Instruction Manual
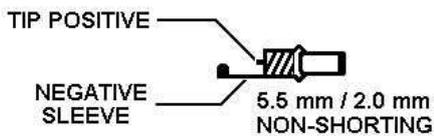## AEA TRAINER
And KEYTRAINER
MODELS KT-1,
MT-1 and MT-1 P

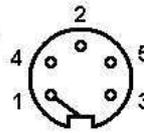# TABLE OF CONTENTS

MT-1, KT-1 WIRING INSTRUCTIONS

| Power Plug | Paddle Connection | Keyer output |

KEYING TRANSISTORIZED TRANSCEIVERS

Some transistorized transceivers such as the ICOM 701 and the Ten-Tec line require a slight modification of the AEA keyer. With this modification, a reed relay is not required for proper keying.

If the KT-1 does not key your transceiver, check your transceivers key input polarity with respect to chassis ground. If positive, modify the unit as follows:

A. Remove the keyer from its case an locate the diode second closest to the speaker (D4).
B. Solder a jumper across this diode.
C. Reassemble the keyer.

IMPORTANT!
If the keyer is to be used with a transceiver or transmitter with negative keying polarity, such as a vacuum tube transmitter with grid blocked keying, it is necessary to remove this jumper.

OPERATION

I. General
The AEA Keyer Trainer is a compact, full feature keyer and a sophisticated Morse trainer. The trainer features user-programmable automatically increasing code speed, two sets of Morse characters (common and common plus uncommon), five letter code groups or random code groups and selectable slow or Farnsworth code training.

II. Keyer

1. **Speed Set**
   The keyer is set to 20 WPM on turn-on. To change speed press [*][6] and enter the new speed as two digits. If the new speed is less then 10 WPM the first digit must be zero.

   Example: To enter 40 WPM: press [*][6][4][0].
             To enter 7 WPM: press [*][6][0][7].

   Speed may also be entered by [*][*][6].

2. **Sidetone Change**
   The key-trainer sidetone is set to 1111 Hz on turn-on. To increase the pitch, press [*][1] and hold the '1' until the desired pitch is reached.

   The sidetone pitch may be lowered by pressing [*][*][1] and hold the '1'.

3. **Automatic or semi-automatic (bug) operation**
   On turn-on, the keyer is set for automatic, iambic operation. The keyer may be operated as a bug by pressing [*][5]. To return to full automatic operation, press [*][*][5].

4. Straight Key Operation

For code practice or on-the-air use, the keyer may be used with a straight key by keying the dash input in semi-automatic (bug) mode.

5. Dot-Space, Dash-space Ratios (Weighting)

"Perfect" Morse code is formed with the length of dot equal to the intracharcter space length (a dot-space ratio of 1.0), and the dash length equal to three intracharacter space length (a dash-space ratio of 3.0).

The dot-space ratio is adjustable from 0.5 to 1.5 and is set to 1.0 on turn-on. To set the dot-space ratio, press [*][2] and enter the new ratio using the pound [#] key as the decimal point.

Examples: To enter a dot-space ratio of 0.7, press [*][2][0][#][7] or [*][2][#][7].
To enter a dot-space ratio of 1.3, press [*][2][1][#][3]

If the dot-space ratio entered exceeds 1.5 or less than 0.5, the ratio will be set to 1.0.

The dash-space ratio is set to 3.0 on turn-on and is adjustable from 2.0 to 4.0. To change the dash-space ratio, enter [*][*][2] and the new dash ratio using the pound [#] key as the decimal pointer.

Example: To enter a dash-space ratio of 3.7, press [*][*][2][3][#][7].

If the dash-space ratio entered exceeds 4.0 or is less than 2.0, the ratio will be set to 3.0.

