A-TRONIX CW KEYBOARD

SPECIFICATIONS

Transmission speed:	5-50 WPM
Character list:	26 Alphabetic
(available without a shift key)	10 Numeric
	7 Punctuation
	4 Special characters (SK, AS, AR, BT)
	1 Double character (transmits next two characters keyed without inter-character space)
	1 Word space
Output 1:	Keyer Output (reed-relay, 20VA, 250 VDC, 1A)
Output 2:	Sidetone Output (Vout—1.5Vrms, Zout—1K)
Power:	117 VAC, 50-60Hz, 15 Watts
Size:	13 in. long, 7 in. deep, 4 in. high
Weight:	6 pounds
Memory Option capacities:	
Erasable	4 sections of 64 characters each
Pre-programmed	32 characters

A-TRONIX
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DESCRIPTION

The A-Tronix CW Keyboard is a self-contained instrument for sending standard Morse Code by operating a typewriter-like keyboard. It requires only a source of 117VAC and a two-wire connection to the key input of any transmitter or other code equipment.

The solid-state circuitry includes:

- a keyboard decoder to translate key strokes into the correct sequence of dots and dashes;
- a 64 deep, first-in-first-out, holding register to store characters in the proper order for transmission;
- a stable clock circuit which can be adjusted by front panel control to the desired speed of transmission. The clock also maintains the proper timing ratios for dots, dashes and the various spaces.
- a sidetone generator and loudspeaker with front panel volume control to provide operator feedback;
- a reed-relay output to provide complete isolation between the keyboard and associated equipment. The relay contacts have virtually no ON resistance and no offset voltage to disturb circuitry in associated equipment;
- a power supply.

Additional circuitry prevents the disruption of any character being transmitted. If a key is depressed while a previously keyed character is being transmitted, the second character will be stored in the holding register and then transmitted after the first character and proper space interval have occurred. Up to 64 characters can be stored in this way making it possible to key far enough ahead so that it is easy to avoid gaps in the transmission which would occur if the holding register were allowed to become empty. A front panel light indicates when the holding register is full. If additional characters are keyed when the holding register is full they will have no effect and will have to be rekeyed. If two or more keys are depressed at the same time, the first one to be actuated will be recognized and the others will have to be rekeyed.

Element and character spacing are designed into the keyboard decoder and are therefore automatic. The word space is generated as a character of proper space length but with no output and is activated by the space bar.

A TUNE switch is also provided as a front panel control. Whenever it is on, the reed-relay output contacts are closed to provide a 'key down' condition.

INSTALLATION

Connect the CW Keyboard to a source of 117VAC power and to the equipment to be operated by it. The reed-relay output is available through an RCA type connector and will drive any equipment that can be operated by an ordinary key as long as the relay ratings are not exceeded. Since many transmitters have a capacitor in parallel with the key terminals which may be as high as 0.1ufd, a current limiting resistor has been included in the Keyboard in series with the relay contacts. This resistor has a value of about 50 ohms and will limit the current surge when the contacts close to prevent damage to the relay. If this resistor is not necessary to keep the relay current within ratings it may be short circuited so that the relay contacts are available directly, but this should only be done if proper operation can not be obtained with the resistor in the circuit. The resistor is located next to the relay which is a shiny cylinder about 1 inch long and ¼ inch in diameter.

The front panel volume control adjusts the level of the audio sidetone at the loudspeaker, and also includes the ON-OFF switch. The audio sidetone is also available at an RCA type connector. This fixed level output is a tone of about 800Hz and can be used for audio equipment or for modulated CW transmission. It is well suited for driving the A-Tronix Code Reader.

OPERATION

When the connections have been made and the CW Keyboard has been turned on with the volume control you are ready to send Morse Code. The 'Register Full' light also serves as a pilot light and is on at reduced intensity whenever the Keyboard is on. The speed control on the front panel should be adjusted so that the code speed is not too fast to be accurately understood by the person receiving it. It should also not be set so fast that the Keyboard operator has difficulty keying rapidly enough to keep up with the transmission. When the CW Keyboard is first used we recommend setting the speed control to the minimum position. After a little practice it should be possible to advance to higher speeds with ease.

