

The following is a brief description of the necessary configuration and connections to be made to successfully use the Heath H-14 line printer with the Radio Shack TRS-80 computer.

**Hardware Configuration**

Along with the computer and the line printer, the following items are necessary for successful operation:

- 1. Radio Shack model 1-3 extension unit.
- 2. Radio Shack model 111111 series interface cable.
- 3. Heath H-14 line printer.

Since the Radio Shack 111111 cable has a 25 pin D connector and the Heath H-14 line printer has a 25 pin D connector, an adapter must be used to connect the two units. The Heath H-14 line printer has a 25 pin D connector and the Radio Shack 111111 cable has a 25 pin D connector. The Heath H-14 line printer has a 25 pin D connector and the Radio Shack 111111 cable has a 25 pin D connector.

**APPLICATION NOTE**  
**USING THE HEATH H-14 LINE PRINTER**  
**WITH THE RADIO SHACK TRS-80 COMPUTER**  
**WRITTEN 06/15/79**

Figure 1

The following is a brief description of the necessary configuration and connections to be made to successfully use the Heath H-14 line printer with the Radio Shack TRS-80 computer.

The Radio Shack model 1-3 extension unit is necessary for successful operation. The Radio Shack model 111111 series interface cable is necessary for successful operation. The Heath H-14 line printer is necessary for successful operation.

The Heath H-14 line printer has a 25 pin D connector and the Radio Shack 111111 cable has a 25 pin D connector. The Heath H-14 line printer has a 25 pin D connector and the Radio Shack 111111 cable has a 25 pin D connector.

This application note describes the hardware configuration and software that is necessary to successfully use the Heath H-14 line printer with the Radio Shack TRS-80 computer.

#### Hardware Configuration

Besides the computer and the line printer, the following pieces of hardware are necessary

1. Radio Shack memory I/O expansion unit
2. Radio Shack RS232C serial interface card
3. Adapter cable described below

Since the Radio Shack RS232C card has a male 25 pin D connector and the Heath H-14 also has a male 25 pin D connector, an adapter must be made in order to connect the two units. You will need 2 female 25 pin D connectors and 3 six inch pieces of wire. Refer to figure 1 for which pins are to be connected in making the adapter.

RADIO SHACK RS232C  
25 PIN CONNECTOR

HEATH H-14  
25 PIN CONNECTOR

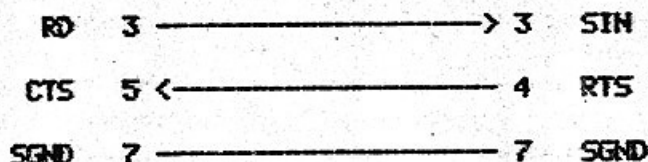


Figure 1

The following lists the switch settings to be used for the Radio Shack RS232C card.

1. No parity
2. One stop bit
3. 8 data bits
4. The TERM/COMM switch should be placed in the COMM position
5. Baud rate to the same as the H-14.

Switch SW102 in the H-14 should be set as per the instructions in the H-14 Operation manual. Be sure that section 3 of switch SW102 is in the "1" position.

# Software

Since the TRS-80 line printer driver is for a parallel interface, not a serial interface, you must first place a serial line printer driver into the top of memory. The software will be informed of the new line printer driver, and it will then communicate with the H14. After powering on your computer, follow the following steps to initiate the serial line printer driver.

1. After power on, the computer will ask "MEMORY SIZE?". Enter one of the values in the 3rd column of figure 2 corresponding to your memory size as given in column 1.
2. After initializing LEVEL II BASIC, load the BASIC program in figure 3.
3. Type RUN to execute the program. This program will place the H-14 line printer driver into high memory and inform BASIC to use this line printer driver. When requested to "ENTER MEMORY SIZE?", enter the same value as in step 1.
4. After a successful loading of the line printer driver, you may execute any of your own BASIC programs. LLIST and LPRINT will now direct their output to the H-14.

A copy of the line printer driver code is included in figure 4. This assembly language program is what is relocated by the BASIC program. The machine code is found in the DATA statements of the BASIC program.

MEMORY SIZE	LAST LOCATION	ENTER IN RESPONSE TO "MEMORY SIZE?"
4K	20479	20399
16K	32767	32687
32K	49151	49071
48K	65535	65455

