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SAS32000 Manual

1. SAS 32000 Stereo Audio Routing & Mixing Switcher

The SAS 32000 Audio Routing & Mixing Switcher from Sierra Automated Systems & Engineering Corporation is a high quality microprocessor based audio switching and summing system for use in professional broadcast and industrial installations. The flexibility of the SAS 32000 allows it to serve in a wide variety of specialized and critical applications.

The system is modular and easily configured. The expandable architecture ensures that the system will grow readily as the number of sources and/or destinations increase without becoming obsolete. This 'building block' approach simplifies specifying a new system or reconfiguring an existing system.

The core of the SAS 32000 is a 32 stereo input / 16 stereo output switching subsystem housed in a three rack unit frame. Reference Block Diagram SAS-320\10 sheets 1 to 3 and Block Diagram SAS32B04. Each frame houses all input amplifiers, crosspoint cards, output amplifiers and power supplies required for a complete system. Available controllers range from single control panel per output to powerful menu driven terminals capable of total system access.

For systems requiring more than 32 stereo inputs or 16 stereo outputs the frames are simply connected together with expansion cables. Two frames will allow 32 in / 32 out or 64 in / 16 out in stereo. 64 inputs with 32 outputs is realized with only four frames, all in stereo. Refer to your system block diagram for the specific arrangement used.

Each switching frame may also be configured for 64 mono input / 16 mono output or 32 mono input / 32 mono output operation. Reference Block Diagrams SAS32B05 and SAS32B06. The 64 mono input configuration may be combined with the 32 stereo input configuration yielding 96 inputs with two frames, 32 stereo and 64 mono with 16 stereo outputs. With one mono and two stereo frames the yield increases to 128 inputs, 64 stereo and 64 mono with 16 stereo outputs. These configurations are popular with today's broadcasters who must still handle a significant number of mono sources. It is more economical to structure the switcher with a dedicated group of mono inputs than to tie all mono sources to both the left and right inputs of a stereo system.

The 32 X 32 mono configuration is primarily used on a stand alone basis for mix-minus conferencing, teleconferencing hubs and communication systems. With this structure each output card handles two separate outputs (see Block Diagram SAS32B05) and one frame handles '32 port' communication tasks with ease.

The internal structure of the SAS 32000 allows full summing of any combination of inputs to any output. The summing of inputs may be under local control and/or via serial remote control.

Full RS-232 / RS-485 serial control is utilized for control links both intra-frame and between output bus controllers and panels. Individual processors are utilized on each output bus for reliability and fast access. A separate frame controller communicates with 'X-Y' control panels and other frames in large systems.

2. Crosspoint / Output Modules

The SXT-32 Stereo Crosspoint / Output Module contains all the electronic switches, output amplifiers and control circuitry for a stereo output channel.

CMOS switching is used to ensure low distortion and noise. The current mode circuit topology provides total isolation, eliminates 'punch through' and allows summation of any or all inputs to the output.

The output amplifiers are balanced and provide a low source impedance of 60 ohms, ideal for today's modern voltage distribution systems. The circuit is fully floating, maintaining output level even if one phase is inadvertently shorted to ground. Maximum output level is in excess of +28 dBu providing ample headroom in any installation.

An on board CMOS microprocessor controls the crosspoints and communicates directly with the output control panel over an RS-485 serial link. This direct communication path provides fast response and unsurpassed reliability. Communication with the frame controller is only necessary to respond to requests from X-Y panels or to pass information to another frame within a large system.

3. Input Amplifiers

Each SIA-8 Stereo Input Amplifier has eight independent stereo buffers. Four SIA-8 modules allow a full thirty-two stereo inputs or sixty-four mono inputs to the SAS 32000.

Each individual amplifier is electronically balanced and floating. Input impedance is high and balanced with respect to ground. Maximum input level is greater than +28 dBu allowing freedom from overload. Excellent common mode rejection across the audio spectrum combined with very high common mode voltage tolerance ensures signal integrity.

Also available is the DCA-8 Digitally Controlled Amplifier. Each DCA-8 module has eight mono digitally gain-controlled amplifiers with over 125 dB of gain range. Up to four DCA-8 modules may be used in 32 input mono switcher frames or up to twelve modules (96 channels) may be housed in the DAS 9600 main frame for controlling level of any audio source or destination. Please see the DAS 9600 manual or contact the factory for additional information.

4. Power Supply Modules

The SAS 32000 main frame has locations for two Model SPS-3 Switching Power Supply modules, each with its own line cord, allowing separate AC feeds to be used for a greater level of redundancy. When two SPS-3 power supplies are installed, each power supply assumes half of the frame load. If either power supply is removed, the other will automatically power the entire frame with no interruption. While one SPS-3 will power a complete frame if adequate ventilation is provided it is highly recommended to use both supplies for redundancy, lower operating temperatures and longer life. Each AC feed is double fused, one fuse on the rear of the frame and a lower rated fuse on the rear of the plug in power supply module. The fuse on the power supply module should open first in the event of a failure so that a fuse change can be performed without having to access the rear of the frame. State of the art switching regulators provide high efficiency and

reduced operating temperatures for increased reliability. In large multi-frame systems it is important to provide good ventilation in the equipment rack to avoid the 'chimney effect' where the upper frames heat up due to the rising warm air (see Installation section following).

5. Control Panels

Two basic types of control panels are available; single output controllers and full system access controllers.

5.1 Single Output Control Panels

Single output controllers communicate directly to a microcontroller on an SXT-32 Crosspoint / Output Module via an isolated RS-485 serial line at 76.8 kilobaud. This allows the output to function independent of other modules. Single output controllers are available in several configurations:

- alpha-numeric 8 character LED displays with rotary shaft encoder input selection
- pushbutton input selection
- alpha-numeric display / shaft encoder with 'hot punch' pushbuttons
- numeric LED displays with lever wheel input selection
- single rack unit 19" EIA rack mount controllers
- console or turret mount very small outline controllers

All alpha-numeric panels provide bright, easy to read eight character dot matrix LED displays for showing source names. The names are displayed in alphabetical order as the Input Select shaft encoder is rotated. This presents the operator with an intuitive interface for effortlessly selecting sources. The shaft encoders have 36 positions per revolution and no end stops for rapidly accessing the desired source. The LED display will show the input that is currently Active or the input which has been Selected (preset) for a Take transition using the shaft encoder. Display mode is indicated by the LEDs in the display control pushbuttons. When the Input Select shaft encoder is rotated the display is automatically switched to the Select mode and the source names available for selection are displayed in alphabetical order. After a Take command the display returns to Active mode. Other selectable features are:

- Preset Exchange which allows rapid transitions between two sources, and
- Dynamic Take which switches crosspoints directly as the Input Select knob is rotated

(see Operation Section 15).

The Model ANC-8 is a rack mounted single output alpha control panel. A dual version, the Model ANC-8D, provides two independent sets of controls for simultaneous control of two outputs in a one rack unit package. The Model CPI-80 is the smallest alpha controller. The entire electronics assembly, including alpha display, measures 1.4 X 3.3 inches and is designed for console or turret mounting. The Model APC-88 is a console mountable control panel with full eight character alpha capabilities and eight 'hot punch' instant access pushbuttons. It measures 1.4 X 5.3 inches, suitable for most console six inch and larger slots.

Pushbutton input select panels are available with 16 (Model PBS-16) or 32 (Model PBS-32) programmable pushbuttons in a single rack unit chassis. The panels operate in interlocked (i.e. one input at a time) or summing modes. In interlocked mode pressing an input pushbutton immediately selects the new input, removing the previous selection. An LED in the pushbutton confirms the input status. When the SUM pushbutton is

depressed the panel switches to the summing mode, and the LED in the sum pushbutton illuminates. Inputs may be freely added or deleted by pressing their pushbuttons.

Lever wheel input select panels are available as the TCP-2, a two digit unit for installations with fewer than 100 inputs, and the TCP-3 with three digits for applications requiring more than 100 inputs. After the lever wheels are set to the desired input selection, a large TAKE pushbutton is depressed to immediately switch to the new input. The selection is confirmed by the LED 'input active' display. Also available is a TCP-2D, which provides two TCP-2s in one rack unit.

5.2 Full System Access 'X-Y' Control Panels

Full system access is allowed from the Model AXC-8 Alpha Numeric X-Y Control Panel or the Model XCP-3 Leverwheel X-Y Control Panel and from a terminal or personal computer. X-Y panels communicate to the MCU-3 frame controllers on a RS-485 serial bus at 76.8 kilobaud. These panels continuously monitor system status (both communication status and changes made by single output controllers) and allow changes to be made by Engineering. All X-Y panels provide two external RS-232C ports; one for connection to a terminal or personal computer for local control and system monitoring, and one for connection to an automation computer or to a modem for remote control. See Sections 12 to 14 for a complete description of programmable features and protocols.

The Model AXC-8 Alpha Numeric X-Y Control Panel provides 2 eight character LED displays, one for source names and one for destination names. Shaft encoders allow selection of the desired input and output. The output names are displayed in alphabetical order as the Output shaft encoder is rotated. The input LED display will show the input that is currently Active or the input which has been Selected (preset) for a Take transition using the Input shaft encoder. Display mode is indicated by the LEDs in the display control pushbuttons. When the Input Select shaft encoder is rotated the display is automatically switched to the Select mode and available source names are displayed in alphabetical order. After a Take command the display returns to Active mode.