When starting a transmission the operator should key characters fast enough so that the 'Register Full' light changes from dim to bright indicating that the register is full. He should then pause until the light goes dim before he keys the next character. So long as no characters are keyed after the light has become bright, and characters are keyed fast enough after the light goes dim to avoid emptying the register, the transmitted code will be perfectly timed and spaced. When the 'Register Full' light first becomes bright it does not mean a character is lost since the register has just been filled by the character causing the light to become bright. Only characters keyed while the light is bright are not stored and must be rekeyed. If the register is allowed to become empty because characters are not keyed rapidly enough for the speed at which the CW Keyboard is set, there will be a break in the transmission which can be noticed in the audio sidetone.

The sidetone will also disclose mistakenly keyed or missing characters. Other than keying while the holding register is full, the only reason for missing a character is depressing one key before the previous one has been released.

MEMORY OPTIONS

256 CHARACTER ERASABLE MEMORY

The following controls and indicators are provided for the operation of the memory.

Memory Select Switches These four switches control the four sections of the memory. Each section has a capacity of 64 characters and the sections can be used singly or in combinations. If the message to be stored has more than 64 characters then it will be necessary to use several memory sections. For example a message of 135 characters would require the use of three sections (although it would not fill the third section). This message could be stored in sections 1, 2, and 3, but if section 1 already had another message which was to be saved, the new message could also be stored in sections 2, 3, and 4. If the existing message to be saved happened to be in section 2, the new message could also be stored in sections 1, 3, and 4. In this way a message may be stored in any section or combination of sections which the operator chooses.

Memory Address Lights These include the 4 lights over the memory select switches, as well as the 6 lights on the left labeled 32, 16, 8, 4, 2, and 1. The 4 lights indicate the status of the 4 position address register which controls the active memory section, and the 6 lights indicate the status of the 64 position address register which controls the operating character position within the active section. Together these lights show the section and character position to which the two address registers are set at any moment, and their indication changes as the address registers progress through a message.

The light over a memory select switch is not necessarily on because the switch

is on. One, but only one, of these four lights is on at all times (even if all four switches are off). It indicates the section that is active at the moment. The operating character position within the active section is shown by the other six lights according to the table.

Table of Operating Character Positions for the 64 Position Address Register

Light Pattern						Character Position	Binary Number	Light Pattern						Character Position	Binary Number
32	16	8	4	2	1										
O	O	O	O	O	O	1	0	●	O	O	O	O	O	33	32
O	O	O	O	O	●	2	1	●	O	O	O	O	●	34	33
O	O	O	O	●	O	3	2	●	O	O	O	●	O	35	34
O	O	O	O	●	●	4	3	●	O	O	O	●	●	36	35
O	O	O	●	O	O	5	4	●	O	O	●	O	O	37	36
O	O	O	●	O	●	6	5	●	O	O	●	O	●	38	37
O	O	O	●	●	O	7	6	●	O	O	●	●	O	39	38
O	O	O	●	●	●	8	7	●	O	O	●	●	●	40	39
O	O	●	O	O	O	9	8	●	O	●	O	O	O	41	40
O	O	●	O	O	●	10	9	●	O	●	O	O	●	42	41
O	O	●	O	●	O	11	10	●	O	●	O	●	O	43	42
O	O	●	O	●	●	12	11	●	O	●	O	●	●	44	43
O	O	●	●	O	O	13	12	●	O	●	●	O	O	45	44
O	O	●	●	O	●	14	13	●	O	●	●	O	●	46	45
O	O	●	●	●	O	15	14	●	O	●	●	●	O	47	46
O	O	●	●	●	●	16	15	●	O	●	●	●	●	48	47
O	●	O	O	O	O	17	16	●	●	O	O	O	O	49	48
O	●	O	O	O	●	18	17	●	●	O	O	O	●	50	49
O	●	O	O	●	O	19	18	●	●	O	O	●	O	51	50
O	●	O	O	●	●	20	19	●	●	O	O	●	●	52	51
O	●	O	●	O	O	21	20	●	●	O	●	O	O	53	52
O	●	O	●	O	●	22	21	●	●	O	●	O	●	54	53
O	●	O	●	●	O	23	22	●	●	O	●	●	O	55	54
O	●	O	●	●	●	24	23	●	●	O	●	●	●	56	55
O	●	●	O	O	O	25	24	●	●	●	O	O	O	57	56
O	●	●	O	O	●	26	25	●	●	●	O	O	●	58	57
O	●	●	O	●	O	27	26	●	●	●	O	●	O	59	58
O	●	●	O	●	●	28	27	●	●	●	O	●	●	60	59
O	●	●	●	O	O	29	28	●	●	●	●	O	O	61	60
O	●	●	●	O	●	30	29	●	●	●	●	O	●	62	61
O	●	●	●	●	O	31	30	●	●	●	●	●	O	63	62
O	●	●	●	●	●	32	31	●	●	●	●	●	●	64	63

