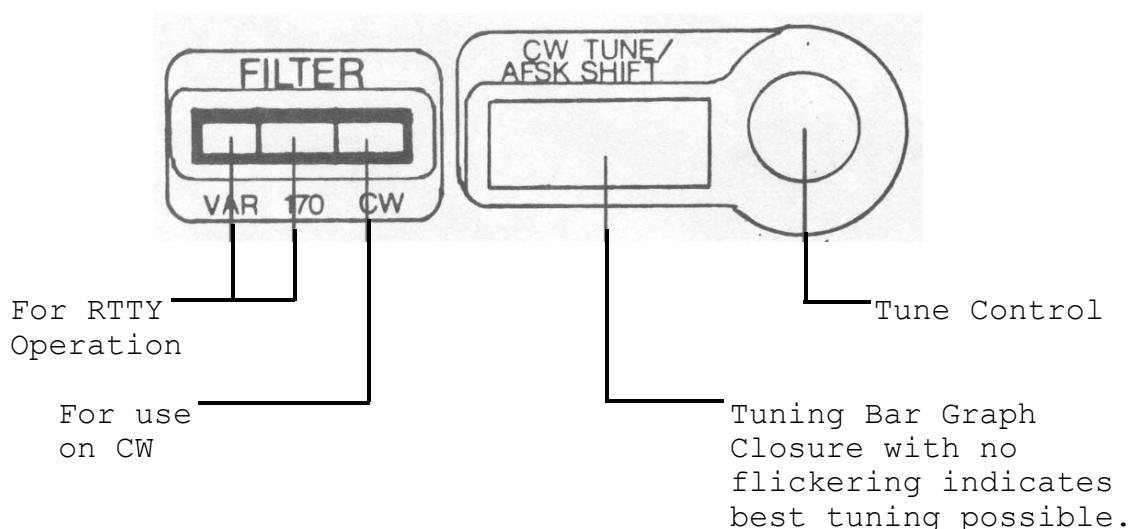


To load an I.D. message, ie. DE ----- (your call letters) put the mode switch in the I.D. position. Message loading in the I.D. position is limited to 40 characters. The Buffer Full indicator will light when the 40 character message memory is full. After the Buffer Full LED is on, additional characters will not be loaded. To finish loading the message, switch the Output mode switch out of the I.D. position.

There are three filter selections available from the front panel. Two are for AFSK teletype use, one is for CW use. The position marked 170 is for use with Amateur and Commercial 170 Hz shift teletype with MARK TONE at 2125 Hz and SPACE at 2295 Hz.

In the VAR position, the SPACE tone filter is tunable with the Tune Control from approximately 2225 Hz to 3125 Hz giving a frequency shift range of approximately 100 Hz to 1 KHz.

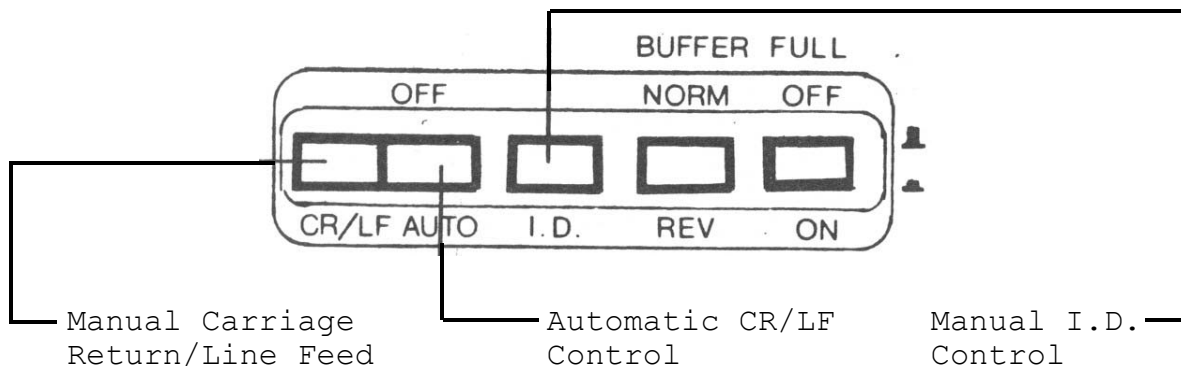
The CW position is also used with the Tune Control to set the internal CCW filter frequency. The range in CW is from approximately 900 Hz to 950 Hz.



CR/LF stands for Carriage Return and Line Feed. The CR/LF push switch generates a carriage return followed by a line feed output when any of the Baudot or ASCII output modes are used. This allows manual control of the carriage and line feed of printers.

The Auto CR/LF switch, in the depressed position, activates an internal character counter which generates an automatic carriage return-line feed signal at the first space following 60 characters or at the end of 71 characters. No data is lost during the carriage return-line feed operation. This mode should

be used with CW input and teletype output modes as it will provide automatic insertion of the carriage return line feed signals at the proper number of characters. It may also be used with teletype input signals but will probably cause short lines of copy due to the transmission of carriage return line feed signals from the originating station.



The I.D. Memory Message Send switch is used to activate the memory message system. The memory message may be sent in any of the output modes and may, for example, be sent in RTTY and again in CW for CW identification when using RTTY.

The Normal-Reverse switch is used on the audio input teletype modes to select the tones used for Mark and Space. Normal AFSK uses 2125 Hz for the Mark tone and the Space tone is higher in frequency by 170 Hz shift for a 2295 Hz tone.

