

Addendum: Logitech 6D Data Packet Format

For use with existing applications, the DynaSight sensor can provide tracking information in the Logitech 6D/2D data formats. These formats were derived from Logitech's 2D mouse format and therefore, have provisions for mouse buttons in addition to orientation angles. This additional information is not used by the DynaSight and is set to zero. The additional overhead associated with these unused bits is substantial. In the case of the Euler angle data format each message packet is doubled in size from eight to sixteen bytes. For the quaternion data format the message packet is more than doubled in size to eighteen bytes.

Because of this additional overhead, OIC does *not* recommend using this format for new applications. In fact, DynaSight users may wish to port existing applications from the Logitech 6D format to the DynaSight NATIVE0 format. Propagation delay across the RS-232 communication channel will be reduced by 4 milli-seconds (at 19,200 baud) when using the NATIVE0 format instead of the Logitech 6D format. In addition, there may be additional latency reductions associated with reduced message packet processing overhead in the application software.

The DynaSight Logitech data format emulation mode is enabled by positioning the number three mode selection DIP switch to the down position. This data format is only available while operating in a stereo sync mode, i.e. switch number two must also be in the down position. For more information about DynaSight operating mode selection see the user manual.

Shown in Table 1 are the commands and the DynaSight's associated response while using the Logitech 6D data format.

Table 1. Mode commands for 6D data formats.

| Function | ASCII Code | Hexadecimal |
|---|------------|-------------|
| Reset to Default State | *R | 2A,52 |
| Enter Incremental Reporting Mode | *I | 2A,49 |
| Enter Stream Reporting Mode | *S | 2A,53 |
| Enter Demand Reporting Mode (Poll Mode) | *D | 2A,44 |
| Demand one Report (Poll the Sensor) | *d | 2A,64 |
| Enter Quaternion Angle Reporting Mode | *Q | 2A,51 |
| Enter Euler Angle Reporting Mode | *G | 2A,47 |
| Enter Long Range Tracking Mode* | *H | 2A,48 |
| Enter Short Range Tracking Mode* | *h | 2A,68 |
| Built-In-Test (BIT) Routines | *<code> | 2A,XX |

* - DynaSight always operates in a long range, high resolution mode.

The Logitech 6D communication format has provisions for exercising the attached sensor's built in test routines. A listing and description of the test commands is shown in Table 2. The DynaSight responds to these codes as shown in Table 3. In response to a

built in test command, the present DynaSight firmware release always returns: BF 3F (hex).

Table 2 Built-In-Tests and the associated test codes.

| Built-In-Test Commands/Test Codes | TST Code (hex) |
|--------------------------------------|----------------|
| Not Used, Returns a "Pass" Test Code | 0 |
| Not Used, Returns a "Pass" Test Code | 1 |
| Not Used, Returns a "Pass" Test Code | 2 |
| Not Used, Returns a "Pass" Test Code | 3 |
| Not Used, Returns a "Pass" Test Code | 4 |
| Not Used, Returns a "Pass" Test Code | 5 |
| Not Used, Returns a "Pass" Test Code | 6 |
| Not Used, Returns a "Pass" Test Code | 7 |
| Not Used, Returns a "Pass" Test Code | 8 |
| Not Used, Returns a "Pass" Test Code | 9 |
| Not Used, Returns a "Pass" Test Code | A |
| Not Used, Returns a "Pass" Test Code | B |

Table 3. Built-In-Test status message, a logic high indicates the test was passed. DynaSight always returns: BF 3F (hex).

| Name | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|-------|------|------|------|------|------|------|------|------|
| Byte1 | 1 | 0 | TST5 | TST4 | TST3 | TST2 | TST1 | TST0 |
| Byte2 | 0 | 0 | TSTB | TSTA | TST9 | TST8 | TST7 | TST6 |

While the DynaSight is operating in the Logitech 6D emulation mode it will use as a default the Euler data format as described in Table 4. Upon command, the DynaSight will report tracking information using the quaternion data format as described in Table 5.

