NAME

sane−pixma – SANE backend for Canon Multi-Function Printers and CanoScan Scanners

DESCRIPTION

The **sane−pixma** library implements a SANE (Scanner Access Now Easy) backend that provides access to Canon PIXMA / i-SENSYS / imageCLASS / imageRUNNER multi-function devices (All-in-one printers) and the Canon CanoScan Flatbed/TPU scanners. The backend implements both the USB interface and network interface (using Canon's BJNP and MFNP protocols). The network interface supports scanners over IPv4 as well as IPv6 (MFNP over IPv6 is untested).

Currently, the following models work with this backend:

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PIXMA E410, E510
PIXMA G2000, G2010, G2100, G4000, G4511
PIXMA MG2100, MG2200, MG2400, MG2500, MG2900, MG3000, MG3100
PIXMA MG3200, MG3500, MG3600, MG4200, MG5100, MG5200, MG5300
PIXMA MG5400, MG5500, MG5600, MG5700, MG6100, MG6200, MG6300
PIXMA MG6400, MG7100, MG7500, MG7700, MG8200
PIXMA MP140, MP150, MP160, MP170, MP180, MP190
PIXMA MP210, MP220, MP230, MP240, MP250, MP260, MP270, MP280
PIXMA MP360, MP370, MP390
PIXMA MP450, MP460, MP470, MP480, MP490, MP495
PIXMA MP500, MP510, MP520, MP530, MP540, MP550, MP560
PIXMA MP600, MP600R, MP610, MP620, MP630, MP640
PIXMA MP700, MP710, MP730, PIXMA MP750 (no grayscale)
PIXMA MP800, MP800R, MP810, MP830
PIXMA MP960, MP970, MP980, MP990
PIXMA MX300, MX310, MX330, MX340, MX350, MX360, MX370
PIXMA MX410, MX420, MX470, MX510, MX520, MX530, MX700, MX720
PIXMA MX850, MX860, MX870, MX882, MX885, MX890, MX920, MX7600
PIXMA TR4500
PIXMA TS3100, TS3300, TS5000, TS5100, TS6100, TS6200, TS8000
PIXMA TS8200
PIXUS MP10
imageCLASS MF634Cdw, MF733Cdw
imageCLASS MF3110, MF3240, MF4010, MF4018
imageCLASS MF4120, MF4122, MF4140, MF4150
imageCLASS MF4270, MF4350d, MF4370dn, MF4380dn
imageCLASS MF4410, MF4430, MF4570dw, MF4660, MF4690
imageCLASS MF5730, MF5770, MF6550, MPC200
imageCLASS D420, D480, D530, D570
i-SENSYS MF210, MF230, MF240, MF440, MF620, MF630, MF640
i-SENSYS MF645C, MF730, MF731/733, MF741/743
i-SENSYS MF3010, MF4320d, MF4330d, MF4500, MF4700, MF4800
i-SENSYS MF6100, MF8030, MF8200C, MF8300
imageRUNNER 1020/1024/1025, 1133
CanoScan 8800F, 9000F, 9000F Mark II
CanoScan LiDE 300, 400
MAXIFY MB2000, MB2100, MB2300, MB2700, MB5000, MB5100, MB5400
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The following models are not well tested and/or the scanner sometimes hangs and must be switched off and on.

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PIXMA MP760, MP770, MP780, MP790
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The following models may use the same Pixma protocol as those listed above, but have not yet been reported to work (or not). They are declared in the backend so that they get recognized and activated. Feedback in the sane−devel mailing list welcome.