In some applications (sometimes by error) the mark and space tones are reversed. The Norm-Rev switch is used in such cases to re-invert the tones. If a HF receiver is used for RTTY copy on Upper Side Band, the Norm-Rev switch should be in the Rev position. In the Lower Side Band setting on the HF receiver, the switch should be in the Norm position.

The Buffer Full LED lights when the 1024 character buffer has 25 characters left. If the buffer is over flowed, the vacuum fluorescent display will blank out. When the overflow is relieved the display will resume operation. Data in the buffer when the display blanks out will not be lost. To avoid having the display

blank out during normal operation, if no output device is being used, it is a good practice to leave the receive output switch in the 300 Baud ASCII position to avoid inadvertent filling of the buffer. Also, the Buffer Full LED is used with the I.D. memory message unit. It will light when more than 40 characters have been entered. The first 40 characters will be loaded in the I.D. memory. Characters sent after the Buffer Full LED is illuminated will not be loaded.

The On/Off push button controls the power to the MBA-RC.

CHECK OUT PROCEDURE

RECEPTION OF CW

1. Be sure the MBA-RC is set up with the proper supply, 10 to VDC at 1.2 amperes.
2. Have audio from either your receiver's headphone jack or from your speaker leads and have the Audio In input connection made to the MBA-RC.
3. With your receiver, tune in a strong CW signal with good fist quality.
4. Turn MBA-RC power On. The display should be illuminated.
5. On the receive input section: slide the switch to Morse.
6. Set the Filter to CW and with the receiver frequency tuning control, tune for maximum closure of the Bar Graph. This should cause the copy to appear on the 32 character display and progress from right to left across the panel. The MBA-RC Tune Control can be used for fine tuning.

If you make any but the finest adjustment in the receiver tuning, you will lose the copy on the 32 character display. It will be necessary to re-tune to retrieve the copy. If your receiver has CW filtering, switching in or out of the filters may also be cause for receiver and MBA-RC re-tuning.

Be sure your receiver has been turned on long enough to assure

good frequency stability. An unstable receiver will result in loss of CW copy due to frequency drift. You will find that a receiver noise blanker can be most useful at times when copying CW in the presence of noise spikes.

The MBA-RC will do a good job of copying signals with QRM. With your receiver, tune to a frequency where there is some QRM and isolate a CW signal. Using the above tuning procedure tune for effective copy on the MBA-RC display. You will note that with careful tuning you can obtain copy. When excessive noise or static is present the MBA-RC microcomputer will read these as E's and T's and they will appear on the display.

Practice the tuning of a CW signal until you can obtain good copy under a variety of receiving conditions.

If you have never before used a computerized Morse code copying unit, you may initially be disappointed because solid copy is not the rule. The MBA-RC should perform as well as, or better than, most all other Morse code readers on the market.

In general, you will note the following:

1. Many slow speed signals on the air are accompanied by sloppy fists. Quite often, the faster the station's sending, the better his fist.
2. At speeds within your own ability to copy, the reader will not perform as well as your own brain, particularly when noise spikes are as strong, or stronger than, the signal or when the signal is sent with a sloppy fist.
3. Sometimes a slow AGC will be better than fast AGC and vice versa, depending on your receiver.
4. The MBA-RC Morse reading function is most useful for teaching you to copy code at a higher speed than you would normally copy comfortably. The large 32 character display allows you to "piece together" what would otherwise be

- poor copy.
5. The MBA-RC is very useful for those operators who cannot seem to copy code without a pencil and paper. After sufficient practice using the MBA-RC, copying CW in your head will become second nature.
 6. Probably one of the biggest uses for the MBA-RC in CW mode is in monitoring your own transmitted fist as it goes out over the air. Many operators are surprised to learn just how sloppy their automatic keyer generated CW can be. This is normally a result of improper spacing between characters and words.
 7. The ✱ symbol is an indication of an invalid character that is seven elements or less in length. Any invalid character of seven elements or more in length is simply ignored by the reader.
 8. You will note that the MBA-RC copies RTTY much better than CW. This is due to the inherent noise rejection features of RTTY operation.

TRANSMISSION OF CW

Transmission of CW would normally be accomplished by using a Baudot or ASCII keyboard. It is possible to use a hand key or electronic keyer as an input and use the MBA-RC to change the speed, but that is really impractical. From the rear panel of the MBA-RC, make the correct connection from the keying out port. For a cathode keyed transmitter and most transistor rigs, use the + keyed output. For blocked grid keyed transmitters use the - keyed output.

Be sure the Transmit/Receive switch is operable. You may use an external toggle switch or a transmit relay contact closure on your transceiver.

Refer to Illustration 6 for the proper front and rear panel switch settings.

KEYING PROCEDURE

1. If using separate receiver and transmitter be sure you are zero beat with the receiver frequency and you have a clear frequency.
2. Effect closure of the Transmit/Receive switch.
3. Key the transmitter, with your selected method.
4. Using accepted operating procedures either call CQ or respond to a calling station. Upon completion of your call, if using an external switch, be sure you are in the receive mode.
5. You should have been able to visually monitor your transmission on the 32 character display.
6. Proceed with your QSO, observing the display in both transmit and receive modes.

RECEPTION OF BAUDOT - RTTY

Please study Illustration 5 for the correct connections on the rear panel of the MBA-RC.