The AXC-8 displays may be toggled between 'Alphanumeric' and 'Numeric' modes. If the Active pushbutton is pressed after the display is in Active mode the panel displays will change to show the numeric value of the input and output. This is a useful feature for the technical user to find out the physical (numeric) input or output which a particular name is programmed to without having to return to the terminal alpha programming screens to perform a cross-reference.

The XCP-3 has lever wheels to select the output to be controlled as well as the input selection. As the output select lever wheels are changed the LED 'input active' display shows the current input selected to that particular output. A new input selection may be made on the input select lever wheels and depressing the TAKE pushbutton will switch immediately to the selected input.

6. Specifications

System

| | |
|--------------------|------------------------------------------------------------------------|
| Gain | 0 dB \pm 0.2 dB, 20-20kHz. |
| Frequency Response | \pm 0.1 dB, 20-15kHz. +0/-0.25 dB, 20kHz. |
| Noise | <-86 dBu, 20kHz. bandwidth <-80 dBu up to 128 inputs, expanded mode |
| Dynamic Range | >114dB, 20 kHz bandwidth noise floor |
| THD | <0.05%, 20-20kHz. |
| IM [SMPTE] | <0.05% |
| Crosstalk | <-70dB, 20-20kHz., both adjacent inputs fed -100dB typical, 1kHz. |
| Separation | <-70dB, 20-20kHz. -100dB typical, 1kHz. |

Audio Inputs

| | |
|------------------|----------------------------------------------------|
| Input Impedance | >50 kohms, balanced |
| Max. Input Level | +28dBu |
| CMRR | exceeds 70dB, 20-20kHz. -90dB typical 50/60 Hz. |

Audio Outputs

| | |
|-------------------|---------------------------------------------------|
| Source Impedance | 60 ohms |
| Max. Output Level | +28dBu, 10 kohm load +25dBm, 600 Ω load |

Serial Interface

| | |
|---------------------|--------------------------------------------|
| Terminal / PC | RS-232C, 19.2 kilobaud |
| Computer / Modem | RS-232C, 9600 / 1200 baud |
| Control Head Format | RS-485 (RS-422 full duplex), 76.8 kilobaud |

General

| | |
|--------------------|---------------------------------------------------------|
| Power Requirements | 115/230 VAC \pm 10%, 200 VA max. |
| Physical Size | 5.25"H X19"W X 18"D [3 EIA rack units] [each frame] |

| | | |
|---------------|------|-------------------------------|
| <u>Notes:</u> | 0dBu | = 0.775 V rms |
| | 0dBm | = 1 milliwatt |
| | | = 0.775 V rms across 600 ohms |

Sierra Automated Systems reserves the right to change specifications without notice.

7. Frame Installation

Each SAS 32000 frame requires 3 rack units (RU) of space. Free air flow is necessary for proper convection cooling of the modules and power supplies. It is necessary to leave at least one rack unit above and below the frame for ventilation. For multi-frame systems forced air cooling is recommended. If your facility has air conditioned positive pressure racks, one rack unit of space between each frame is sufficient. Suitable fan assemblies are available through Sierra Automated Systems & Engineering Corporation for installations without the luxury of air conditioned racks. Please contact the factory for assistance in planning multi-frame system rack layout and providing for air flow requirements.

Locate a suitable area where there is enough clearance in front of and below the frame for the frame door to open fully. Any obstruction may prevent the door from opening wide enough to remove or install the modules. The door must open almost fully, 150 degrees or more, for adequate clearance.

Refer to the rear connector wiring diagrams for user audio connections. Input connections wire to the SIA-8, and Output connections wire to the SXT-32. The diagrams also detail internal pin assignments that do not require user connection. Ensure that only the user audio connections are used, as damage to external equipment may result if connectors are mis-wired. Remember that a large number of inputs and outputs will be wired to your system. This will result in large diameter cable bundles. Plan your routing and service loop requirements now!

8. SIA-8 Audio Input Interconnect

Each SIA-8 module services eight stereo inputs in a standard 32 X 16 stereo configuration, sixteen mono inputs for a 64 X 16 mono configuration, or eight mono inputs for a 32 X 32 mono configuration. For 16 mono inputs to an SIA-8 the inputs wire as 1 = 1 LEFT, 2 = 1 RIGHT, 3 = 2 LEFT, 4 = 2 RIGHT, 5 = 3 LEFT, etc. When using a 32 X 32 mono frame configuration the eight mono inputs per input card are connected to either the left or right input terminals.

Stereo Audio Inputs Serviced (see above) SIA-8 Position

| | |
|----------|---|
| 1 to 8 | 1 |
| 9 to 16 | 2 |
| 17 to 24 | 3 |
| 25 to 32 | 4 |

See inside of Frame door and Wiring Diagrams SIA8W01 & SIA8WM1.

If you will not be using all of the inputs available on an installed SIA-8 it is recommended that these unused inputs be shorted or alternately terminated with 600 ohms to prevent unwanted pickup of stray signals.

The SIA-8 AUX outputs are used when a system requires expanded outputs (more than 16) and multiple frames are installed. In this case another frame of SIA-8 and SXT-32 cards are required. The user wires each SIA-8 AUX output from the first frame to its respective SIA-8 USER input on the expansion (second) frame, without inducing loading effects on the original audio sources. The first frame contains outputs 1 to 16, and the expanded (second) frame provides outputs 17 to 32. Refer to your system expansion diagram for detail and Block Diagrams SAS320/10-1 to 3.

9. SXT-32 Audio Output & Control Interconnect

See Wiring Diagram SXT32W01. Each SXT-32 module services one output or subscriber in the standard 32 X 16 stereo or 64 X 16 mono configurations. User Audio Outputs (left and right) are the switched audio outputs used.

In the 64 X 16 mono mode the Left Output is typically connected to the Right Aux Input and the Right User Audio Output is used as the primary output for all 64 sources.

In the 32 X 32 mono mode each SXT-32 module services two outputs. SXT-32 #1 provides outputs 1 & 2, SXT-32 #2 provides outputs 3 & 4, etc.. The 'Left Output' on Wiring Diagram SXT32W01 serves Output 1 (3,5,..odd) and the 'Right Output' serves Output 2 (4,6,..even). See Wiring Diagram SXT32WM1.

The control panel for each subscriber connects to its respective SXT-32 Serial Data terminals, Row 27, 27C=+, 27B=-, 27C=shield. This cable connects RS-485 serial data at 76.8 Kbaud. Low capacitance shielded data cable such as Gepco 6104 (CL2 rated) or Belden 8102 (CM rated) is recommended. Avoid running data cables along side cabling to very high gain sensitive audio or video inputs. Maximum cable length should not exceed 3000 feet from control panel to SAS 32000 Frame. Contact the factory for termination information if longer runs are required.

The SXT-32 AUX audio inputs are used when a system requires more than 32 stereo or 64 mono inputs. In this case another frame of SIA-8 and SXT-32 cards is required. For expansion, wire the SXT-32 User Audio Outputs (Switched Audio) of the expanded (second) frame to the respective SXT-32 AUX Inputs of the primary (first) frame. The primary frame switches Audio Inputs 1 to 32, and the second frame inputs become Audio Inputs 33 to 64. Refer to expansion diagrams for detail (Block Diagrams SAS-320\10-1 to 3 or your system specific drawings).

10. MCU-3 Frame Controller Interconnect

See Wiring Diagram MCU3W01. Note: if you have a 32 X 32 teleconference hub or other system with the optional RS-232 port installed on the MCU-3 please see system specific information provided with your system.

The Model MCU-3 Frame Controller Module communicates with the full system access X-Y control panels to inform of changes which have been commanded by local single output control panels and to accept and distribute commands which originate from the central X-Y panel. The X-Y panel is normally connected to Row 1, C=RS485+, B=RS485- and A=shield. Several sets of pins are provided for ease of interconnect in expanded systems.

A system requires multiple frames to obtain larger numbers of inputs and / or outputs (see Block Diagram SAS-320\10-3). As the number of outputs grows beyond sixteen the MCU-3 modules which control the expanded frames are connected in 'party line' fashion to the full system X-Y control panel bus allowing the central X-Y to communicate with all system outputs. Reference the connections between the X-Y panel and frames 1 and 3 in Block Diagram SAS-320\10-3. As the number of inputs increases to require additional frames the 'Primary' or 'upper' MCU-3 communicates to the 'Secondary' or expansion frames on a separate 'expansion RS-485' port. Reference the connections between frames 1 & 2 and frames 3 & 4 in Block Diagram SAS-320\10-3. The primary expansion port pins are Row 5, C=RS485+, B=RS485- and A=shield.

