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SmarTek Acoustic Sensor - Version 1 (SAS-1)

Installation and Setup Guide

Part-Y
Communication Via Internet

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Note: In all cases, do not work or position equipment over an active traffic lane. Working over active lanes presents a hazard to the installer and to travelers using the highway. Follow local authorized procedures when installing the SAS-1 unit and any associated components or subsystems.

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Detailed Protocol/Formats for Multiple Device Communication

This document describes the communication protocol/format between data collection software running at a central facility and a roadside cabinet with multiple SmarTek SAS-1 traffic sensors and a SmarTek Cabinet Watchdog Voltage Monitor. Connectivity between the central facility and all roadside cabinets may be a network or the internet.

Each cabinet may be connected to one or more SAS-1 traffic sensors (SAS0001, SAS0002, etc.) and a Cabinet Watchdog Voltage Monitor. Each of these devices must be set during installation to operate in the polled mode since they all share a common serial communication line to the system interface (CDPD modem, serial device server, dialup modem, etc.). This interface implements the communication link back to the central facility.

The following section describes the required polling command which is sent to each cabinet and the resulting data message response format from each device connected to the system interface in the roadside cabinet. The response order is also shown.

This protocol description applies to SAS-1 software Version SAS_140 or later.

Global Broadcast Command To Each Roadside Cabinet:

<ESC>{SAS0000,FLOW=Chr(33),Mess_Format}

Mess_Format = Chr(33) for Simple Flow, Chr(34) for Flow with Truck Count

ASCII Chr(33) is **!** and Chr(34) is **“**
<ESC> is ASCII Chr(27)

Example:

<ESC>{SAS0000,FLOW=!,!} (Poll Command: Simple Flow Message)
or
<ESC>{SAS0000,FLOW=!,”} (Poll Command: Message with Truck Count)

Response from Roadside Cabinet (SAS-1s and Cabinet Watchdog)

For Mess_Format=Chr(33):

First:

Chr(2)CWD0001<sp>aa.aaa<sp>bb.bbb<sp>cc.ccc<sp>dd.ddd<sp>efghijkl<CR><LF>Chr(3)

Next (0.25 Second Delay):

Chr(2)SAS0001<sp>PPP<sp>LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 1 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 2 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 3 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 4 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>Chr(3)	(Lane 5 data)

Next (0.25 Second Delay):

Chr(2)SAS0002<sp>PPP<sp>LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 1 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 2 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 3 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 4 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>Chr(3)	(Lane 5 data)

Next (0.25 Second Delay):

Chr(2)SAS0003<sp>PPP<sp>LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 1 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 2 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 3 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 4 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>Chr(3)	(Lane 5 data)

Next (0.25 Second Delay):

Chr(2)SAS0004<sp>PPP<sp>LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 1 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 2 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 3 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>	(Lane 4 data)
LL<sp>VVV<sp>OOO<sp>SSSS<CR><LF>Chr(3)	(Lane 5 data)

Etc.

For Mess_Format = Chr(34) the SAS-1 Response Format is shown below. The Response Sequence and the Cabinet Watchdog Voltage Monitor Format are unchanged.

Chr(2)SASxxxx<sp>PPP<sp>LL<sp>VVV<sp>UUU<sp>WWW<sp>OOO<sp>SSSS<CR><LF>
LL<sp>VVV<sp>UUU<sp>WWW<sp>OOO<sp>SSSS<CR><LF>
LL<sp>VVV<sp>UUU<sp>WWW<sp>OOO<sp>SSSS<CR><LF>
LL<sp>VVV<sp>UUU<sp>WWW<sp>OOO<sp>SSSS<CR><LF>
LL<sp>VVV<sp>UUU<sp>WWW<sp>OOO<sp>SSSS<CR><LF>Chr(3)

For the SAS-1 Message Format, the following applies:

PPP is the message position in the SAS-1 FIFO buffer, **LL** is the lane number, **VVV** is the total vehicle volume or count, **UUU** is the commercial truck count, **WWW** is the tractor-trailer count, **OOO** is lane occupancy in percent, **SSSS** is average speed in mph. Spaces (ASCII Chr (32)) in the format are designated as **<sp>** while **<CR>** and **<LF>** represent carriage return (ASCII Chr(13)) and line feed (ASCII Chr(10)) respectively. **Chr (2)** and **Chr(3)** are the start of message and end of message characters. Note that this entire message is ASCII. **PPP** indicates whether the message is current (**PPP=1**), or old and should be dropped (**PPP=0**), or behind (**PPP>1**). If the "Poller" is behind, the SAS-1 should be immediately repolled (and the message kept) until PPP=1.

For the Cabinet Watchdog Voltage Monitor Message Format, the following applies:

aa.aaa is the analog voltage measurement (volts) at pin AI1 on J2,
bb.bbb is the analog voltage measurement (volts) at pin AI2 on J2,
cc.ccc is the analog voltage measurement (volts) at pin AI3 on J2,
dd.ddd is the analog voltage measurement (volts) at pin AI4 on J2,
e is the state of the isolated input at pins AK2, KA2 on J4 (e=0 or 1),
f is the state of the isolated input at pins AK1, KA1 on J4 (f=0 or 1),
g is the state of the TTL input at pins 11, 12 on J3 (g=0 or 1),
h is the state of the TTL input at pins 9, 10 on J3 (h=0 or 1),
i is the state of the TTL input at pins 7, 8 on J3 (i=0 or 1),
j is the state of the TTL input at pins 5, 6 on J3 (j=0 or 1),
k is the state of the TTL input at pins 3, 4 on J3 (k=0 or 1),
l is the state of the TTL input at pins 1, 2 on J3 (l=0 or 1)