

The 12 Sacrificed Characters & Their "G" Graphics Substitutions

To create the horizontal and vertical grid segments required for Automated Logic Diagrams (ALDs) without adding characters beyond the hard 48-slug limit, IBM replaced the **12 standard commercial special characters**. The 26 alphabetic and 10 numeric characters remained entirely unchanged.

The physical font mapping swaps operated under the following **6-bit BCD** configurations:

BCD (Octal)	BCD Bits (CBA8421)	Card Punch	Standard "A" Character	"G" Chain Logic Graphic Symbol	ALD Function / Description
13	001101	11-8-4	* (Asterisk)		Vertical Line (Passes straight through a column)
33	011101	11-8-3	\$ (Dollar Sign)	—	Horizontal Line (Extends a logic rail across a column)
53	101101	0-8-4	, (Comma)	┌	Upper Left Corner (Starts a block or drops a top trace)
73	111101	0-8-3	. (Period)	┐	Upper Right Corner (Closes the top edge of a block)
14	001110	8-4	/ (Group Mark)	└	Lower Left Corner (Starts a bottom edge or turns upward)
34	011110	12-8-4	© (Record Mark)	┘	Lower Right Corner (Closes a bottom box edge)
54	101110	0-8-2	¥ (Word Separator)	├	Left Tee (Logic line intersecting a vertical block wall)
74	111110	12-8-3	÷ (Segment Mark)	┤	Right Tee (Logic output exiting a block wall)
12	001100	8-3	# (Number Sign)	┴	Top Tee (Traces splitting off a horizontal line downwards)
32	011100	12-8-2	& (Ampersand)	┬	Bottom Tee (Traces tying upward into a horizontal rail)
52	101100	11-8-2	- (Minus / Dash)	⊕	Cross Junction (Intersecting traces without connecting)
72	111100	12	+ (Plus Sign)	⊖ / 	Inverter Triangle / Block Indicator (Often a small block arrow)

Pick the Exact Font Name from Your List:

-dec-terminal-medium-r-normal--14-140-75-75-c-80-dec-dectech

- **Launch an xterm Dedicated to the ALD Drawings:**

bash

```
xterm -fn "-dec-terminal-medium-r-normal--14-140-75-75-c-80-dec-dectech" -e  
"your_fortran_program"
```

Use code with caution.

- **The 8-Bit Fortran Mapping:**

In this mode, the entire font is transformed into graphics and math blocks. You can write a standard CHARACTER*1 byte sequence in Fortran using these raw CHAR() decimal codes to print your unbroken, interlocking box-and-line connections:

- CHAR(251) = | (Vertical Line)
- CHAR(250) = — (Horizontal Line)
- CHAR(240) = ┌ (Upper Left Corner)
- CHAR(241) = ┐ (Upper Right Corner)
- CHAR(242) = └ (Lower Left Corner)
- CHAR(243) = ┘ (Lower Right Corner)

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Option 2: The iso8859-1 Escape Code Method (The VT100 Standard)

If you want to use your **-dec-terminal-...-iso8859-1** font to output normal text *and* graphics in the exact same window (just like an original DEC terminal doing menu borders or layout grids), you can use the **DEC Special Graphics** hardware toggle.

The iso8859-1 terminal driver recognizes 1-byte control sequences to dynamically shift gears:

- **Switch to Graphics Mode:** Write CHAR(27) // ' (0 ' (Escape, Open Parenthesis, Zero).
- **Switch Back to Text Mode:** Write CHAR(27) // ' (B ' (Escape, Open Parenthesis, Capital B).

While inside Graphics Mode, standard lowercase 8-bit ASCII keys physically transform into line-drawing modules:

- CHAR(120) (lowercase x) = | (Vertical Line)
- CHAR(113) (lowercase q) = — (Horizontal Line)
- CHAR(108) (lowercase l) = ┌ (Upper Left Corner)
- CHAR(107) (lowercase k) = ┐ (Upper Right Corner)
- CHAR(109) (lowercase m) = └ (Lower Left Corner)
- CHAR(106) (lowercase j) = ┘ (Lower Right Corner)
- CHAR(116) (lowercase t) = ┌┐ (Left T-Junction)
- CHAR(117) (lowercase u) = ┐┌ (Right T-Junction)
- CHAR(110) (lowercase n) = ┌┐└┘ (Cross Junction)

The Standard Hardware Solution: Shifting G0 and G1 Designations

A VT100/VT220 terminal (and XTerm emulating one) contains two active character set "registers": **G0** and **G1**. You can map your regular text font (iso8859-1) to G0, map your line-and-box graphics font (dec-dectech) to G1, and then use 1-byte control characters to toggle between them character-by-character without the font changing globally.

C With CHAR(27)/'(0' active in your 20-pixel XTerm window:

C -----

C 'q' (113) = — (Horizontal Line Rail)

C 'x' (120) = | (Vertical Line Rail)

C 'l' (108) = ┌ (Top Left Corner)

C 'k' (107) = ┐ (Top Right Corner)

C 'm' (109) = └ (Bottom Left Corner)

C 'j' (106) = ┘ (Bottom Right Corner)

C 'w' (119) = ⊥ (Top Tee - splits a horizontal rail down)

C 'v' (118) = ⊥ (Bottom Tee - ties a vertical line up)

C 't' (116) = ⊥ (Left Tee - splits a vertical rail right)

C 'u' (117) = ⊥ (Right Tee - ties a horizontal line left)

C 'n' (110) = ⊕ (Cross Junction - intersecting pass-through)