Summagraphics Tablets On SGI Platforms Running IRIX 5.x

Supported Tablets:

MM 961 6” by 9” Tablet

Note: *although support for the MM1201 tablet is coded into the driver, the functionality could not be verified, so it is not considered to be supported.*

Output formats supported:

MM Packed Binary

Commands Supported:

Feature	IRIX Implementation		
	Control word	Value	
Tablet Selection	model	“961”	
Coordinate System			
Absolute	coordinate	“absolute”	
Relative	coordinate	“relative”	
Origin Location			
Upper Left	origin	“upper”	
Lower Left	origin	“lower”	
Report Modes			
Point	reporting	“point”	
Remote Request			
command	reporting	“remote-mode”	
trigger*	reporting	“remote-trig”	
Stream	reporting	“stream”	
Switch Stream	reporting	“switch”	
Axis Update	axis_update	“value”	(where “value” is 0 to 90)
Increment	increment	“value”	(where “value” is 0 to 90)
Report Rate			
Maximum	rate	“max”	
Maximum/2	rate	“max/2”	
Maximum/8	rate	“max/8”	
Maximum/32	rate	“max/32”	

Commands Supported (continued):

Feature	IRIX Implementation		
	Control word	**Value**	
Resolution			
Preset Resolutions			
1 Line Per Inch	resolution	"1lpi"	
2 Lines Per Inch	resolution	"2lpi"	
4 Lines Per Inch	resolution	"4lpi"	
100 Lines Per Inch	resolution	"100lpi"	
200 Lines Per Inch	resolution	"200lpi"	
400 Lines Per Inch	resolution	"400lpi"	
500 Lines Per Inch	resolution	"500lpi"	
1000 Lines Per Inch	resolution	"1000lpi"	
Number of Buttons			
2 Buttons (i.e. stylus)	buttons	"2"	
4 Buttons	buttons	"4"	
5 Buttons	buttons	"5"	
Scaling (done in X Windows system)			
	scale	"valuex/valuey"	
Tablet Number			
Tablet 0	tablet	"0"	
Tablet 1	tablet	"1"	
Tablet Control			
Resume Transmission*	control	"xon"	
Stop Transmission*	control	"xoff"	
Reset Tablet*	control	"reset"	
Origin Offset			
Offset origin in positive X direction	offsetx	"value"	*in tablet increments*
Offset origin in positive Y direction	offsety	"value"	*in tablet increments*

* Feature not suggested for inclusion in config file

Commands/Features Not Supported:

Variable Resolutions

Note: *code for this function is included in the driver, but problems with the tablet prevented this feature from working correctly, therefore it is not supported.*

Selftest

Test Results

Echo

Code Check

Using the IRIX Control Strings to Configure the Summagraphics Tablet

There are three ways that the commands can be used to configure the tablet.

- Control commands placed in the file "*tablet*" in the */usr/lib/X11/input/config* directory
- Commands given directly by means of a program like "devctrl"
- From an application using the same approach as "devctrl"
  Note: source for the devctrl command is found in */usr/people/4Dgifts/examples/device/input/X*

In each of these situations it is important that the control word and the value are separated by a tab or at least one space character. The IRIX operating system is case sensitive, so care needs to be taken to duplicate the control and value strings exactly. No case conversion is done in the driver. All values must be put in quotes as shown on the list of commands.

Most commands can be put in the X11/input/config/tablet file since the configuration of the tablet rarely changes once it is set up. However, some commands do not make sense to include in the config file. These commands are:

- Remote report mode trigger
- Stop Transmission (xoff)
- Resume Transmission (xon)
- Reset Tablet

These commands would typically be used from an application to trigger a tablet report, start or stop tablet reports, or reset the tablet.

An Example Configuration File for the Summagraphics Tablet

Unless otherwise specified the tablet assumes the default configuration (see following section). These default settings can be altered by placing configuration commands in a configuration file. The following is an example of a configuration file that would set up the Summagraphics tablet for use on a Silicon Graphics workstation. The configuration shown would allow the tablet puck (or stylus) to be used as a pointing device. The mouse would still be operative as the pointer as well. This configuration file would be named *tablet*, and would be placed in the */usr/lib/X11/input/config* directory.

```
x_init {
    pushpointer    "on"                  * make the tablet the pointing device
    autostart      "on"                  * start up the tablet device automatically
    origin         "upper"               * set the origin to the upper left corner
    reporting      "switch"              * set the reporting mode to "switch"
    resolution     "200lpi"              * set resolution to 200 lines per inch
}
```

Another example of a configuration file would be for use with the 5080 emulation program. A configuration file for this particular use is shown below:

```
x_init {
    pushpointer    "on"                  * make the tablet the pointing device
    autostart      "on"                  * start up the tablet device automatically
    scalewhich     "none"                * X scaling functions
    scalex         "1280/6000"           *        .
    scaley         "1024/4800"           *        .
    scale0         "1280/6000"           *        .
    scale1         "1024/4800"           *        .
    offsety        "2500"                * offset the origin 2.5 inches up
}
```

Default Tablet Settings

The following are the default device settings for the Summagraphics tablet. These are set in the device driver but can be overridden by inserting an alternate setting in the *tablet* configuration file as shown above.