Figure 2

```

0010 REM TRS-80 LP DRIVER FOR HEATH H-14 LINE PRINTER
0020 ON ERROR GOTO 300
0030 INPUT "ENTER MEMORY SIZE";I
0040 I=I+1
0050 REM POKE NEW DCB TYPE & ADDRESS IN LEVEL II BASIC TABLES
0060 POKE 16421,2
0070 J=INT(I/256)
0080 POKE 16422,I-J*256
0090 POKE 16423,J
0100 REM LOAD RELOCATABLE LP DRIVER
0110 X=I
0120 IF X>I+72 THEN 400
0130 X1=X : IF X1>=32768 THEN X1=X1-65536
0140 READ Y
0150 IF Y<0 THEN 180
0160 POKE X1,Y : IF PEEK(X1)<>Y THEN 300
0170 GOTO 230
0180 Y=I-Y
0190 J=INT(Y/256)
0200 POKE X1,Y-J*256 : IF PEEK(X1)<>Y-J*256 THEN 300
0210 X=X+1 : X1=X1+1
0220 POKE X1,J : IF PEEK(X1)<>J THEN 300
0230 X=X+1
0240 GOTO 120
0300 REM LOAD ERROR — ABORT
0310 PRINT "LOAD ERROR — ABORT"
0320 GOTO 500
0400 REM SUCCESSFUL LOAD
0410 PRINT "H-14 LP DRIVER LOADED"
0500 REM END
0510 ON ERROR GOTO 0
0520 END
1000 DATA 229,197,245,58,-72,254,1,40,29,62
1010 DATA 1,50,-72,211,232,219,233,230,248,246
1020 DATA 4,211,234,219,233,230,7,33,-64,6
1030 DATA 0,79,9,126,211,233,241,193,225,219
1040 DATA 234,203,119,40,250,219,232,230,128,40
1050 DATA 250,121,254,13,32,2,62,10,211,235
1060 DATA 201,34,68,85,102,119,170,204,238,0

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Figure 3



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00E8      RESURT EQU 0E8H      ;OUT RESETS UART / IN RS232 CNTRL BITS
00E9      SWITCH EQU 0E9H      ;OUT BAUD RATE / IN SENSE SWITCHES
00EA      CNTREG EQU 0EAH      ;OUT UART CNTRL / IN UART STATUS
00EB      DTAREG EQU 0EBH      ;IN/OUT DATA

          ORG 0                ;ORG TO 0 FOR RELOCATING
0000 E5    LP      PUSH HL      ;SAVE REG HL
0001 C5      PUSH BC      ;SAVE REG BC
0002 F5      PUSH AF      ;SAVE REG A & PSW
0003 3A 48 00 LD A,(FLAG)      ;Q. UART
0006 FE 01    CP 001H          ;    INITIALIZED
0008 28 1D    JR Z,RESTOR      ;    BR IF YES
000A 3E 01    LD A,001H        ;INDICATE UART
000C 32 48 00 LD (FLAG),A      ;    INITIALIZED
000F D3 E8    OUT (RESURT),A    ;RESET UART
0011 DB E9    IN A,(SWITCH)     ;READ SENSE SWITCHES
0013 E6 F8    AND 0F8H         ;RESET RTS,
0015 F6 04    OR 004H          ;    RESET DTR,
0017 D3 EA    OUT (CNTREG),A    ;    NO BREAK
0019 DB E9    IN A,(SWITCH)     ;GET BAUD RATE
001B E6 07    AND 007H         ;    FROM SWITCHES
001D 21 40 00 LD HL,BDTABL     ;GET
0020 06 00    LD B,000H        ;    BAUD RATE
0022 4F      LD C,A            ;    GENERATOR
0023 09      ADD HL,BC         ;    VALUE
0024 7E      LD A,(HL)         ;    FROM TABLE
0025 D3 E9    OUT (SWITCH),A    ;OUT TO UART
0027 F1      RESTOR POP AF      ;RESTORE REG A & PSW
0028 C1      POP BC            ;RESTORE REG BC
0029 E1      POP HL            ;RESTORE REG HL
002A DB EA    STATIN IN A,(CNTREG) ;Q. XMIT HOLDING
002C CB 77    BIT 6,A           ;    REG EMPTY
002E 28 FA    JR Z,STATIN      ;    BR IF NOT
0030 DB E8    CHKCTS IN A,(RESURT) ;Q. PRINTER
0032 E6 80    AND 080H         ;    BUSY
0034 28 FA    JR Z,CHKCTS      ;    BR IF YES
0036 79      LD A,C            ;GET OUTPUT CHARACTER
0037 FE 0D    CP 00DH          ;Q. CR
0039 20 02    JR NZ,PRINT      ;    BR IF NOT
003B 3E 0A    LD A,00AH        ;CONVERT TO LF
003D D3 EB    PRINT OUT (DTAREG),A ;OUT CHAR TO PRINTER
003F C9      RET              ;RETURN TO CALLER

;
; BAUD RATE GENERATOR VALUE TABLE
;
0040 22      BDTABL DEFB 022H    ;110 BAUD
0041 44      DEFB 044H    ;150 BAUD
0042 55      DEFB 055H    ;300 BAUD
0043 66      DEFB 066H    ;600 BAUD
0044 77      DEFB 077H    ;1200 BAUD
0045 AA      DEFB 0AAH    ;2400 BAUD
0046 CC      DEFB 0CCH    ;4800 BAUD
0047 EE      DEFB 0EEH    ;9600 BAUD

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0048 00

5  
FLAG

DEFB  
END

000H

:FLAG BYTE

Figure 4