Package LCD
Version 3.10.3

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Contents

1. Documentation Of Package LCD

1.1. LCD - Displaying Status Informations On A LC-Display

1.1.1. Introduction

This package enables a LCD module connected to the parallel port of fli4l. Serial LCD modules by Matrix-Orbital can be used too. Some more filters for special displays exist.

Informations like date, time, values of actual load, ISDN- or DSL up- and download rates/bars in kb/s can be shown on the display.

1.1.2. Konfiguration

To use the package lcd configure the following variables:

```
OPT_LCD='yes'  (Default setting: OPT_LCD='no')
```

LCD_COLS - Amount of characters per line. The kernel module supports values of 16, 20, 24, 32 and 40 at the moment. Modules with 8 or 27 charcters per line usually will work as well. fli4l will transfer 16 res. 40 to the kernel module.

LCD_LINES - Amount of lines.

Possible values: 1, 2 and 4.

Attention: Displays on parallel ports with two controller chips (4x16, 4x40 etc.) have to be defined with two lines! The coordinates of the values to be shown can be specified as usual. The LCD driver decides which of the two controllers has to be addressed depending on coordinates.

LCD_ADDRESS IO address of the LPT port, i.e. '0x278'

If a serial display by Matrix-Orbital is used specify the serial port to be used here i.e. 'com1' or 'com2'. With 'none' LAN-only is set, see: `LCD_LANIP`

Displaying on a monitor: 'console' or tty1 choose the main screen. This may lead to output mixed with normal messages and hence is not advised. 'tty2', 'tty3' ... 'tty9' select other virtual consoles reached by typing ALT-F2 ... F9. ALT-F1 returns to the main screen.

Important: *parallel interfaces on motherboards or on ISA adapters are fully supported. PCI adapters with parallel ports provided by NETMOS-Chips can be also used.*

```
cat /proc/pci
```

lists PCI devices discovered. Select the device with matching Vendor-ID and Device-ID and choose one of the following IO addresses:

- *Nm9705CV (Vendor id=9710, Device id=9705, Port1 1st entry)*
- *Nm9735CV (Vendor id=9710, Device id=9735, Port1 3rd entry)*
- *Nm9805CV (Vendor id=9710, Device id=9805, Port1 1st entry)*
- *Nm9715CV (Vendor id=9710, Device id=9815, Port1 1st entry, Port2 3rd entry)*
- *Nm9835CV (Vendor id=9710, Device id=9835, Port1 3rd entry)*
- *Nm9755CV (Vendor id=9710, Device id=9855, Port1 1st entry, Port2 3rd entry)*

Consider this as an experimental feature because of the lack of matching hardware to test. Please report errors on the newsgroups!

LCD_LANIP (optional variable)

IP address of a 16x2 displays on a Pollin AVR-NET-IO in LAN or other displays on ethersex - see further variables (experimental)

LCD_LANTYPE (optional variable)

Type of firmware. Choose: 'pollin' (default) - Original firmware AVR-NET-IO 'ethersex' - firmware by www.ethersex.de with active LCD

LCD_LANUSER (optional variable)

Authentification for ethersex if PAM is set to ecmd/tcp. Here: Username

LCD_LANPASS (optional variable)

Password belonging to `LCD_LANUSER`

LCD_TIME_LONG LCD_TIME_SHORT These are two timer values for the IO port of the LCD-Display. If blank the following defaults will be used:

```
LCD_TIME_LONG='100'
LCD_TIME_SHORT='40'
```

If problems occur, for example distorted output on the LCD display try to use higher values:

```
LCD_TIME_LONG='120'
LCD_TIME_SHORT='60'
```

These variables have no meaning for serial displays by Matrix-Orbital.

LCD_ADDR_TYPE - Way of addressing the LCD controller.

```
LCD_ADDR_TYPE='0'     # For HD44780 and compatible
LCD_ADDR_TYPE='1'     # For HD66712 and compatible
LCD_ADDR_TYPE='2'     # Obsolete
```

These variables have no meaning for serial displays by Matrix-Orbital.

LCD_WINAMP Ready-to-use LCD displays by Kernel-Concepts exist in different wiring variants: normal and Winamp-wiring. Newer displays use the latter, specify 'yes' in this case.

