Dumpsys Input Diagnostics

The **dumpsys** input command dumps the state of the system's input devices, such as keyboards and touchscreens, and the processing of input events.

Input

To dump the input system's state, run the following command:

```
$ adb shell dumpsys input
```

Output

The set of information reported varies depending on the version of Android but consists of three sections:

- Event Hub State
- Input Reader State
- Input Dispatcher State

Event Hub State

```
INPUT MANAGER (dumpsys input)

Event Hub State:
  BuiltInKeyboardId: -2
  Devices:
    -1: Virtual
      Classes: 0x40000023
      Path:
      Descriptor: a718a782d34bc767f4689c232d64d527998ea7fd
      Location:
      ControllerNumber: 0
      UniqueId:
      Identifier: bus=0x0000, vendor=0x0000, product=0x0000, version=0x0000
      KeyLayoutFile: /system/usr/keylayout/Generic.kl
      KeyCharacterMapFile: /system/usr/keychars/Virtual.kcm
      ConfigurationFile:
      HaveKeyboardLayoutOverlay: false
    1: msm8974-taiko-mtp-snd-card Headset Jack
      Classes: 0x00000080
      Path: /dev/input/event5
      Descriptor: c8e3782483b4837ead6602e20483c46ff801112c
      Location: ALSA
      ControllerNumber: 0
      UniqueId:
      Identifier: bus=0x0000, vendor=0x0000, product=0x0000, version=0x0000
      KeyLayoutFile:
      KeyCharacterMapFile:
      ConfigurationFile:
      HaveKeyboardLayoutOverlay: false
    2: msm8974-taiko-mtp-snd-card Button Jack
      Classes: 0x00000001
      Path: /dev/input/event4
      Descriptor: 96fe62b244c555351ec576b282232e787fb42bab
      Location: ALSA
      ControllerNumber: 0
      UniqueId:
      Identifier: bus=0x0000, vendor=0x0000, product=0x0000, version=0x0000
      KeyLayoutFile: /system/usr/keylayout/msm8974-taiko-mtp-snd-card_Button_Jack.kl
      KeyCharacterMapFile: /system/usr/keychars/msm8974-taiko-mtp-snd-card_Button_Jack.kcm
```

```
    ConfigurationFile:
    HaveKeyboardLayoutOverlay: false
  3: hs_detect
    Classes: 0x00000081
    Path: /dev/input/event3
    Descriptor: 485d69228e24f5e46da1598745890b214130dbc4
    Location:
    ControllerNumber: 0
    UniqueId:
    Identifier: bus=0x0000, vendor=0x0001, product=0x0001, version=0x0001
    KeyLayoutFile: /system/usr/keylayout/hs_detect.kl
    KeyCharacterMapFile: /system/usr/keychars/hs_detect.kcm
    ConfigurationFile:
    HaveKeyboardLayoutOverlay: false
  4: touch_dev
    Classes: 0x00000014
    Path: /dev/input/event1
    Descriptor: 4e2720e99bd2b59adae8529881343531fff7c98e
    Location:
    ControllerNumber: 0
    UniqueId:
    Identifier: bus=0x0000, vendor=0x0000, product=0x0000, version=0x0000
    KeyLayoutFile:
    KeyCharacterMapFile:
    ConfigurationFile: /system/usr/idc/touch_dev.idc
    HaveKeyboardLayoutOverlay: false
  5: qpnp_pon
    Classes: 0x00000001
    Path: /dev/input/event0
    Descriptor: fb60d4f4370f5dbe8267b63d38dea852987571ab
    Location: qpnp_pon/input0
    ControllerNumber: 0
    UniqueId:
    Identifier: bus=0x0000, vendor=0x0000, product=0x0000, version=0x0000
    KeyLayoutFile: /system/usr/keylayout/qpnp_pon.kl
    KeyCharacterMapFile: /system/usr/keychars/qpnp_pon.kcm
    ConfigurationFile:
    HaveKeyboardLayoutOverlay: false
  6: gpio-keys
    Classes: 0x00000081
    Path: /dev/input/event2
    Descriptor: d2c52ff0f656fac4cd7b7a118d575e0109a9fe1c
    Location: gpio-keys/input0
    ControllerNumber: 0
    UniqueId:
    Identifier: bus=0x0019, vendor=0x0001, product=0x0001, version=0x0100
    KeyLayoutFile: /system/usr/keylayout/gpio-keys.kl
    KeyCharacterMapFile: /system/usr/keychars/gpio-keys.kcm
    ConfigurationFile:
    HaveKeyboardLayoutOverlay: false
```