Each frame in a multi-frame system has a specific address programmed on its MCU-3 connector to define the output, 'X', and input, 'Y', numbers housed within. Note that in a single frame system no address strapping is required on the MCU-3 connector (X = 0 and

Y = 0). On power-up the MCU-3 reads the address and establishes its place within the system. 'Primary' frames are those which communicate on the XY bus with the system XY control panel (reference frames 1 and 3 in diagram SAS320\10-3). 'Secondary' or 'expansion' frames are those which supply additional inputs only to primary frames (reference frames 2 and 4 in diagram SAS320\10-3). The primary frames have the 'X', or output group address, programmed as shown below. The 'Y', or input group address, is always 0 for the primary frame which signifies the first group of inputs (inputs 1 to 32 in a standard stereo system). The expansion frames have the 'Y' input group programmed as shown below. 'X' is left at 0 for expansion frames since the primary frame is relaying all commands based on local input / output numbers. (- = no connect; ' = jumper)

| <u>Output 'X' Address</u> | <u>A0</u> connect pins C19 to C20 | <u>A1</u> connect pins C21 to C22 | <u>A2</u> connect pins C23 to C24 | <u>A3</u> connect pins C25 to C26 |
|---------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|
| 0 - out 1 to 16 | - | - | - | - |
| 1 - out 17 to 32 | Ⓣ | - | - | - |
| 2 - out 33 to 48 | - | Ⓣ | - | - |
| 3 - out 49 to 64 | - | - | Ⓣ | - |
| 4 - out 65 to 80 | - | - | - | Ⓣ |

| <u>Input 'Y' Address</u> | <u>A0</u> connect pins A19 to A20 | <u>A1</u> connect pins A21 to A22 | <u>A2</u> connect pins A23 to A24 | <u>A3</u> connect pins A25 to A26 |
|--------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|
| 0 - in 1 to 32 | - | - | - | - |
| 1 - in 33 to 64 | Ⓣ | - | - | - |
| 2 - in 65 to 96 | - | Ⓣ | - | - |
| 3 - in 97 to 128 | - | - | Ⓣ | - |
| 4 - in 129 to 160 | - | - | - | Ⓣ |

11. Crimp Connector Wiring

Quality gold plated two piece euroconnectors are used on each circuit card. The mating euroconnectors mounted on the motherboard have gold plated 0.025" square posts to which all customer and expansion interconnects are made. Crimp contacts are inserted into euroconnector housings which are securely fastened to the rear panel. The electrical connection is passed directly to each individual circuit cards mating connector.

All connections are via crimp contacts and Euroconnector housings supplied and mounted on the rear of the SAS 32000 frame. All cable ends can be pre-cut to length, stripped and jacketed. It is recommended that the jacket be stripped back about 1 inch (25 mm), and each wire end stripped 1/8 inch (3.3 mm). Do not tin the wire ends. The crimp contacts should be installed on all of the wire ends. The Euroconnector housing can be removed from the rear of the frame, and the wires, pre-terminated with the crimp contacts can be inserted into correct positions in the housing (see wiring diagrams and Crimp Detail Drawing SAS32CR1. Lacing bars on the rear of the frame are provided and should be used to aid in a clean installation, as well as strain relief for the possible large pack of cabling. Shielded two conductor audio cable such as Belden 8451 / 82761 or Gepco 61801 is recommended.

12. External Serial Control

The 'XY' full system access control panels, Models XCP-3 and AXC-8, are each provided with two RS-232 serial ports.

The TERMINAL port provides an interface for a local terminal or personal computer. A VT-100 type (or compatible) terminal connected to this port allows user programmability of system attributes and crosspoint control via easy to use menu driven software. The X-Y panel software provides the necessary escape character sequences for the VT-100 to display all menus and supports XON-XOFF protocol. No hardware handshaking is required.

The second port, COMPUTER, provides an RS-232 serial interface for control via automation computer or connection to a modem. An automation computer may be connected to this port for total system crosspoint control or a modem will allow remote control capabilities. Switcher command protocol is described in the following pages.

12.1 Connecting a Terminal

A terminal, VT-100 type or compatible, must be connected to the XY panel for programming pushbutton and alpha assignments. A 25 pin D female connector (TERMINAL) on the rear panel provides an RS-232C serial port, 19.2K baud, 8 data bits, 1 stop bit, no parity. This connector is configured as a DCE device (data computer/console equipment) for direct connection to a DTE (data terminal equipment) terminal.

| | | | |
|------------------------------------------------------|---------|-----------------------------------------------------|----------------------------|
| X-Y Panel TERMINAL PORT <u>DB25 male on cable</u> | (cable) | VT-100 Terminal RS-232 <u>DB25 male on cable</u> | <u>DB9 female on cable</u> |
| Gnd pin 7> ----- shield -----< | | Gnd pin 7 | Gnd pin 5 |
| TX pin 3> -----< | | RX pin 3 | RX pin 2 |
| RX pin 2> -----< | | TX pin 2 | TX pin 3 |

Once the terminal has been connected and setup for proper baud rate and serial format, press return to refresh and display main menu.

12.2 Connecting to the 'Computer' Port

The Computer port on your XY panel provides a concise high speed protocol for connection to an automation computer (see Section 15 thru 17). XY Controllers may alternately be ordered with software to support remote control via modem over dial up telephone lines. A 25 pin D female connector (COMPUTER) provides an RS-232C serial port at 9600 baud, 8 data bits, 1 stop bit, no parity. The COMPUTER port may be configured for 9600 or 1200 baud.

| | | | |
|------------------------------------------------------|---------|---------------------------------------------------|----------------------------|
| X-Y Panel COMPUTER PORT <u>DB25 male on cable</u> | (cable) | to Computer RS-232 <u>DB25 female on cable</u> | <u>DB9 female on cable</u> |
| Gnd pin 7> ----- shield -----< | | Gnd pin 7 | Gnd pin 5 |
| TX pin 2> -----< | | RX pin 3 | RX pin 2 |
| RX pin 3> -----< | | TX pin 2 | TX pin 3 |

13. Terminal RS 232 Control

Software from the XY panel provides the following switcher programming functions:

- a). PBS-32 pushbutton key assignments.
- b). Source Alpha name assignments.
- c). Output Alpha name assignments.
- d). Dynamic Crosspoint display and control of the switcher.
- e). Dynamic SXT-32 communication status.

All programming functions are accessed from the main menu:

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SIERRA AUTOMATED SYSTEMS

32000 Series Switcher Ver. 5.40
Terminal Control Program

MAIN MENU

1. PBS-32 Button Programming Menu
2. Source Alpha List Programming Menu
3. Output Alpha List Programming Menu
4. Dynamic Crosspoint Display
5. Output SXT-32 Comm Status

Enter Selection:
```

The Pushbutton assignment menu allows assignment of any source to any pushbutton on PBS or APC type control panels. The PBS-32 is a local control panel with 32 buttons, and may require button reassignments if the number of sources in the system exceeds 32 or if you simply wish to rearrange the lower numbered sources. Panels with 16 buttons use the first 16 programming locations only and 8 button panels use the first 8.

Pushbutton Assignment menu:

```
Pushbutton Programming Menu

Output Panel is: 01

-----
PB01= 01 | PB02= 02 | PB03= 68 | PB04= 80 | PB05= 81 | PB06= 82 | PB07= 07 | PB08= 08
CART 1 | INPUT 02 | INPUT 68 | INPUT 80 | INPUT 81 | INPUT 83 | INPUT 07 | INPUT 08
-----
PB09= 09 | PB10= 10 | PB11= 11 | PB12= 12 | PB13= 13 | PB14= 14 | PB15= 15 | PB16= 16
INPUT 09 | INPUT 10 | INPUT 11 | INPUT 12 | INPUT 13 | INPUT 14 | INPUT 15 | INPUT 16
-----
PB17= 17 | PB18= 18 | PB19= 19 | PB20= 20 | PB21= 21 | PB22= 22 | PB23= 23 | PB24= 24
INPUT 17 | INPUT 18 | INPUT 19 | INPUT 20 | INPUT 21 | INPUT 22 | INPUT 23 | INPUT 24
-----
PB25= 25 | PB26= 26 | PB27= 27 | PB28= 28 | PB29= 29 | PB30= 30 | PB31= 31 | PB32= 32
INPUT 25 | INPUT 26 | INPUT 27 | INPUT 28 | INPUT 29 | INPUT 30 | INPUT 31 | INPUT 32
-----

1. Select Another Output Panel [N]ext, [L]ast
2. Program a Pushbutton Assignment
3. Return to Main Menu
```

Options 2 & 3 in the main menu provide alpha assignment menus. Each source or destination can be assigned an alpha-numeric name using these menus. Sources above 32 or outputs above 16 can be displayed by using the up and down arrow keys (scrolls 1 line up or down) or by entering L (last) or N (next) to page up and down in blocks of 32 sources. The ANC-8 alpha numeric control panel (or other local control panel) will allow selection of sources identified by the alpha name associated with each source. Source alpha names can be changed at any time, and all changes will be instantly transferred to all alpha control panels when editing is complete and option 2 is selected. All standard ASCII characters are valid, both upper and lower case. Sources may be hidden (restricted) from the remote panels by programming the first character as the open bracket '{'.

Source Alpha Assignment menu:

```

Source-Alpha Name Programming Menu
-----
src # 01| src # 02| src # 03| src # 04| src # 05| src # 06| src # 07| src # 08
CART 1 | CART 2 | CART 3 | REMOTE 1| REMOTE 2| REMOTE 3|CASS 1 |CASS 2
-----
src # 09| src # 10| src # 11| src # 12| src # 13| src # 14| src # 15| src # 16
STUDIO A| STUDIO B| STUDIO C| INPUT 12| INPUT 13| INPUT 14| INPUT 15| INPUT 16
-----
src # 17| src # 18| src # 19| src # 20| src # 21| src # 22| src # 23| src # 24
INPUT 17| INPUT 18| INPUT 19| INPUT 20| INPUT 21| INPUT 22| INPUT 23| INPUT 24
-----
src # 25| src # 26| src # 27| src # 28| src # 29| src # 30| src # 31| src # 32
INPUT 25| INPUT 26| INPUT 27| INPUT 28| INPUT 29| INPUT 30| INPUT 31| INPUT 32
-----

1. Program Source Alpha Names
2. Editing Complete, Send Assignments to System
3. Return to Main Menu

```

Option 4 provides system crosspoint status and allows matrix control in real time. This menu is useful for quickly determining which sources are assigned to each output. It also provides a means of controlling the matrix crosspoints to easily and intuitively set up mix-minus feeds or other complex matrix maps. Control of each crosspoint is accomplished by simply positioning

Dynamic Crosspoint Display:

```

Sierra Automated Systems 32000 Series Switcher Ver. 5.40
Dynamic Crosspoint Status Display

Output                Inputs Assigned
-----
---1's--- ---10's--- ---20's--- ---30's--- ---40's--- ---50's--- -60's
123456789 0123456789 0123456789 0123456789 0123456789 0123456789 01234

01  ---X--- -X-----
02  ----- --X-----
03  -----
04  -----
05  -----
06  ----- -X--X-----
07  -----
08  ---X-----
09  -----
10  -----
11  -----
12  -----
13  -----
14  XXX-----
15  ----- --X-----
16  ----- -----X

```

the cursor to the desired crosspoint using the arrow keys, (up,down,left and right) followed by pressing an action key. If your terminal does not have arrow keys then upper case [A] for up, [B] for down, [C] for right, and [D] for left can be used as an alternative. Pressing the [S] key, which stands for 'sum', will toggle the crosspoint on and off. As many crosspoints as desired may be summed on to any output. If you require a 'take and replace' function rather than summing ON and OFF you may press [T] which will Take (turn on) the highlighted crosspoint and turn off all others to that output.

For larger systems pressing [I] or [O] key will go to the next input or output page for display. The procedure for controlling crosspoints can be repeated. Pressing any other key will return to the main menu, including the Enter or [CR] key.

The dynamic SXT-32 comlink status display is displayed when option 5 from the main menu is selected. This menu indicates the communication status between each SXT-32 crosspoint module and the systems MCU-3 frame controller. This menu is useful for quickly determining which SXT-32 crosspoint modules are installed. In larger systems you may use the [O] key to page through outputs or the [N] next and [L] last keys.

Dynamic Comlink Status Display:

```

Sierra Automated Systems 32000 Series Switcher Ver. 5.40
XCP-3 Dynamic SXT 32 Comlink Display

Output          Comlink Status

-- = SXT 32 not communicating to MCU 3 Master
ok = SXT 32 installed and communicating to MCU 3 Master