LCD_FILTER - Filter for special displays. At the moment filters exist for - ipc_a78 displays

```
LCD_FILTER='mo2ipc_a78'     # For mo2ipc_a78 displays
```

LCD_START_MSG The message specified here will be shown on the display during system startup shortly after driver loading. It should not exceed the length of one line because longer texts may not be shown completely.

LCD_STOP_MSG The message specified here will be shown on the display during system shutdown. It should not exceed the length of one line because longer texts may not be shown completely.

LCD_REBOOT_MSG The message specified here will be shown on the display during system reboot. It should not exceed the length of one line because longer texts may not be shown completely.

LCD_START_ISDN_RATE Specifies if program isdn_rate should be started.

LCD_TYPE_N Output format of program isdn_rate can be largely customized to the personal taste of the user.

`LCD_TYPE_N` sets the number of data types to be shown. Data types are always shown, independent of being online or not.

LCD_TYPE_x `LCD_TYPE_x` specifies data type and column/row of the display in which the information should appear. Data types are coded numerically. Possible values: see table 1.1.

The following two digits in `LCD_TYPE_1` set the position. Format: "column row", whereas both digits start with '0'.

Example:

```
LCD_TYPE_1='4 10 1'   # Status in 2nd row, starting from column 11
            | |  |
            | |  \--    row in display
            | \-----    column in display
            \-------    Information type according to table
```

For Type 39 (fixed text) expand format above with a text to be displayed.

Example:

```
LCD_TYPE_2='39 10 1 Hello'   # Text "Hello" in 2nd row
                             # starting at column 11
```

Typ	Information	Characters
0	local date dd.mm.yyyy	10
1	local date dd.mm.yy	8
2	local time hh:mm:ss	8
3	remote date dd.mm.yyyy	10
4	remote date dd.mm.yy	8
5	remote time hh:mm:ss	8
6	isdn status channel 1	7
7	isdn status channel 2	7
8	dsl status	7
9	isdn circuit name channel 1	16
10	isdn circuit name channel 2	16
11	dsl circuit name	16
12	isdn input rate bar	8
13	isdn output rate bar	8
14	dsl input rate bar	8
15	dsl output rate bar	8
16	isdn input rate	5
17	isdn output rate	5
18	dsl input rate	5
19	dsl output rate	5
20	isdn charge channel 1	6
21	isdn charge channel 2	6
22	dsl charge	6
23	isdn ip address channel 1	15
24	isdn ip address channel 2	15
25	dsl ip address	15
26	load 1	5
27	load 2	5
28	phone	16
29	isdn online time channel 1	8
30	isdn online time channel 2	8
31	dsl online time	8
32	isdn quantity in channel 1	8
33	isdn quantity in channel 2	8
34	dsl quantity in	8
35	isdn quantity out channel 1	8
36	isdn quantity out channel 2	8
37	dsl quantity out	8
38	cpu usage	4
39	fixed text	max 20
40	text -> /etc/lcd_text1.txt	max 20
41	text -> /etc/lcd_text2.txt	max 20
42	text -> /etc/lcd_text3.txt	max 20
43	text -> /etc/lcd_text4.txt	max 20
44	router uptime	10

Table 1.1.: Overview of possible values for LCD_TYPE_x

Types 40 - 43 fetch text to be displayed from the files mentioned in the type list. These files are read and displayed every second during runtime. They can be read and changed by other programs as well, (i.e. telmond). Possible usecases are messages for incoming E-Mails even while being offline (MyJack). Standard texts for data types 40-43 are definded by the following variables (and are spooled to temporary files during system startup, names are generated by pasting of indexes into the string "/etc/lcd_text<Zahl>.txt"):

```
LCD_VAR_TEXT_1='Text 1'  # -> /etc/lcd_text1.txt
LCD_VAR_TEXT_2='Text 2'  # -> /etc/lcd_text2.txt
LCD_VAR_TEXT_3='Text 3'  # -> /etc/lcd_text3.txt
LCD_VAR_TEXT_4='Text 4'  # -> /etc/lcd_text4.txt
```

Texts can also be displayed depending on online state (i.e. online time only while being online and while being offline date and time at the same place). Configure the following variables:

LCD_TYPE_ONLINE_N Set the amount of data types to be shown in `LCD_TYPE_ONLINE_N`. They will only be shown while being online.

