Price $2.95

Instruction Manual
AEA MBA READER
MODEL MBA-RO

INSTRUCTION MANUAL
AEA (MORSE-BAUDOT-ASCII) MBA READER™
Model MBA-RO

INTRODUCTION

The MBA-RO reader will provide excellent service to the user if he will take the time to read this manual and learn the procedures outlined for proper operation of the equipment. Your appreciation for the MBA-RO and operating skill will increase significantly if you use and practice the methods outlined in this manual. You should not expect the MBA-RO or any other MORSE reader to copy CW as well as the human mind in the presence of noise or QRM. The reader really shines at speeds above the level of the human operator! The MBA-RO uses a 32 character vacuum fluorescent display. The characters proceed from right to left across the screen during copy or while transmitting. The MBA-RO is designed to allow the user to monitor the speed of Morse code reception by moving the Mode Switch to the SPEED setting. The speed will then be indicated in the last two characters at the right end of the display, separated by two spaces, at speeds under 100 WPM, with 28 characters available for code copy.

The MBA-RO will allow solid Morse code copy up to 80 WPM. At speeds above 80 WPM the Reader may produce occasional errors. Choices for Baudot copy are 60-67-75 and 100 WPM and are clearly marked on the Mode Switch. The operator may select teletype ASCII at 110 baud clearly marked on the Mode Switch. During CW transmission, the MBA-RO can also serve to alert you to any sending habits which may tend to make your message difficult to copy. The most common problem for operators is that of running characters and/or words together or putting word spaces within words.

To put your MBA-RO into operation, only a few precautions need be taken. The reader requires a 13 (± 3) VDC supply capable of delivering 500 mA. The AEA model AC-1 12 Volt 600 mA Wall Adaptor is available at your dealer. The power plug required is 2.1 mm coaxial type. The other connectors necessary are miniature 1/8" (3.5 mm) phone plugs. An optional tilt stand is also available at your dealer.

MBA Reader is a trade mark of Advanced Electronic Applications, Inc.

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HOOKUP INSTRUCTIONS

1. Power: To activate the MBA-RO display it is necessary to apply a nominal 13 volt DC source to the Input Jack on the left apron of the enclosure. The power source should provide 13 volts DC ± 3 volts at 500 mA. The AEA AC-1 Wall Adaptor is suitable for a power source. No damage to the reader will occur if the power input polarity is reversed, however the reader will not operate. Also, if you have the reader connected to a receiver or other device, it may short out your power supply if the power is applied with reverse polarity. The center pin is the positive connection.

2. Receiver: The MBA-RO requires CW or RTTY signals from your receiver audio to generate the visual display. Receiver audio can be taken from the speaker jack with the line connected to the reader at the Audio Input Jack. If you use a transceiver and do not wish to use the speaker jack, taps at the speaker from the speaker leads will work equally well. Occasionally a low value resistor in series with the speaker is necessary to reduce the audio volume to a comfortable level and provide sufficient audio to the reader. The Audio Output Jack on the reader can be fed to an external speaker or a tape recorder that can be used for future message playback. The MBA-RO can monitor your keying by picking up the transmitter sidetone that normally is present in the transceiver output. Depending on the sidetone frequency you may have to turn the Filter Switch to the "OUT" position. Amateur and commercial radio teletype signals have very narrow bandwidths and a highly stable receiver is necessary for accurate and reliable tuning, regardless of the reader used. Some receivers require as much as a full hour warm-up period before suitable stability is achieved. Be sure to remove the receiver from any cold or hot air drafts that will cause drifting! If you turn on your receiver at the same time you turn on your heat in a cold room, you can expect to encounter receiver drift!