The control of these memory address registers has been designed in such a way that maximum flexibility is combined with simplicity of operation. It works as follows. The 4 position register selects the first section turned on, and then moves to the next section which is turned on each time the 64 position register resets, or whenever the active section switch is turned off. If all four sections were turned on, and section 2 had been turned on first, the sequence would be 2341234 12341234 etc. The first section turned on will always become active even if another section had been active when all four section switches were off.

The 64 position address register proceeds sequentially through each of the 64 character positions whenever a message is being stored or transmitted. It is reset to the beginning whenever it reaches the last position, or whenever the memory select switch for the active section is turned off.

The result of this arrangement is that a message can be stored in whatever space is available. For example suppose a message had already been stored in section 2, and two new messages, the first of 100 characters, and the second of 50 characters, were to be added to memory. It could be done as follows. Starting with all memory select switches off, the operator would turn on sections 1, 3 and 4. Since section 1 was turned on first it would be the active section, and since the 64 position register would be at the beginning, the operator would start typing the 100 character message. When the operator finished the 64th character the 64 position register would reset to the beginning, and the 4 position register would move to section 3 (since switch 2 was not on) — all automatically — so the operator could go right on storing the message without interruption. When he finished the 100th character he would turn off the section 3 switch. This would cause the 4th section to become active and would reset the 64 position register to the beginning. The operator could then start typing the 50 character message. When he was finished with the 50 character message he could turn off the section 4 switch. He would then be at the start of section 1 (ready for transmission).

Program Switch When this switch is on, the memory sections in use are set to store a new message. It is not necessary to erase whatever previous information may have been stored since this is done automatically, position by position, as the new message is put into memory. The new message is put into memory by simply operating the keyboard when the memory section or sections have been selected and the program switch turned on.

If the tail end of an old message remaining in memory beyond the end of the new message is to be erased it can be done by operating the space bar after the new message has been completed, or all four sections can be completely cleared before starting a new message by turning the Keyboard off and then on again to activate the automatic clear system. This is not necessary, however, as explained in connection with the repeat key.

The program switch should always be off when no program storage is intended. If the program switch is on, message storage will take place in whichever section is active, even if all four section switches are off.

Repeat Key This key is used to transmit a stored message. The memory select switches must be turned off to reset the address registers and then the switches selecting the memory sections to be used should be turned on. The program switch should be off. Transmission of the message in memory is started by operating the repeat key. If there are characters in the holding register when the repeat key is operated the stored message transmission will start immediately after these characters.