Table 4. 16-byte Euler Angle Data Packet Format Used by the DynaSight Sensor.

| Name | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|------|------|------|------|------|------|------|------|
| Byte1 | 1 | STS | 0 | RES | 0 | 0 | 0 | 0 |
| Byte2 | 0 | X20 | X19 | X18 | X17 | X16 | X15 | X14 |
| Byte3 | 0 | X13 | X12 | X11 | X10 | X9 | X8 | X7 |
| Byte4 | 0 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |
| Byte5 | 0 | Y20 | Y19 | Y18 | Y17 | Y16 | Y15 | Y14 |
| Byte6 | 0 | Y13 | Y12 | Y11 | Y10 | Y9 | Y8 | Y7 |
| Byte7 | 0 | Y6 | Y5 | Y4 | Y3 | Y2 | Y1 | Y0 |
| Byte8 | 0 | Z20 | Z19 | Z18 | Z17 | Z16 | Z15 | Z14 |
| Byte9 | 0 | Z13 | Z12 | Z11 | Z10 | Z9 | Z8 | Z7 |
| Byte10 | 0 | Z6 | Z5 | Z4 | Z3 | Z2 | Z1 | Z0 |
| Byte11* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte12* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte13* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte14* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte15* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte16* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* - These bytes are associated with orientation angles and are set to zero by the DynaSight.

STS: Track status bit. This bit is set if the DynaSight is in Search mode or if tracking conditions are marginal (normally at range extremes).

RES: Reserved.

X20 - X0: X translation form origin (LSB = 0.001")

Y20 - Y0: Y translation form origin (LSB = 0.001")

Z20 - Z0: Z translation form origin (LSB = 0.001")

(Origin is defined by the fiducial mark on the DynaSight's front overlay.)

Table 5. 18-byte Quaternion Data Packet Format Used by the DynaSight Sensor.

| Name | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
|---------|------|------|------|------|------|------|------|------|
| Byte1 | 1 | STS | 0 | RES | 0 | 0 | 0 | 0 |
| Byte2 | 0 | X20 | X19 | X18 | X17 | X16 | X15 | X14 |
| Byte3 | 0 | X13 | X12 | X11 | X10 | X9 | X8 | X7 |
| Byte4 | 0 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |
| Byte5 | 0 | Y20 | Y19 | Y18 | Y17 | Y16 | Y15 | Y14 |
| Byte6 | 0 | Y13 | Y12 | Y11 | Y10 | Y9 | Y8 | Y7 |
| Byte7 | 0 | Y6 | Y5 | Y4 | Y3 | Y2 | Y1 | Y0 |
| Byte8 | 0 | Z20 | Z19 | Z18 | Z17 | Z16 | Z15 | Z14 |
| Byte9 | 0 | Z13 | Z12 | Z11 | Z10 | Z9 | Z8 | Z7 |
| Byte10 | 0 | Z6 | Z5 | Z4 | Z3 | Z2 | Z1 | Z0 |
| Byte11* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte12* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte13* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte14* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte15* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte16* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte17* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Byte18* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* - These bytes are associated with orientation angles and are set to zero by the DynaSight.

STS: Track status bit. This bit is set if the DynaSight is in Search mode or if tracking conditions are marginal (normally at range extremes).

RES: Reserved.

X20 - X0: X translation form origin (LSB = 0.001")

Y20 - Y0: Y translation form origin (LSB = 0.001")

Z20 - Z0: Z translation form origin (LSB = 0.001")

(Origin is defined by the fiducial mark on the DynaSight's front overlay.)

Default settings for the DynaSight while operating in the Logitech 6D mode are:

- Demand Reporting Mode (Poll Mode)
- Euler Angle Data Format Reporting Mode

Data packets are transmitted to the host from the DynaSight using the EIA RS-232 communication format. The specific port characteristics are described in Table 6.

Table 6. EIA RS-232 Communication Port Parameters for the DynaSight Sensor.

| Parameter | Setting |
|-----------|---------|
| Data Bits | 8 |
| Stop Bits | 1 |
| Parity | None |
| Baud Rate | 19200 |