1. With your receiver, tune in a strong RTTY signal. Be sure your receiver is set at LSB, and tune to the high audio tone side of the RTTY signal.
2. Apply power to the MBA-RC, the 32 character display should be illuminated.
3. With your receiver, tune to the lowest tone frequency up through the RTTY signal until the Bar Graph on the MBA-RC reaches maximum closure, but flickers on and off with the signal. Then tune for maximum closure of the Bar Graph on a slightly lower frequency with no or only minimum flicker. The two peaks are close together, it is important to be able to tune right to the one that causes no flicker of the Bar Graph.
4. Minor adjustments can be made to the receiver tuning to peak up copy if the receiver or transmitter frequencies are drifting.

Practice tuning a RTTY signal so you can achieve good copy in a minimum of time. If you experience difficulty tuning RTTY follow the steps outlined here:

- A. Be sure all switch settings are as shown in Illustration 5.
- B. Make sure all rear panel connections are correctly made.
- C. Try selecting a different speed, e.g. 60-67-75-100 to ascertain you are tuned to the right speed. Most amateur RTTY is at 60 WPM.
- D. If copy is garbled, push the Norm/Rev switch in. If the originating station is transmitting in Reverse mode the copy will be garbage.
- E. Switch the Filter to Var (variable) in case the originating station is using something different than 170 Hz shift. When you switch to Var you will need to re-tune the Bar Graph for maximum closure.
- F. The 2125 - 2295 Hz tones used for most RTTY is a higher pitch than most CW operators are used to. If your transceiver has passband tuning of I.F. Shift, be sure both controls are properly centered.
- G. If you have an X -Y oscilloscope, you can connect it to the scope output jacks on the rear panel of the MBA-RC for precise tuning. The ARRL Amateur Radio Handbook is an excellent reference source for more information on RTTY.

If none of these remedial moves clears up the problem, don't despair. If you are copying Commercial RTTY you should know that much of their transmission is encrypted so you cannot intercept the copy (especially much of the news service RTTY).

TRANSMISSION OF BAUDOT - RTTY

WARNING.....WARNING.....WARNING.....WARNING.....WARNING.....WARNING

During RTTY transmissions your transmitter operates in a key-down mode. Most amateur transmitters can be damaged by continuous operation at their normal CW input power levels. It will be necessary to reduce input power when using AFSK

teletype to about 40% of the normal CW input power. Consult the Owner's Manual for the transmitter you are using.

Study Illustration 5 for the proper rear panel control and connection procedures. Make sure all connections are secure. Now look at the front panel switches. The only change will be in the Output/Transmit slide switch. Put this switch on 60.

TRANSMITTING PROCEDURE

1. If you are using a separate transmitter and receiver, be sure the transmitter is zero beat with your receiver.
2. Effect closure of the Transmit switch either manually or via a transmitter contact closure.
3. Using your Baudot keyboard, either respond to a RTTY station calling CQ or initiate a CQ call. When completed be sure the T/R switch is set for receive.
4. When a station responds, carry on with the QSO per the above.
5. To prevent your printer from repeating your transmissions you should set the Xmit Printer Lock Up button into the OUT position on the rear panel.
6. The 32 character display will be operative and show your Baudot transmissions.

RECEPTION OF ASCII - RTTY

Please study Illustration 9 carefully for the rear panel connections. If you are not using a video terminal the RS-232 option is not required. However, your parallel output keyboard would be connected to the ASCII parallel input port.

The tuning procedure for ASCII is identical to the Baudot tuning procedure. Be sure to learn the tuning by practice.

TRANSMISSION OF ASCII - RTTY

Be sure to observe the WARNING as set forth in the Baudot transmission. The RTTY transmitter input should be about 40% of the normal CW input power, or the level specified in the Owner's Manual.

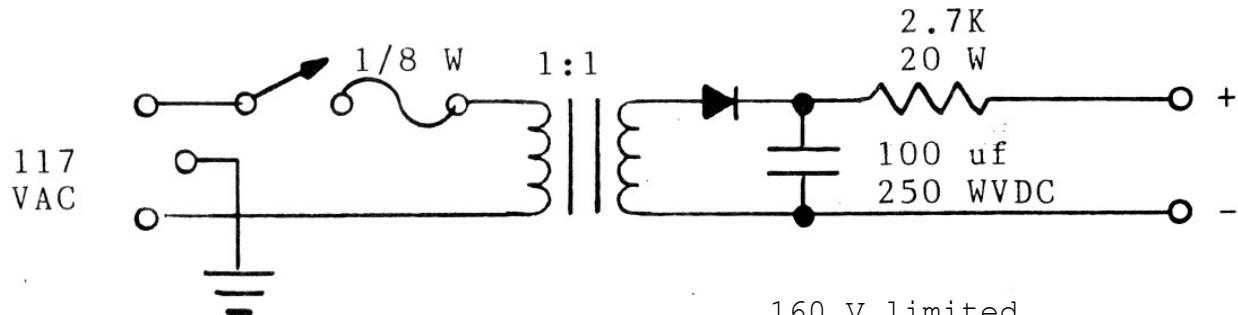
Again study Illustration 9 for the proper switch settings. Proceed to transmit, observing the same procedure as outlined in Baudot Transmission.