LCD_TYPE_ONLINE_x `LCD_TYPE_ONLINE_x` Data type, column and row where to show the information on the display. Data types are coded numerically. Format and type match the ones from the 'LCD_TEXT_x' table.

Example:

```
LCD_TYPE_ONLINE_1=' 8  0 0'     # dsl status
```

LCD_TYPE_OFFLINE_N `LCD_TYPE_OFFLINE_N` sets the number of data types to show. These data types are only displayed while being offline.

LCD_TYPE_OFFLINE_x `LCD_TYPE_OFFLINE_x` Data type, column and row where to show the information on the display. Data types are coded numerically. Format and type match the ones from the 'LCD_TEXT_x' table.

Example:

```
LCD_TYPE_OFFLINE_1=' 0  0 0'  # local date
```

LCD_DSL_SPEED_IN LCD_DSL_SPEED_OUT `LCD_DSL_SPEED_IN` und `LCD_DSL_SPEED_OUT` is used for scaling bar display (type 14 and 15). Maximum data transfer rates of a DSL connection are set here. In principle any integer value can be specified. It may be even useful to set slightly higher values to avoid a plus sign at the end of the bar. Please note that connection names may be slightly different from real data transfer rates, for example DSL1000 has a maximum download rate (inbound) of 1024 kilobits/s.

Example for a DSL connection with 1024/128 kilobit/s:

```
LCD_DSL_SPEED_IN='1024' # Bitrate for DSL inbound
LCD_DSL_SPEED_OUT='128' # Bitrate for DSL outbound
```

These values are irrelevant for ISDN connections.

1.1.3. isdn_rate

The program „isdn_rate“ is the core of package LCD. It monitors circuit states and puts out the data types mentioned in the config file at the matching position in the LCD display. isdn_rate is executed as follows:

```
isdn_rate [-ip router-ip] [-port imond-port] [-telmond-port telmond-port]
          [-type hitachi|matrix-orbital|tty] [-config configfilename]
```

Optional parameters have the following meanings:

-ip router-ip IMOND and/or TELMOND running on a router are used as data sources. `-ip` sets the corresponding router IP address. If the parameter is omitted 127.0.0.1 (localhost) will be used. The name of the router may be used instead of the address as well.

-port imond-port `-port` sets the port IMOND can be reached at. Default port is 5000.

-telmond-port telmond-port `-telmond-port` sets the port TELMOND can be reached at. Default port is 5001.

-type hitachi|matrix-orbital|tty `-type` sets the display type. `hitachi` selects displays compatible to HD44780. `matrix-orbital` Matrix-Orbital displays. `tty` directs output to console. IMPORTANT: All output of isdn_rate is directed to stdout. Redirection to according interfaces is needed because of this. Default value is tty.

-config configfilename `-config` sets the path and the name of the lcd.conf file to be created by the script rc410.lcd. Default value is /var/run/lcd.conf.

A windows version of isdn_rate exists. To use it the file /var/run/lcd.conf either has to be copied manually into the isdn_rate directory after router startup or has to be created by hand. Execution could work like this:

```
isdn_rate -ip fli4l -config lcd.conf
```

1.1.4. Pin wiring of a LCD module connected to the parallel port

```
  13 _____________________________ 1 Front view of a
    \ o o o o o o o o o o o o o /   parallel port, rear
     \ o o o o o o o o o o o o /    side of a PC
   25 ------------------------- 14
```

Connecting a LCD module:

Parallelport-Pin	Beschreibung	LCD-Modul	LCD-Pin	
18-25	GND		--	|
	GND		1	--|- Bridge
	R/W		5	--|
	+5V		2	
1	STROBE	EN(1)	6	
2	D0	D0	7	
3	D1	D1	8	
4	D2	D2	9	

```
            5      D3             D3           10
            6      D4             D4           11
            7      D5             D5           12
            8      D6             D6           13
            9      D7             D7           14
           14      Autofeed       RS            4
           17      Select In      EN(2)         ? (for LCD with 2 controllers)

  Display with backlight:
                                  HG+          15 (with series resistor ~ 20 Ohm)
                                  GND          16
```

Connect a >= 20kOhm Poti between +5V and GND on pin 3 to control display contrast. For my display (Conrad) Pin 3 is directly connected to ground.

```
  +5V ---+
         /
         \ <--+
         /    |
         \    |
  GND ---+    +--- VL (Pin 3 - driver input)
```

