



Summary

The following software shows how custom characters can be defined and displayed on the character display. The code is programmed using Forth.

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\ MI - AN - 022           Custom Display Characters
\ This file demonstrates how up to five custom characters can be defined and
\ displayed on the 4x20 character display. Below, CHARACTER.PATTERN is a defining
\ word which associates 8 pattern bytes with a given name. BINARY is defined to
\ allow expression of character patterns as eight bytes represented by 1s and 0s.
\ Finally, INIT.CUSTOM CHAR takes a pattern and custom character code (0..4) and
\ initializes the display with the given pattern.
\
\ After defining these words, the code demonstrates how these functions are used
to
\ display the custom characters.
\
\ To use this code, connect your QED Board to the display and send the code over.
\ The custom up and down arrow characters should be visible on the display once
\ the code has been sent.
\
\ Please contact Mosaic Industries at 510/790-1255 if you have any questions
\ regarding this code.
\
\ The information provided herein is believed to be reliable; however, Mosaic
\ Industries assumes no responsibility for inaccuracies or omissions. Mosaic
\ Industries assumes no responsibility for the use of this information and all use
\ of such information shall be entirely
\ at the user's own risk.
ANEW CUSTOM DISPLAY.CHARS

HEX
\ CHARACTER.PATTERN is a defining word which defines <name> to return an xaddr
\ which is the location of the last byte of a custom character pattern. The reason
\ characters are stored in reverse order is to allow greater clarity in the custom
\ pattern definition, code simplicity, and efficiency. To use this function,
supply
\ eight bytes which define the desired binary pattern
\ then call CHARACTER.PATTERN followed by <name>. Afterward, whenever <name> is
\ executed, the address of the pattern will be left on the stack.
: CHARACTER.PATTERN
  <DBUILDS ( n1..n8\<name> -- )
    C, C, C, C, C, C, C, C, \ store each char byte associated w/name
  DOES> ( -- xaddr ) \ when name is execute the xaddr of the
; \ first character byte is returned.
\ BINARY changes the BASE to binary to allow custom character patterns to be
\ expressed as 1s and 0s.
: BINARY ( -- | Changes BASE to binary )
  2 BASE !
;

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\ INIT. CUSTOM CHAR when provided with a custom character pattern xaddr and a
\ character code (0..4) will initialize the display with the pattern. After executing
\ this function, <character code> CHAR>DISPLAY commands will result in the display of
\ the custom character.
: INIT. CUSTOM CHAR ( xaddr. char. pattern\char. code -- )
  ROT 7 + -ROT \ addr+7\page\custom char#
  3 SCALE 40 OR \ convert char code to command byte addr
  DUP 8 + SWAP DO \ Each custom character is made of 8 bytes, for each
one:
  I COMMAND>DISPLAY \ write the location of the current byte
  XDUP C@ CHAR>DISPLAY \ write the contents of the current byte
  1XN- \ decrement for the next content byte
  LOOP XDROP
;

\ *** Usage Example ***
\ *** Begin by defining custom character patterns:
BINARY \ Binary mode helps clarify the custom character bit patterns.

00000 \ Each character is 5 bits wide by 8 bits high
00100
01110
11111
00100
00100
00100
00000 CHARACTER. PATTERN UP. PATTERN \ Define this pattern as up

00000
00100
00100
00100
11111
01110
00100
00000 CHARACTER. PATTERN DOWN. PATTERN \ Define this pattern as down

\ *** Define constants to assign patterns to display char codes 0..4
HEX
0 CONSTANT UP. ARROW \ 0 will be the up arrow character
1 CONSTANT DOWN. ARROW \ 1 will be the down arrow character
\ characters 2, 3 and 4 have not been defined.

\ *** Initialize the display with custom character patterns
INIT. DISPLAY \ Reset, clear and init
the display
UP. PATTERN UP. ARROW INIT. CUSTOM CHAR \ Init display char 0 with up
DOWN. PATTERN DOWN. ARROW INIT. CUSTOM CHAR \ Init display char 1 with down

\ *** Test patterns by displaying them:
0 0 PUT. CURSOR UP. ARROW CHAR>DISPLAY \ Move cursor, then request up char
1 0 PUT. CURSOR DOWN. ARROW CHAR>DISPLAY \ Move cursor, request down char

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