

CONV/DCONV Program and Data Conversion LEVEL I to LEVEL II

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CONV and DCONV will let you convert your LEVEL I BASIC programs and data files into the LEVEL II format. They are machine language programs, and must be loaded into RAM under the SYSTEM command.

MINIMUM REQUIRED HARDWARE TO USE THE PROGRAMS:

LEVEL II TRS-80 (4K or 16K RAM)

Video Display

CTR-41 or similar cassette recorder

Notation

We've used the following special notation in this manual for clarity and brevity:

CAPITALS and punctuation	Indicate material which you type in exactly as it appears.
<i>lowercase italics</i>	Indicate words, letters or values you supply from a set of acceptable inputs for that situation.
SCREENED CAPITALS	Represent input you supply upon prompting from the Computer. This convention will only be used where necessary to distinguish between Computer prompting and keyboard input.

ENTER

"Press the ENTER key."

CONV (Program Conversion)

This program provides a one-to-one translation from LEVEL I statements and abbreviations to their LEVEL II counterparts.

This does not mean the converted programs will always run as-is. After converting a program, you'll sometimes need to make minor changes in punctuation, syntax and function arguments. With LEVEL II's powerful EDIT mode, this is easy.

Why doesn't the CONV program do "everything"? Doing-it-all would require a much longer conversion program – which wouldn't leave you with enough RAM available to load your LEVEL I program.

See **Cleaning Up Your Converted Program** for a list of things that will need "fixing" in your converted program.

How to load CONV

If you're going to convert more than one program during a single session, you should protect the memory area which will contain the CONV program, so your BASIC programs won't try to use that area. This is done by powering up the TRS-80 and answering the MEMORY SIZE? question as follows:

If your TRS-80 has . . .

then type as highlighted in gray:

4K RAM

MEMORY SIZE? 19189 **ENTER**

16K

MEMORY SIZE? 31477 **ENTER**

Now prepare your Recorder to play the tape, using a volume setting of 4-6. Be sure to play the correct side of the tape ("4K" or "16K" depending on how much RAM your TRS-80 has).

Type:

>SYSTEM ENTER

***? CONV ENTER**

The tape will begin to load, and a pair of asterisks will appear on the upper right of the Display; one will blink on and off. If an error occurs during loading, a C will appear in the upper right corner, and the tape will stop. In this case load the program again. You may need to adjust the volume slightly higher or lower.

When the tape has loaded successfully, another *? will appear. Now type:

***? / ENTER**

To use CONV

The display will prompt you to LOAD TAPE & PRESS ENTER? Insert the LEVEL I BASIC program and prepare the Recorder to play it. Since it is a LEVEL I tape, **you must reset the volume to a LEVEL I setting, around 8 on the CTR-41.**

When the tape is ready, press **ENTER**. The computer will now load the tape. If there is an error during loading, the message LOAD TAPE & PRESS ENTER? will be repeated. Rewind the tape and try again, with a slightly higher or lower volume setting.

If the Computer determines that your original program is too long to fit in the available memory, it will display the message PROGRAM TOO LONG and return you to BASIC. If this happens, you will need to shorten the original program using a LEVEL I machine, or add more RAM (up to 16K) to your LEVEL II machine.

NOTE: Just because a program fits in a LEVEL I machine does not ensure it will fit in a LEVEL II with the same amount of RAM. Remember, CONV is taking up around 1290 bytes of RAM.

After the LEVEL I tape has loaded successfully, the Display will prompt you to PRESS ENTER TO BEGIN? Press **ENTER** and the conversion process will begin.

The PROGRAM TOO LONG message may also appear during the conversion process; this is because some LEVEL I statements take up more space when they are converted to LEVEL II.

CONVERSION COMPLETE
PRESS ENTER TO CONTINUE?

will appear when the program has been converted. This may take from one second to a minute, depending on the length of your program.

When you press ENTER, you will return to BASIC. The converted program is now in memory, and can be LISTed, CSAVED, RUN, EDITed, etc.

To restart CONV and convert another LEVEL I program, type

>SYSTEM ENTER

*? / *entry-point* ENTER

where the *entry-point* is 19190 for 4K machines and 31478 for 16K machines. This causes the Computer to jump to the entry-point address and begin executing CONV.

Cleaning Up Your Converted Program

As mentioned earlier, you will sometimes need to make changes in the converted program to make it "run-able". The following list will help you locate the typical changes required.