The code speed is automatically corrected for other than "perfect" dot-space, dash-space ratios. The code speed is based on the word "PARIS". [1]

6. Dot and Dash Memories

The selectable dot and dash memories are enabled on keyer turn-on. The dot memory allows insertion of a dot during a string of dashes. For example, the letter "Q" could be generated in the following manner:
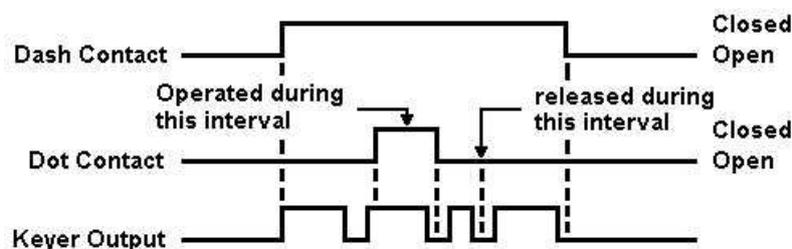
The dash memory operates in the same fashion, allowing the insertion of a dash in a string of dots.

To disable the dot memory, press [*][3].
To enable the dot memory, press [*][*][3].
To disable the dash memory, press [*][4].
To enable the dash memory, press [*][*][4].

7. Iambic Operation

Full Iambic operation is available with the dot and dash memories enabled or disabled. The Iambic feature is useful for generating characters with alternating dots and dashes such as the period and the letter "C". To utilize this feature, hold both the dot and the dash paddle closed.

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[1] See Appendix B

8. Transmitter Tune

To allow transmitter tuning, the keyer output transistors will be operated by pressing [*][*][7]. The '7' must be released before the keypad tone is completed. Tuning will be terminated by pressing any keypad button or operating the dot or dash paddle.

9. Mistakes

Incomplete, undesired keypad entries may be terminated by pressing the pound [#] key twice. If the entry has been completed, simply repeat with the correct entry. Unacceptable entries will be ignored. For example, if a speed change were entered [*][6][2][*], the result will be no speed change.

III. Trainer Operation

1. General

This Morse trainer generates a sequence of pseudo-random Morse characters which repeats after approximately 24.000 characters.

For code practice, ten fixed and one random starting points are available. Answer sheets for the ten fixed starting points are available from AEA.

The trainer can be programmed to increase its code speed from the programmable starting and finishing speeds during a programmable time.

Several other features are also program selectable.

2. Trainer Starting Speed

The trainer starting speed is set to 5 WPM when turned-on. To change the starting speed, press [*][6] and enter the two digit speed. For speeds less than ten WPM the first digit must be zero.

Example: For a 7 WPM starting speed, press [*][6][0][7].

3. Trainer Finishing Speed

The trainer finishing speed is set to 15 WPM on turn-on. To change the finishing speed, press [*][*][6] and enter the two digit speed. For speeds less than ten WPM the first digit must be zero.

Example: For finishing speed of 25 WPM, press [*][*][6][2][5].

4. Trainer Speed Increase Duration

On turn-on, the trainer period is set to ten minutes. To change the training period, press [*][7] and enter the new period in minutes and tenths of minutes using the pound [#] key as the decimal point. The digit following the decimal [#] concludes the entry and is necessary. The range is from 0.1 to 99.9 minutes.

Example: For a training period of 5 minutes and 30 seconds (= 5.5 minutes), press [*][7][#][5]. For a training period of 60 minutes, press [*][7][6][0][#][0].

5. Programming Constant Speed

In both slow code and Farnsworth mode, the trainer may be programmed for no speed change by programming a training period of 0.0.

Example: For no speed change, press [*][7][0][#][0].

In the slow code mode, the trainer will send at the starting speed. A finishing speed higher than the starting speed should be entered even for constant speed operations.

6. **Initiating Trainer Operation**

   After the various trainer operations have been selected, the trainer may be started by pressing [*][*][*] and then any of the digits. Each digit starts its own unique character sequence and your copy may be compared with the published answer book. (Write to AEA for Trainer Answer book. Send $2 including postage & handling.)

   If you find that you are memorizing the character sets press [*][*][*][#] for a random starting point.

7. **Terminating Trainer Operation**

   To stop the trainer, press and hold the pound [#] key until the trainer quits sending. After the key is released, a few additional dots and dashes may follow. The key paddles may also be used in place of the pound [#] key.

8. **Code Training Method – Farnsworth or Slow**

   Many people have found that it takes far less time to learn Morse code if the Morse characters are set at speeds greater than 12 to 15 WPM, but with the spaces between characters much longer than normal for these speeds. This method is referred to as "fast code" in this trainer, it is also called the Farnworth method. In this mode, the characters are sent at the finishing speed and the intercharacter space is initially set to make the code speed equal to the starting speed. The extra inter character space is gradually shortened throughout the training period. At the end of the training period the code will continue to be sent at the finish point.