01 ..... ok
02 ..... ok
03 ..... ok
04 ..... --
05 ..... --
06 ..... ok
07 ..... --
08 ..... ok
09 ..... --
10 ..... --
11 ..... --
12 ..... --
13 ..... --
14 ..... ok
15 ..... ok
16 ..... ok

```

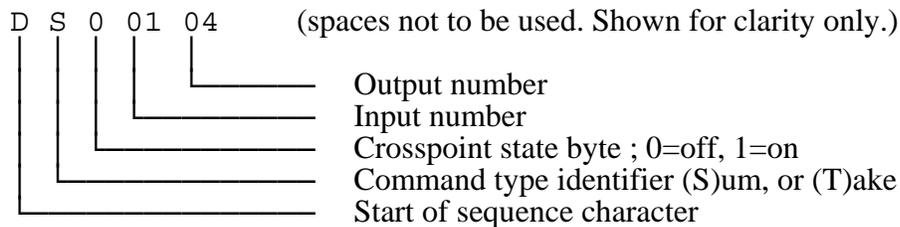
14. Computer RS 232 Port

The 'XY' full system access control panel, Model AXC-8 alphanumeric controller, allows RS-232 control of the system crosspoints as described below. The XY panel may be ordered with the SAS 'Conventional Command Protocol' designed for efficient interface with automation computers, or with the more verbose 'Extended Command Protocol' designed for remote site access from a master control terminal. The host computer or terminal will connect to the "COMPUTER" RS-232C port on the XY panel. This port is configured for 9600 baud (optionally 1200 baud), 8 data bits, 1 stop bit, no parity. For remote site control applications a 9600 baud Hayes compatible modem may be connected to this serial port so that the switcher is operable from a master control terminal communicating over dial up telephone lines.

14.1 Conventional Command Protocol

14.1.1 Command Sequence

All characters are standard ASCII, capital letters only. The command sequence is shown here:



All commands must begin with the 'start of sequence character' capital "D".

The 'command type identifier' must follow the start of sequence character. There are two command types for invoking crosspoint control; 'S' for summing mode operations (add or subtract crosspoints) or 'T' for 'take and replace' single crosspoint commands. The take and replace function will turn on the crosspoint desired and simultaneously turn off the previously selected crosspoint(s).

The next character is the 'crosspoint state byte'. The desired state of the crosspoint when using a sum type sequence is defined by this byte. A '1' will turn the crosspoint on while a '0' will turn the crosspoint off. This byte must be '1' for Take command sequences.

The next two digits determine the input number. Always use two digits (01, 07, 16, 32, etc.). Valid input numbers are 01 up to max installed. The Take command sequence will accept input number '00' causing all crosspoints to be turned off. This provides a convenient method of clearing all crosspoints on a selected output. The take command sequence DT10001 will clear all crosspoints previously assigned to output number 1.

The final two digits determine the output number. Valid output numbers are 01 up to max installed.

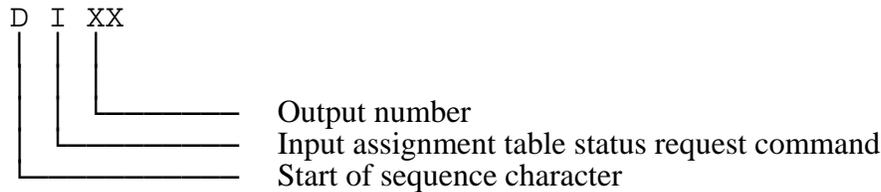
The command sequence 'DT10203' will turn on input 2 to output 3 and turn off previously selected crosspoints (Take). The command sequence 'DS11604' will turn on input 16 to output 4, adding it to any previous selections (Sum).

The SAS32000 will respond with the ASCII characters 'ok<CR+LF>' to indicate receipt of a valid command sequence. An ASCII 'error<CR+LF>' will be sent if an out of range or invalid request is received. <CR+LF> represents 'carriage return + line feed'.

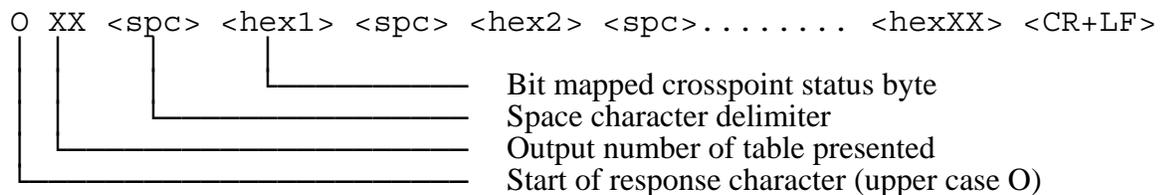
14.1.2 Status Request Sequence

The status request command allows interrogation of the crosspoint status of any output. The input crosspoint status is returned in ASCII hex values which represent a bit mapped table of the inputs that are on or off.

Status Request Command (spaces not to be used. Shown for clarity only)



The system will respond with the following:



The <hex> bytes are two ascii characters representing a hexadecimal value which is a bit mapped representation of the crosspoint states. The number of bytes returned is determined by the overall system input size. For example, input status for 96 inputs is presented in 12 bytes.

- <hex1> = input table byte 1, inputs 1 thru 8 (ascii hex 00-FF)
- <hex2> = input table byte 2, inputs 9 thru 16 (ascii hex 00-FF)
- <hex3> = input table byte 3, inputs 17 thru 24 (ascii hex 00-FF)
- <hex4> = input table byte 4, inputs 25 thru 32 (ascii hex 00-FF)
- <hex5> = input table byte 5, inputs 33 thru 40 (ascii hex 00-FF)
- <hex6> = input table byte 6, inputs 41 thru 48 (ascii hex 00-FF)
- <hex7> = input table byte 7, inputs 49 thru 56 (ascii hex 00-FF)
- <hex8> = input table byte 8, inputs 57 thru 64 (ascii hex 00-FF)
- <hex9> = input table byte 9, inputs 65 thru 72 (ascii hex 00-FF)
- <hex10> = input table byte 10, inputs 73 thru 80 (ascii hex 00-FF)
- <hex11> = input table byte 11, inputs 81 thru 88 (ascii hex 00-FF)
- <hex12> = input table byte 12, inputs 89 thru 96 (ascii hex 00-FF)

Input Crosspoint Status Bit Map

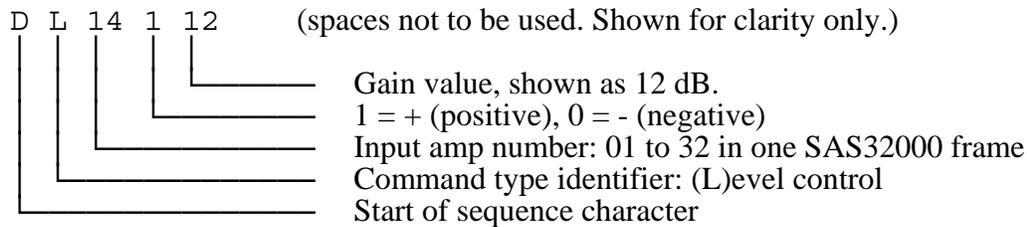
| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|--------|----|----|----|----|----|----|----|----|
| byte1 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| byte2 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| byte3 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 |
| byte4 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 |
| byte5 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 |
| byte6 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 |
| byte7 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 |
| byte8 | 64 | 63 | 62 | 61 | 60 | 59 | 58 | 57 |
| byte9 | 72 | 71 | 70 | 69 | 68 | 67 | 66 | 65 |
| byte10 | 80 | 79 | 78 | 77 | 76 | 75 | 74 | 73 |
| byte11 | 88 | 87 | 86 | 85 | 84 | 83 | 82 | 81 |
| byte12 | 96 | 95 | 94 | 93 | 92 | 91 | 90 | 89 |

Input Crosspoints

**note that a bit value of '1' represents an input which is 'ON' while a bit value of '0' represents an input which is 'OFF'.

14.1.3 Command Sequence: Level Control

Standard 'unity gain only' SAS 32000 systems do not allow level manipulation. Level control commands are only valid for systems equipped with optional digitally controlled amplifiers. All characters are standard ASCII, capital letters only. The following will illustrate the command sequence:



All commands must begin with the 'start of sequence character' capital "D".

The 'command type identifier' follows the start of sequence character: 'L' for level control.

The next two characters identify the amplifier to be adjusted. In a single SAS32000 frame the numbers 01 to 32 are valid. In a single DAS9600 frame the numbers 01 to 96 are valid. In a multi-frame system consult the system specific documentation for amplifier numbers.

The next three characters specify the gain. The first number identifies positive (1 = gain) or negative (0 = attenuation) level. The next two numbers numerically specify the gain in whole decibels. Gain is adjustable in 1 dB increments from -99 to +27 dB.

Positive 12 dB gain is specified as '112'.

Minus 60 dB is specified as '060'.

Unity gain, or 0 dB, is specified as '000' or '100'.

The SAS32000 will respond with the ASCII characters 'ok<CR+LF>' to indicate receipt of a valid command sequence. An ASCII 'error<CR+LF>' will be sent if an invalid request is received.

14.2 Extended Command Protocol

The SAS 32000 is optionally available with 'Extended Protocol' installed on the XY panel COMPUTER port. This protocol is slightly more verbose than the 'conventional' protocol (see section 14.1) to provide a better user interface and to minimize the risk of corruption due to a poor phone line. Additional security is also provided by the password utility. A section on modem setup follows if communication through modems over a telephone line is required.

14.2.1 General

This system is provided with a special 'Extended Command Protocol' designed for 'remote site access' from a master control terminal. The host computer or terminal may connect to the system at 9600 or 1200 baud through the "COMPUTER" RS-232C port on the XY panel. The protocol is robust enough to be used through a modem operating over a common telephone line. If the switcher is placed at a remote site an auto-answer modem would be connected to the "COMPUTER" RS-232C port on the XY panel. This port is configured for 1 start bit, 1 stop bit, no parity, baud rate selectable to 9600 or 1200 baud.

The system is password protected with two levels of priority:

- Level One System Control for user operation
- Level Two Administrative Control

The two levels are provided for program transmission and delivery organizations so that day to day operations do not require giving the operator access to higher level engineering functions.

Level One System Control provides the commands required to interrogate the system status, change input to output routing and adjust output drive level if the system is equipped with digitally controlled output amplifiers.

Level Two Administrative Control, in addition to all level one commands, adds the ability to program the system prompt, passwords, and alphanumeric names associated with each input and output. It also allows adjustment of the input amplifier gain if the system is equipped with digitally controlled input amplifiers.

It is important to remember that HELP may be typed at any time to give the operator a quick listing of commands and their syntax.

14.2.2 Baud Rate Selection

The AXC-8 control panel allows selection of baud rate via the front panel controls. Depress and hold both the ACTIVE and SELECT pushbuttons to access concealed programming mode. The display changes to SEL, indicating 'Select and Take' mode for crosspoint selection. Depressing the TAKE pushbutton toggles the panel between DYN, 'Dynamic Take' mode, and SEL. Rotating the shaft encoder one click clockwise while still holding ACTIVE and SELECT pushbuttons down enables baud rate selection. Now depressing the TAKE pushbutton toggles between 9600 and 1200 baud. See section 15.1.2.2.

14.2.3 Command Syntax

All characters are standard ASCII, capital letters only. Commands are entered as a command line only after the prompt. The default prompt is 'SAS32000*' but the system may be programmed for any prompt desired up to eight characters (see Program Prompt below). Enter return or backspace to obtain the prompt character. All commands must be terminated with the <enter> key.

14.2.4 Level One User System Control

14.2.4.1 Log On

When a connection is established the operator enters a return or <enter> to obtain the response:

...please enter password:

When the password is typed the system displays the '#' character to confirm reception of the characters. When logged on to User Level 1 the prompt tag (end of prompt character) will be an asterisk "*" character. When logged onto the Administrative Level 2 the prompt tag will be a closed bracket ">" character.

Prompt for user level 1: SAS32000*

Prompt for administrative level 2: SAS32000>

14.2.4.2 Take a new crosspoint

SAS32000* TAKE Ixx TO Omm

where: 'I' means Input with xx as the input or source number, and 'O' means Output with mm as the output or destination number. TAKE means to 'take and replace', selecting the specified crosspoint and releasing the previous selection. All numbers must be a two character entry; an example command to select input number 4 to output number 1 will be as follows:

SAS32000* TAKE I04 TO O01

Response will be:

ok

Output 01 : *Out 01* @ 0 dB <--- Input 04 : *Input 04* @ 0 dB
SAS32000*

The first line, 'ok', confirms the command was received and interpreted correctly. Note that the system will respond with 'bad command' if the syntax is not followed correctly or if an incorrect command is entered.

The next line reports status of the output which has been changed (see below 'Inquiry of Crosspoint Status').

The next line returns the prompt, indicating the system is ready to accept subsequent commands.

14.2.4.3 Select/mix a new crosspoint

SAS32000* SUM ON Ixx TO Omm

where: 'I' means Input with xx as the input or source number, and 'O' means Output with mm as the output or destination number. The source may be added, SUM ON, or deleted, SUM OFF, from the current mix. All numbers must be a two character entry; an example command to select input number 4 to output number 1 will be as follows:

SAS32000* SUM ON I04 TO O01

Response will be:

ok

```
Output 01 : Out 01 @ 0 dB      <--- Input 04 : Input 04 @ 0 dB
                                <--- Input 07 : Input 07 @ 0 dB
                                <--- Input 20 : Input 20 @ 0 dB
```

SAS32000*

The response is the same as for a take command with the exception that all inputs which are currently summed, or mixed, to the requested output are listed to show the complete status of that destination.

14.2.4.4 Inquiry of Crosspoint Status

To request the status of an output, i.e. which input(s) is connected:

SAS32000*?Oxx

where ?=inquiry, O=output, and xx= output number

response:

```
Output xx : alpha out (level)  <--- Input mm : alpha in (level)
                                <--- Input nn : alpha in (level)
                                <--- Input pp : alpha in (level)
```

SAS32000*

where: xx= output number, mm= input number, *alpha out*=alpha assignment for that output, *alpha in*=alpha assignment for that input and level is the absolute gain programmed for that input or output. Note that all inputs which have been selected are shown. If more than 16 inputs have been selected the screen will pause. Pressing space bar will resume reporting until all inputs which are currently selected have been displayed.

To display the status of all outputs a wild card entry may be made in place of the output number. The wild card character is an asterisk character. The command syntax is as follows:

SAS32000*?O **

The output status will be displayed for outputs 1 thru 16 for viewing purposes. Pressing the space bar will allow the next page of output status to be displayed. Any other keyboard action will terminate the status request command.

14.2.4.5 Adjust Output Drive Level

Drive level is defined as the absolute gain through the output stage. The system allows both relative and absolute level settings. A relative command will raise or lower the gain a specified number of dB and an absolute command will set the level to a specified value in dB. The syntax for adjusting output level is as follows:

To raise level of output xx by yy amount (in dB):

```
SAS32000*LEVEL Oxx R yy
```

To lower level of output xx by yy amount (in dB):

```
SAS32000*LEVEL Oxx L yy
```

To set the level of output xx to yy amount (in dB):

```
SAS32000*LEVEL Oxx + yy
```

or

```
SAS32000*LEVEL Oxx - yy
```

Note the yy value must always be a 2 digit entry; e.g. 04, 15 and 00. The + or - directive indicates to the system an absolute command. Entering - 00 or + 00 will set level to 0 dB (unity gain through the specified stage). Also note a space character is required before and after the + and - characters.

14.2.4.6 Level Inquiry

The audio level for each input and output can be displayed using the following level inquiry command:

```
SAS32000*?L Ixx   Audio level for Input xx
```

or

```
SAS32000*?L Oyy   Audio level for Output yy
```

The system responds with the level in dB for the requested audio channel:

```
INPUT xx : gain level is zz dB
```

or

```
OUTPUT yy : gain level is zz dB
```

14.2.4.7 Log Off

When all selections to the switcher have been completed, the master terminal can terminate the session with the BYE command. At the remote site this will cause the AXC-8 to disable all entries and instruct the modem to terminate the call.