1. Change commas following TAB functions to semi-colons or omit punctuation altogether. Example:

change PRINT TAB(10), "HELLO"

to PRINT TAB(10) "HELLO"

2. Every IF statement should be followed by an explicit THEN statement. Example:

change IF A=B B=0

to IF A=B THEN B=0

3. Be sure PRINT AT is converted to PRINT@. There are some LEVEL I constructions which will cause CONV to leave PRINT AT unchanged. Examples:

change PRINT AT 475, "CENTER"

to PRINT@ 475, "CENTER"

change PRINT AT 0, "FIRST"; AT 30, "SECOND"

to PRINT@0, "FIRST":PRINT@30, "SECOND"

4. Graphics functions SET(x,y), RESET(x,y) and POINT(x,y) will not "wrap around" in LEVEL II. Therefore be sure to restrict the arguments x and y as follows:

$0 \leq x < 128$

$0 \leq y < 48$

5. If your LEVEL I program uses the array A() with subscripts higher than 10, you need to add a DIM A(x) statement to the beginning of your converted program (where x is the highest subscript used). Example:

DIM A(30)

This statement would allow you to use array elements A(0) through A(30). Of course, you can use any variable name as an array name in LEVEL II BASIC.

6. In LEVEL I, an INPUT statement allows you to type in variables and expressions, not just constants. In LEVEL II, you have to type in a constant, either string or numeric, depending on the INPUT variable.

Example:

change Y=1: N=0: INPUT "YES OR NO (Y/N)"; R
IF R=1 THEN PRINT "THAT'S BEING POSITIVE!"

to INPUT "YES OR NO (Y/N)"; R\$
IF R\$="Y" THEN PRINT "THAT'S BEING POSITIVE!"

7. In LEVEL II, DATA statements must contain constants only – no variables or expressions.
8. In LEVEL I, a True logical expression is evaluated as a 1; in LEVEL II, the same expression has the value – 1. Therefore if your LEVEL I program uses such expressions, you need to change them accordingly in the converted program. Example, to compute MAX(A,B):

change M = (A<B)*B + (B<A)*A

to M = -(A<B)*B - (B<A)*A

9. In LEVEL I, POINT (x,y) returns 1 when graphics block (x,y) is ON, and 0 when it is OFF. But in LEVEL II, POINT (x,y) returns -1 for (x,y) ON, and 0 for (x,y) OFF. So be sure to allow for this difference. Example:

change $C = C + \text{POINT}(X, Y)$

to $C = C - \text{POINT}(X, Y)$

if you want to increment C each time (x,y) is ON.

DCONV (Data Conversion)

This program reads in LEVEL I data tapes (created with the PRINT# statement), and duplicates the data in a LEVEL II format on a new tape.

How to load DCONV

DCONV loads into low memory, below the area that can be protected with the MEMORY SIZE option. Therefore you'll need to load the DCONV tape at the beginning of each data conversion session. (No need or reason to protect memory with the MEMORY SIZE option).

Prepare your recorder to play DCONV, using a volume of 4-6 on the CTR-41. DCONV loads into the same RAM addresses for 4K and 16K machines; therefore both sides of the cassette contain the same program.

Type:

>SYSTEM ENTER

*? DCONV ENTER

The tape will begin to load, and a pair of asterisks will appear on the upper right of the Display; one will blink on and off. If an error occurs during loading, a C will appear in the upper right, and the tape will stop. In this case, load the program again, using a slightly higher or lower volume.

When the tape has loaded successfully, another *? will appear. Type:

*? ENTER

and DCONV will start, prompting you to prepare the Recorder to play your LEVEL I data tape.

Before you use DCONV . . .

First you need to understand how LEVEL I data tapes are recorded. You know that data was placed on the tape with one or more PRINT# statements. What you may not realize is that each one of the PRINT# statements creates a discrete "record" on the tape which is independent of all those records that follow or precede it. All these records on a given tape are collectively referred to as a data "file"; however, DCONV must read the file and convert it one record at a time.

For example, the program:

```
10 INPUT A,B,C
20 PRINT# A; ", "; B; ", "; C
30 PRINT# "THE END"
```

creates two data records, one containing the values for A,B,C and the other containing the character string "THE END". DCONV would first read-in the record created by line 20, convert it, and then read and convert the record created by line 30.