3. Key: This input is a direct connection to the keying input circuit of the MBA-RO. You may connect a straight key, bug or electronic keyer to this input. If your transmitter keying is positive polarity, it may be connected in parallel with the MBA-RO Key Input. Transmitters or transceivers that use grid block or negative keying cannot use this input. For grid block keying type transmitters, the transmitter audio sidetone may be used for transmit monitoring. The key input may also be used for direct connection to a teletype converter. For this use, open circuit is mark and closed circuit is space. If you experience difficulty in sending tinto the MBA-RO with a hand key, you may be experiencing "contact bounce". This can be corrected by cleaning the contacts with a burnishing tool and/or placing a 1 microfarad capacitor across the key contacts.

CHECK OUT PROCEDURE

We recommend that you perform the following functions to quickly acquaint yourself with the MBA-RO and to ensure that the unit is working properly. Refer to the following Operating Hints section for more details.

1. Power Switch/Threshold Control: Turn on the power by moving the Power Switch clockwise. The display should show all asterisks. Advance the Threshold Control and note the two tune lights above the control knob. The righthand light should be on as you start advancing the control. As you continue to advance the control the right tune light should go off and the left tune light should come on (at about the 2 o'clock position). The Threshold Control is used for filter adjustment and in conjunction with the tune lights will give you a visual indication of proper tuning of the signal you wish to copy. The normal adjustment for RTTY and CW is for **both lights off with no signal** input. If the control is advanced so that the left light is on, the reader will not function. Once the threshold level is set, it should **not** be necessary to continuously readjust the control. However, the threshold should be reset when going between the RTTY and CW positions. The Threshold Control sets the input signal trigger level, it is not a tuning control!

2. Filter Switch: The Filter Switch has four positions, (early model MBA-RO's have three). The CW filter is tuned to 800 Hz and in the RTTY positions, the 800 Hz filter is used for the "mark tone". If you desire a different CW pitch, the filter may be defeated by setting the Filter Switch to the "OUT" position. Three modes of RTTY filters may be selected. The normal amateur 170 Hz shift is the RTTY N (Narrow) position (800 Hz and 970 Hz filters) and commercial 425 Hz shift is selected in the RTTY W (Wide) position (800 Hz and 1225 Hz filters). Other RTTY shifts may be copied in the CW position. This allows "space only" tuning with some loss of noise rejection.

Now turn on your receiver and tune in a CW signal you wish to copy. Activating a CW Filter on your reader will require more careful tuning. If you elect to use filters on both the receiver and the reader they must be peaked with your receiver's passband. This can best be accomplished using the receiver band edge marker as a constant level signal source to tune on. If you use only one filter, e.g., reader filter on and receiver off, or receiver on and reader filter off, the tuning is easier, but you may not achieve as much noise immunity. Many receivers do not have passband tuning and therefore the receiver filter frequency may not be matched to the reader CW filter frequency.

3. Tuning Check-Out:

A. Morse: Now set the Mode Switch to **Morse**, and the Filter Switch to CW, (SPEED may be selected if you wish to see the code speed). Then adjust the Threshold Control until both of the LED's are off with no Audio input present at the Reader. Now inject the audio into the Reader and tune the receiver frequency dial until the LED's flicker at near full lumination in step with the CW signal. You should be getting good CW copy at this time.

B. Techniques: Perform the following steps to learn the tuning techniques for the MBA-RO. It is a good idea to periodically review these in order to gain the maximum capability from your reader.

1. With a displayed signal on the screen, decrease the receiver audio until the copy stops. This establishes the minimum audio level needed to sustain good copy.

2. Turn off the Filter Switch, or if just using receiver CW filter, turn to USB and note the effect on the tune lights and display copy.

3. With the Signal properly tuned-in vary the passband control on your receiver (if ti has one) and note the peaking/loss characteristics.

4. If your receiver has RIT (typical of transceivers) turn it on and carefully adjust the control to lose and re-establish reader copy.

From these exercises you will soon acquire the quickest and best tuning techniques for CW reception.

