M L K - 1
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THE MLK-1 IS A SOLID STATE, OPTICALLY ISOLATED, LOOP KEYER INTENDED FOR USE WITH MACROTRONICS HAM INTERFACE BOARDS IN THE RTTY MODE. IT PROVIDES THE ABILITY TO RECEIVE AND TRANSMIT THROUGH A 60 OR 20 MA. LOOP. THIS MAKES CONNECTION OF THE HAM INTERFACE TO AN EXTERNAL TERMINAL UNIT AND AUXILIARY EQUIPMENT (PRINTER, REPERF, TEEDEE, ETC.) STRAIGHTFORWARD. IT ALSO ALLOWS USING THE M80 HAM INTERFACE IN CONJUNCTION WITH THE 'LLIST' AND 'LPRINT' INSTRUCTIONS ON THE TRS-80 TO OBTAIN HARD COPY ON A BAUDOT PRINTER AS EXPLAINED IN THE M80 INSTRUCTION MANUAL.

TO USE THE MLK-1, FIRST CONNECT A JUMPER WIRE ON THE BOARD AS EXPLAINED IN THE SECTION BELOW. NEXT, REMOVE THE REED RELAY FROM ITS SOCKET. CAREFULLY OBSERVE THE PIN NUMBERS ON BOTH THE MLK-1 AND THE RELAY SOCKET. THE NOTCH IN THE RELAY IS CLOSEST TO PIN 1.

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*              C A U T I O N !                        *
*INSERTING THE MLK-1 INTO THE WRONG PINS*
*WILL UNDOUBTEDLY DESTROY THE ENTIRE*
*MODULE! CHECK PIN ALIGNMENT SEVERAL*
*TIMES BEFORE INSERTING THE MLK-1.    *
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INSERT THE MLK-1 INTO THE RELAY SOCKET SO THAT THE WHITE (OR SILVER) DOT IS CLOSEST TO PIN 1 OF THE SOCKET.
 NOTE: IF EITHER THE RELAY OR THE MSK-1 SOLID STATE REPLACEMENT ARE REPLACED IN THE SOCKET, THEY WILL PERFORM NORMALLY EVEN WITH THE JUMPER MODIFICATION.

USE OF THE MLK-1 WITH THE M80 VERSION 2 BOARD (MARKED M80/2)

NOTE: THE DOT ON THE MLK-1 SHOULD BE CLOSEST TO THE CENTER OF THE BOARD (AWAY FROM THE EDGE CONNECTOR)
CONNECT THE FOLLOWING TO THE 24 PIN EDGE CONNECTOR:
JUMPER* PIN C TO PIN 2
CONNECT PIN 5 TO LOOP POSITIVE (+)
CONNECT PIN E TO LOOP NEGATIVE (-)

USE OF THE MLK-1 WITH THE S80 BOARD (MARKED M650)

NOTE: THE DOT ON THE MLK-1 SHOULD BE CLOSEST TO THE CENTER OF THE BOARD (AWAY FROM THE EDGE CONNECTOR)
CONNECT THE FOLLOWING TO THE 24 PIN EDGE CONNECTOR:
JUMPER* PIN H TO PIN 2
CONNECT PIN 11 TO LOOP POSITIVE (+)
CONNECT PIN 10 TO LOOP NEGATIVE (-)

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* INSERT A SPST SWITCH IN SERIES WITH THE JUMPER IF YOU WILL BE USING THE CW MODE WITH THE MLK-1 IN THE SOCKET. SEE NOTE 1 UNDER THE SECTION "USING THE MLK LOOP KEYER MODULE".

USING THE MLK LOOP KEYER MODULE
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HERE ARE SEVERAL THINGS TO KEEP IN MIND BEFORE USING THE MLK LOOP KEYER MODULE:

1. THE MLK CONTAINS TWO OPTICAL ISOLATORS, SEVERAL HIGH VOLTAGE KEYING TRANSISTORS, AND AN ASSORTMENT OF RESISTORS AND HIGH VOLTAGE DIODES. ONE OF THE ISOLATORS AND ALL OF THE KEYING TRANSISTORS DERIVE THEIR POWER DIRECTLY FROM THE CURRENT LOOP. WHEN CURRENT IS FLOWING IN THE LOOP (MARK), THE RECEIVE OPTICAL ISOLATOR REMAINS OPEN, THEREBY LEAVING THE 'KEY-IN' LINE HIGH (+5 VOLTS). WHEN CURRENT IS NOT FLOWING IN THE LOOP (SPACE), THE RECEIVE ISOLATOR CLOSES, THEREBY PULLING THE 'KEY-IN' LINE LOW (0 VOLTS). THE MACROTRONICS HAM INTERFACE SOFTWARE ASSUMES THAT A LOW ON THE 'KEY-IN' LINE IS A KEY DOWN CONDITION IN CW, AND A SPACE CONDITION IN RTTY. IT IS THEREFORE ESSENTIAL THAT A 60 OR 20 MIL. LOOP SUPPLY BE CONNECTED WHENEVER THE MLK IS IN THE RELAY SOCKET AND THE SOFTWARE IS LOADED. OTHERWISE, THE LED WILL REMAIN LIT, THE SIDE TONE WILL GIVE A CONTINUOUS TONE, THE PLL WILL NOT FUNCTION, CW KEYING WILL BE 'UPSIDE-DOWN', AND THE SOFTWARE WILL BE UNABLE TO DECODE ANYTHING ON RECEIVE!