IN CASE OF DIFFICULTIES

If, after re-reading this manual, you are having difficulties, a phone call to the factory Customer Service Department will likely provide a quick answer to your problems. Before calling the factory, try to have the MBA-RC in operation near the telephone so that our technician can talk you through the problems.

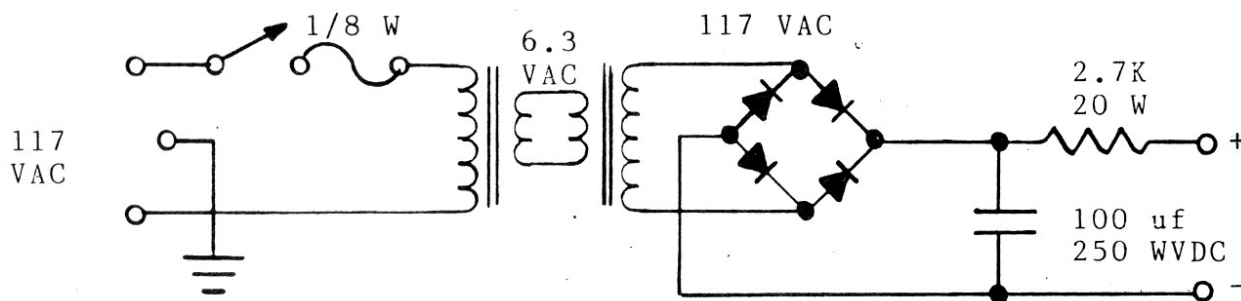
Our telephone number is 206-775-7373. office hours are 0800 to 1630 Pacific Time Zone.

SUGGESTED 60 ma. LOOP SUPPLIES
For Mechanical Teletype Machines



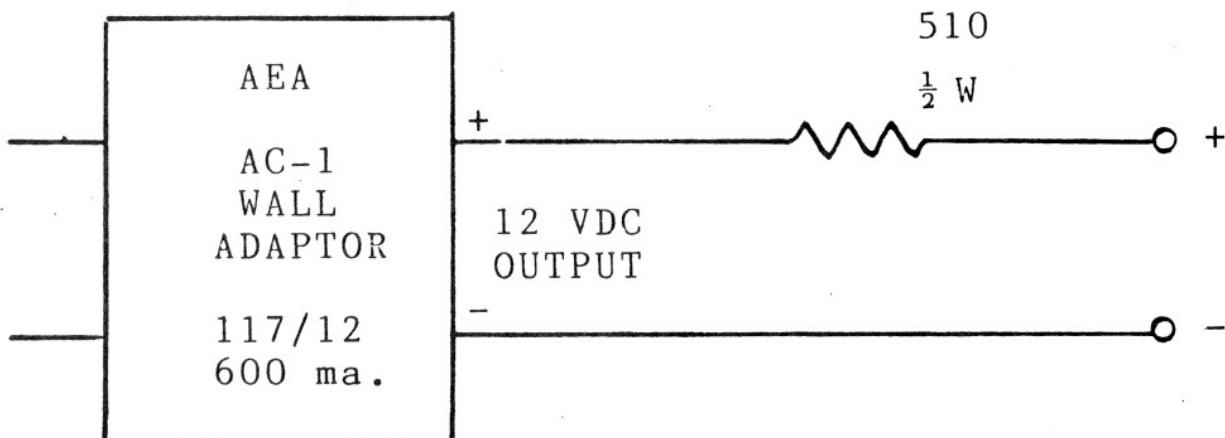
160 V limited
to 60 ma.

CAUTION: Lethal voltage
and current.



SUGGESTED 20ma LOOP SUPPLY

For CRT Terminals
(Not recommended for Mechanical
Teletype Machines)