Parameter	Default
Origin	Lower Left
Resolution	1000 lines per inch
Reporting Mode	Stream
Reporting Rate	Maximum
Tablet Model	961
Number of Buttons	5
Coordinate System	Absolute

Configuring the Silicon Graphics Workstation for the Summagraphics Tablet

The following are the steps required to configure the SGI workstation to use the Summagraphics tablet. All the following operations must be done as *root*.

1. Copy the object file, *summa.o*, into the */var/sysgen/boot* directory.
2. Edit the file */var/sysgen/system*/gfx.sm. Find the line that contains the entry for “dial” (USE: dial sball tablet) and append the word “summa” to the end of the list.
3. Copy the file *summa.master* into the */var/sysgen/master.d* directory and name it *summa*.
4. Link the serial port that will be used for the tablet to the summa input device:
   To use the tablet on serial port 1:
   ```
   ln /dev/ttyd1 /dev/input/summa
   ```
   To use the tablet on serial port 2:
   ```
   ln /dev/ttyd2 /dev/input/summa
   ```
5. Create a configuration file. The */usr/lib/X11/input/config* directory may, or may not, exist. If it does not exist, create the directory:
   ```
   mkdir /usr/lib/X11/input/config
   ```
   Use an editor to create a custom config file in the form shown previously, or you can copy over the file summa_input_config into the input/config directory. The name of this config file should be *tablet*.
6. Create a new kernel that includes the tablet driver.
   ```
   autoconfig
   ```
7. Reboot to use the new kernel:
   ```
   reboot
   ```

Notes to Anyone Who Needs to Look at the Driver Source Code

- As noted previously, there are a number of features that are not supported but have code in the driver for their support. For example, the MM 1201 is not supported, but code for it exists in the driver. Code for sending the diagnostic commands (self test, send test results, codecheck and echo) to the tablet are in the driver, but a mechanism for an application to get access to this data has not been implemented.
- There are a lot of lines of code that can help in debugging the driver or tablet in the form of messages printed to the console window. In normal operation (i.e. as shipped) these messages do not appear. To activate these messages, edit the summa.c file and change the value of the define variable DBGLEVEL. It is normally set to 0. Setting it to 1, 2, 3, or 4 will progressively enable more and more debugging messages. Recompile the driver and put it in */usr/sysgen/boot* and use it.
- Two programs are very useful in testing or debugging the driver or tablet. They are *xlist* and *devctrl*. Both of these programs can be found in the 4Dgifts area of the disk. Specifically, they will be found in:

  `/usr/people/4Dgifts/examples/devices/input/X`

  Compile these programs and use them for debugging and testing.
- One undocumented feature is the ability to read back the configuration of the tablet. If DBGLEVEL is set to 2 or greater, the x and y resolution will be printed out on the console window. To use this feature, recompile the driver with the new value of DBGLEVEL and after rebooting, give the command:

  `devctrl tablet diag "get_config"`
- It is difficult to convince the X window system to send a null to a device. The Summagraphics tablet uses a null to reset the tablet. So, rather than figure out some fancy way to send a null without crashing the system, the tablet is reset to its default condition (as defined in the technical manual) by sending the appropriate set of commands.
- Support for variable resolution is included in the driver, but for some reason did not work with the tablet we had. The resolution can be defined in either lines per inch or in pixels. The syntax for using the command (with the devctrl program) is:

  `devctrl tablet resolution "valuex/valuey"`

  for pixel value resolutions, and:

  `devctrl tablet resolution "valuex|valuey"`

  for resolution in lines per inch. In all the tests done, this command did not change the resolution of the tablet.

Listing of Files

The following is a listing of the files included on the Summagraphics Tablet Driver directory.

README	the readme file describing streams modules in IRIX 5.x. This is the same as the file found in the 4Dgifts/examples/input/devices directory.
docs	[directory]
docs/Summa.ps	this file in postscript format
docs/Summa.txt	this file in ascii text format
io	[directory]
io/Makefile	the make file for summa
io/idev.c	source for the idev interface
io/idev.o	object file for the idev interface
io/summa.c	source for the summagraphics driver
io/summa.o	the summagraphics tablet driver
summa.master	the file that will go in /usr/sysgen/master.d
summa_input_cfg	an example input/config file
sys	[directory]
sys/idev.h	the header file for the idev interface
sys/shmiq.h	the header file for the shared memory input queue
sys/summa.h	the header file for the summagraphics driver
test	[directory]
test/Makefile	the make file for inputtest
test/README	an info file for inputtest
test/idev.c	source file for idev interface (linked to the file in the io directory)
test/idev.o	object file for the idev interface
test/inputtest	the inputtest program
test/inputtest.c	source code for inputtest
test/inputtest.h	header file for inputtest
test/inputtest.o	object file for the inputtest program
test/summa.c	source file for the summagraphics driver (linked to the file in the io directory)
test/summa.o	object file for the summagraphics driver