```
SAS32000*BYE
```

The AXC-8 will respond (after a 3 second delay) with +++. The remote modem will disconnect after 3 seconds. Once BYE has been <entered> the AXC-8 will ignore all subsequent entries until the next call has been placed and communications are re-established.

14.2.5 Level Two Administrative Control

14.2.5.1 Log On

To log on to the level 2 administrative level the corresponding password must be entered. The prompt will show as follows: (note '>' tag at end of prompt)

```
SAS32000>
```

All commands of level 1 user control can be executed at this level. Additionally the following commands are available:

14.2.5.2 Program Passwords

This level allows passwords for both user and administrative levels to be programmed. The password can be any keyboard entry (letters, numbers or punctuation symbols) from 4 to 10 characters. The command syntax is as follows.

To program user level 1 password:

```
SAS32000>PW U xxxx
```

where xxxx can be 4 to 10 characters.

To program administrative level 2 password:

```
SAS32000>PW A xxxx
```

where xxxx can be 4 to 10 characters.

14.2.5.3 Program Prompt

The prompt can be programmed to any string up to eight characters to allow easy identification of a remote site dialed up on line. The command for this is as follows:

```
SAS32000>PP IDB SYS1
```

The response will be the new prompt string.

```
IDB SYS1>
```

14.2.5.4 Program Alpha Assignment

To program alpha assignments for any source or destination:

```
SAS32000>PA Xyy abcdefgh
```

where X= I for input or O for output, yy= absolute number, and *abcdefgh*= up to eight character alpha string.

14.2.5.5 Inquiry of Alpha Assignment

To have current alpha assignment displayed:

```
SAS32000>?A Iyy for Input request
```

```
SAS32000>?A Oyy for Output request
```

where yy= absolute number.

Response:

Alpha Assignment for Input/Output yy is: *abcdefgh*

14.2.5.6 Adjust Input Sensitivity

The Administrative Command Level provides the ability to adjust input sensitivity / forward gain if the system has been provided with digitally controlled input amps. This command is similar in syntax to the output level. This command is an engineering (or administrative) function and is restricted from User Level 1 since adjusting the input gain will affect all output channels that have that input selected. The syntax of the input gain command is as follows:

To raise the gain of input xx by yy amount (in dB):

```
SAS32000>LEVEL Ixx R yy
```

To lower the gain of input xx by yy amount (in dB):

```
SAS32000>LEVEL Ixx L yy
```

To set the gain of input xx to yy amount (in dB)