PARALLEL & SERIAL CONNECTIONS

1. PARALLEL ASCII OUTPUT PINS

PIN	CONNECTION
18	D0
9	D1
17	D2
10	D3
16	D4
11	D5
15	D6
12	D7
13	BUSY
14	STROBE
21	GROUND
20	GROUND
8	+ 5
19	+ 5

2. PARALLEL ASCII INPUT PINS

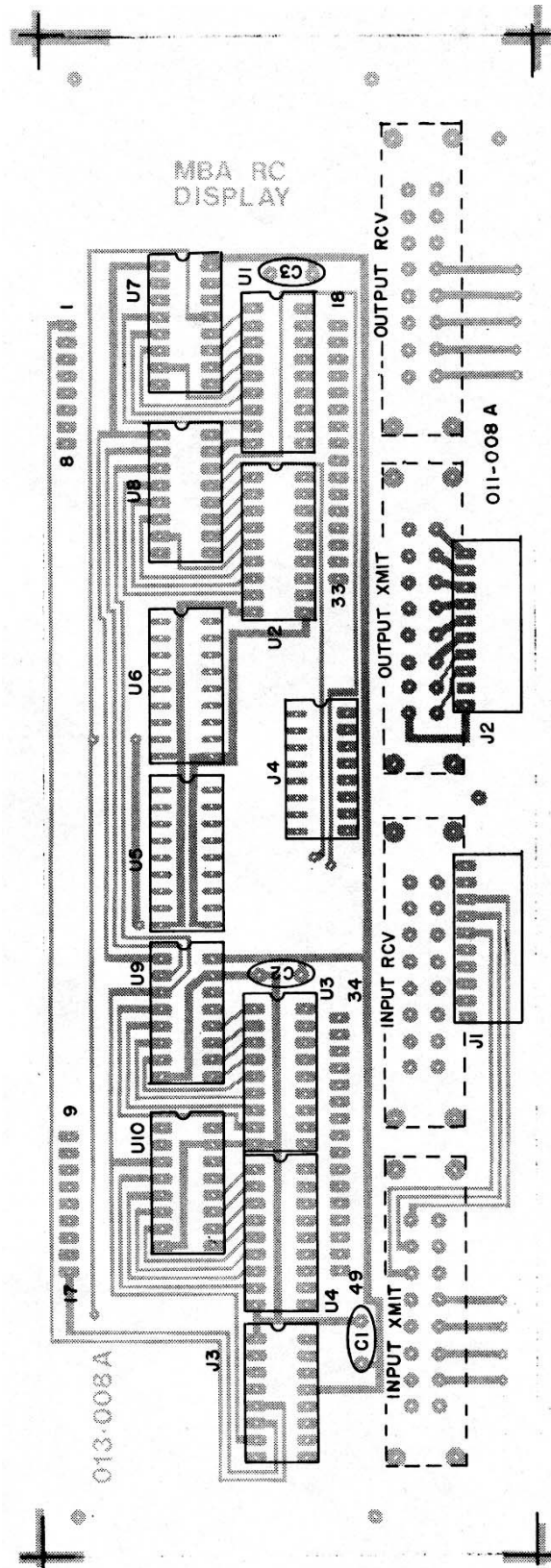
PIN	CONNECTION
26	D0
1	D1
25	D2
2	D3
24	D4
3	D5
4	D6
23	STROBE
6	GROUND
21	GROUND
5	+ 5
22	+ 5