   "Slow" code sends code with the proper inter character spacing. Unless you can copy code at speeds greater than 12 WPM, we strongly urge use of the fast code method.

   The trainer selects fast code operation during turn-on. To select "slow" code, press [*][0]. To re-select "fast" code, press [*][*][0].

9. **Five Character Code Group or Random Spacing**

   On turn-on, the trainer is set to transmit five character groups of code. If desired, random groups and spacing may be selected by pressing [*][9]. To reselect five character groups, press [*][*][9].

10. **Common or All Morse Characters**

    For the advanced code student, additional uncommon Morse characters may be selected by pressing [*][8]. To reselect common characters, momentarily turn off the power switch. Tables of the common and uncommon character sets are listed in appendix A.
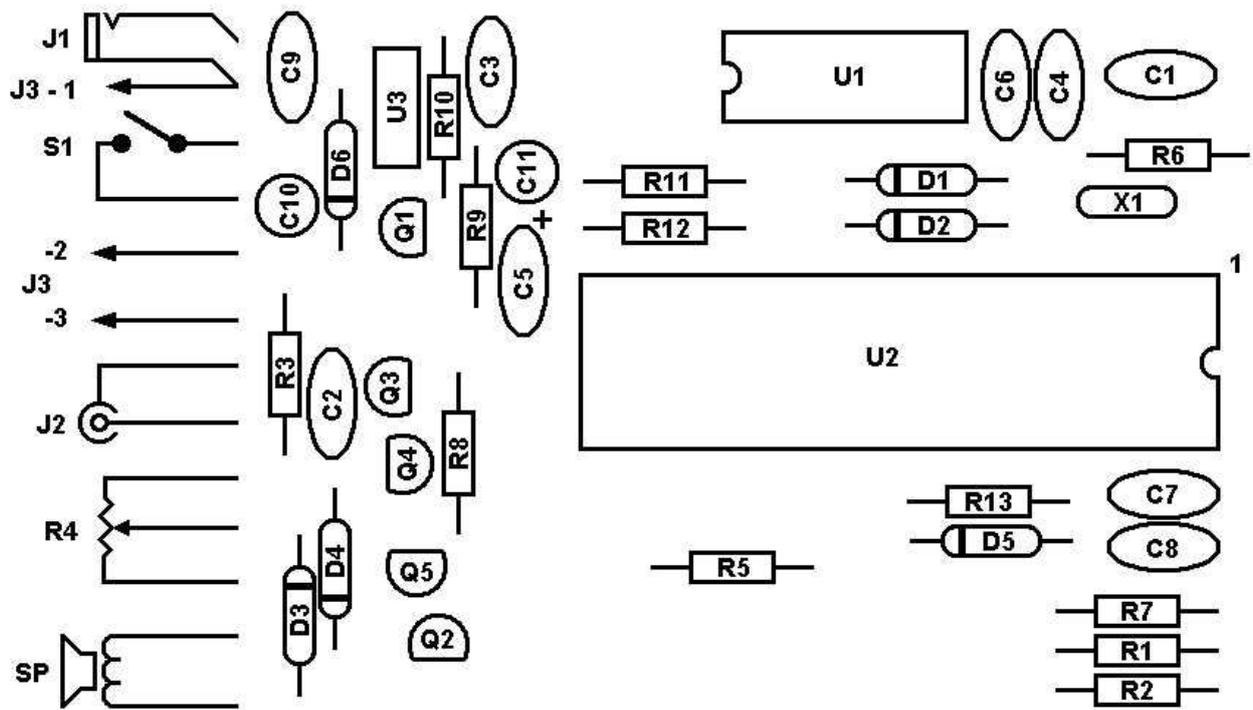
GENERAL INFORMATION