Things to check

- All of the expected input devices are present.
- Each input device has an appropriate key layout file, key character map file and input device configuration file. If the files are missing or contain syntax errors, then they will not be loaded.
- Each input device is being classified correctly. The bits in the **`Classes`** field correspond to flags in **`EventHub.h`** such as **`INPUT_DEVICE_CLASS_TOUCH_MT`**.
- The **`BuiltInKeyboardId`** is correct. If the device does not have a built-in keyboard, then the id must be **`-2`**, otherwise it should be the id of the built-in keyboard.
- If you observe that the **`BuiltInKeyboardId`** is not **`-2`** but it should be, then you are missing a key character map file for a special function keypad somewhere. Special function keypad devices should have key character map files that contain just the line **`type SPECIAL_FUNCTION`** (that's what in the **`tuna-gpio-keykad.kcm`** file we see mentioned above).

Input Reader State

The **InputReader** is responsible for decoding input events from the kernel. Its state dump shows information about how each input device is configured and recent state changes that have occurred, such as key presses or touches on the touch screen.

As an example, this is what a special function keypad looks like:

```
Input Reader State
...
  Device 3: tuna-gpio-keypad
    IsExternal: false
    Sources: 0x00000101
    KeyboardType: 1
    Keyboard Input Mapper:
      Parameters:
        AssociatedDisplayId: -1
        OrientationAware: false
      KeyboardType: 1
      Orientation: 0
      KeyDowns: 0 keys currently down
      MetaState: 0x0
      DownTime: 75816923828000
```

Here is a touch screen. Notice all of the information about the resolution of the device and the calibration parameters that were used.

```
Input Reader State
...
  Device 6: Melfas MMSxxx Touchscreen
      IsExternal: false
      Sources: 0x00001002
      KeyboardType: 0
      Motion Ranges:
        X: source=0x00001002, min=0.000, max=719.001, flat=0.000, fuzz=0.999
        Y: source=0x00001002, min=0.000, max=1279.001, flat=0.000, fuzz=0.999
        PRESSURE: source=0x00001002, min=0.000, max=1.000, flat=0.000, fuzz=0.000
        SIZE: source=0x00001002, min=0.000, max=1.000, flat=0.000, fuzz=0.000
        TOUCH_MAJOR: source=0x00001002, min=0.000, max=1468.605, flat=0.000, fuzz=0.000
        TOUCH_MINOR: source=0x00001002, min=0.000, max=1468.605, flat=0.000, fuzz=0.000
        TOOL_MAJOR: source=0x00001002, min=0.000, max=1468.605, flat=0.000, fuzz=0.000
        TOOL_MINOR: source=0x00001002, min=0.000, max=1468.605, flat=0.000, fuzz=0.000
      Touch Input Mapper:
        Parameters:
          GestureMode: spots
          DeviceType: touchScreen
          AssociatedDisplay: id=0, isExternal=false
          OrientationAware: true
        Raw Touch Axes:
          X: min=0, max=720, flat=0, fuzz=0, resolution=0
          Y: min=0, max=1280, flat=0, fuzz=0, resolution=0
          Pressure: min=0, max=255, flat=0, fuzz=0, resolution=0
          TouchMajor: min=0, max=30, flat=0, fuzz=0, resolution=0
          TouchMinor: unknown range
          ToolMajor: unknown range
          ToolMinor: unknown range
          Orientation: unknown range
          Distance: unknown range
          TiltX: unknown range
          TiltY: unknown range
          TrackingId: min=0, max=65535, flat=0, fuzz=0, resolution=0
          Slot: min=0, max=9, flat=0, fuzz=0, resolution=0
      Calibration:
        touch.size.calibration: diameter
        touch.size.scale: 10.000
        touch.size.bias: 0.000
        touch.size.isSummed: false
        touch.pressure.calibration: amplitude
        touch.pressure.scale: 0.005
        touch.orientation.calibration: none
        touch.distance.calibration: none
      SurfaceWidth: 720px
      SurfaceHeight: 1280px
      SurfaceOrientation: 0
```

```
    Translation and Scaling Factors:
      XScale: 0.999
      YScale: 0.999
      XPrecision: 1.001
      YPrecision: 1.001
      GeometricScale: 0.999
      PressureScale: 0.005
      SizeScale: 0.033
      OrientationCenter: 0.000
      OrientationScale: 0.000
      DistanceScale: 0.000
      HaveTilt: false
      TiltXCenter: 0.000
      TiltXScale: 0.000
      TiltYCenter: 0.000
      TiltYScale: 0.000
    Last Button State: 0x00000000
    Last Raw Touch: pointerCount=0
    Last Cooked Touch: pointerCount=0
```

