

## MorseMatic Errata

### 1. Trainer duration and beacon **off** time set.

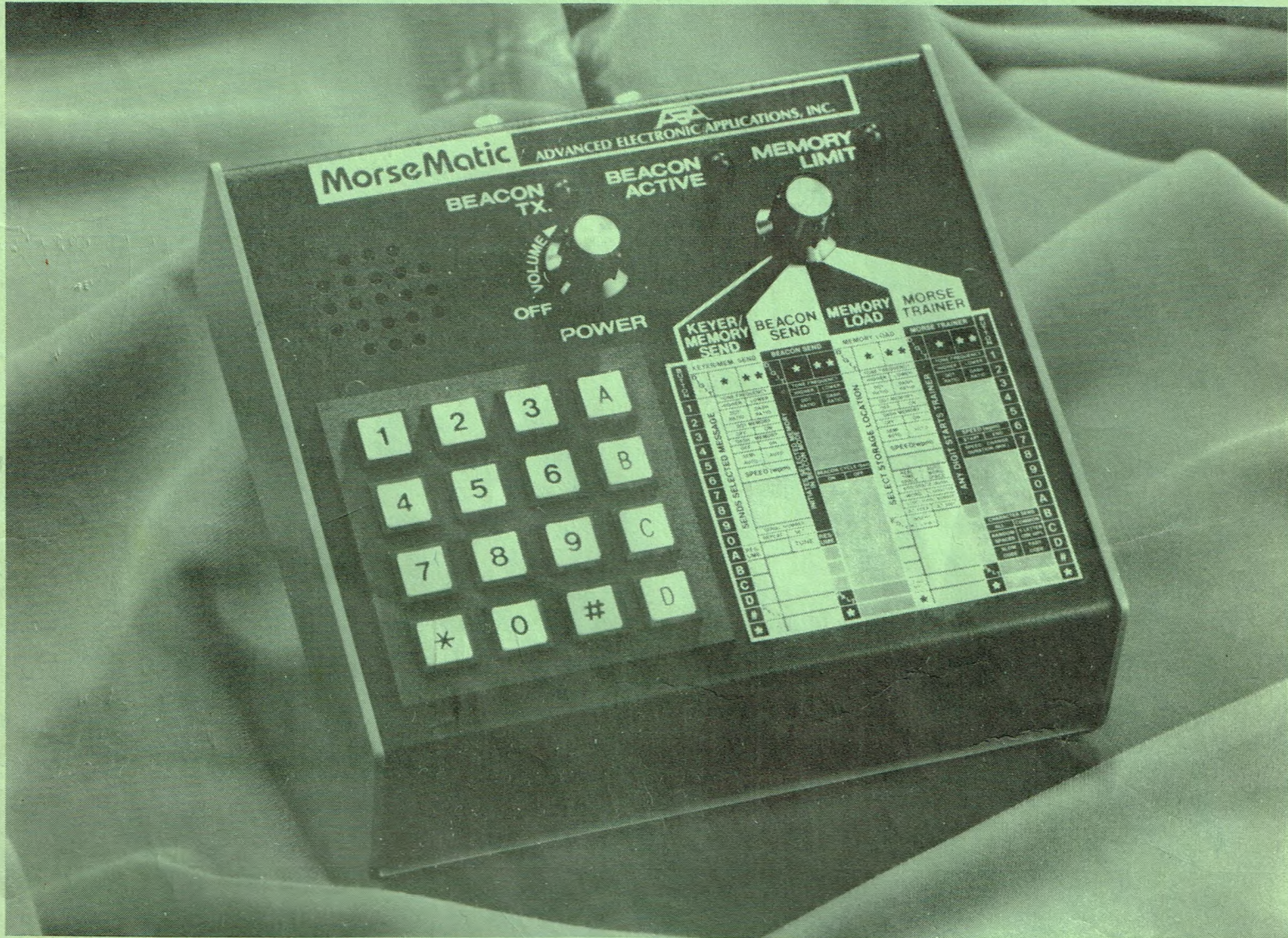
To set the trainer duration or beacon off time, first load a short message in any one of the memory locations, a single dot or dash is sufficient. Then, switch to trainer or beacon operation and load the duration or off time normally. It is the loading operation that clears one of the internal registers, just having something in the memory is not sufficient.

### 2. Trainer Character error.

In the difficult character set, the parenthesis has been coded incorrectly. It will be sent as -----instead of ---.--, which will make the difficult character set even more difficult.



ADVANCED ELECTRONIC APPLICATIONS, INC.