1. Battery Operation

The MT-1P includes a Ni-Cad battery pack and charger. Five to eight hours of operation may be expected on a full charge. Dead batteries should be charged for 14 hours. With dead batteries, the MT-1P will not operate from the charger during the first hour of charging. For charging, the power switch on the MT-1P must be off.
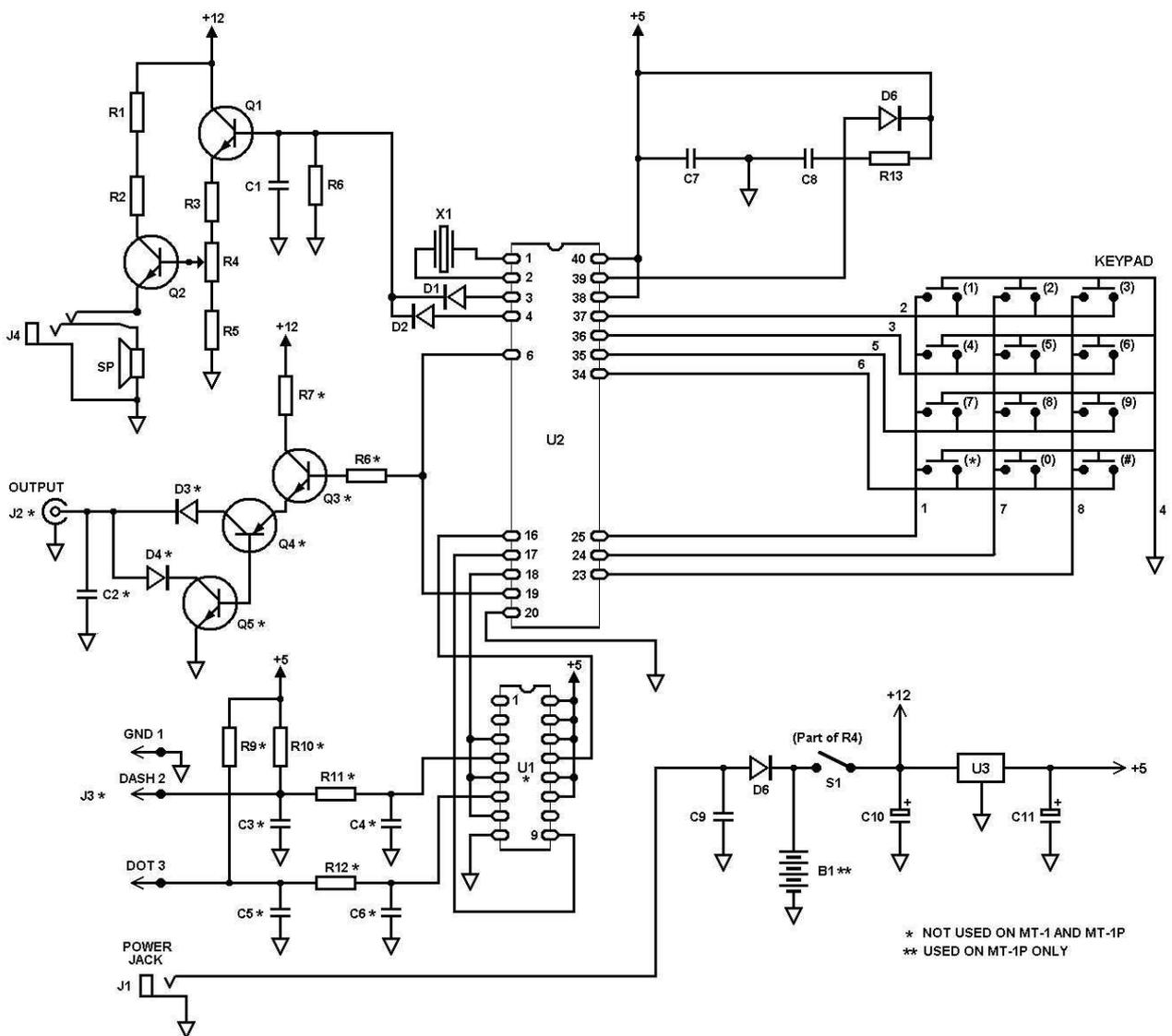
SCHEMATIC