Here is an external keyboard / mouse combo HID device. (This device doesn't actually have a mouse but its HID descriptor says it does.)

```
  Device 7: Motorola Bluetooth Wireless Keyboard
    IsExternal: true
    Sources: 0x00002103
    KeyboardType: 2
    Motion Ranges:
      X: source=0x00002002, min=0.000, max=719.000, flat=0.000, fuzz=0.000
      Y: source=0x00002002, min=0.000, max=1279.000, flat=0.000, fuzz=0.000
      PRESSURE: source=0x00002002, min=0.000, max=1.000, flat=0.000, fuzz=0.000
      VSCROLL: source=0x00002002, min=-1.000, max=1.000, flat=0.000, fuzz=0.000
    Keyboard Input Mapper:
      Parameters:
        AssociatedDisplayId: -1
        OrientationAware: false
      KeyboardType: 2
      Orientation: 0
      KeyDowns: 0 keys currently down
      MetaState: 0x0
      DownTime: 75868832946000
    Cursor Input Mapper:
      Parameters:
        AssociatedDisplayId: 0
        Mode: pointer
        OrientationAware: false
      XScale: 1.000
      YScale: 1.000
      XPrecision: 1.000
      YPrecision: 1.000
      HaveVWheel: true
      HaveHWheel: false
      VWheelScale: 1.000
      HWheelScale: 1.000
      Orientation: 0
      ButtonState: 0x00000000
      Down: false
      DownTime: 0
```

Here is a joystick. Notice how all of the axes have been scaled to a normalized range. The axis mapping can be configured using key layout files.

```
Device 18: Logitech Logitech Cordless RumblePad 2
    IsExternal: true
    Sources: 0x01000511
    KeyboardType: 1
    Motion Ranges:
      X: source=0x01000010, min=-1.000, max=1.000, flat=0.118, fuzz=0.000
      Y: source=0x01000010, min=-1.000, max=1.000, flat=0.118, fuzz=0.000
      Z: source=0x01000010, min=-1.000, max=1.000, flat=0.118, fuzz=0.000
      RZ: source=0x01000010, min=-1.000, max=1.000, flat=0.118, fuzz=0.000
```

```
    HAT_X: source=0x01000010, min=-1.000, max=1.000, flat=0.000, fuzz=0.000
    HAT_Y: source=0x01000010, min=-1.000, max=1.000, flat=0.000, fuzz=0.000
  Keyboard Input Mapper:
    Parameters:
      AssociatedDisplayId: -1
      OrientationAware: false
    KeyboardType: 1
    Orientation: 0
    KeyDowns: 0 keys currently down
    MetaState: 0x0
    DownTime: 675270841000
  Joystick Input Mapper:
    Axes:
      X: min=-1.00000, max=1.00000, flat=0.11765, fuzz=0.00000
        scale=0.00784, offset=-1.00000, highScale=0.00784, highOffset=-1.00000
        rawAxis=0, rawMin=0, rawMax=255, rawFlat=15, rawFuzz=0, rawResolution=0
      Y: min=-1.00000, max=1.00000, flat=0.11765, fuzz=0.00000
        scale=0.00784, offset=-1.00000, highScale=0.00784, highOffset=-1.00000
        rawAxis=1, rawMin=0, rawMax=255, rawFlat=15, rawFuzz=0, rawResolution=0
      Z: min=-1.00000, max=1.00000, flat=0.11765, fuzz=0.00000
        scale=0.00784, offset=-1.00000, highScale=0.00784, highOffset=-1.00000
        rawAxis=2, rawMin=0, rawMax=255, rawFlat=15, rawFuzz=0, rawResolution=0
      RZ: min=-1.00000, max=1.00000, flat=0.11765, fuzz=0.00000
        scale=0.00784, offset=-1.00000, highScale=0.00784, highOffset=-1.00000
        rawAxis=5, rawMin=0, rawMax=255, rawFlat=15, rawFuzz=0, rawResolution=0
      HAT_X: min=-1.00000, max=1.00000, flat=0.00000, fuzz=0.00000
        scale=1.00000, offset=0.00000, highScale=1.00000, highOffset=0.00000
        rawAxis=16, rawMin=-1, rawMax=1, rawFlat=0, rawFuzz=0, rawResolution=0
      HAT_Y: min=-1.00000, max=1.00000, flat=0.00000, fuzz=0.00000
        scale=1.00000, offset=0.00000, highScale=1.00000, highOffset=0.00000
        rawAxis=17, rawMin=-1, rawMax=1, rawFlat=0, rawFuzz=0, rawResolution=0
```

