NAME

syscons, **sc** - the legacy console driver

SYNOPSIS

options MAXCONS=N
options SC_ALT_MOUSE_IMAGE
options SC_CUT_SEPCHARS=_characters_
options SC_CUT_SPACES2TABS
options SC_DFLT_TERM
options SC_DISABLE_KDBKEY
options SC_DISABLE_REBOOT
options SC_HISTORY_SIZE=N
options SC_MOUSE_CHAR=C
options SC_NO_CUTPASTE
options SC_NO_FONT_LOADING
options SC_NO_HISTORY
options SC_NO_PALETTE_LOADING
options SC_NO_SUSPEND_VTYSWITCH
options SC_NO_SYSMOUSE
options SC_NO_TERM_DUMB
options SC_NO_TERM_SC
options SC_NO_TERM_SCTEKEN
options SC_PIXEL_MODE
options SC_TWOBUTTON_MOUSE
options SC_NORM_ATTR=_attribute_
options SC_NORM_REV_ATTR=_attribute_
options SC_KERNEL_CONS_ATTR=_attribute_
options SC_KERNEL_CONS_ATTRS=_attributes_
options SC_KERNEL_CONS_REV_ATTR=_attribute_
options SC_DFLT_FONT
makeoptions SC_DFLT_FONT=_font_name_
device sc

In */boot/device.hints*:
hint.sc.0.at="isa"
hint.sc.0.vesa_mode=0x103

In */boot/loader.conf*:
kern.vty=sc

DESCRIPTION

The **syscons** driver provides multiple virtual terminals. It resembles the SCO color console driver.

Note that the **syscons** driver is not compatible with systems booted via UEFI(8). Forcing use of **syscons** on such systems will result in no usable console.

The **syscons** driver is implemented on top of the keyboard driver (atkbd(4)) and the video card driver (vga(4)) and so requires both of them to be configured in the system.

There can be only one **syscons** device defined in the system.

Virtual Terminals

The **syscons** driver provides multiple virtual terminals which appear as if they were separate terminals. One virtual terminal is considered current and exclusively occupies the screen and the keyboard; the other virtual terminals are placed in the background.

In order to use virtual terminals, they must be individually marked ''on'' in */etc/ttys* so that getty(8) will recognize them to be active and run login(1) to let the user log in to the system. By default, only the first eight virtual terminals are activated in */etc/ttys*.

You press the Alt key and a switch key to switch between virtual terminals. The following table summarizes the correspondence between the switch key and the virtual terminal.

Alt-F1	ttyv0	Alt-F7	ttyv6	Shift-Alt-F1	ttyva
Alt-F2	ttyv1	Alt-F8	ttyv7	Shift-Alt-F2	ttyvb
Alt-F3	ttyv2	Alt-F9	ttyv8	Shift-Alt-F3	ttyvc
Alt-F4	ttyv3	Alt-F10	ttyv9	Shift-Alt-F4	ttyvd
Alt-F5	ttyv4	Alt-F11	ttyva	Shift-Alt-F5	ttyve
Alt-F6	ttyv5	Alt-F12	ttyvb	Shift-Alt-F6	ttyvf

You can also use the ''nscr'' key (usually the PrintScreen key on the AT Enhanced keyboard) to cycle available virtual terminals.

The default number of available virtual terminals is 16. This can be changed with the kernel configuration option MAXCONS (see below).

Note that the X server usually requires a virtual terminal for display purposes, so at least one terminal must be left unused by getty(8) so that it can be used by the X server.

Key Definitions and Function Key Strings

The **syscons** driver, in conjunction with the keyboard driver, allows the user to change key definitions and function key strings. The kbdcontrol(1) command will load a key definition file (known as ''keymap'' file), dump the current keymap, and assign a string to a function key. See keyboard(4) and kbdmap(5) for the keymap file.

You may want to set the *keymap* variable in */etc/rc.conf.local* to the desired keymap file so that it will be automatically loaded when the system starts up.