1.1.5. Connection of a 4x40 displays

Connection of a 4x40 displays differs vastly from other displays - see this Example (Conrad - NLC-40x4x05):

```
Parallel port pin   Description   LCD module           LCD pin
        18-25                                           --|
                    GND                               13  --|- bridge
                    R/W                               10  --|
                    +5V                               14
              1     STROBE        EU (Enable-Upper)    9
              2     D0            D0                   8
              3     D1            D1                   7
              4     D2            D2                   6
              5     D3            D3                   5
              6     D4            D4                   4
              7     D5            D5                   3
              8     D6            D6                   2
              9     D7            D7                   1
             14     Autofeed      RS                  11
             17     Select In     ED (Enable-Down)    15
```

Connect a >= 20kOhm Poti between +5V and GND on pin 12 to control display contrast. It may be enough to connect pin 12 directly to ground to achieve readable display.

```
  +5V ---+
         /
```

```
       \ <--+
       /    |
       \    |
GND ---+    +--- VL (Pin 12 - driver input)
```

- Connect ED wire to pin 17 of the parallel port.
- Define the display as 2x40 in lcd.txt.
- As type definition for isdn_rate set 4x40 for rown-/column size instead.

Unfortunately no standard exists for the pin wiring of a motherboard's internal parallel port connector. For internal use of LCD modules the pin connection has to be found in another way.

Power supply for a LCD module can't be taken directly from the parallel port because of its current draw being too high. Use mouse (PS/2), keyboard (DIN, PS/2), game port, USB or PC power supply instead. Game ports may be complicated as well. Always use a voltmeter at first! No guarantees can be given, your mileage may vary.

1.1.6. Winamp-wiring of a LCD module

```
 13 _____________________________ 1 Front view of a
   \ o o o o o o o o o o o o o /   parallel port, rear
    \ o o o o o o o o o o o o /    side of a PC
  25 ------------------------- 14
```

Connecting a LCD module with Winamp wiring:

Parallel port pin	description	LCD module	LCD pin	
18-25	GND		1	
14	Autofeed	R/W	5	
	+5V		2	
1	STROBE	EN(1)	6	
2	D0	D0	7	
3	D1	D1	8	
4	D2	D2	9	
5	D3	D3	10	
6	D4	D4	11	
7	D5	D5	12	
8	D6	D6	13	
9	D7	D7	14	
16	Init	RS	4	
Displays with backlight:				
	+5V	HG+	15	
		GND	16	(with regulating series resistor 100 Ohm)

Connect a >= 10kOhm Poti between +5V and GND on pin 3 to control display contrast. For my display (Conrad) Pin 3 is directly connected to ground.

```
+5V ---+
       /
       \ <--+
       /    |
       \    |
GND ---+    +--- VL (Pin 3 - driver input)
```

1.1.7. Tips and Tricks

Connecting 2 displays By aid of the 2nd EN signal it is possible to use 2 identical displays in parallel zu. To accomplish this Pin 6 of the first display is connected to pin 1 (EN1) of the parallel port while pin 6 of the 2nd display is wired to pin 17 (EN2). All other wires are connected in parallel.

Two sided displays For two sided displays make the following connections:

```
25-pol. Sub-D        LCD

1 -------|
         |
          \
           \-------- Pin 6

         |
17-------|

       switch
```

Pin 6 of the display is connected to the common side of the switch. The two EN wires are connected to the two pins of the switching side.

Driving both variants EN2 signal is generated when a row z is accessed with `LCD_LINES` $< z <$ 2*`LCD_LINES`. If a row number higher than that is used both displays are adressed to get definable chars (i.e. isdn_rate's bar display) on both displays. Both display sides can have their own defined chars.

Hence for a 4x40 a 2x40 display is specified in <config>/lcd.txt. Rows are accessed with 0-3. row numbers 4 and 5 are sent to both displays in this case. Row 4 is sent to row 0 and 2, row 5 is sent to row 1 and 3.

Addressing i.e. 2 parallel 4x20 displays looks like this:

- row 0-3 are shown on display 1
- row 4-7 are shown on display 2
- row 8-11 are shown on both displays

Oscillation loops With long cables or certain parallel ports oscillation loops can cause troubles. Either use shorter cables or if this is not feasible use a termination. Take a 10kOhm resistor for each of the 10 data wires connected to +5V.

A. Appendix For Package LCD

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