## MORSEMATIC MODEL MM-1

## INSTRUCTION MANUAL

P.O. Box 2160 • Bldg O & P—2006-196th SW • Lynnwood, Wa. 98036  
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ABBREVIATED INSTRUCTIONS

	<u>Instruction</u>	<u>Limits</u>
<b>Keyer:</b>		
Code speed	* 6 N N	02-99 in 1 wpm increments
Tone { Increase Decrease	* 1 * * 1	100 Hz. to 2500 Hz.
Dot-space ratio	* 2 N # N	0.5-1.5 in 0.1 increments
Dash-space ratio	* * 2 N # N	2.0-4.0 in 0.1 increments
Dot memory { On Off	* * 3 * 3	N/A
Dash memory { On Off	* * 4 * 4	N/A
Semiautomatic (bug)	* 5	N/A
Automatic	* * 5	N/A
Tune On Off	* * A Any button or key paddle	N/A
Serial number { Repeat Set	* 0 * * 0 N N N N #	N/A
<b>Memory Load:</b>		
Load	N message #	N/A
Erase	N #	N/A
Serial number insertion	* A	N/A
Serial number set	* 0 N N N N #	1# to 9,999#
Auto space load	* * 8	N/A
Real time load	* 8	N/A
Additional spaces { Character (3) Word (7)	* * 9 * 9	N/A
<b>Morse Trainer:</b>		
Start speed set	* 6 N N	02-99 in 1 wpm increments
Finish speed set	* * 6 N N	02-99 in 1 wpm increments
Duration of speed increase set (minutes & tenths)	* 7 N N # N	00.1 to 59.9 in 0.1 min. increments

	<u>Instruction</u>	<u>Limits</u>
Fast code method	* * D	N/A
Slow code method	* D	N/A
Characters { Common + Uncommon	* * B * B	N/A
Character groups { 5 character Random character	* * C * C	N/A
<b>Beacon Send:</b>		
Beacon transmission time set (seconds)	* 7 N N N 7	1 to 999 in increments of 1 sec.
Beacon quiet time set (seconds)	* * 7 N N N 7	1 to 999 in increments of 1 sec.
Beacon start	N message (starts on button release)	N/A

N = one of the numbered buttons

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MorseMatic™ SPECIFICATIONS

Keyer and trainer speed range: 2 to 99 wpm.

Memory: 4096 bits (approximately 500 Morse characters).  
Option to 16,384 bits.

Keying outputs: Grid block - -300 V. max., 30 ma. max.  
Cathode/transistor - +300 V. max., 300 ma. max.

Serial number range: 01 - 9,999.

Beacon send time range: 1 - 999 seconds.

Beacon receive time range: 1 - 999 seconds.

Trainer increasing speed duration: 0.1 - 59.9 minutes.

Dot memory off: Program selectable.

Dash Memory Off: Program selectable.

Dot/space ratio: 0.5 - 1.5.

Dash/space ratio: 2.0 - 4.0.

Semiautomatic (bug) mode: Program selectable.

Memory keep-alive: Holder provided for two size C batteries for up to 24 hours of memory retention. Batteries are automatically switched in only upon removal of external 12 volt source.

Trainer modes: Program common or all characters.  
Program slow or fast (Farnsworth) speed increase.  
Program random length or 5 letter word length.

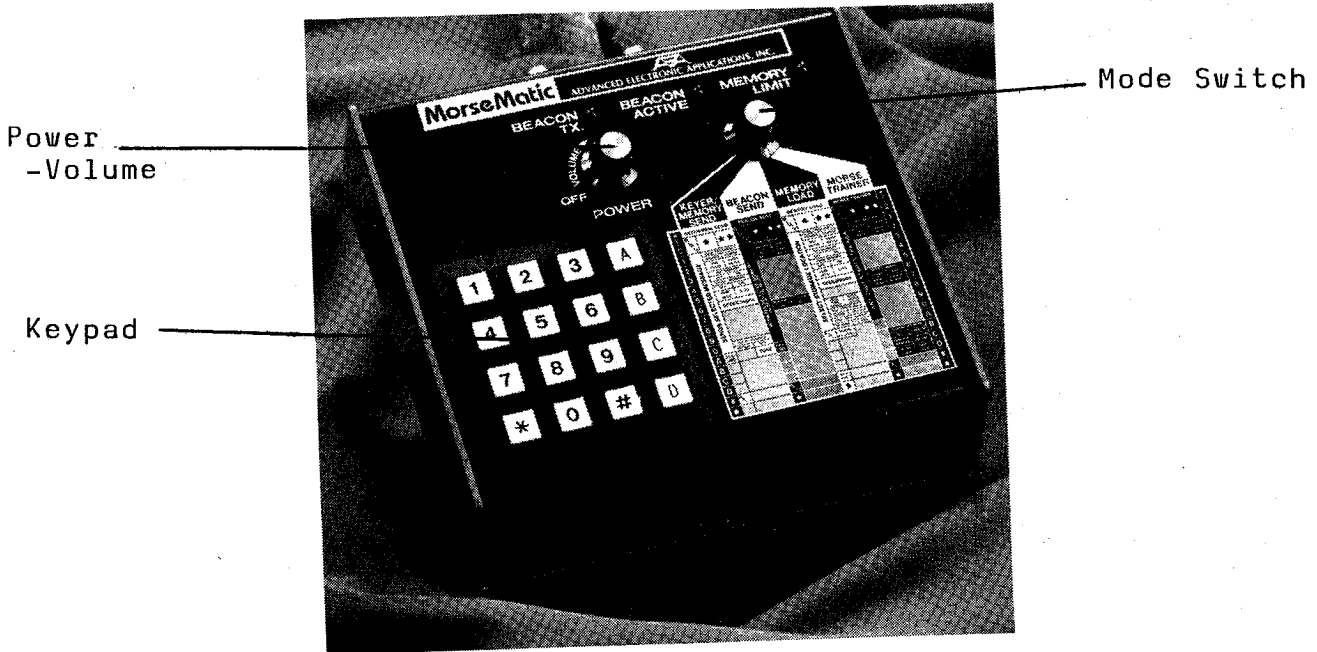
Power required: 9-16 VDC at 300 ma. (600 ma. with memory expansion option.)