C. Radio Teletype: Next tune your receiver to a good radio teletype signal. These can usually be found on 20 meters between 14.075 and 14.100 Mhz. On the receiver, **be sure to set the switch to USB.** On the MBA-RO, set the following: Filter Switch to RTTY (N), Threshold Control so that both LED's are off with no audio input and Mode Switch at 60 WPM Baudot. Now set the receiver audio to a level to assure copy by the reader. Using the receiver tuning, adjust from high tone frequencies down until the righthand tune light is on steadily and the left light flickers during reception. You should now have good visual copy moving from right to left across the display.

Again, go through the outlined procedures 1, 2, 3 and 4 above. This will help establish the circuit relationships needed for easy tune up. Note that the left LED shows the ouput of the filter comparator while the right LED SHOWS THE SUMMATION OF THE MARK and SPACE filters. Hence, if both MARK and SPACE tones are tuned to the center of the filters, the right LED will be continuously lit as the signal shifts between MARK and SPACE.

You are now ready to check the MBA-RO in the TRANSMITTER MONITORING MODE. If you have a transmitter sidetone present in the receiver audio output that is connected to the MBA-RO, no further connections are required. The reader will copy the generated sidetone when you activate the key. As you key, you should see the text on the reader display. **It may be necessary to turn the reader filter to OFF.** In this mode the MBA-RO can serve as a useful training device in improving your Morse sending technique. Even skilled CW operators will experience an improved fist after exposure to the MBA-RO. The most common problem for operators is that of running characters and/or words together or putting word spaces within words. With these check-out procedures completed, you should be ready to put your reader into operation.

4. CW Speed Indication: The MBA-RO calculates code speed by measuring the length of each dot and dash. The space between characters is ignored. The speed is updated only between words.

OPERATING HINTS

1. Follow the tuning instruction you have learned. Keep in mind that CW reception is noticeably more susceptible to noise than RTTY reception.For this reason you will find it more demanding to tune in CW reception than RTTY. However, carefully following the procedures outlined earlier should eliminate most of the problems with CW reception. Generally speaking, in high noise conditions, a highly skilled CW operator cannot be matched by any computer available with today's technology. A good computerized reader such as the MBA-RO will certainly be able to copy Morse better at higher speeds than the majority of CW operators.

2. You may find that it is necessary to adjust your receiver tuning during the course of copy. This is caused by QSB, and adjacent frequency QRM, or frequency drift of the receiver **or transmitted signal.** For many receivers, it is necessary to allow 45 minutes or more for warm-up. This is required because of the close frequency tolerances of RTTY and is independent of the type reader used! Also, be sure to remove the receiver from any hot or cold air drafts.

3. When copying RTTY (Baudot), the most common amateur speed is 60 WPM. If, however, you should find a signal that is not reading properly, you can set the speed selection at 67, 75 or 100 WPM to see if this establishes good copy. Experience will dictate the proper selection.

4. ASCII sounds quite different from Baudot. If you are unfamiliar with ASCII, tune W1AW for their Bulletin. They follow each 60 WPM Baudot Bulletin transmission with a repeat Bulletin in ASCII at 110 Baud. Normally, the tuned copy of W1AW on Baudot will only require a change in the Mode Switch to copy their ASCII Transmission.

5. You may experience difficulty tuning commercial RTTY broadcasts as many of the news stations are using different or modified RTTY codes to prevent "eavesdropping".

6. The mark tone filter is also used for CW in the MBA. It is factory tuned to 800 Hz and the narrow and wide space tones are tuned to 970 Hz and 1225 Hz. This arrangement requires USB for normal RTTY and LSB for "reversed" tone frequencies. The filters may be retuned at the factory (at no expense during the warranty period) for other shifts or tone frequencies such as the 2125 Hz - 2295 Hz tone pair commonly used in VHF FM systems.

7. Some Baudot teleprinters automatically shift to letters during a space. The MBA-RO has this feature installed. It may be disabled by clipping the wire jumper near pin 23 of the 74150.

8. One of the most common errors made by operators that have never before tuned RTTY signals is **TUNING TOO FAST.** RTTY tuning requires slow precise tuning, regardless of the reader you use!