PARTS PICTORIAL

PARTS LIST

B1	7AA NiCad	8.75v
C1	.0047 mf	50v disc cer
C2	.01 mf	500v disc cer
C3,4,5,6	.001	500v disc cer
C7,9	1 mf	50v disc cer
C8	.01 mf	50v disc cer
C10,11	10 mf	25v dipped tantalium
D1,2,5	1N4448 or 1N4148	
D,3,4	1N4006	
D6	1N4003	
Q1,3	2N3904	
Q2	MPUO1A or PMS6561	
Q4	MPSA92	
Q5	MPSA42	
R1,2	12 Ohms	½W 5% Carbon Comp
R3,7	330 Ohms	¼W 5% Carbon Comp
R4	1K Ohms	pot w switch, audio taper
R5	240 Ohms	¼W 5% Carbon Comp
R6,11,12	47K Ohms	¼W 5% Carbon Comp
R8	4.7K Ohms	¼W 5% Carbon Comp
R9,10	1K Ohms	¼W 5% Carbon Comp
R13	10K Ohms	¼W 5% Carbon Comp
U1	CDA4044B or MC14044B	
U2	AEA 1980 MT-1	
U3	7805 Voltage regulator	
X1	4.00 MHz Xtal	

APPENDIX A

Common Character Set

A · –
B – · · ·
C – · – ·
D – · ·
E ·
F · · – ·
G – – ·
H · · · ·
I · ·
J · – – –
K – · –
L · – · ·
M – –
N – ·
O – – –

P · – – ·
Q – · – ·
R · – ·
S · · ·
T –
U · · –
V · · · –
W · – –
X – · · –
Y – · – –
Z – – · ·
0 – – – – –
1 · – – – –
2 · · – – –
3 · · · – –

4 · · · · –
5 · · · · ·
6 – · · · ·
7 – – · · ·
8 – – – · ·
9 – – – – ·
Period · – · – · –
Comma – – · · – –
Question Mark · · – – · ·
Fraction bar – · · – ·

Less Common Characters

Colon – – – · · ·
Semicolon – · – · – ·
Parenthesis – · – – · –
Apostrophe · – – – – ·
Exclamatio point – · – · –
Quote · – · · – ·
Hyphen – · · · · –

Double Dash – · · · –
Understood · · · – ·
Wait · – · · ·
End of Work SK · · · – · –
Break BK – · · · – · –
End of Message AR · – · – ·

APPENDIX B

CODE SPEED

The international Morse code speed is defined by the word "PARIS". It has 10 dots, 4 dashes, 9 intracharacter spaces, 4 inter-character spaces and one word space for a total equivalent of 50 code elements (dot or space Time). To adjust code speed for various dot-space and dash-space ratios, the number of code elements in the word "PARIS" is used as a reference so that with any allowable dot-space and dash-space ratios, the code speed is correct for the reference word "PARIS".

PROGRAMMING KEY

MODEL KT-1 MORSE KEYER TRAINER

	*	**	***
1	Tone Frequency Up	Tone Frequency Down	
2	Dot Ratio	Dash Ratio	
3	Dot Mem. Off	Dot Mem. On	TRAINER
4	Dash Mem. Off	Dash Mem. Off	
5	Semi-Auto (bug)	Auto	TEST
6	Start Speed	Finish Speed	
7	Practice Duration	Tune	POSITION
8	All Characters	XXXXXXXXXXXX	
9	Random Space	5 Letter Groups	
0	Slow Code	Farnsworth	Random
#	HALT Trainer		

PROGRAMMING EXAMPLES

KEYER FUNCTIONS
1. To increase the sidetone frequency, press [*] and hold '1'.
2. Press [*][2] and enter the dot ratio [N][#][N] (range 0.5 to 1.5).
3. Press [*][*][2] and enter the dash ratio [N][#][N] (range 2.0 to 4.0).
4. Press [*][6] and enter any two digit speed from 01 to 99.

TRAINER FUNCTIONS
1. Press [*][6] and enter a starting speed from 01 to 99.
2. Press [*][*][6] and enter a character speed from 02 to 99 (must be higher than starting speed).
3. Press [*][7] and enter a practice duration (range 0.1 to 59.9 minutes) with [#] used for decimal point. Use [0][#][0] for infinite duration.
4. Press [*][*][*][#] to begin random code generation.