Weight: 1 lb. 12 oz.

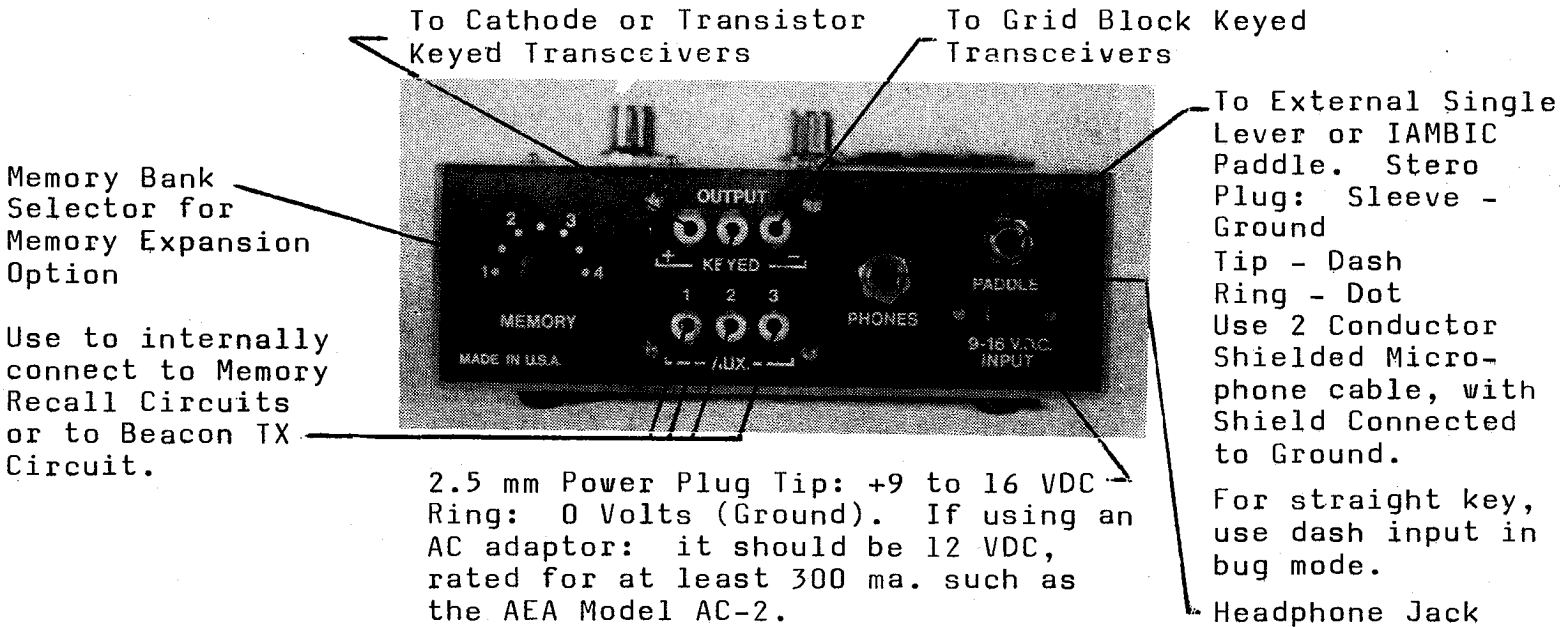
Dimensions: 6" deep x 6" wide x 3½" high

Options: 2000 character memory expansion board and switch.  
CMOS (low standby power) memory.

FRONT PANEL LAYOUT



BACK PANEL LAYOUT



Power -Volume

Mode Switch

Keypad

Memory Bank Selector for Memory Expansion Option

Use to internally connect to Memory Recall Circuits or to Beacon TX Circuit.

For straight key, use dash input in bug mode.



OPERATION

I. Keyer Mode

1. Speed set.

The keyer is set to 20 wpm on turn-on. To change the speed push   and enter the new speed as two digits, eg.   . If the new speed is less than 10 wpm, the first digit must be zero. The range of speed is from 02 to 99 wpm.

Example: To enter 40 wpm; press     .

To enter 7 wpm; press     .

2. Sidetone change.

The sidetone is set to 500 Hz. on turn-on. It may be raised by pressing   and holding the "1" key until the desired tone is reached. The tone may be lowered by pressing  twice and holding the "1" key, i.e.    .

The frequency at the end of the sidetone change will be the frequency of the CW sidetone. The frequency of the keypad feedback tone will be lower.

3. Auto semi-auto operation.

On turn-on the keyer is set to automatic keyer operation. The keyer may be operated in the semi-automatic mode by pressing   . The keyer now behaves as a "bug". To return to full automatic mode, press    .

4. Dot-dash ratio.

"Perfect" Morse code is sent with the time for a dot equal to the time for a character space (a dot-space ratio of 1.0) and the time for a dash equal to 3 space times (a dash-space ratio of 3.0).

The dot-space ratio is adjustable from 0.5 to 1.5 in 0.1 increments and is set to 1.0 on turn-on. To adjust the dot-space ratio, press   and enter the dot ratio with the pound (#) sign as a decimal.