PIXMA E400, E460, E470, E480, E500, E560, E600, E610
PIXMA E3100, E3300, E3400, E4200
PIXMA G2020, G2060, G3020, G3060, G7000, G7080
PIXMA MG4100, MG6500, MG6600, MG6800, MG6900, MG8100
PIXMA MP375R, MP493, MP740
PIXMA MX320, MX390, MX430, MX450, MX490, MX710
PIXMA G3000, G3010, G4010, G6000, G6080, G7000, GM4000, GM4080
PIXMA TR7500, TR7530, TR7600, TR8500, TR8530, TR8580, TR8600
PIXMA TR8630, TR9530
PIXMA TS3400, TS5100, TS6000, TS6130, TS6180, TS6230, TS6280, TS6300
PIXMA TS6330, TS6330, TS6380, TS6400, TS7330, TS7400, TS7430, TS8100
PIXMA TS8130, TS8180, TS8230, TS8280, TS8300, TS8330, TS8380, TS9000
PIXMA TS9100, TS9180, TS9500, TS9580
PIXUS MP5, XK50, XK60, XK70, XK80, XK90
imageCLASS MF720, MF810/820, MF5630, MF5650, MF5750, MF8170c
imageCLASS MPC190, D550
i-SENSYS MF110, MF220, MF260, MF410, MF420, MF510, MF520, MF740
i-SENSYS MF5880dn, MF5900, MF6680dn, MF8500C
MAXIFY MB5300

The following models may use partly the same Pixma protocol as other devices listed above, but may still need some work. They are declared in the backend as experimental and need the environment variable PIXMA_EXPERIMENT=1 to get recognized and activated. Snoop logs are required to further investigate, please contact the sane−devel mailing list.

−− none −−

The backend supports:

* resolutions of 75, 150, 300, 600, 1200, 2400, 4800, and 9600 DPI (some maybe buggy),
* color and grayscale mode, as well as lineart on certain models,
* a custom gamma table,
* Automatic Document Feeder, Simplex and Duplex.
* Transparency Unit, 24 or 48 bits depth. Infrared channel on certain models.

The device name for USB devices is in the form pixma:xxxxyyyy_zzzzz where x, y and z are vendor ID, product ID and serial number respectively.

Example: pixma:04A91709_123456 is a MP150.

Device names for BJNP/MFNP devices is in the form pixma:aaaa_bbbbb where aaaa is the scanners model and bbbb is the hostname or ip-adress.

Example: pixma:MF4800_192.168.1.45 is a MF4800 Series multi-function peripheral.

This backend, based on cloning original Canon drivers protocols, is in a production stage. Designed has been carried out without any applicable manufacturer documentation, probably never available. However, we have tested it as well as we could, but it may not work in all situations. You will find an up-to-date status at the project homepage. (See below). Users feedback is essential to help improve features and performances.

OPTIONS

Besides "well-known" options (e.g. resolution, mode etc.) **sane−pixma** backend also provides the following options, i.e. the options might change in the future.
The button status can be polled i.e. with *scanimage −A*.
Button scan is disabled on MAC OS X due to darwin libusb not handling timeouts in usb interrupt reads, but may work when using the network protocol.

adf−wait

This option enables and sets the time in seconds waiting for a document inserted into the **Automatic Document Feeder**. The maximum allowed waiting time is 3600 sec (= 1 hour).

button−controlled

> This option can be used by applications (like **scanadf**(1) and **scanimage**(1)) in batch mode, for example when you want to scan many photos or multiple-page documents. If it is enabled (i.e. is set to true or yes), the backend waits before every scan until the user presses the "SCAN" button (for MP150) or the color-scan button (for other models). Just put the first page in the scanner, press the button, then the next page, press the button and so on. When you finished, press the gray-scan button. (For MP150 you have to stop the frontend by pressing Ctrl-C for example.)

button−update (deprecated)

> (write only) In the past this option was required to be set to force reading of the button status for *button−1* and *button−2*. The **sane−pixma** backend no longer requires this option to be used: if no fresh data is available, it will be now requested automatically from the scanner. This option is left for backward compatibility reasons.

button−1 button−2

> (read only) These options will return the value of the respective buttons. value 0 means that the button was not pressed, 1 is returned when the button was pressed. Some scanners with more than two buttons send the button number as target.