Software Font

For most modern video cards, e.g., VGA, the **syscons** driver and the video card driver allow the user to change the font used on the screen. The vidcontrol(1) command can be used to load a font file from */usr/share/syscons/fonts*.

The font comes in various sizes: 8x8, 8x14 and 8x16. The 8x16 font is typically used for the VGA card in the 80-column-by-25-line mode. Other video modes may require different font sizes. It is better to always load all three sizes of the same font.

You may set *font8x8*, *font8x14* and *font8x16* variables in */etc/rc.conf* to the desired font files so that they will be automatically loaded when the system starts up.

Optionally you can specify a particular font file as the default. See the SC_DFLT_FONT option below.

Screen Map

If your video card does not support software fonts, you may still be able to achieve a similar effect by re-mapping the font built into your video card. Use vidcontrol(1) to load a screen map file which defines the mapping between character codes.

Mouse Support and Copy-and-Paste

You can use your mouse to copy text on the screen and paste it as if it was typed by hand. You must be running the mouse daemon moused(8) and enable the mouse cursor in the virtual terminal via vidcontrol(1).

Pressing mouse button 1 (usually the left button) will start selection. Releasing button 1 will end the selection process. The selected text will be marked by inverting foreground and background colors. You can press button 3 (usually the right button) to extend the selected region. The selected text is placed in the copy buffer and can be pasted at the cursor position by pressing button 2 (usually the middle button) as many times as you like.

If your mouse has only two buttons, you may want to use the SC_TWOBUTTON_MOUSE option below to make the right button to paste the text. Alternatively you can make the mouse daemon emulate

the middle button. See the man page for moused(8) for more details.

Back Scrolling

The **syscons** driver allows the user to browse the output which has ''scrolled off'' the top of the screen.

Press the ''slock'' key (usually ScrllLock / Scroll Lock or Pause on many keyboards) and the terminal is in the ''scrollback'' mode. It is indicated by the Scroll Lock LED. Use the arrow keys, the Page Up/Down keys and the Home/End keys to scroll buffered terminal output. Press the ''slock'' key again to get back to the normal terminal mode.

The size of the scrollback buffer can be set by the SC_HISTORY_SIZE option described below.

Screen Saver

The **syscons** driver can be made to put up the screen saver if the current virtual terminal is idle, that is, the user is not typing on the keyboard nor moving the mouse. See splash(4) and vidcontrol(1) for more details.

DRIVER CONFIGURATION

Kernel Configuration Options

The following kernel configuration options control the **syscons** driver.

MAXCONS=N

> This option sets the number of virtual terminals to *N*. The default value is 16.

SC_ALT_MOUSE_IMAGE

> This option selects the alternative way of displaying the mouse cursor in the virtual terminal. It may be expensive for some video cards to draw the arrow-shaped cursor, and you may want to try this option. However, the appearance of the alternative mouse cursor may not be very appealing. Note that if you use the SC_NO_FONT_LOADING option then you must also use this option if you wish to be able to use the mouse.

SC_CUT_SEPCHARS=_characters_

> This options specifies characters that will be looked for when the driver searches for words boundaries when doing cut operation. By default, its value is "\x20" -- a space character.

SC_CUT_SPACES2TABS

> This options instructs the driver to convert leading spaces into tabs when copying data into cut buffer. This might be useful to preserve indentation when copying tab-indented text.

SC_DFLT_TERM=_name_

This option specifies the name of the preferred terminal emulator.

SC_DISABLE_KDBKEY

>   This option disables the ''debug'' key combination (by default, it is Alt-Esc, or
>   Ctl-PrintScreen). It will prevent users from entering the kernel debugger (KDB) by pressing
>   the key combination. KDB will still be invoked when the kernel panics or hits a break point if
>   it is included in the kernel. If this option is not defined, this behavior may be controlled at
>   runtime by the sysctl(8) variable *hw.syscons.kbd_debug*.