Example: To enter a dot ratio of 0.7; press

or     .

To enter a ratio of 1.3; press      .

If the dot-space ratio entered exceeds 1.5 or is 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 in 0.1 increments. To change the dash ratio, enter    and the new dash ratio.

Example: Dash ratio of 3.5 is desired; press   2   3   5 .

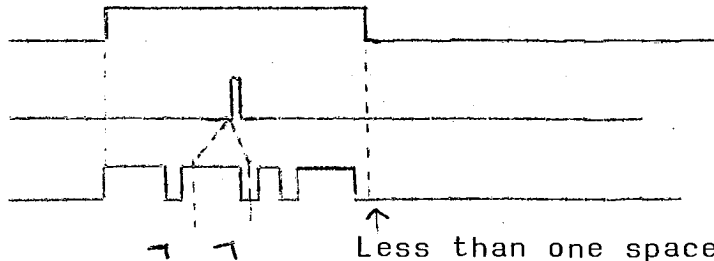
If the dash-space ratio entered exceeds 4.0 or is less than 2.0, the ratio will be set to 3.0.

The code speed is automatically adjusted for other than "perfect" dot and dash ratios and is based on the word "PARIS".<sup>1</sup>

5. Dot-dash "memory".

The selectable dot and dash memories are enabled on turn-on. The dot memory allows insertion of a dot during a string of dashes. For example, the letter "Q" could be sent as follows:

Dash contact	closed
	open
Dot contact	closed
	open
Keyer output	closed
	open



Dot contact made after dash has started but before space time has expired, will give proper dot. Dot contact does not have to be proper duration.

The dash memory operates in the same fashion, allowing the insertion of a dash in a string of dots.

With both dot and dash memory enabled, holding both dot and dash contacts closed will result in alternating dots and dashes. This feature is useful for generating characters like the period and the letter "C".

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 .

6. Transmitter tuning.

To allow transmitter tuning, the keyer output transistor will be operated upon pressing   A .The "A" key must be released quickly.

Tuning will be terminated upon pressing any pad button or touching the dot or dash key paddle.

The tune feature only operates in the keyer/memory send mode.

<sup>1</sup>See Appendix B.

7. Clearing entries.

Incomplete, undesired entries may be erased by pressing # twice.

8. Unacceptable entries.

Unacceptable entries will be ignored. For example, if a speed change were entered \* 6 2 A , the result will be no speed change.

II. Memory Keyer Utilization

A. Memory Load Mode

IMPORTANT NOTE: When the MorseMatic™ first has 12 V. or battery keep-alive power applied, it is necessary to properly reset the memory. The reset is properly established by making the following entries in the order shown:

# # 1 # 2 # 3 # 4 # 5 # 6 # 7 # 8 # 9 #

Resetting the memory will not be necessary unless 12 V. power is removed and the keep-alive batteries are not installed. If the unit was not properly reset in the beginning, simply unplug the MorseMatic™ from the power source (and disconnect the keep-alive batteries), reconnect, and perform the reset entries. Power is applied at all times to the memory, as long as 12 volts input is connected.

1. Memory locations.

The MorseMatic™ has ten separate memory locations that may be loaded with any length messages, to about 500 characters, total. That is, one memory could have all 500 characters or one with 50, another with 300, and another with 150, etc. (An optional memory expansion to 2,000 characters will be available in the future.)

Two memory loading options are available, the real-time load and the automatic load. In both load modes, memory loading does not begin until the first character is loaded (i.e., there will be no pause when starting memory send).

2. Automatic memory load.

In automatic load, a pause in loading longer than two dot times records a character space. If the pause is

longer than five dot times, a word space is recorded. In this mode you may make long pauses between words without using additional memory. The MorseMatic™ is set to automatic load during turn-on.

3. Real-time memory load.

In the real-time load, all pauses in sending will be recorded as sent. To reselect automatic load, press \* \* 8 .

4. Message entry.

To enter a message into the memory, press the digit of the desired location, key in the message, and terminate the message with # .

Example: To store a message in memory 5, press 5 .

Now enter the message with the key.

IMPORTANT: After the message is entered, press # .

5. Maximum loading speed.

The maximum loading speed is normally 20 wpm. However, faster loading (up to 40 wpm) is permissible if the memory is loaded in sequence (0, 1, 2, etc.). This means that to load a given memory at 40 wpm (say memory 3), all higher memories (4, 5, 6, etc.) must be empty or contain relatively short messages. When the MorseMatic™ is first turned on, the memories contain garbage. These must be cleared prior to high-speed, sequential loading.

If the maximum loading speed is exceeded, loading errors will be present in the memory being loaded. Other memories will not be affected.

6. Serial number.

An automatically incremented serial number (01 to 9,999) may be inserted anywhere in any of the ten messages. It may also be inserted as many times as desired within a message. (The serial number increments only after the message is sent.)

To insert the automatic serial number during the loading of a message, press \*A .

On turn-on the serial number is set to 01. In the MEMORY-LOAD mode, a different starting serial number may be loaded by pressing \*0 XX XX # .

Examples: To start at serial number 57, press

\*0 57 # . (Before or after message has been loaded.)

To start at serial number 4234, press

\*0 4234 # . (Before or after message has been loaded.)