original

> (read only) Returns the value of the type or size of original to be scanned if the scanner provides that data. Known values of type: 1 = document, 2 = photo, 5 = film. Known values of size: 1 = A4, 2 = Letter, 8 = 10x15, 9 = 13x18, b = auto. Not all scanners can provide this data.

target   (read only) Returns the value of the target of the scan operation if the scanner provides that data. The values depend on the scanner type. Known values: 1 = save to disk, 2 = save to pdf, 3 = send to email, 4 = send to application or 1 = JPEG, 2 = TIFF, 3 = PDF, 4 = Compact PDF. For some scanners this value is equivalent to the number of the pressed button. Not all scanners can provide this data.

scan−resolution

> (read only) Returns the resolution of the scan operation if the scanner provides that data. Known values: 1 = 75 dpi, 2 = 150 dpi, 3 = 300 dpi, 4 = 600 dpi. Not all scanners can provide this data.

document−type

> (read only) Returns the type of the scanned document if the scanner provides that data. Known values: 1 = Document, 2 = Photo, 3 = Auto scan. Not all scanners can provide this data.

adf−status

> (read only) Returns the status of the document feeder if the scanner provides that data. Known values: 1 = ADF empty, 2 = ADF filled. Not all scanners can provide this data.

adf−orientation

> (read only) Returns the scan orientation of the medium scanned from ADF if the scanner provides that data. Known values: 1 = Portrait, 2 = Landscape. Not all scanners can provide this data.

FILES

/usr/lib/x86_64-linux-gnu/sane/libsane−pixma.a

> The static library implementing this backend.

/usr/lib/x86_64-linux-gnu/sane/libsane−pixma.so

> The shared library implementing this backend (present on systems that support dynamic loading).

/etc/sane.d/pixma.conf

> The backend configuration file (see also description of **SANE_CONFIG_DIR** below).

> The file contains an optional list of networked scanners using the BJNP or MFNP protools (See below for datails on networking support for scanners). Normally only scanners that cannot be auto-detected because they are on a different subnet shall be listed here. If you do not use Linux and your OS does not allow enumeration of interfaces (i.e. it does not support the **getifaddrs**() qfunction) you also may need to add your scanner here as well.

Scanners shall be listed in the configuration file as follows:

<method>://<host>[:port][/timeout=<value>]

where method indicates the protocol used (bjnp is used for inkjet multi-functionals and mfnp is used for laser multi-functionals).

host is the hostname or IP address of the scanner, e.g. bjnp://10.0.1.4 for IPv4, bjnp://[2001:888:118e:18e2:21e:8fff:fe36:b64a] for a literal IPv6-address or bjnp://myscanner.my-domain.org for a hostname.

The port number is optional and in normally implied by the method. Port 8610 is the standard port for mfnp, 8612 for bjnp.

A scanner specific timeout value for the network protocol can be set using the bjnp-timeout parameter. The value is in ms.

Define scanners each on a new line.

More globally applicable timeouts can be set using the bjnp-timeout parameter as follows:

bjnp-timeout=<value>

A timeout defined using bjnp-timeout will apply to the following scanner definitions in the file. If required the bjnp-timeout setting can be defined multiple times, where each setting will apply only to the scanners that follow the setting. The last setting is used for the auto discovered scanners. If not explicitly set, the default 1000ms setting will apply.

Setting timeouts should only be required in exceptional cases.

If so desired networking can be disabled as follows:

-        If the first non-commented line contains **networking=no** all networking will be disabled. This will cause all further statements in the configuration file to be ignored.

-        A line that contains **auto_detection=no** will cause auto-detection to be skipped. Explicitly defined network scanners will still be probed.

USB SUPPORT

USB scanners will be auto-detected and require no configuration.

NETWORKING SUPPORT

The **sane−pixma** backend supports network scanners using the so called Canon BJNP and MFNP protocols.