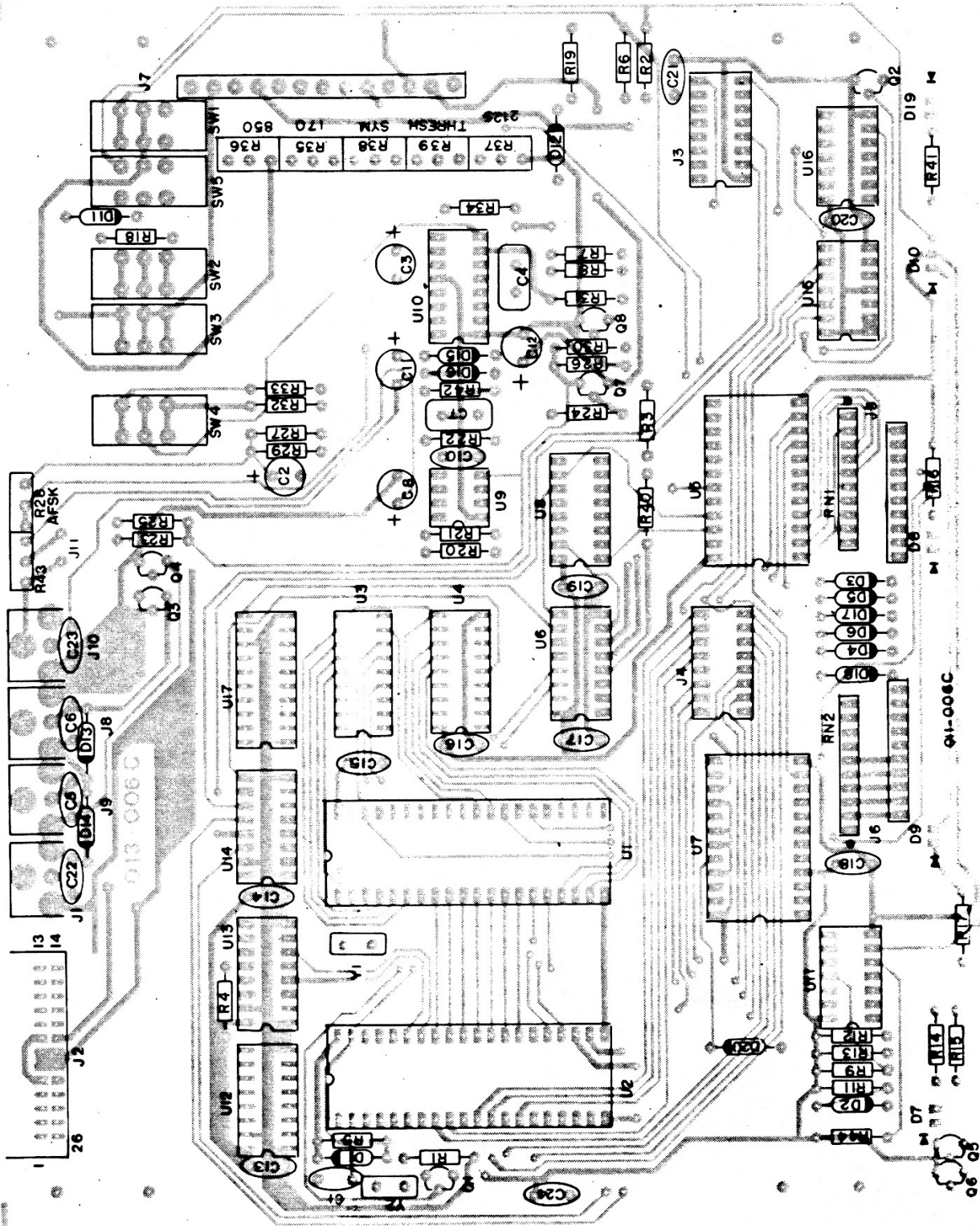
3. CURRENT LOOP

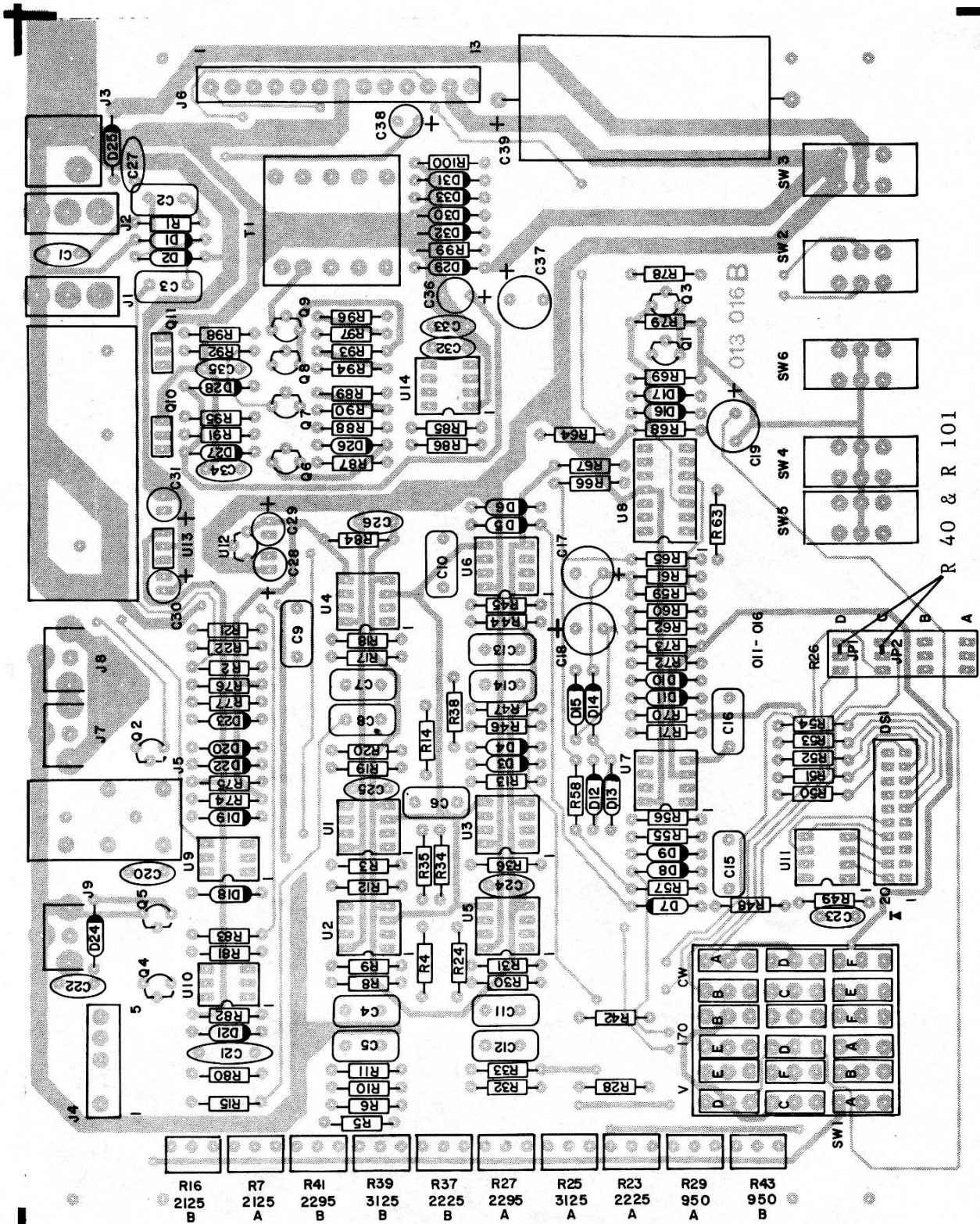
PIN	CONNECTION
1	+ LOOP OUT
3	- LOOP OUT
4	+ LOOP IN
5	- LOOP IN

SYMBOLS

A	A	1	1	A	A
B	B	2	2	° A	B
C	C	3	3	E	E
D	D	4	4	CH	CH
E	E	5	5	N	N
F	F	6	6	Ö	E
G	G	7	7	U	U
H	H	8	8	Non Valid Characters	*
I	I	9	9	Error	BLANK
J	J	Period	.	Understood	U
K	K	Question Mark	?		
L	L	Colon	:	<u>Additional Teletype Character</u>	
M	M	Semi-colon	;		
N	N	Parenthesis	(< >)	Bell	△
O	O	Apostrophe	'	CR	∠
P	P	Exclamation Point	!	LF	∩
Q	Q	Quote	"	#	±
R	R	Fraction Bar	/	S	5
S	S	AS	AS	%	∞
T	T	SK	SK	&	∑
U	U	BK	BK	*	*
V	V	KN	KN	+	+
W	W	AR	AR	Null Character	Σ
X	X	Double Dash	=	[or	-
Y	Y	Hyphen	--) or	∩
Z	Z	Zero	0	Del	*