The serial number may be reset to 01 by pressing \* \* 0 .

#### 7. Pause in automatic load.

An extra pause, or dead time, may be loaded in memory. A character space (equal to three dot times) may be inserted in a message by pressing \* \* 9 . A word space (equal to seven dot times) is loaded by pressing \* 9 .

#### 8. Erase.

Provided the 12 V power source has not been interrupted or memory back-up batteries are used, turning the keyer on and off from the switch will not erase memory. If the 12 V power source is interrupted and no battery back-up is used, the memory will be lost and upon turn-on will fill with random characters (garbage). Complete erasure or reset of all memory locations must be made as previously described in section II-A.

If individual messages are to be erased, simply press the message number N and # . The entire message in that location will be erased.

Example: Erase messages 3 and 7, press

3 # 7 # or 7 # 3 # .

If long messages are to be entered, unused or undesired messages should be erased.

#### 9. Edit.

If in memory send (see memory send section), a message is halted before it is completed, the remainder may be terminated or changed at that point. Switch to MEMORY

LOAD. To change the remainder of the message, press A , enter the new part of the message normally, and finish with # . If the remainder of the original message was to be erased, press A # .

10. Memory full.

The memory full warning light is illuminated when approximately 22 characters remain. When the sidetone changes, all memory is full and loading is automatically terminated. If further loading is desired to complete the current message, one of the other messages must be erased or shortened. (Use edit mode for reducing a previous message and then continue the current message.) If further loading is initiated before clearing space, all messages will be lost and it will be necessary to remove power from the memory by removing the battery and power plug.

11. Semi-auto key entry.

Messages may be entered in the semi-auto (bug) mode. During memory send, they will be sent with the selected dot and dash ratio.

B. Memory Send Mode

The messages stored in any of the ten memory locations may be sent at any speed between 2 and 99 wpm regardless of their loading speed.

The mode switch must be in KEYS-MEMORY SEND.

1. Sending a message.

To start a message, press the digit of the desired message. The message will start when the button is released.

Example: To send message 6, press 6 .

2. Interrupting and restarting a message.

A message may be interrupted by either pressing the # button or tapping either of the key paddles. The Morse-Matic<sup>TM</sup> then enters normal keyer operation. The message may either be restarted by pressing the message digit or resumed from the point of interruption by pressing A .

If the message has completed, pressing [A] will start the next message.

3. Editing.

See section II.A.9.

4. Serial number change or repeat.

Each time a message with a serial number is sent and completed, the number is incremented, allowing the same number to be repeated within a message.

It is common in contests for a station to ask for a serial number repeat only. We recommend that you load one message location [N] with:

[N] "NR" (keyed in with paddle) [\*][A][\*][A] "K" (keyed in with paddle) [#].

Now you can very rapidly hit [\*][0] and then [N] for the serial number only to be repeated twice. This can also be used to verify your last serial number after taking a break. Each time [\*][0] is pressed, the serial number will be reduced by one.

In the KEYSER-MEMORY SEND mode, a new serial number may be entered by pressing [\*][\*][0] [X][X][X][X][#].

Example: To reset the serial number to 285, press [\*][\*][0] [2][8][5][#].

If a message with a serial number was sent and the contact not completed, you simply press [\*][0] prior to making your next contact and the previously sent serial number will be reused for the new contact.

III. Beacon Send Mode

In certain areas of communications such as moon bounce, tropospheric, and meteor scatter, it is desirable to transmit a message during a fixed time and then receive for another fixed time.

The MorseMatic<sup>TM</sup> does this by sending any of the ten memory messages in a selected time by adjusting the code speed.

1. Beacon on and off time.

The following entries must be made in BEACON SEND mode.

The range of beacon on and beacon off times is from one second to 999 seconds in one second increments. The time entry must be terminated with the pound sign [#].

Example: A message is to be sent in 15 seconds and then the receiver is to be activated for 45 seconds. Load the beacon on time to 15 seconds by pressing  7  1  5  # . Load the beacon off time (receive time) to 45 seconds by pressing  \*  \*  7  4  5  # .

2. Serial numbers in beacon mode.

Serial numbers may be included in a beacon message but because of uncertainty of the incrementing serial number length, the beacon on time will be longer than entered by the time required to send the serial number.

3. Initiating the beacon mode.

To start the beacon, press the digit of the desired message. The message is started when the button is released. The beacon active indicator will remain on while the beacon is cycling.

4. Interrupting the beacon.

As in the memory send mode, the beacon may be interrupted by either pressing the  # button or touching either of the key paddles. After interruption, keyer mode is entered.

5. Restart or resume beacon.

As in the memory send mode, the beacon may be restarted by pressing the digit of the desired message or the beacon message may be resumed by pressing  A .

6. Transmitter.

An accessory output is available on the MorseMatic<sup>TM</sup> to operate a transmitter send receive switch from one second before the beacon starts sending until the beacon message is completed. The first time the beacon message is sent, the accessory output is not operated. This allows a test of the message speed before operating the transmitter. This accessory output may be connected to one of the auxiliary jacks. (See schematic) The beacon transmit light will indicate when this output is activated. This feature can allow manual transmitter switching if desired.



#### IV. Morse Trainer Mode

The Morse trainer sends randomly selected Morse characters at an increasing rate for a selectable duration. The random characters are preprogramed into one of the custom microcomputers using a pseudo random generator.