The repeat key can also be used during message storage. It will mark a position in memory when it is operated so that the adress register will automatically stop when it reaches that position during transmission. In doing so it will erase anything previously stored in that position so that the character in the previous position will be the last one transmitted. When the memory stops automatically in this way during transmission it can either be reset to the beginning by turning the memory select switch off and then on again, or it can be restarted with the repeat key so that any balance of the message which might be in memory will be transmitted. This feature can be used to preclude the transmission of leftover messages in memory, or to program automatic memory interrupts.

Backspace Key This key can be used whenever the program switch is on. It will back up the 64 position address register memory one position each time it is depressed. This feature is useful in reaching an exact memory position when changes or corrections are to be made.

Operating Sequence

First the memory select switches should be turned off to reset the address registers to the beginning. Then the memory sections to be used and the program switch should be turned on. The actual message storage is now accomplished by

keying the characters on the keyboard. After the complete message has been stored it is good practice to press the repeat key. This will stop the address register at that point when the message is being transmitted. When the complete message has been stored the program and memory select switches should be turned off.

To transmit the stored message the appropriate memory select switches should be turned on and then the repeat key pressed.

Other Features

Whenever the main power switch on the volume control is turned off the messages in memory will be lost and must be reprogrammed when the Keyboard is turned on again. An automatic clear system operates for about 5 seconds when the power is turned on to eliminate any random characters which would otherwise occur in the memory. It leaves the memory completely empty and ready for programming.

A memory interrupt feature makes it possible to insert additional information into the transmission of a stored message at any point. To do this the stored message is started as described above. When the last character of the stored message prior to the interrupt point is being transmitted (as indicated by the sidetone), the first character of the information to be inserted should be keyed manually followed by the rest of the information to be inserted. The operation of any character key, including the space bar, automatically stops the memory and the Keyboard will transmit whatever is manually keyed. As long as the section switches are not turned off the memory will not be reset so that the balance of the stored message can be transmitted at the conclusion of the inserted information by operating the repeat key.

The interrupt feature also makes it possible to make changes or correct parts of stored messages without re-entering the entire message. To do this start the message and then interrupt it at the desired point with the space bar as described above. Then turn on the program switch and enter the corrected characters. After the corrected characters have been stored turn off the program switch and the change should be complete. To check the message reset the address registers to the beginning by turning the memory select switches off and then on again and start the memory with the repeat key. Note that if the correction is longer than the characters it replaces it will be necessary to re-enter the balance of the message from the correction point all the way to the end since the Keyboard cannot move the characters in the memory. Should the memory interrupt occur beyond the desired point by a character or two the backspace key can be used to back up the memory one character at a time.