At the end of the input reader dump there is some information about global configuration parameters such as the mouse pointer speed.

```
  Configuration:
    ExcludedDeviceNames: []
    VirtualKeyQuietTime: 0.0ms
    PointerVelocityControlParameters: scale=1.000, lowThreshold=500.000, highThreshold=3000.000, acceleration=3.000
    WheelVelocityControlParameters: scale=1.000, lowThreshold=15.000, highThreshold=50.000, acceleration=4.000
    PointerGesture:
      Enabled: true
      QuietInterval: 100.0ms
      DragMinSwitchSpeed: 50.0px/s
      TapInterval: 150.0ms
      TapDragInterval: 300.0ms
      TapSlop: 20.0px
      MultitouchSettleInterval: 100.0ms
      MultitouchMinDistance: 15.0px
      SwipeTransitionAngleCosine: 0.3
      SwipeMaxWidthRatio: 0.2
      MovementSpeedRatio: 0.8
      ZoomSpeedRatio: 0.3
```

Things To Look For

1. All of the expected input devices are present.
2. Each input device has been configured appropriately. Especially check the touch screen and joystick axes.

Input Dispatcher State

The **`InputDispatcher`** is responsible for sending input events to applications. Its state dump shows information about which window is being touched, the state of the input queue, whether an ANR is in progress, and so on.

```
Input Dispatcher State:
  DispatchEnabled: 1
  DispatchFrozen: 0
  FocusedApplication: <null>
```

```
FocusedWindow: name='Window{3fb06dc3 u0 StatusBar}'
TouchStates: <no displays touched>
Windows:
  0: name='Window{357bbbfe u0 SearchPanel}', displayId=0, paused=false, hasFocus=false, hasWallpaper=false, visible
  1: name='Window{3b14c0ca u0 NavigationBar}', displayId=0, paused=false, hasFocus=false, hasWallpaper=false, visib
  2: name='Window{2c7e849c u0 com.vito.lux}', displayId=0, paused=false, hasFocus=false, hasWallpaper=false, visibl
  3: name='Window{31c9f22 u0 Heads Up}', displayId=0, paused=false, hasFocus=false, hasWallpaper=false, visible=fal
  4: name='Window{3fb06dc3 u0 StatusBar}', displayId=0, paused=false, hasFocus=true, hasWallpaper=false, visible=tr
  5: name='Window{278c1d65 u0 KeyguardScrim}', displayId=0, paused=false, hasFocus=false, hasWallpaper=false, visib
  6: name='Window{869f213 u0 com.android.systemui.ImageWallpaper}', displayId=0, paused=false, hasFocus=false, hasW
  7: name='Window{16ab6320 u0 InputMethod}', displayId=0, paused=false, hasFocus=false, hasWallpaper=false, visible
  8: name='Window{cf4ff0b u0 com.google.android.googlequicksearchbox/com.google.android.launcher.GEL}', displayId=0
  9: name='Window{1a7be08a u0 com.android.systemui/com.android.systemui.recents.RecentsActivity EXITING}', displayI
  10: name='Window{2280455f u0 com.google.android.gm/com.google.android.gm.ConversationListActivityGmail}', display
  11: name='Window{657fee5 u0 com.mobilityware.freecell/com.mobilityware.freecell.FreeCell}', displayId=0, paused=f
MonitoringChannels:
  0: 'WindowManager (server)'
RecentQueue: length=10
  MotionEvent(deviceId=4, source=0x00001002, action=2, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=1, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=0, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=2, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=2, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=2, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=2, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=2, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
  MotionEvent(deviceId=4, source=0x00001002, action=1, flags=0x00000000, metaState=0x00000000, buttonState=0x000000
PendingEvent: <none>
InboundQueue: <empty>
ReplacedKeys: <empty>
Connections:
  0: channelName='WindowManager (server)', windowName='monitor', status=NORMAL, monitor=true, inputPublisherBlocked
    OutboundQueue: <empty>
    WaitQueue: <empty>
  1: channelName='278c1d65 KeyguardScrim (server)', windowName='Window{278c1d65 u0 KeyguardScrim}', status=NORMAL,
    OutboundQueue: <empty>
    WaitQueue: <empty>
  2: channelName='357bbbfe SearchPanel (server)', windowName='Window{357bbbfe u0 SearchPanel}', status=NORMAL, moni
    OutboundQueue: <empty>
    WaitQueue: <empty>
  3: channelName='869f213 com.android.systemui.ImageWallpaper (server)', windowName='Window{869f213 u0 com.android.
    OutboundQueue: <empty>
    WaitQueue: <empty>
  4: channelName='3fb06dc3 StatusBar (server)', windowName='Window{3fb06dc3 u0 StatusBar}', status=NORMAL, monitor=
    OutboundQueue: <empty>
    WaitQueue: <empty>
  5: channelName='2c7e849c  (server)', windowName='Window{2c7e849c u0 com.vito.lux}', status=NORMAL, monitor=false,
    OutboundQueue: <empty>
    WaitQueue: <empty>
  6: channelName='cf4ff0b com.google.android.googlequicksearchbox/com.google.android.launcher.GEL (server)', window
u0 com.google.android.googlequicksearchbox/com.google.android.launcher.GEL}', status=NORMAL, monitor=false, inputPubl
    OutboundQueue: <empty>
    WaitQueue: <empty>
  7: channelName='2280455f com.google.android.gm/com.google.android.gm.ConversationListActivityGmail (server)', win
    OutboundQueue: <empty>
    WaitQueue: <empty>
  8: channelName='1a7be08a com.android.systemui/com.android.systemui.recents.RecentsActivity (server)', windowName=
    OutboundQueue: <empty>
    WaitQueue: <empty>
  9: channelName='3b14c0ca NavigationBar (server)', windowName='Window{3b14c0ca u0 NavigationBar}', status=NORMAL,
    OutboundQueue: <empty>
    WaitQueue: <empty>
  10: channelName='16ab6320 InputMethod (server)', windowName='Window{16ab6320 u0 InputMethod}', status=NORMAL, mon
    OutboundQueue: <empty>
    WaitQueue: <empty>
  11: channelName='657fee5 com.mobilityware.freecell/com.mobilityware.freecell.FreeCell (server)', windowName='Wind
    OutboundQueue: <empty>
    WaitQueue: <empty>
  12: channelName='31c9f22 Heads Up (server)', windowName='Window{31c9f22 u0 Heads Up}', status=NORMAL, monitor=fal
    OutboundQueue: <empty>
    WaitQueue: <empty>
```

```
AppSwitch: not pending
  7: channelName='2280455f com.google.android.gm/com.google.android.gm.ConversationListActivityGmail (server)', win
    OutboundQueue: <empty>
    WaitQueue: <empty>
  8: channelName='1a7be08a com.android.systemui/com.android.systemui.recents.RecentsActivity (server)', windowName=
    OutboundQueue: <empty>
    WaitQueue: <empty>
  9: channelName='3b14c0ca NavigationBar (server)', windowName='Window{3b14c0ca u0 NavigationBar}', status=NORMAL,
    OutboundQueue: <empty>
    WaitQueue: <empty>
  10: channelName='16ab6320 InputMethod (server)', windowName='Window{16ab6320 u0 InputMethod}', status=NORMAL, mon
    OutboundQueue: <empty>
    WaitQueue: <empty>
  11: channelName='657fee5 com.mobilityware.freecell/com.mobilityware.freecell.FreeCell (server)', windowName='Wind
    OutboundQueue: <empty>
    WaitQueue: <empty>
  12: channelName='31c9f22 Heads Up (server)', windowName='Window{31c9f22 u0 Heads Up}', status=NORMAL, monitor=fal
    OutboundQueue: <empty>
    WaitQueue: <empty>
AppSwitch: not pending
Configuration:
  KeyRepeatDelay: 50.0ms
  KeyRepeatTimeout: 500.0ms
```

Things To Look For

1. In general, all input events are being processed as expected.
2. If you touch the touch screen and run dumpsys at the same time, then the `TouchStates` line should show the window that you are touching.

Last updated March 27, 2017.