Several modes of operation are selectable. The mode switch must be set to MORSE TRAINER to enter the following:

1. Trainer starting speed.

The starting speed is set to 05 wpm on turn-on. To change the start speed, press [\*] [6] and enter the two digit speed.

Example: 07 wpm start speed, press [\*] [6] [0] [7] .

2. Trainer finishing speed.

The finish speed is set to 15 wpm on turn-on. To change the finish speed, press [\*] [\*] [6] and enter the two digit speed.

Example. 20 wpm finish speed, press [\*] [\*] [6] [2] [0] .

3. Trainer speed increase duration.

On turn-on, the trainer duration is set to 10.0 minutes. The duration is entered in minutes and tenths of minutes with the [#] (pound) key used as a decimal. The digit following the decimal [#] concludes the entry and is necessary. The range is from 0.1 minute to 59.9 minutes.

Example: 5 min. 30 sec. duration (=5.5 min.), press [\*] [7] [5] [#] [5] or [\*] [7] [0] [5] [#] [5] .

Example: 15 min. 0 sec., press [\*] [7] [1] [5] [#] [0] .

At the end of the speed increase duration, the trainer will continue to send at the finish speed.

4. Terminating trainer operation.

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

5. Initiating trainer operation.

After the various trainer options have been selected, the trainer may be started by pressing any of the digits or the

A button. Each digit will send its own unique character sequence and your copy may be compared with the published answer book. If you find that you are memorizing the character sets, press the [A] button for a random start. There will be a delay in the start of the trainer after the button is released.

6. Fast or slow code mode.

Many people find learning code takes far less time if the characters are sent at speeds greater than 12 to 15 wpm, but with the spaces between characters much longer than normal for these speeds. This is referred to as fast code or the Farnsworth method. In this mode, the characters are sent at the finishing speed, but the intracharacter space is adjusted to make the code speed equal to the starting speed. The extra space is gradually shortened until the code is sent at the finishing speed.

Slow code sends code with the proper intercharacter spacing during the speed increase. Unless you can copy code at speeds greater than 12 wpm, we strongly recommend use of the fast code method.

During turn-on the fast code mode is selected. To select slow code, press \* D . Fast code is reselected by pressing \* \* D .

7. Five character code groups or random spacing.

On turn-on, the trainer is set to transmit five character code groups. If desired, random spacing may be selected by pressing \* C . Five character groups are reselected by pressing \* \* C .

8. Common characters or all characters.

For the advanced code student, additional, uncommon characters may be selected by pressing \* B . Tables of both common and uncommon characters are listed in Appendix A.

V. Remote Memory Recall

Two memory locations, 0 and 1, may be remotely activated. Connect pads 31 and 32 to the auxiliary jacks as shown in the schematic. Then, in addition to the keypad, momentary grounding of the respective auxiliary jack will start the memory send feature in location 0 or 1.

APPENDIX A

Common Character Set

A . _	O _ _ _	2 . . _ _ _
B _ . . .	P . _ _ .	3 . . . _ _
C _ . _ .	Q _ _ . _	4 . . . . _
D _ . .	R . _ .	5 . . . . .
E .	S . . .	6 _ . . . .
F . . _ .	T _	7 _ _ . . .
G _ _ .	U . . _	8 _ _ _ . .
H . . . .	V . . . _	9 _ _ _ _ .
I . .	W . _ _	Period . _ . _ . _
J . _ _ _ _	X _ . . _	Comma _ . . . _ _
K _ . _	Y _ . _ _	Hyphen _ . . . . _
L . _ . .	Z _ _ . .	Fraction bar _ . . _ .
M _ _	Ø _ _ _ _ _	Question mark . . _ _ . .
N _ .	l . _ _ _ _	Double dash _ . . . . _