```
SAS32000>LEVEL Ixx + yy
```

or

```
SAS32000>LEVEL Ixx - yy
```

Note the yy value must always be a 2 digit entry; e.g. 04, 15 and 00. The + or - directive indicates to the system an absolute command. Entering - 00 or + 00 will set level to 0 dB (unity gain through the specified stage). Also note a space character is required before and after the + and - characters.

14.2.6 Summary of Commands

Inquiry

| | |
|--------|-----------------------------------------------------|
| HELP | Presents Command Summary to Screen |
| ?A Ixx | Inquire Alpha name assigned to Input xx |
| ?A Oyy | Inquire Alpha name assigned to Output yy |
| ?L Ixx | Inquire Level of Input xx |
| ?L Oyy | Inquire Level of Output yy |
| ?Oyy | Inquire which input source is selected to output yy |
| ?O ** | Dump full system status to screen |

Switching

| | |
|--------------------|------------------------------------|
| TAKE Ixx TO Oyy | Select Input xx to Output yy |
| SUM ON Ixx TO Oyy | Add Input xx to Output yy mix |
| SUM OFF Ixx TO Oyy | Remove Input xx from Output yy mix |

Switcher Parameters

| | |
|------------------------|----------------------------------------------------------------------|
| PA Ixx <i>abcdefgh</i> | Program alpha assignment for Input xx to alpha name <i>abcdefgh</i> |
| PA Oyy <i>abcdefgh</i> | Program alpha assignment for Output yy to alpha name <i>abcdefgh</i> |
| PP <i>abcdefgh</i> | Program prompt name to <i>abcdefgh</i> (1 to 8 characters) |
| PW A <i>abcdefghij</i> | Program Password for Administrative menu (4 to 10 characters) |
| PW U <i>abcdefghij</i> | Program Password for User menu (4 to 10 characters) |

Audio Levels

| | |
|----------------|--------------------------------------|
| LEVEL Ixx L zz | Lower Input xx audio gain zz dB |
| LEVEL Ixx R zz | Raise Input xx audio gain zz dB |
| LEVEL Ixx + zz | Set Input xx audio gain to + zz dB |
| LEVEL Ixx - zz | Set Input xx audio gain to - zz dB |
| LEVEL Oyy L zz | Lower Output yy audio level zz dB |
| LEVEL Oyy R zz | Raise Output yy audio level zz dB |
| LEVEL Oyy + zz | Set Output yy audio level to + zz dB |
| LEVEL Oyy - zz | Set Output yy audio level to - zz dB |

Ending Session

| | |
|-----|----------------------------------------------------------------------------------------|
| BYE | Instructs remote system modem to disconnect and returns to the security password menu. |
|-----|----------------------------------------------------------------------------------------|

14.2.7 Remote Site Modem Setup

The remote site modem must be configured as follows: Auto-answer must be enabled and the modem responses must be disabled. The AXC-8 will issue a command string on power up which will program most Hayes SmartModem compatible products. Power up the modem first, connect it to the AXC-8, then power up the AXC-8. This procedure is only required once. Alternately, a terminal may be connected to the remote modem to enter the following Hayes AT setup commands, or commands as required for the modem to be used:

| | |
|--------|----------------------------------------------------------------------------------------------------------------------|
| ATS0=1 | Sets modem for auto-answer after 1 ring detected. |
| ATQ1 | Suppresses modem responses |
| ATE0 | Suppresses modem echoes |
| AT&W | Saves the configuration in nonvolatile memory and allows the modem to be powered up in the programmed configuration. |

Once this procedure has been completed, the modem can be connected to the AXC-8 serial port (labeled COMPUTER) and the modem requires no further programming.

15 Control Panel Operation

15.1 AXC-8 Alphanumeric XY Control Panel

The Model AXC-8 Alphanumeric XY Full System Access XY Control Panel has several features which can assist the engineer with normal operations and installation. These features are detailed in the following sections.

15.1.1 Alphanumeric / Numeric Mode Toggle

The front panel displays may be switched into Numeric Mode to allow the user to easily cross-reference the Alphanumeric to Numeric designations. The panel may also be operated in numeric mode. When the display is in Active mode and the Active display control pushbutton is depressed the displays will toggle between Alphanumeric and Numeric modes. The only indication is the change of names to the defaults (OUT YY, INPUT XX).

To avoid unintentional change of Mode when entering the concealed programming layers depress and hold the Select pushbutton first and then depress and hold the Active pushbutton.

15.1.2 Concealed Programming Layers

The AXC-8 control panel offers several programmable features accessible through 'concealed' programming layers. To enter into these sub-menus depress and hold both display control pushbuttons and then use the TAKE pushbutton and shaft encoder to alter settings as explained below (depress Select first to avoid changing display mode; see Section 3.1). The Input shaft encoder is used to access the different layers. The Take pushbutton is used to alter parameters or enter into lower level layers.

15.1.2.1 'Take' Mode

The input selection is normally operated in 'Select', or 'Take and Replace', mode. As the Input shaft encoder is rotated the display is automatically entered into Select mode. Once the desired source has been preset the TAKE switch may be depressed to replace the current source with the preset selection. The display control pushbuttons, Active and Select, may be freely depressed to show either the current or preset source in the display.

The panel may also be operated in 'Dynamic' mode. Here the Input shaft encoder simply emulates a continuous rotary input selector.

To change Take Mode enter concealed programming mode. While holding the display control pushbuttons the input display will show the take mode; SELECT or DYNAMIC. Depressing the Take pushbutton while still holding the display control pushbuttons toggles the Take Mode.

15.1.2.2 Computer Port Baud Rate

The Computer port baud rate may be selected between 9600 and 1200 baud. Enter concealed programming mode: while holding the display control pushbuttons rotate the shaft encoder one click clockwise. Depress the Take pushbutton to toggle the baud rate.

15.1.2.3 Gain Control

Note that the gain adjustment layer will have no effect on 'unity gain only' systems which are not equipped with digitally controlled amplifiers.

The Input Gain Adjustment layer is the third programming level. Enter concealed programming mode: while holding the display control pushbuttons rotate the shaft encoder two clicks clockwise. Depress the Take pushbutton to enter Input Gain Adjustment mode. The Output display now shows the gain in dB. The Output Select shaft encoder changes the gain setting 'on the fly' from -100 to +27 dB. The Input Select shaft encoder scrolls through the sources. To Exit the gain adjustment layer depress the Take pushbutton.

15.3.1 Power On Initialization.

When power is applied, the CPI-80 / APC-88 will go thru an initialization period where it checks all option jumpers. The unit will display "HELLO" for a few seconds, followed by option messages "OPTION A" and/or "OPTION B". The messages are displayed for a few seconds if the option jumper is installed. The option message is simply not displayed when the jumpers are not installed. The final message indicating the switch mode is then displayed. "SW. NORM" is displayed for normal "Select and Take" mode switching, and "SW. DYN" is displayed for "Dynamic" switching; this is set by the Switch mode jumper. The Switch mode is the final initialization display and is followed by showing the currently selected crosspoint (by alpha name) or "NO SXT" if there is no data connection between the panel and the SXT-32. The panel will wake-up in display "Active" mode with the first source (alphabetically) designated in the pre-select register. These compact panels have only one display control pushbutton; when the LED is extinguished the display is showing the Active source. When the LED is illuminated the display is showing the Selected or preset source.

15.3.2 Jumper Options.

Option A: Remote Shaft Encoder

Option A is a jumper that is installed on the mating connector (female cable end) of the 9 pin D RS-485 system connector P1. Jumper pins 6 to 7 to enable option A.

Option A not installed (normally):

CPI-80 / APC-88 will put the display into "SELECT" mode when the shaft encoder is moved. SELECT mode is annunciated by the LED in the select button illuminated.

Option A installed:

APC-88 will **not** put the display into "SELECT" mode when the shaft encoder is moved. This option allows the use of a common remote shaft encoder connected to more than one APC-88. The remote shaft encoder will adjust only the panel that has been put into "SELECT" mode by pressing the Select switch, effectively arming the desired APC-88 for select adjustment by the common remote shaft encoder.

Option B: Preset Exchange

Option B is a jumper that is installed on the mating connector (female cable end) of the 9 pin D RS-485 system connector P1. Jumper pins 6 to 8 for the APC-88 or pins 8 to 9 for the CPI-80 to enable option B.

Option B not installed:

'Preset Exchange' mode is **not** enabled.

Option B installed:

'Preset Exchange' mode is enabled. This allows repeated rapid transitions between two sources. When a new input selection is made the previously ACTIVE input is put into the SELECT or preset position. Depressing the TAKE switch again will 'swap' the two sources.

Option C: Take Switch Control Mode.