Keep this information in mind. It'll help you use DCONV properly, and help you understand what to do in case of a loading error during the data read-in process.

How to use DCONV

The following instructions tell you how to convert data tapes using a single recorder. If your TRS-80 is equipped with an Expansion Interface and two recorders, skip these instructions and use the instructions below, titled **Using DCONV with Two Recorders**.

After you load DCONV as described above, the program prompts you to prepare the Recorder to play your LEVEL I data tape. **Be sure to adjust the Recorder volume to a LEVEL I setting (around 8).** Leave the volume at this setting until you finish converting all your data.

With data tape inserted and Recorder ready, press **ENTER**. DCONV will read-in one record and then prompt you to remove the data cassette (*don't* rewind it!) and insert the cassette onto which you want to record the converted LEVEL II data. Put your Recorder in the Record mode, and press **ENTER**.

After DCONV has converted the data and stored it on tape, it will prompt you to remove the LEVEL II tape (*don't* rewind it!) and re-insert the original data tape so the next record can be read. You'll repeat this LEVEL I Play . . . LEVEL II Record . . . sequence once for each record on the LEVEL I data tape. *Be sure not to advance or rewind either tape accidentally.*

Continue the Play-Record sequence until nothing happens on the Display when you attempt to load the next record – no flashing asterisk, no further prompting messages, etc. You can then press RESET to return to BASIC, or insert another LEVEL I data tape and continue converting data.

Data Loading Errors

If there is an error while you are loading a LEVEL I data record, the message INPUT ERROR will be displayed and the tape will stop. You will then need to re-read the current data record, as follows:

1. Press the STOP key on the Recorder.
2. Remove REM and EAR plugs.
3. Reset the tape counter to zero. This gives you a reference point for the current record.
4. Rewind the tape until the counter reads 996. This is approximately where the current record starts. You can play the tape and listen for a short break somewhere around 996. Don't rewind too far or you'll get into the preceding record.
5. Once you've located the beginning of the current record, replace EAR and REM plugs, press PLAY, and then press **ENTER** on the Computer. DCONV will now re-read the record.

Using DCONV with Two Recorders (Expansion Interface Required)

If you have the Expansion Interface and two recorders connected (as explained in the Expansion Interface Operator's Manual), it is much easier to convert data from LEVEL I to LEVEL II format. The entire data file will be converted automatically – no need to swap LEVEL I and LEVEL II cassettes in a single recorder.

However, you will need to modify the DCONV program slightly, using a sequence of POKES in the Direct mode of BASIC.

1. Load DCONV as explained under **How to load DCONV**. However, do not jump to the entry point of DCONV. Instead, after DCONV has loaded and *? is displayed, hit the BREAK key. This will return you to BASIC.
2. Now type in the following instructions exactly as they appear below:

```
>FORX=17244T017260:POKEX,0:NEXT:POKE17261,62:POKE17284,195:POKE17285,29:POKE17286,67
```

3. Now insert the LEVEL I tape into Recorder #1, set volume to around 8, and press PLAY.
4. Insert the blank tape for the converted data into Recorder #2, and press RECORD and PLAY.
5. Type:

```
>SYSTEM ENTER
```

```
*? ENTER
```
6. DCONV will prompt you to LOAD THE LEVEL I TAPE AND PRESS ENTER.
7. Press **ENTER** and the program will automatically be loaded from Recorder #1, converted, and stored in LEVEL II format on the tape in Recorder #2.
8. When all records have been read, Recorder #1 will continue to play to the end of tape and Recorder #2 will remain stopped. Press RESET while holding down BREAK to return to BASIC; or insert another LEVEL I data tape to be converted.


If at any time during data loading and conversion, there is an error, DCONV will display the message INPUTERROR and stop the tape. You should then follow the instructions provided above under the section **Data Loading Errors**.

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NOTE: Good data processing procedure dictates that the user test the program, run and test sample sets of data, and run the system in parallel with the system previously in use for a period of time adequate to insure that results of operation of the computer or program are satisfactory.

RADIO SHACK  **A DIVISION OF TANDY CORPORATION**
U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

AUSTRALIA

**280-316 VICTORIA ROAD
RYDALMERE, N.S.W. 2116**

BELGIUM

**PARC INDUSTRIEL DE NANINNE
5140 NANINNE**

U. K.

**BILSTON ROAD WEDNESBURY
WEST MIDLANDS WS10 7JN**