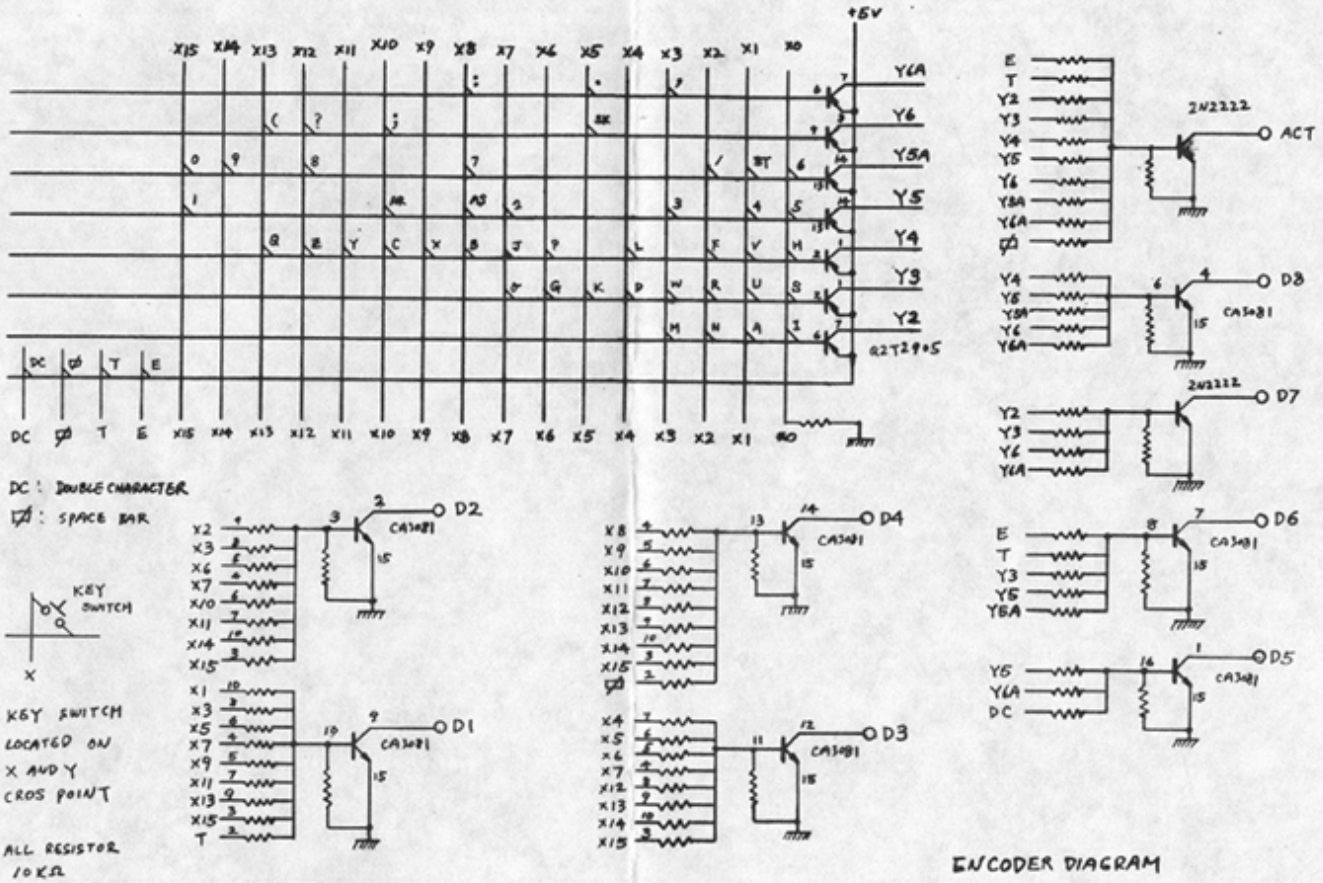
32 CHARACTER PRE-PROGRAMMED MEMORY

The message in this memory can contain up to 32 characters which are put into the memory at the factory. Once the message has been specified and the memory ordered it cannot be changed (and does not have to be reprogrammed after the Keyboard has been turned off). The message programmed into this memory can include any of the characters on the keyboard and it can also incorporate the automatic stop feature (described in the erasable memory section) to end the message or for programmed interrupts. If no automatic stops are included in the program the memory will cycle over and over again (including any unused positions) until stopped by the operator. Stopping the memory can be done at any point by operating any of the character keys or the space bar. Unlike the erasable memory this will also reset the memory to the beginning automatically.

To use the memory first make sure all four of the memory select switches and the program switch for the erasable memory are turned off. Then start the memory by operating the repeat key. If automatic stops are included in the program the memory can be reset to the beginning at these points by operating the space bar, or it can be caused to continue by operating the repeat key. If no automatic stops are included, the operator must depress the space bar or a character key to stop and reset the memory. He can also do this at any point he wishes even if there are automatic stops.