IF IT IS UNDESIRABLE TO HAVE THE LOOP SUPPLY ON WHILE OPERATING CW, YOU CAN EITHER:

A. REMOVE THE MLK MODULE FROM ITS SOCKET, OR

B. INSERT A SPST SWITCH IN SERIES WITH THE JUMPER WIRE WHICH YOU INSTALLED AS EXPLAINED EARLIER. OPERATE CW WITH THE SWITCH OPEN, AND OPERATE RTTY WITH THE SWITCH CLOSED.

2. WHEN INSTALLING THE JUMPER ON THE FOIL SIDE OF THE M80 - THE OPTICAL ISOLATOR PIN NUMBERING IS UNUSUAL:

VIEWED FROM THE FOIL SIDE
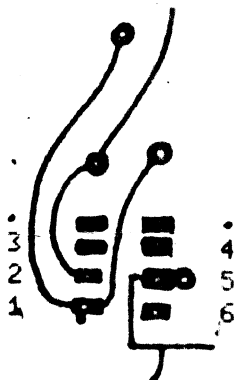
3. AS EXPLAINED IN THE M-80 INSTRUCTION MANUAL, THE 7476 WILL OCCASIONALLY 'LATCH' IN A KEY DOWN CONDITION WHEN THE M-80 IS FIRST TURNED ON. THIS MIGHT ALSO HAPPEN WITH THE MLK INSTALLED. IF IT DOES, THE LED WILL REMAIN LIT, THE LOOP WILL BE OPEN, AND THE SIDE TONE WILL GIVE A CONTINUOUS TONE IN THE SPEAKER. SIMPLY TYPE A LETTER OR TWO ON THE KEYBOARD WHILE IN THE RTTY SEND MODE. THIS WILL RETURN THE MLK TO A CLOSED LOOP CONDITION. ANOTHER "FIX" IS TO CONNECT A 10K OHM RESISTOR BETWEEN PINS 2 AND 13 OF THE 7476 SOCKET.

4.   IF THE LOOP IS CLOSED, BUT THE LED REMAINS LIT, YOU PROBABLY HAVE THE LOOP POLARITY REVERSED.   THIS WILL   NOT   DAMAGE   EITHER THE   MLK   OR YOUR LOOP SUPPLY, SINCE THE MLK CONTAINS DIODES FOR REVERSE POLARITY PROTECTION.   SIMPLY REVERSE THE LOOP LEADS.

5.   THE MLK-1 IS DESIGNED TO OPERATE ON AS LITTLE AS 15MA   TO   A MAXIMUM OF 65 MA.

6.   THE MLK-1 CAN EASILY BE USED TO DRIVE A HEATHKIT MODEL M14 ASCII PRINTER WITH THE M80.   THE M14 HAS ITS OWN BUILT   IN   20MA LOOP   SUPPLY.   THE   M14   NEEDS   TO   BE SET TO 110 BAUD AND THE INTERNAL JUMPERS: J104 TO J102, J103 TO J101 AND J113 TO J114.

7.   WE HAVE SEEN A FEW M80 VERSION 1 BOARDS WHICH HAVE A PROBLEM WITH THE MLK INSTALLED.   THE LOOP MYSTERIOUSLY OPENS UP WHILE ON RECEIVE CAUSING THE M80 TO PRINT GARBAGE   ON   THE   SCREEN.   TO PREVENT   THIS A .01 MF DISC CAPACITOR MAY BE   CONNECTED FROM PIN 15 TO PIN 16 (+5V) OF THE 7476 CHIP.

