TechNotes

Bi-Directional Feedback for CS-Bus Products

Overview:

A very important part of the Converging Systems product line is the feedback that is automatically provided upon a state change (change in motor position or change in light level or color). In the past older version of our firmware required the control system to query for such information but newer firmware releases now automatically enable unsolicited bi-directional feedback (when a CS-Bus controller has set it Notify flag to ENABLED). This makes the engineering of a third-driver driver much easier and as a bonus reduces the amount of bus traffic.

Primer Overview on Driver Feedback for 3ʳᵈ party device drivers

Note: This Tech Note is designed to amplify on the reference data found in the Converging Systems' Device Driver Toolkit) for Motor Control and Lighting Control devices

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Feedback Modes

Motors	When a command is sent to send a motor to a new position, the motor controller sends back status information while the motor is moving and finally when it reaches its destination (0.00 to 100.00 with 0.00 being at the top for projection screens).
LEDS	When a command is sent to change a LEDs' brightness or hue or saturation or any other variable, the controller sends back status information while the LED is sequencing and finally when the LED reaches its set state. This information is provided in a variety of formats depending upon the device being controlled (monochrome, RGB, RGBW, Bi-White Tunable White). For more information see information below (and sample backchannel strings).

Rational for this data.

Dealers and users are beginning to demand backchannel information on the UI. We can provide this information.

Next Steps

We are pleased that you are implementing backchannel communication. This type of implementation definitely differentiates the attractiveness of control systems for users from those which do not support such features.

The two most important backchannel features to implement are Motor. Position=xx and LED.COLOR= (for hue, saturation brightness mode) or for traditional implementations LED.VALUE=(for R,G,B or R,G,B,W modes). For completeness other modes would be useful as well. Particularly in the commercial space, color temperature and circadian tuning are really important.

SUMMARY OF TYPES OF FEEDBACK

For **Motor Position**	We provide one type here: **Type 1**--MOTOR.POSITION=0.00 to 100.00 with 0.00 being at the top Actual Backchannel Trace !1.1.1.MOTOR.STATUS=EXTENDING; !1.1.1.MOTOR.POSITION=44.94; !1.1.1.MOTOR.POSITION=59.00; **Note**: data is provided in decimal format.
For **RGB Feedback** Use: For devices which support RGB color mode	We provide two types here **Type 1**-- (**H**ue/**S**at/**B**rightness) which is preferred--the feedback is in the format **!Z.G.N.LED.COLOR=h,s,b;** ("h" refers to Hue, "s" refers to Saturation, and "b" refers to brightness) Actual Backchannel Trace !200.1.5.LED.COLOR=0.240.240; **Type 2**—(Red, Green, Blue) which is provide for old school users- the feedback is in the format **!Z.G.N.LED.VALUE=R.G.B**; ("R" refers to Red, "G" refers to Green, and "B" refers to Blue) Actual Backchannel Trace !200.1.5.LED.VALUE=240.0.0; **Note**: data is provided in integer formal ranging from 0 to 240.
For **RGBW Feedback***	We provide two types here **Type 1**-- (Hue/Sat/Brightness) which is preferred-- the feedback is in the format **!Z.G.N.LED.COLOR=;**

Use: For devices which support tunable white and full color output) *Note: Most popular	<center>Actual Backchannel Trace</center> <center>!200.1.5.LED.COLOR=0.240.240;</center> **Type 2**— (Red, Green, Blue, White) which is provide for old school users and also useful for controlling the white component in RGBW mode-- the feedback is in the format **!Z.G.N.LED.VALUE=r,g,b,w;** <center>Actual Backchannel Trace</center> <center>!200.2.1.LED.VALUE=240.0.0.0;</center> **Note:** data is provided in integer formal ranging from 0 to 240..
For **Monochrome** Feedback **Use**: For all control systems to show Brightness and/or On/Off state **Note**: Brightness is also part of the HSB feedback under RGB and RGBW	We provide two types here **Type 1**-- (~~Hue/Sat~~/Brightness) which is preferred-- the feedback is in the format **!Z.G.N.LED.COLOR=0,0,b;** <center>Actual Backchannel Trace</center> <center>!200.1.1.LED.COLOR=0.0.20;</center> **Note:** the first two octets are provided as "0" and "0" as placeholders to keep the syntax identical with other color feedback data, since hue and saturation are not relevant here. *This very important feedback scheme is most important for all control systems to (i) move a Brightness/Fade slider to the current brightness level, or (ii) toggle a single light indicator button to one type of state such as **on** (when brightness is >0) or **Off** (when brightness =0)* Alternatively, for this case only (with monochrome) there is a Type 2 scenario **Type 2**—(Brightness only in this special case)-- the feedback is in the format **!Z.G.N.LED.VALUE=b;** <center>!200.1.1.LED.VALUE=20;</center> **Note**: value go from 0 to 240 for all.
Color Temperature (CCT) **Use:** For devices which support CCT which includes RGB and RGBW	We provide Color Temperature (CCT) as well as Circadian Tuning levels in a combined response string (shared with Circadian Tuning information). For CCT the data is contained in the second field after the period. Ranges run from 1700K to 7000K. <center>!200.2.1.LED.STATUS=0.1700;</center>

devices and bi-white devices	
Circadian Tuning Use: For devices which support Circadian Tuning which includes currently the ILC-400 controller in RGBW mode.	We provide Circadian Tuning levels in a combined response string (shared with CCT data). For Circadian Tuning, the data is contained in the first field after the "=" sign. !200.2.1.LED.STATUS=0.1700; **Note**: Integer values range from "0" for sunrise or sunset and "240" for midday sun).