9. Random noise is a major problem in machine copy of CW or RTTY. If noise impulse gets through the filters, the computer cannot tell the difference between the noise impulse and a good signal. If you have a noise blanker on your receiver, you should use it, as it will usually improve copy. One advantage the MBA-RO offers with a 32 character display is

the ability to do some "post-copy editing" which means that you can make sense out of what would otherwise be poor copy. With experience, your ability to post-copy edit will imporve significantly.

10. The MBA-RO is programmed to read clean CW fists. Poor fist copying is always a compromise in design because if you allow for copying a sloppy fist in one extreme it will do very poorly in the other extreme. Generally, you will find that in the Ham bands, the copy will be best on high speed signals. This is because most high speed operators are using keyboards or are good automatic keyer operators.

11. The AEA Model MBA-RO represents an excellent value in engineering design and fine craftsmanship. We are most interested in having all our valued customers get the most from their investment in AEA products. If you are having any operational difficulties with your equipment after having read this manual, please feel free to contact our service department at (206) 775-7373. Many times a misunderstanding of the operating instructions can be cleared up with a few short minutes of telephone conversation.

12. For Morse training, we highly recomend the KT-1, KT-2, MM-1, MM-2 or MT-1 models of AEA trainers that can be used in conjunction with the MBA-RO for the best low cost training package that we are aware of. Any of the above mentioned trainers will generate Morse characters from a self-contained computer at any desired speed between 2 and 99 WPM. The MBA-RO can be used as an "impartial" judge of one's sending fist. It will also prove invaluable for assisting the student in initially familiarizing himself with the Morse characters.

MBA-RO SPECIFICATIONS

Morse:

Automatic Speed Tracking Range: 3-99 WPM
Filter: 100 Hz Bandwidth, 800 Hz Center, can be switched out
Speed Reading: Updated after each word space, 3-99 WPM

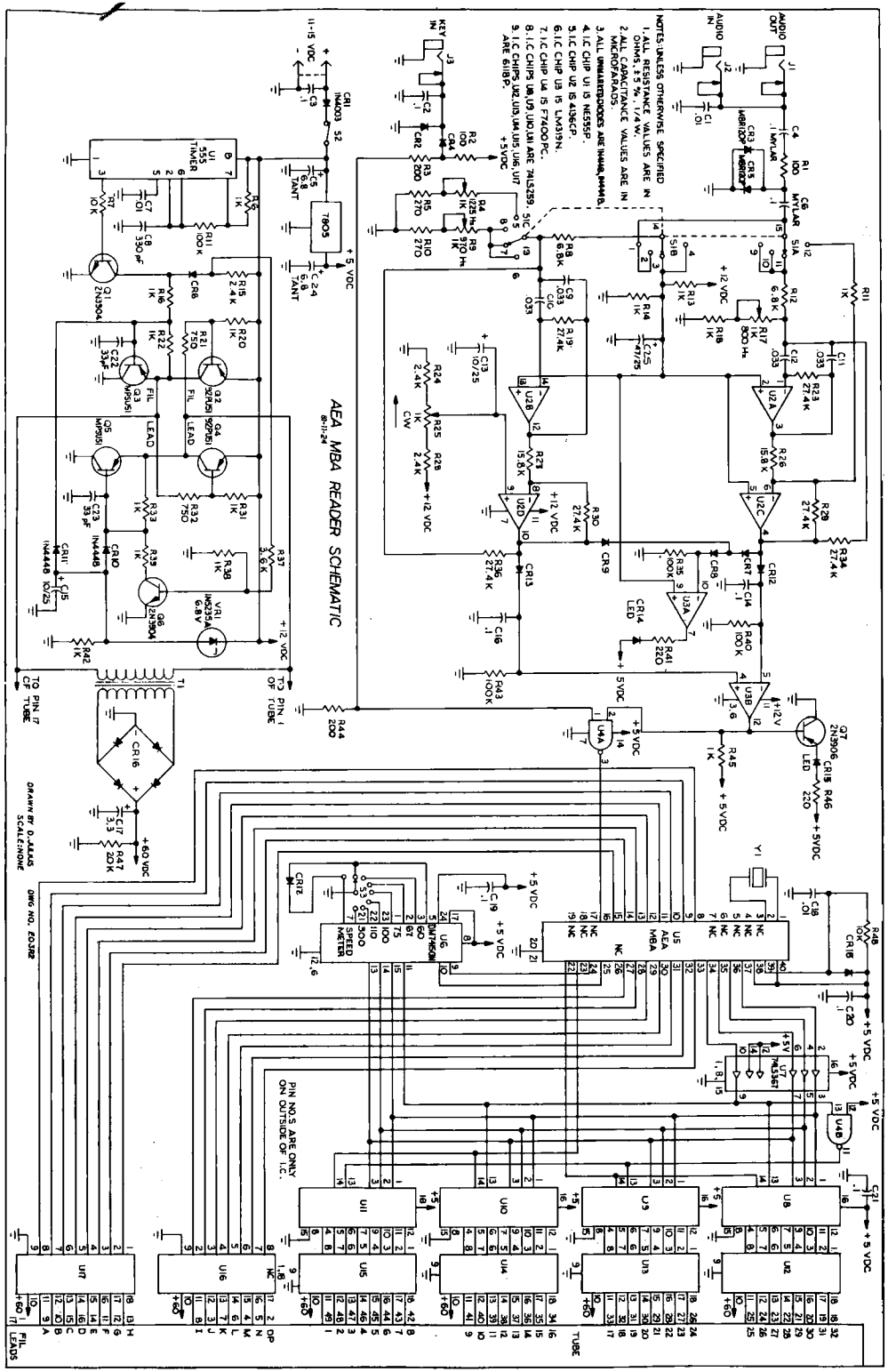
RTTY:

ASCII Speeds: 110 Baud
Baudot Speeds: Switchable 60, 66 2/3, 75, 100 WPM
Filters: Space Filter 100 Hz Bandwidth, 800 Hz Center Mark Filter 100 Hz Bandwidth, switchable 970 Hz (170 Hz shift) or 1225 Hz (425 Hz shift) Other shifts can be tuned by using CW filter only and tuning for space tone only.

General:

Display: 32 Character alphanumeric vacuum fluorescent 0.29"
14 segment characters
Input Impedance: Matches any common receiver output impedance
Power Requirements: 10 to 16 VDC at approximately 500 mA
117 Vac with optional AEA Model AC-1
Wall adaptor

Specifications subject to change without notice or obligation.



SYMBOLS

A	A	1	1	Ä
B	B	2	2	ÅA
C	C	3	3	É
D	D	4	4	CH
E	E	5	5	Ñ
F	F	6	6	Ö
G	G	7	7	Ü
H	H	8	8	Non Valid Characters
I	I	9	9	Error
J	J	Period	.	Understood
K	K	Question Mark	?	
L	L	Colon	:	Additional Teletype Characters
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	S	AS	AS	%
T	T	SK	SK	&
U	U	BK	BK	*
V	V	KN	KN	+
W	W	AR	AR	Null Character
X	X	Double Dash	=	[or
Y	Y	Hyphen	-	) or
Z	Z	Zero	Ø	Del

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 or original purchase. In order to obtain warranty service: (1) Complete and mail the warranty registration card, within ten days or purchase, to Advanced Electronic Applications, Inc., and (2) Send written notification to the address below or telephone our service department, as soon as possible after discovering a possible defect:

Advanced Electronic Applications, Inc.
Attention: Service Department
2006 - 196th S.W.
Lynnwood, WA 98036
(206) 775-7373

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 enclse 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 ocnform to the quality and specifications of the original parts; (2) misuse, abuse, neglect, or improper installation; (3) accidental or intentional damage. The field installatin or circuits or batteries according to the instructions in the manual will not nullify this warranty.

All implied warranties, if any, terminate ninety days from the dat or 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.

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