8.   THE FLESHER TU-170 TERMINAL UNIT WAS DESIGNED   WITH THE ASSUMPTION   THAT   A   PRINTER   WOULD   BE IN THE LOOP TO LIMIT THE CURRENT.   IF YOU ARE USING A TU-170 WITHOUT A PRINTER, A 2.5K TO 3K 15W   RESISTOR   SHOULD   BE   PLACED   IN SERIES WITH THE LOOP TO PREVENT DAMAGE TO THE 47 OHM 1/4 WATT CURRENT LIMITING   RESISTOR IN THE TU-170.
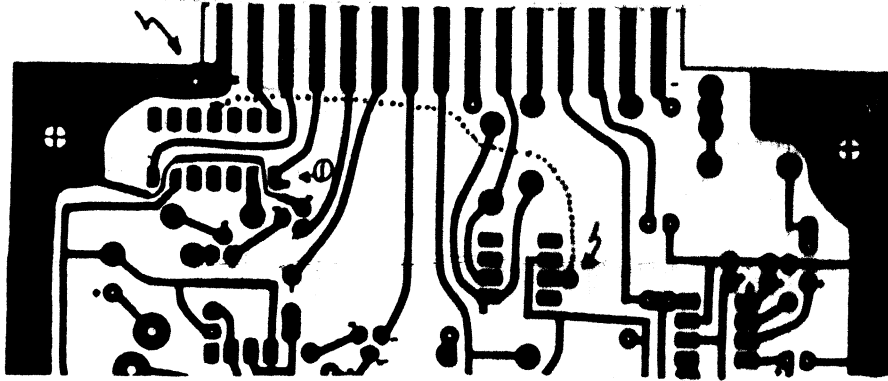
9.   TYPICAL LOOP CONNECTION DIAGRAM:
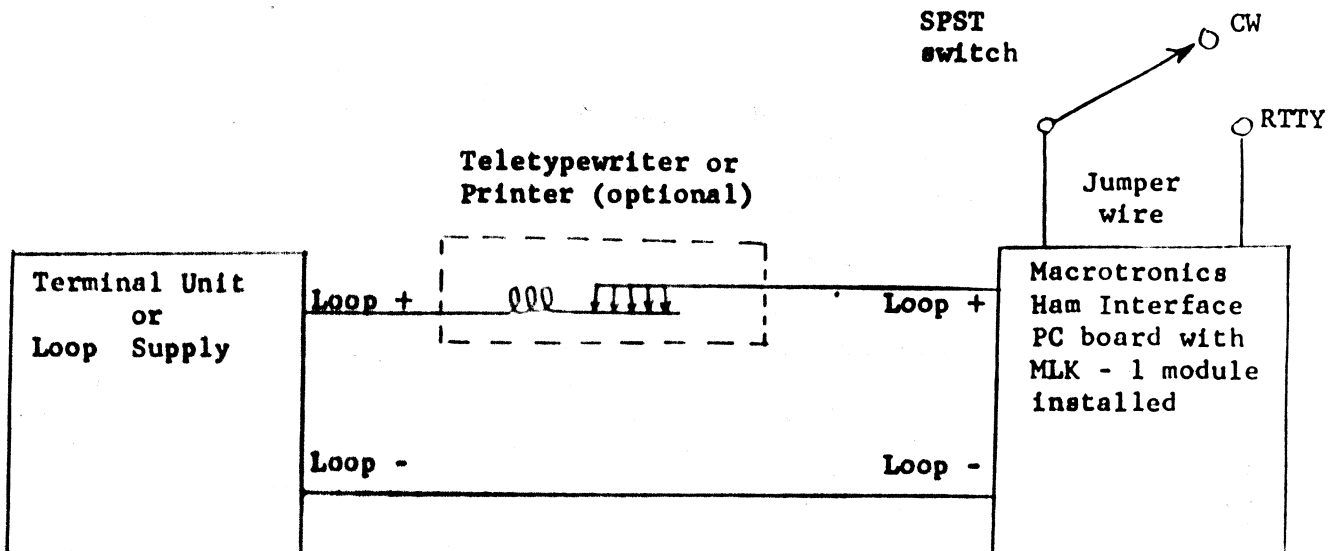
USE OF THE MLK-1 WITH THE M-80 VERSION 1 BOARD (MARKED M80)

NOTE: THE DOT ON THE MLK-1 SHOULD BE CLOSEST TO Q5.
CONNECT A JUMPER WIRE* ON THE FOIL SIDE OF THE BOARD FROM PIN 11
OF THE RELAY SOCKET TO PIN 5 OF THE OPTOISOLATOR.   CONNECT   THE
FOLLOWING TO THE 30 PIN EDGE CONNECTOR:
JUMPER   PIN 12 TO PIN 15
CONNECT PIN 13 TO LOOP POSITIVE (+)
CONNECT PIN 14 TO LOOP NEGATIVE (-)

USE OF THE MLK-1 WITH THE M-65 BOARD

NOTE: THE DOT ON THE MLK-1 SHOULD BE CLOSEST TO THE PHONO
JACKS.
CONNECT A JUMPER WIRE* ON THE FOIL SIDE OF THE BOARD FROM PIN 11
OF THE RELAY SOCKET TO THE FOIL TRACE CONNECTED TO THE CENTER
CONNECTOR OF THE 'KEY' JACK.   CONNECT THE LOOP AS FOLLOWS:
CENTER CONNECTOR OF 'NO' TO LOOP POSITIVE (+)
CENTER CONNECTOR OF 'NC' TO LOOP NEGATIVE (-)

M-65 VERSION 1 1 ——————>

M-65 VERSION 1 0 —┐