SC_DISABLE_REBOOT

>   This option disables the ''reboot'' key (by default, it is Ctl-Alt-Del), so that the casual user
>   may not accidentally reboot the system. If this option is not defined, this behavior may be
>   controlled at runtime by the sysctl(8) variable *hw.syscons.kbd_reboot*.

SC_HISTORY_SIZE=N

>   Sets the size of back scroll buffer to *N* lines. The default value is 100.

SC_MOUSE_CHAR=C

>   Unless the SC_ALT_MOUSE_IMAGE option above is specified, the **syscons** driver reserves
>   four consecutive character codes in order to display the mouse cursor in the virtual terminals
>   in some systems. This option specifies the first character code to *C* to be used for this
>   purpose. The default value is 0xd0. A good candidate is 0x03.

SC_PIXEL_MODE

>   Adds support for pixel (raster) mode console. This mode is useful on some laptop computers,
>   but less so on most other systems, and it adds substantial amount of code to syscons. If this
>   option is NOT defined, you can reduce the kernel size a lot. See the VESAMODE flag below.

SC_TWOBUTTON_MOUSE

>   If you have a two button mouse, you may want to add this option to use the right button of the
>   mouse to paste text. See *Mouse Support and Copy-and-Paste* above.

SC_NORM_ATTR=_attribute_

SC_NORM_REV_ATTR=_attribute_

SC_KERNEL_CONS_ATTR=_attribute_

SC_KERNEL_CONS_ATTRS=_attributes_

SC_KERNEL_CONS_REV_ATTR=_attribute_

> These options will set the default colors. Available colors are defined in
> *<machine/pc/display.h>*. See *EXAMPLES* below. SC_KERNEL_CONS_ATTRS is a
> character string giving a sequence of attributes in binary format. The sequence will be
> repeated up to the number of CPUs. Beware that the string must not be null, since the kernel
> divides by its length.

SC_DFLT_FONT

> This option will specify the default font. Available fonts are: iso, iso2, koi8-r, koi8-u, cp437,
> cp850, cp865, cp866 and cp866u. 16-line, 14-line and 8-line font data will be compiled in.
> Without this option, the **syscons** driver will use whatever font is already loaded in the video
> card, unless you explicitly load a software font at startup. See *EXAMPLES* below.

SC_NO_SUSPEND_VTYSWITCH

> This option, which is also available as loader(8) tunable and sysctl(8) variable
> *hw.syscons.sc_no_suspend_vtswitch*, disables switching between virtual terminals (graphics
> <-> text) during suspend/resume (ACPI and APM). Use this option if your system is freezing
> when you are running X and trying to suspend.

The following options will remove some features from the **syscons** driver and save kernel memory.

SC_NO_CUTPASTE

> This option disables ''copy and paste'' operation in virtual terminals.

SC_NO_FONT_LOADING

> The **syscons** driver can load software fonts on some video cards. This option removes this
> feature. Note that if you still wish to use the mouse with this option then you must also use the
> SC_ALT_MOUSE_IMAGE option.

SC_NO_HISTORY

> This option disables back-scrolling in virtual terminals.

SC_NO_SYSMOUSE

> This option removes mouse support in the **syscons** driver. The mouse daemon moused(8) will
> fail if this option is defined. This option implies the SC_NO_CUTPASTE option too.

SC_NO_TERM_DUMB

SC_NO_TERM_SC

SC_NO_TERM_SCTEKEN
> These options remove the "dumb", "sc", and "scteken" terminal emulators, respectively.

Driver Flags

The following driver flags can be used to control the **syscons** driver. Driver flags can be set with the **hint.sc.0.flags** tunable, either in */boot/device.hints*, or else at the loader prompt (see loader(8)).