Canon seems to be dropping support for these protocols in recent scanners. To verify if your scanner supports one of these protocols, check the content of the _scanner._tcp service entry in mDNS/DNS-SD (using for example **avahi-discover**(1)). If that does not list port 8610 or 8612 your scanner probably does not support the mfmp or bjnp protols.

Both IPv4 and IPv6 are supported, but IPv6 is as yet untested with MFNP. Please report your results on the mailing list.

Configuration is normally not required. The **sane−pixma** backend will auto-detect your scanner if it is within the same subnet as your computer if your OS does support this.

If your scanner can not be auto-detected, you can add it to the **sane−pixma** configuration file (see above).

FIREWALLING FOR NETWORKED SCANNERS

The **sane−pixma** backend communicates with port 8610 for MFNP or port 8612 for BJNP on the scanner. So you will have to allow outgoing traffic TO port 8610 or 8612 on the common subnet for scanning.

Scanner detection is slightly more complicated. The **sane−pixma** backend sends a broadcast on all direct connected subnets it can find (provided your OS allows for enumeration of all network interfaces). The broadcast is sent FROM port 8612 TO port 8610 or 8612 on the broadcast address of each interface. The outgoing packets will be allowed by the rule described above.

Responses from the scanner are sent back to the computer TO port 8612. Connection tracking however

does not see a match as the response does not come from the broadcast address but from the scanners own address. For automatic detection of your scanner, you will therefore have to allow incoming packets TO port 8612 on your computer. This applies to both MFNP and BJNP.

So in short: open the firewall for all traffic from your computer to port 8610 (for MFNP) or 8612 (for BJNP) AND to port 8612 (for both BJNP and MFNP) to your computer.

With the firewall rules above there is no need to add the scanner to the *pixma.conf* file, unless the scanner is on a network that is not directly connected to your computer.

ENVIRONMENT

SANE_DEBUG_PIXMA
If the library was compiled with debug support enabled, this environment variable controls the debug level for this backend itself. Higher value increases the verbosity and includes the information printed at the lower levels.
0 print nothing (default)
1 print error and warning messages (recommended)
2 print informational messages
3 print debug-level messages
4 print verbose debug-level messages
11 dump USB traffic
21 full dump USB traffic

SANE_DEBUG_BJNP
If the library was compiled with debug support enabled, this environment variable controls the debug level for the **BJNP and MFNP** network protocols for this backend. Higher value increases the verbosity and includes the information printed at the lower levels.
0 print nothing (default)
1 Print error and warning messages (recommended)
2 Print high level function tracing information
3 Print more detailed protocol tracing information
4 Print protocol headers
5 Print full protocol contents

PIXMA_EXPERIMENT
Setting to a non-zero value will enable the support for experimental models. You should also set SANE_DEBUG_PIXMA to 11.

SANE_CONFIG_DIR
This environment variable specifies the list of directories that may contain the configuration file. On *NIX systems, the directories are separated by a colon (':'), under OS/2, they are separated by a semi-colon (';'). If this variable is not set, the configuration file is searched in two default directories: first, the current working directory (".") and then in */etc/sane.d*. If the value of the environment variable ends with the directory separator character, then the default directories are searched after the explicitly specified directories. For example, setting **SANE_CONFIG_DIR** to "/tmp/config:" would result in directories *tmp/config*, ., and */etc/sane.d* being searched (in this order).

SEE ALSO
sane(7), **sane−dll**(5), **scanimage**(1), **scanadf**(1), **gamma4scanimage**(1), **getifaddrs**(3)

In case of trouble with a recent Pixma model, try the latest code for the **sane−pixma** backend, available in the Sane git repository at:
https://gitlab.com/sane-project/backends.git

You can also post into the Sane-devel mailing list for support.

AUTHORS

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We would like to thank all testers and helpers. Without them we could not be able to write subdrivers for models we don't have. See also the project homepage.