R 40 & R 101

PARTS LIST

Display Board

<u>Reference</u>	<u>Value</u>
DS 1	Vacuum Fluorecent Display
C 1,2,3	Ceramic Cap. .01 50V.
U 1,2,3,4,5,6	I. C. Fluorecent Display Driver XR6118
U 7,8,9,10	I. C. 8 Bit ADD LAT. 74LS259

PARTS LIST

Analog Board

<u>Reference</u>	<u>Value</u>
C 1,22,23,24,25,26,32	Ceramic Cap. .01 50V.
C 2,3,6,9,10,15,16	Mylar Cap. .1 10% 50V.
C 4,5,7,8,11,12,13,14	Mylar Cap. .068 2% 50V.
C 17,18,28,29,30,31,36	Electrolytic Cap. Rad. 10uf 25V.
C 19	Electrolytic Cap. Rad. 47uf 35V.
C 20,27	Ceramic Cap. .1
C 21	Ceramic Cap. .1 500V.
C 33	Ceramic Cap. 330p .1
C 34,35	Ceramic Cap. 33p 50V.
C 37	Electrolytic Cap. Rad. 4700uf 25V.
C 38	Electrolytic Cap. Rad. 3.3uf 100V
C 39	Electrolytic Axial Cap. 4700 uf 25V
D 3,4,5,6,8-17, 19,20, 1,2,	Diode, Signal 1N4448
D 26,27,28,30,31,32,33	
D 7	Diode, Zener 4.7V. 1N751
D 21 - 25	Diode, Power 1N4006
D 29	Diode, Zener 6.8 V. 1N5235A
Q 1,3,5,6,7	Transistor NPN 2N3904
Q 2	Transistor NPN MPS 6521
Q 4	Transistor NPN MPS A42
Q 8,9	Transistor PNP 92 PU51
Q 10,11	Transistor PNP MPS U51

PARTS LIST

Analog Board

<u>Reference</u>	<u>Value</u>
R 1,21,22,34,35,69,83,87 ,65,66	Resistor $\frac{1}{4}W$. 5% 10K
R 2,3,12,78,100,72	Resistor $\frac{1}{4}W$. 5% 20K
R 4,14,55,56,70,71	Resistor $\frac{1}{4}W$. 1% 20K
R 5	Resistor $\frac{1}{4}W$. 1% 7.87K
R 6, 15,28,42	Resistor $\frac{1}{4}W$. 5% 270
R 7,16,25,27,39,41	Pot. Trim 500
R 8,17,30,34	Resistor $\frac{1}{4}W$. 1% 2.26K
R 9,18,31,45	Resistor $\frac{1}{4}W$. 1% 4.53K
R 10,19,32,46	Resistor $\frac{1}{4}W$. 1% 27.4K
R 11,20,33,47	Resistor $\frac{1}{4}W$. 1% 7.32K
R 13.63.67	Resistor $\frac{1}{4}W$. 5% 200K
R 23,27	Pot Trim 1K
R 24	Resistor $\frac{1}{4}W$. 5% 30K
R 26	Pot 2 Gang 1K-1K
R 29,43	Pot Trim 5K
R 36	Resistor $\frac{1}{4}W$. 5% 360
R 38	Resistor $\frac{1}{4}W$. 5%
R 48,82	Resistor $\frac{1}{4}W$. 5% 180
R 49	Resistor $\frac{1}{4}W$. 5% 620
R 94,97	Resistor $\frac{1}{4}W$. 5% 750
R 75	Resistor $\frac{1}{4}W$. 5% 2.2K
R 76	Resistor $\frac{1}{4}W$. 5% 200
R 77	Resistor $\frac{1}{4}W$. 5% 300
R 79	Resistor $\frac{1}{4}W$. 5% 2K
R 80,89,101,40	Resistor $\frac{1}{4}W$. 5% 3.6K
R 74,81	Resistor $\frac{1}{4}W$. 5% 5.1K
R 88	Resistor $\frac{1}{4}W$. 5% 2.4K
R 64,6B,73	Resistor $\frac{1}{4}W$. 5% 47K
R 50,51,52,53,54,84	Resistor $\frac{1}{4}W$. 5% 470
R 57,58,59,60,61,62,86	Resistor $\frac{1}{4}W$. 5% 100K
R 85,90,91,92,93,95,96,98,99	Resistor $\frac{1}{4}W$. 5% 1K
U1	I.C. DUAL OP AMP. LM358
U 2,3,4,5,6,7	I.C. DUAL BI-FET XR082
U 8	I.C. COMPARATOR LM319
U 9	I.C. OPTO ISOL. 4U25
U 10	I.C. OPTO ISOL. H11D2
U 11	I.C. LED LADDER DR. TL487C

