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## **I N S T A L L A T I O N   N O T E S**

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# **SAS ROUTER AND RUBICON-TO- AUTOMATION SYSTEM CONTROL INTERFACE**

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### **OVERVIEW**

This document gives an overview of the possibilities and requirements of a serial or IP based interface between the SAS system and the automation system. The major advantage to the customer is a greatly reduced number of interconnections per automation computer. If these functions are performed by traditional optos and relays, each channel of automation would require seven opto/relay interconnections (console on/off, automation cut on/off, automation preview on/off, automation cut ready). For an eight-cut automation computer, 56 interconnects are replaced by one serial or IP interface.

SAS developed the Universal Serial Interface (USI) as a means to control external equipment, and to receive controls from external equipment. The interface is universal, in that there is no specific automation-based programming to be entered in the SAS system for each installation; the required programming is done in the automation system, associating the SAS channel to the automation channel. Detailed information on all SAS USI commands is in the document "USI Protocol, 32KD, Rev 11.pdf" or later.

### **Serial RS232**

This is the method most often used for SAS-Automation control. A single three-conductor RS232 cable is run from each automation computer to the SAS RIOLink to which the Rubicon associated with that automation system is connected. (The RIOLink has a total of five RS232 ports.) The connection can also be made to any of the RS232 ports on the SAS 32KD Mixer/Router; however, this interconnection results in a slightly longer latency (75-100ms vs. 25ms) that some users of tight formats find less than ideal. Note that the SAS RS232 interface does not connect to the SAS computer (used to program the SAS system); the connection is directly to the SAS RIOLink that controls the console.

### **TCP/IP**

The automation system connects to the TCP/IP port on the 32KD or RIOLink.

### **Input Source Channel Numbers**

In the SAS system, each source (input) is assigned a unique four-digit channel number. Remote control operations will refer to the source channel number rather than the console and module number. This allows the user to "dial up" a source on any module, and remote control will follow. This is a departure from the way traditional consoles were controlled, where remote interfaces were "hard wired" to a module.

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## Console Numbers

In the SAS system, each console is assigned a unique three-digit console number. This is used in automation to restrict remote control of a given source to only one particular console. The console number “999” is a wild card, referring to all consoles.

## Source Control vs. Module Control

All of the commands listed below refer to a source number rather than a console module. The commands also refer to a console number. If a console number is entered, the command is acted upon if the source is selected on any module in that console. If the console number “999” is entered, the command is acted up if the source is selected on any module on any console. Note that this has the affect--sometime intentional, sometimes unexpected--of turning on and off a module on more than one console if that source is selected on more than one console.

## USI Broadcasts

The SAS USI “broadcasts” all actions occurring in the SAS system, such as Rubicon module on/off, cue on/off, identifying the action by SAS channel number and Console Number. The receiving equipment must “listen” to all traffic on the USI, and be programmed to respond to particular strings required to execute the desired control functions. In a large system, the USI bus can be quite active with tally traffic or other serial messages that are not related to the specific console port that the workstation is communicating with. Note that especially when communicating via TCP/IP, there could be many different consoles and inputs that the automation system must deal with.

## CONSOLE/AUTOMATION CONTROL

### 1.10.10 Rubicon Module On/Off

The operator turns ON a Rubicon module; SAS sends the message defined in:

```
1.1.10 NOTIFICATION OF CONSOLE MODULE ACTION
^M1CCCCSSSS
where “CCC” is the console number, and “SSSS” is the source number.
```

The operator turns OFF a Rubicon module; SAS sends the message defined in:

```
1.1.10 NOTIFICATION OF CONSOLE MODULE ACTION
^M0CCCCSSSS
where “CCC” is the console number, and “SSSS” is the source number.
```

The automation system is programmed to associate the above string to the particular automation system channel. The automation system would then start the cut when the Console On message is received, and stop the cut when the Console Off message is received.

### 1.1.8 Automation System control of Rubicon Module On/Off

A cut is started on the automation system; the automation system sends a message to SAS to turn the Rubicon module on:

```
1.1.8 CONSOLE MODULE CONTROL MESSAGE
^Z201CCCCSSSS
where “CCC” is the console number, and “SSSS” is the source number.
```

A cut is stopped on the automation system or the cut ends; the automation system sends a message to SAS to turn the Rubicon module off:

```
1.1.8 CONSOLE MODULE CONTROL MESSAGE
^Z200CCCCSSSS
where “CCC” is the console number, and “SSSS” is the source number.
```

NOTE: When either of the above messages are received and acted upon in the SAS system, a Notification of Module Action message is sent (the USI protocol issues a command for every console action). It is not desirable for the

automation system to send a Console Module Control Message when the control action was initiated from the Rubicon. If this command is issued, the SAS system will send a second Notification of Module Action message. This can result in an endless loop of command messages.

### 1.1.8 Automation System control of Rubicon module Cue On/Off

A cut is put into preview or cue on the automation system; the automation system sends a message to SAS to turn the Rubicon module cue on:

1.1.8 CONSOLE MODULE CONTROL MESSAGE

`^Z203CCCCSSSS`

*where "CCC" is the console number, and "SSSS" is the source number.*

A cut is taken out of preview or cue on the automation system or the cut ends; the automation system sends a message to SAS to turn the Rubicon module cue off:

1.1.8 CONSOLE MODULE CONTROL MESSAGE

`^Z202CCCCSSSS`

*where "CCC" is the console number, and "SSSS" is the source number.*

NOTE: It is important that the Console Module Cue On/Off message be sent without also sending a Console Module On/Off message. If sent, it would turn the module on and therefore take the cut to air, when that is contrary to the intended operation.

### 1.3.4 Automation System control of Rubicon module OFF LED

This is optional for automation systems where automation decks or channels can be loaded (cut ready to play), or unloaded (no cut ready to play).

A cut is loaded (ready); the automation system sends a message to SAS to turn the Rubicon module OFF LED on:

1.3.4 OPTO COMMAND

`^E1XXXX`

*where "XXXX" is the opto number associated in the SAS system with the OFF LED*

A cut is unloaded (not ready); the automation system sends a message to SAS to turn the Rubicon module OFF LED off:

1.3.4 OPTO COMMAND

`^E0XXXX`

*where "XXXX" is the opto number associated in the SAS system with the OFF LED*

### 1.1.9 Automation System control of Rubicon module 8-character LED

This is optional, used by some stations to display the cut name in the 8-character LED at the bottom of the Rubicon module. (If this feature is not used, the source name programmed into the SAS system is displayed, such as "Cart 1-1".)

1.1.9 CONSOLE MODULE CHANNEL LABEL OVERRIDE MESSAGE

`^Z21CCCCSSSSAAAAAAAA`

*where "CCC" is the console number, "SSSS" is the source number, and "AAAAAAAA" is the 8-character alpha label to be displayed.*

Note: The label override alpha will be displayed until new label written is written by command or until a new source is selected on the module by the operator.

## OTHER NON-CONSOLE COMMANDS:

1.1.3 Router control to direct a router source to a router output

This is typically used for automation system recording of an audio source as a pre-programmed event.

1.1.3 TAKE COMMAND: OPTION THREE – 4 Digit ASCII Number

`^ETSSSSDDDD`

*where "SSSS" is the source number, and "DDDD" is the destination number.*

A take command in the SAS system is a take and replace; any source previously assigned to the destination is replaced by the new source.

There are many other control possibilities, such as sum on/sum off (adding a source to an output without removing any previous sources, in effect a mix bus), change of level control, and fade in/fade out. Refer to the document "USI Protocol, 32KD, Rev 11.pdf" or later.