WARRANTY

A-Tronix warrants each new CW Keyboard to be free from defective material and workmanship, and agrees to remedy such defect, provided the unit is sent or delivered to A-Tronix within 6 months from the date of purchase. This warranty does not cover units which have been subject to misuse, neglect, accident, incorrect application or improper installation.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82T295
DC
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DC : DOUBLE CHARACTER
: SPACE BAR
KEY SWITCH
KEY SWITCH LOCATED ON X AND Y CROS POINT
ALL RESISTOR 10KΩ
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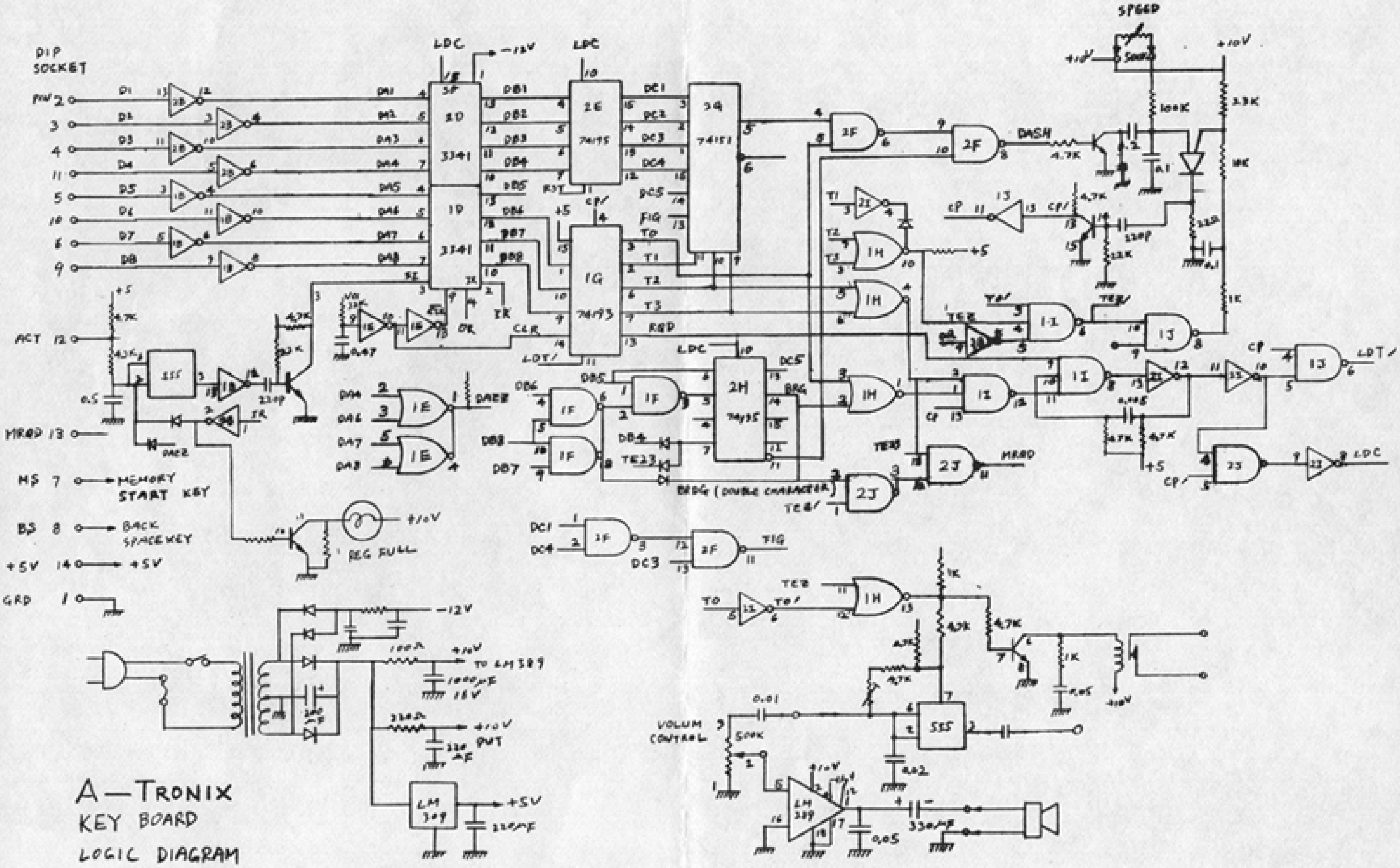

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LOGIC DIAGRAM