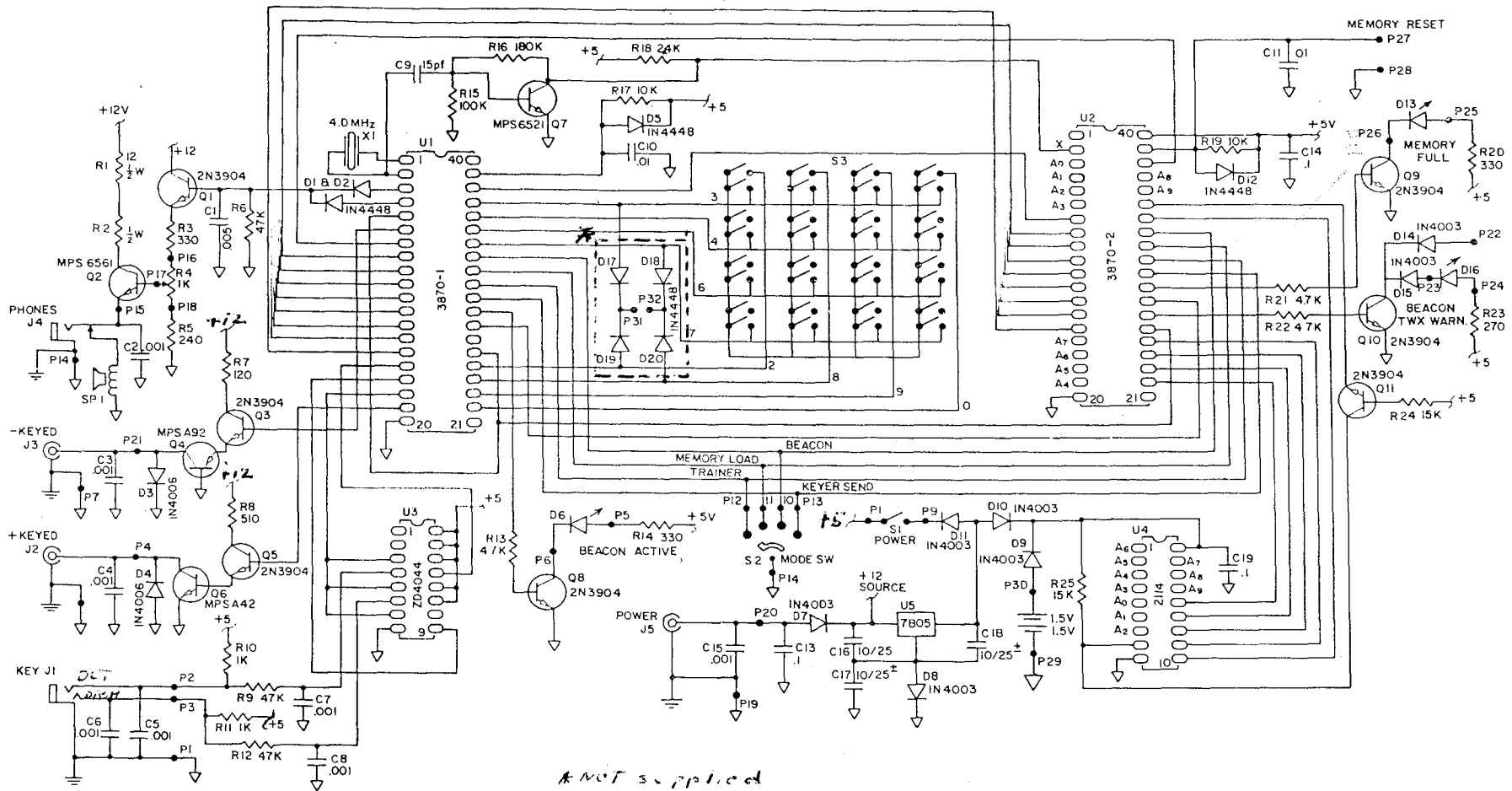
Less Common Characters

Colon _ _ _ . . .	Understood . . . _ .
Semicolon _ . _ . _ .	Wait <u>AS</u> . _ . . .
Parentheses _ . _ _ . _	End of work <u>SK</u> . . . _ . _
Apostrophe . _ _ _ _ .	Break <u>BK</u> _ . . . . .
Exclamation point _ . _ . _	End of message <u>AR</u> . _ . _ .
Quote . _ . . _ .	