PARTS LIST

Analog Board

<u>Reference</u>	<u>Value</u>
U 12	I.C. REGULATOR 78105
U13	I.C. REGULATOR 7805

PARTS LIST

Logic Board

<u>Reference</u>	<u>Value</u>
C 1, 24	Ceramic Cap. .1 50V.
C 2,3,8,11	Electrolytic Cap. 10uf 25V.
C 4,7	Mylar Cap. 10% .033
C 5,6,10,13 - 23	Ceramic Cap. .01 500V.
D 1,11,12	Diode, Signal IN4448
D 2,13,14,15,16	Diode, Power IN4006
D 3,4,5,6,17,18,20	Diode, Germanium IN270
D 7,8.9.10,19	Diode, LED Red
Q 2,8	Transistor NPN 2N3904
Q 3	Transistor PNP MPSA92
Q 4	Transistor NPN MPSA42
Q 5,6	Transistor PNP 2N3906
Q 7	Transistor NPN MPS6561
R 1,2,3,6,7,8,9, 11,13,20,26	Resistor $\frac{1}{4}$ W. 5% 1K
R 21,42, 5, 44	Resistor $\frac{1}{4}$ W. 5% 10K
R 14,15	Resistor $\frac{1}{4}$ W. 5% 20K
R 16,17	Resistor $\frac{1}{4}$ W. 5% 150
R 18,19,30,40	Resistor $\frac{1}{4}$ W. 5% 15K
R 22	Resistor $\frac{1}{4}$ W. 5% 100
R 23	Resistor $\frac{1}{4}$ W. 5% 130
R 25	Resistor $\frac{1}{4}$ W. 5% 470
R 31	Resistor $\frac{1}{4}$ W. 5% 510K
R 32	Resistor $\frac{1}{4}$ W. 5% 11K
R 33	Resistor $\frac{1}{4}$ W. 5% 6.8K

PARTS LIST

Logic Board

<u>Reference</u>	<u>Value</u>
R 12,24,27,29	Resistor $\frac{1}{4}$ W. 5% 5.1K
R 4	Resistor $\frac{1}{4}$ W. 5% 4.7K
R 41	Resistor $\frac{1}{4}$ W. 5% 180
R 34	Resistor $\frac{1}{4}$ W. 5% 12K
R 38	Pot Trim 25K
R 39	Pot Trim 500
R 35,36,37	Pot Trim 5K
R 43	Pot Trim 50
R 28	Pot Trim 50K
U 1	I.C. uP AEA MBA-RO
U 2	I.C. uP AEA MBA-RC
U 3,4	I.C. 1KX4 MOS RAM 2114
U 5,7	I.C. 16 to 1 MUX 74150
U 6	I.C. 8 BIT ADD LAT. 74LS259
U 8	I.C. CMOS LATCH 4044
U 9	I.C. TIMER 555
U 10	I.C. FUNCTION GEN. XR2206
U 11	I.C. HEX INVERTER 7416
U 12,13,14	I.C. HEX BUFFER 74LS367
U 15	I.C. DUAL NAND 7420
U 16	I.C. QUAD NAND 7400
Y 1,2	XTAL 4.000 MHz

TECHNICAL SPECIFICATIONS

Morse Speed Range	2 to 80+ WPM
Baudot Speed Range	60-67-75-100 WPM
ASCII Speed Range	110 Baud, (300 Baud transmit only)
I.D. Buffer Capacity	40 Characters
Buffer Capacity	1024 Characters
TTY Current Loop	20 to 60 mA
Parallel ASCII Port	26 Pin Socket
RS 232 Provision (optional)	VIA Current Loop Connector
Tuning LED Bar Graph Indicator	Scope Output (X-Y)
Keying Output	Cathode, Blocked Grid and Transistor
Switching	Manual Transmit/Receive or from Automatic Transmit/Receive Contact Closure
AFSK Output	Tone Out Connector
AFSK Shift	170 and 850 Hz Front Panel Variable 100 to 1000 Hz Shift
AFSK Output	Rear Panel Adjustable
Speaker Level Control	Rear Panel Adjustable
Printer Lock Up	For Transmit & Receive
Down Shift On Space	For Transmit & Receive
Audio Input	Rear Panel Connector
Speaker Output or Tape Input of Audio	Rear Panel Connector
Power Required:	13 VDC \pm 3 V @ 1.2 Amperes.
Weight:	4 lb. 6 oz.
Dimensions:	7 $\frac{1}{4}$ " deep x 9 $\frac{1}{4}$ " wide x 5" high
Scope Output	2.5 to 6.0 Volts PP

LIMITED WARRANTY

ADVANCED ELECTRONIC APPLICATIONS, INC. warrants to the original purchaser that this product shall be free from defects in material or workmanship for ninety days from the date of original purchase. In order to obtain warranty service: (1) Complete and mail the warranty registration card to Advanced Electronic Applications, Inc., and (2) Send written notification to the address below as soon as possible after discovering a possible defect:

Advanced Electronic Applications, Inc.
Attention: Service Department
2006 -196th S.W.
Lynnwood, Wa. 98036

The written notification must include a copy of the invoice. Include a description of the defective part or condition, with details of the electrical connections to associated equipment and list such equipment. Please enclose your name, phone number, and address. Shipping charges for any parts or units submitted for replacement under this warranty must be paid by the purchaser.

Correct maintenance, repair, and use are important to insure proper performance from this product. Carefully read the Instruction Manual. This warranty does not apply to any defect AEA determines is caused by (1) improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specification of the original parts; (2) misuse, abuse, neglect, or improper installation; (3) accidental or intentional damage.

All implied warranties, if any, terminate ninety days from the date of original purchase. AEA is not responsible for damage to other equipment or property or any other consequential or incidental damage of any kind whether based on contract, negligence, or strict liability. Maximum liability shall not, in any case, exceed the purchase price of the unit.

The foregoing constitutes AEA's entire obligation with respect to this product. The original purchaser and any user or owner shall have no other remedy and no claim for incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion of incidental or consequential damages, therefore, the above limitations and exclusions may not apply to you.

This warranty gives specific legal rights. You may also have other rights which vary from state to state.