0x0080 (VESAMODE)
> This option puts the video card in the VESA mode specified by */boot/device.hints* variable *vesa_mode* during kernel initialization. Note that in order for this flag to work, the kernel must be compiled with the SC_PIXEL_MODE option explained above. A list of the available mode can be obtained via vidcontrol(1).

0x0100 (AUTODETECT_KBD)
> This option instructs the syscons driver to periodically scan for a keyboard device if it is not currently attached to one. Otherwise, the driver only probes for a keyboard once during bootup.

Loader Tunables

These settings can be entered at the loader(8) prompt or in loader.conf(5).

kern.vty
> When both **syscons** and vt(4) have been compiled into the kernel, the one to use for the system console can be selected by setting this variable to 'sc' or 'vt'. The *GENERIC* kernel uses vt(4) when this value is not set.

FILES

/dev/console	
/dev/consolectl	
/dev/ttyv?	virtual terminals
/etc/ttys	terminal initialization information
/usr/share/syscons/fonts/*	font files
/usr/share/syscons/keymaps/*	key map files
/usr/share/syscons/scrmaps/*	screen map files

EXAMPLES

As the **syscons** driver requires the keyboard driver and the video card driver, the kernel configuration file should contain the following lines.

    device atkbdc
    device atkbd

    device vga
    device sc
    device splash

You also need the following lines in */boot/device.hints* for these drivers.

    hint.atkbdc.0.at="isa"
    hint.atkbdc.0.port="0x060"
    hint.atkbd.0.at="atkbdc"
    hint.atkbd.0.irq="1"
    hint.vga.0.at="isa"
    hint.sc.0.at="isa"

If you do not intend to load the splash image or use the screen saver, the last line is not necessary, and can be omitted.

Note that the keyboard controller driver **atkbdc** is required by the keyboard driver **atkbd**.

The following lines will set the default colors. The normal text will be green on black background. The reversed text will be yellow on green background. Note that you cannot put any white space inside the quoted string, because of the current implementation of config(8).

    options SC_NORM_ATTR=(FG_GREEN|BG_BLACK)
    options SC_NORM_REV_ATTR=(FG_YELLOW|BG_GREEN)

The following lines will set the default colors of the kernel message. The kernel message will be printed bright red on black background. The reversed message will be black on red background.

    options SC_KERNEL_CONS_ATTR=(FG_LIGHTRED|BG_BLACK)
    options SC_KERNEL_CONS_REV_ATTR=(FG_BLACK|BG_RED)

Provided SC_KERNEL_CONS_ATTR is not set, or is set to its default of bright white on black, the following line will set 4 red-ish colors for printing kernel messages in colors depending on the CPU.

    options SC_KERNEL_CONS_ATTRS=\"\x0c\x04\x40\x0e\"

The default scheme is probably better for up to 8 CPUs. Use a long string to get unique colors for more than 8 CPUs.

To turn off all per-CPU coloring of kernel messages, set SC_KERNEL_CONS_ATTR to a non-default

value, or use the default in a pattern of length 1.

    options SC_KERNEL_CONS_ATTRS=\"\x0f\"

The following example adds the font files *cp850-8x16.fnt*, *cp850-8x14.font* and *cp850-8x8.font* to the kernel.

    options SC_DFLT_FONT
    makeoptions SC_DFLT_FONT=cp850
    device sc

SEE ALSO
kbdcontrol(1), login(1), vidcontrol(1), atkbd(4), atkbdc(4), keyboard(4), screen(4), splash(4), ukbd(4), vga(4), vt(4), kbdmap(5), rc.conf(5), ttys(5), config(8), getty(8), kldload(8), moused(8)

HISTORY
The **syscons** driver first appeared in FreeBSD 1.0.

AUTHORS
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CAVEATS
The amount of data that is possible to insert from the cut buffer is limited by the {MAX_INPUT}, a system limit on the number of bytes that may be stored in the terminal input queue - usually 1024 bytes (see termios(4)).

BUGS
This manual page is incomplete and urgently needs revision.