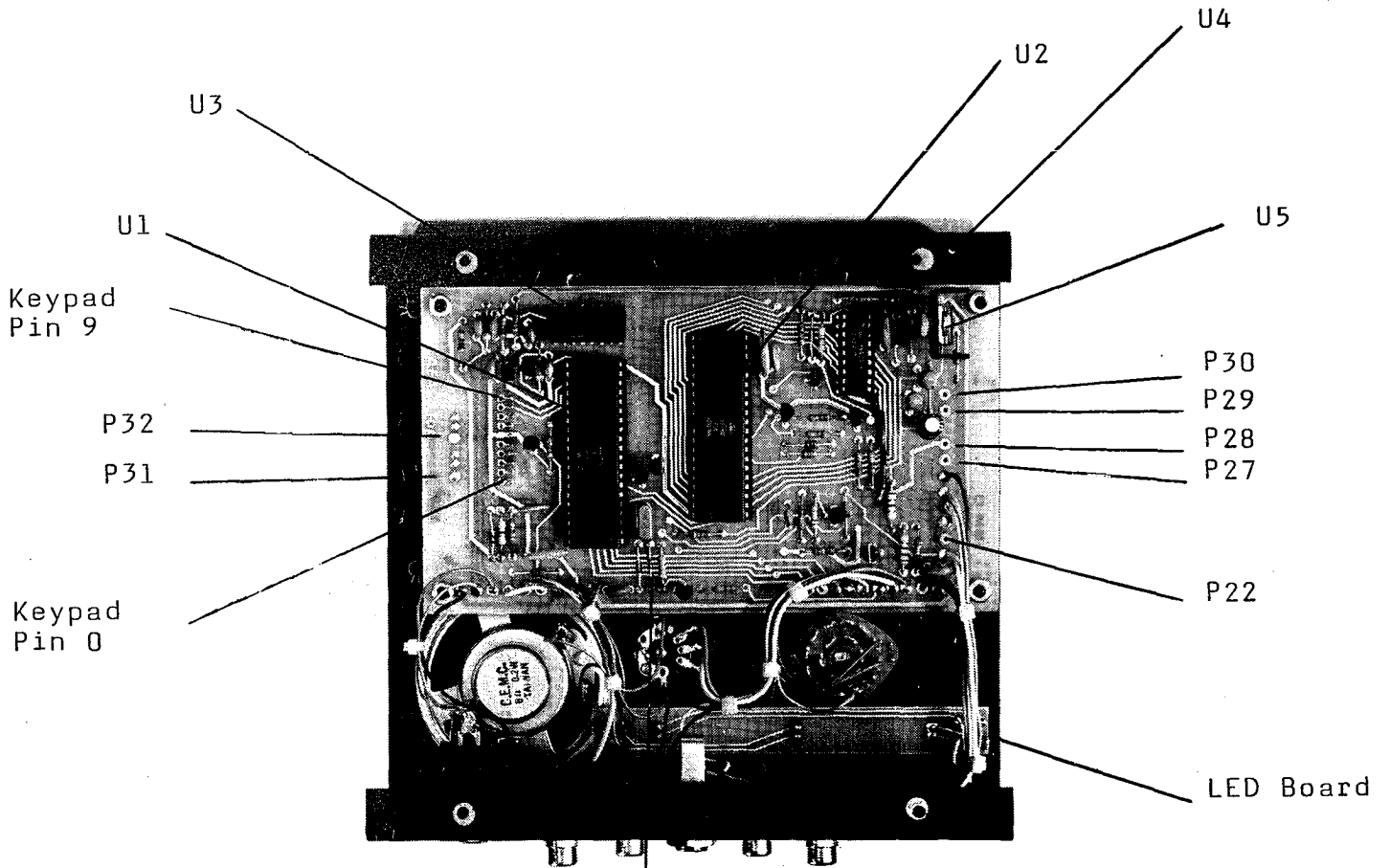
APPENDIX B

CODE SPEED

The international Morse code speed is defined by the word "PARIS". It has 10 dots, 4 dashes, 9 intra-character 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".



PARTS PICTORIAL



D2 - Remove to defeat  
Keypad Feedback Tone.

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  
Bldg. "O", 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. The field installation of 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 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.

ADVANCED ELECTRONIC APPLICATIONS, INC.  
P.O. BOX 2160  
Lynnwood, WA. 98036

BUTTON	KEYER/MEM. SEND		BEACON SEND		MEMORY LOAD		MORSE TRAINER		BUTTON			
	D-G-T	* **	D-G-T	* **	D-G-T	* **	D-G-T	* **				
1	SENDS SELECTED MESSAGE	TONE FREQUENCY		INITIATES SELECTED MEMORY IN BEACON MODE	TONE FREQUENCY		SELECT STORAGE LOCATION	TONE FREQUENCY		1		
2		HIGHER	LOWER		HIGHER	LOWER		HIGHER	LOWER	HIGHER	LOWER	2
3		DOT RATIO	DASH RATIO		DOT RATIO	DASH RATIO		DOT RATIO	DASH RATIO	DOT RATIO	DASH RATIO	3
4		DOT MEMORY			DOT MEMORY			DOT MEMORY		DOT MEMORY		4
5		OFF	ON		OFF	ON		OFF	ON	OFF	ON	5
6		DASH MEMORY			DASH MEMORY			DASH MEMORY		DASH MEMORY		6
7		OFF	ON		OFF	ON		OFF	ON	OFF	ON	7
8		SEMI AUTO	AUTO		SEMI AUTO	AUTO		SEMI AUTO	AUTO	SEMI AUTO	AUTO	8
9		SPEED (wpm)			SPEED(wpm)			SPEED(wpm)		SPEED (wpm)		9
0		START	END		START	END		START	END	START	END	0
A	SPEED CHANGE DURATION (MIN.)		SPEED CHANGE DURATION (MIN.)		SPEED CHANGE DURATION (MIN.)		SPEED CHANGE DURATION (MIN.)		A			
B	REAL TIME SPACE		REAL TIME SPACE		REAL TIME SPACE		REAL TIME SPACE		B			
C	AUTO WORD SPACE		AUTO WORD SPACE		AUTO WORD SPACE		AUTO WORD SPACE		C			
D	ADD SPACE (Auto)		ADD SPACE (Auto)		ADD SPACE (Auto)		ADD SPACE (Auto)		D			
#	WORD	CHARACTER	WORD	CHARACTER	WORD	CHARACTER	WORD	CHARACTER	#			
*	START SERIAL NUMBER		START SERIAL NUMBER		START SERIAL NUMBER		START SERIAL NUMBER		*			
	AT XXXX	AT 0001	AT XXXX	AT 0001	AT XXXX	AT 0001	AT XXXX	AT 0001				
	INSERT W.S.-S/N-W.S.		INSERT W.S.-S/N-W.S.		INSERT W.S.-S/N-W.S.		INSERT W.S.-S/N-W.S.					
	CHARACTER SEND		CHARACTER SEND		CHARACTER SEND		CHARACTER SEND					
	ALL	COMMON	ALL	COMMON	ALL	COMMON	ALL	COMMON				
	RANDOM SPACES	5 LETTER CODE GRPS.	RANDOM SPACES	5 LETTER CODE GRPS.	RANDOM SPACES	5 LETTER CODE GRPS.	RANDOM SPACES	5 LETTER CODE GRPS.				
	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE				
	END INPUT		END INPUT		END INPUT		END INPUT					
	HALT		HALT		HALT		HALT					
	RES-UME		RES-UME		RES-UME		RES-UME					
	TUNE		TUNE		TUNE		TUNE					