Option C is a jumper that is installed on the mating connector (female cable end) of the 9 pin D RS-485 system connector P1 for the APC-88. Jumper pins 6 to 9. For the CPI-80 place a jumper on Auxiliary connector J1 pins 1 and 2 (the TAKE switch pins).

The CPI-80 / APC-88 can operate in 2 control modes: "Select and Take" or "Dynamic". Normal operating mode is Select and Take, where a TAKE pushbutton action is required to actually switch to the crosspoint that has been preselected using the shaft encoder. In the "Dynamic" control mode crosspoints will be switched immediately as the shaft encoder is adjusted.

Option C not installed:
'Select and Take' mode. Normal setting.

Option C installed:
'Dynamic' switch mode.

Preset Display Blink

The CPI-80 / APC-88 is shipped with the PRESET DISPLAY BLINK jumper installed.

Aux Header J1:

pin 4 - "FLASH SYNC IN"
pin 5 - "FLASH SYNC OUT"

With jumper installed between pins 4 and 5 of J1, the display will blink in "SELECT" mode. When the jumper is removed the display will be steadily on in "SELECT" mode. For installations utilizing more than one APC-88 within a console all displays may be made to blink synchronously when in the "SELECT" mode. This is accomplished by wiring J1 pin 4 (FLASH SYNC OUT) of any one APC-88 to J1 pin 5 (FLASH SYNC IN) terminal on all other panels.

Operation.

Hot Punch Pushbuttons

The Model APC-88 provides eight pushbuttons which will instantly select a source which has been programmed. The source to be controlled is programmed by the central system terminal or computer. Select menu # 1, PBS-32 button programming, from the main menu. Select the output to which the Model APC-88 is connected. The first 8 of the 32 menu button positions correspond to the eight pushbuttons of a Model APC-88.

Select and Take Switch Control Mode.

The INPUT SELECT dial is a shaft encoder with 36 positions per revolution, and no end stops. As the INPUT SELECT dial is rotated the source names are displayed in alphabetical order. The TAKE pushbutton is depressed to immediately switch to the input which has been pre-selected. This is confirmed by the "INPUT ACTIVE" display.

"Preset Exchange" is a feature which allows repeated rapid transitions between two sources. If enabled (Option B) the APC-88 automatically puts the previously "Active" source into the "INPUT SELECT" or preset position upon execution of a TAKE command.

The display control pushbutton allows the display to selectively view "INPUT ACTIVE" (source currently switched on), or the "INPUT SELECT" (source that is pre-selected for a TAKE transition). When the INPUT SELECT dial is rotated the display is automatically switched to the "INPUT SELECT" mode (if option A is not enabled). Display mode is annunciated by illumination of the LED within the SELECT pushbutton. When in "SELECT" mode the display will automatically go into "ACTIVE" mode if the current active crosspoint is dialed up.

Dynamic Switch Control Mode.

In this mode of operation the TAKE pushbutton is inactive. The "SELECT" switch is also not required for operation. The display will be set to "ACTIVE" and the "Preset Exchange" feature will no longer be enabled. Crosspoints will be selected "Dynamically" and immediately as the select shaft encoder is moved; no Take switch action is needed. The selection when adjusting the shaft encoder will be in alphabetical order and the display will always show the currently selected crosspoint.

| DATE | DESCRIPTION |
|-------|------------------------------------|
| 11/92 | REV A: CORRECTED 9 PIN CONNECTIONS |

| C | | B | | A | |
|----|-------------------|----|----------------|----|----------------|
| 1 | XY 422 + | 1 | XY 422 - | 1 | XY SIG GND |
| 2 | XY 422 + | 2 | XY 422 - | 2 | XY SIG GND |
| 3 | | 3 | | 3 | |
| 4 | | 4 | | 4 | |
| 5 | EXP 422 + | 5 | EXP 422 - | 5 | EXP SIG GND |
| 6 | EXP 422 + | 6 | EXP 422 - | 6 | EXP SIG GND |
| 7 | | 7 | | 7 | |
| 8 | | 8 | | 8 | |
| 9 | RS 232 TX | 9 | RS 232 RX | 9 | RS 232 GND |
| 10 | RS 232 TX | 10 | RS 232 RX | 10 | RS 232 GND |
| 11 | | 11 | | 11 | |
| 12 | | 12 | | 12 | |
| 13 | XY 422 + | 13 | XY 422 - | 13 | XY SIG GND |
| 14 | XY 422 + | 14 | XY 422 - | 14 | XY SIG GND |
| 15 | | 15 | | 15 | |
| 16 | | 16 | | 16 | |
| 17 | EXP 422 + | 17 | EXP 422 - | 17 | EXP SIG GND |
| 18 | EXP 422 + | 18 | EXP 422 - | 18 | EXP SIG GND |
| 19 | O/P FRM A0 | 19 | | 19 | I/P FRM A0 |
| 20 | GND | 20 | | 20 | GND |
| 21 | O/P FRM A1 | 21 | | 21 | I/P FRM A1 |
| 22 | GND | 22 | | 22 | GND |
| 23 | O/P FRM A2 | 23 | | 23 | I/P FRM A2 |
| 24 | GND | 24 | | 24 | GND |
| 25 | O/P FRM A3 | 25 | | 25 | I/P FRM A3 |
| 26 | GND | 26 | MCU RESET | 26 | DIG GND |
| 27 | GPO1 | 27 | GPO2 | 27 | DIG GND |
| 28 | FRAME 422+ | 28 | FRAME 422- | 28 | DIG GND |
| 29 | | 29 | | 29 | |
| 30 | | 30 | | 30 | |
| 31 | | 31 | | 31 | |
| 32 | +8V DIG. INTERNAL | 32 | DIGITAL COMMON | 32 | DIGITAL COMMON |

422 TO XY PANEL

422 TO EXPANSION FRAMES

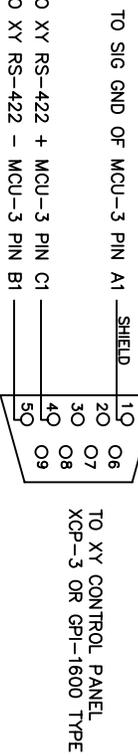
RS 232 SALVO PORT

422 TO XY PANEL LOOP THRU

422 TO EXPANSION FRAMES LOOP THRU

WIRING DETAIL OF CONNECTOR FROM MCU-3 TO SYSTEM XY PANELS

DB9-S FEMALE CABLE END



GENERAL PURPOSE OUTPUTS

GPU HARDWARE RESET

XY FRAME POSITION I/P AND O/P ADDRESS

INTERNAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: DECIMALS ± 1/64 FRACTIONS ± 1/32 ANGLES ± 2'

| | |
|----------|-------|
| DRAWN | AL |
| CHECKED | |
| APPROVED | |
| DATE | 04\88 |

SAS Sierra Automated Systems

MCU-3 CONNECTOR WIRING

SHEET 1 OF 1

C MCU3W01

| DATE | DESCRIPTION |
|------|-------------|
| | |
| | |

A

- 1 OUT 1 LT +
- 2 OUT 1 LT -
- 3 OUT 2 RT +
- 4 OUT 2 RT -
- 5 OUT 4 LT +
- 6 OUT 4 LT -
- 7 OUT 5 RT +
- 8 OUT 5 RT -
- 9 OUT 7 LT +
- 10 OUT 7 LT -
- 11 OUT 8 RT +
- 12 OUT 8 RT -
- 13 COMMON
- 14 COMMON
- 15 COMMON
- 16 COMMON
- 17 COMMON
- 18 COMMON
- 19 COMMON
- 20 COMMON
- 21 COMMON
- 22 COMMON
- 23 COMMON
- 24 COMMON
- 25 COMMON
- 26 COMMON
- 27 COMMON
- 28 COMMON
- 29 COMMON
- 30 ±22V INTERNAL
- 31 -22V INTERNAL
- 32 DIGITAL COMMON

B

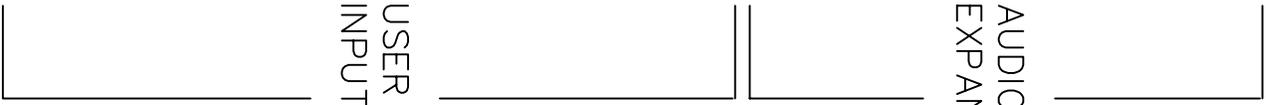
- 1 OUT 1 RT +
- 2 OUT 1 RT -
- 3 OUT 3 LT +
- 4 OUT 3 LT -
- 5 OUT 4 RT +
- 6 OUT 4 RT -
- 7 OUT 6 LT +
- 8 OUT 6 LT -
- 9 OUT 7 RT +
- 10 OUT 7 RT -
- 11 COMMON
- 12 COMMON
- 13 IN 1 LT -
- 14 IN 1 RT -
- 15 IN 2 LT -
- 16 IN 2 RT -
- 17 IN 3 LT -
- 18 IN 3 RT -
- 19 IN 4 LT -
- 20 IN 4 RT -
- 21 IN 5 LT -
- 22 IN 5 RT -
- 23 IN 6 LT -
- 24 IN 6 RT -
- 25 IN 7 LT -
- 26 IN 7 RT -
- 27 IN 8 LT -
- 28 IN 8 RT -
- 29 COMMON
- 30 ±22V INTERNAL
- 31 -22V INTERNAL
- 32 DIGITAL COMMON

C

- 1 OUT 2 LT +
- 2 OUT 2 LT -
- 3 OUT 3 RT +
- 4 OUT 3 RT -
- 5 OUT 5 LT +
- 6 OUT 5 LT -
- 7 OUT 6 RT +
- 8 OUT 6 RT -
- 9 OUT 8 LT +
- 10 OUT 8 LT -
- 11 COMMON
- 12 COMMON
- 13 IN 1 LT +
- 14 IN 1 RT +
- 15 IN 2 LT +
- 16 IN 2 RT +
- 17 IN 3 LT +
- 18 IN 3 RT +
- 19 IN 4 LT +
- 20 IN 4 RT +
- 21 IN 5 LT +
- 22 IN 5 RT +
- 23 IN 6 LT +
- 24 IN 6 RT +
- 25 IN 7 LT +
- 26 IN 7 RT +
- 27 IN 8 LT +
- 28 IN 8 RT +
- 29 COMMON
- 30 ±22V INTERNAL
- 31 -22V INTERNAL
- 32 +8V DIG. INTERNAL

AUDIO OUTPUTS TO EXPANSION FRAMES

USER AUDIO INPUTS



| | |
|----------------------------|-----------------|
| UNLESS OTHERWISE SPECIFIED | |
| DIMENSIONS ARE IN INCHES | |
| TOLERANCES: | ANGLES |
| FRACTIONS ± 1/64 | DECIMALS ± .015 |
| XXX=±0.005 | Z |
| DRAWN A.S. | |
| CHECKED | |
| APPROVED | |
| DATE 04\88 | |


SIERRA AUTOMATED SYSTEMS
SIA-8 CONNECTOR WIRING

SHEET 1 OF 4

C SIA8W01

| REVISIONS | |
|-----------|-------------|
| DATE | DESCRIPTION |
| | |
| | |

A

- 1 OUT 1 +
- 2 OUT 1 -
- 3 OUT 2 +
- 4 OUT 2 -
- 5 OUT 4 +
- 6 OUT 4 -
- 7 OUT 5 +
- 8 OUT 5 -
- 9 OUT 7 +
- 10 OUT 7 -
- 11 OUT 8 +
- 12 OUT 8 -
- 13 COMMON
- 14 COMMON
- 15 COMMON
- 16 COMMON
- 17 COMMON
- 18 COMMON
- 19 COMMON
- 20 COMMON
- 21 COMMON
- 22 COMMON
- 23 COMMON
- 24 COMMON
- 25 COMMON
- 26 COMMON
- 27 COMMON
- 28 COMMON
- 29 COMMON
- 30 ±22V INTERNAL
- 31 -22V INTERNAL
- 32 DIGITAL COMMON

B

- 1 OUT 1 +
- 2 OUT 1 -
- 3 OUT 3 +
- 4 OUT 3 -
- 5 OUT 4 +
- 6 OUT 4 -
- 7 OUT 6 +
- 8 OUT 6 -
- 9 OUT 7 +
- 10 OUT 7 -
- 11 COMMON
- 12 COMMON
- 13 IN 1 -
- 14 IN 1 -
- 15 IN 2 -
- 16 IN 2 -
- 17 IN 3 -
- 18 IN 3 -
- 19 IN 4 -
- 20 IN 4 -
- 21 IN 5 -
- 22 IN 5 -
- 23 IN 6 -
- 24 IN 6 -
- 25 IN 7 -
- 26 IN 7 -
- 27 IN 8 -
- 28 IN 8 -
- 29 COMMON
- 30 ±22V INTERNAL
- 31 -22V INTERNAL
- 32 DIGITAL COMMON

C

- 1 OUT 2 +
- 2 OUT 2 -
- 3 OUT 3 +
- 4 OUT 3 -
- 5 OUT 5 +
- 6 OUT 5 -
- 7 OUT 6 +
- 8 OUT 6 -
- 9 OUT 8 +
- 10 OUT 8 -
- 11 COMMON
- 12 COMMON
- 13 IN 1 +
- 14 IN 1 +
- 15 IN 2 +
- 16 IN 2 +
- 17 IN 3 +
- 18 IN 3 +
- 19 IN 4 +
- 20 IN 4 +
- 21 IN 5 +
- 22 IN 5 +
- 23 IN 6 +
- 24 IN 6 +
- 25 IN 7 +
- 26 IN 7 +
- 27 IN 8 +
- 28 IN 8 +
- 29 COMMON
- 30 ±22V INTERNAL
- 31 -22V INTERNAL
- 32 +8V DIG. INTERNAL

AUDIO OUTPUTS TO EXPANSION FRAMES

USER AUDIO INPUTS

NOTES:
1. EACH INPUT IS AVAILABLE ON TWO SETS OF PINS. EITHER MAY BE USED FOR INTERCONNECTION.

| | |
|----------------------------|-----------------|
| UNLESS OTHERWISE SPECIFIED | |
| DIMENSIONS ARE IN INCHES | |
| TOLERANCES: | ANGLES |
| FRACTIONS ± 1/64 | DECIMALS ± .015 |
| XXX=±0.005 | Z |
| DRAWN A.S. | |
| CHECKED | |
| APPROVED | |
| DATE 04\88 | |


SIERRA AUTOMATED SYSTEMS
 SIA-8 CONNECTOR WIRING, 32 X 32 MONO

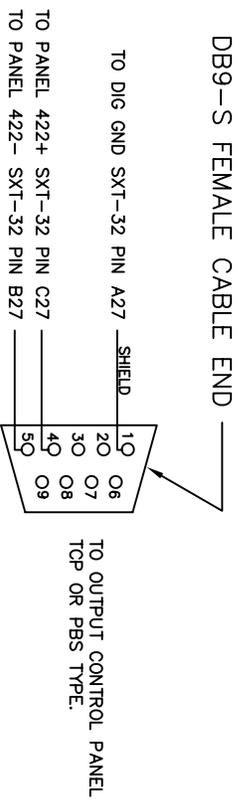
SHEET 1 OF 1

C SIA8WM1

| REVISIONS | |
|-----------|-------------|
| DATE | DESCRIPTION |
| | |
| | |

- | | | | |
|----------|----------------------|-------------------|-------------------|
| C | 1 IN 1 LEFT | 1 IN 1 RIGHT | 1 IN 2 LEFT |
| | 2 IN 2 RIGHT | 2 IN 3 LEFT | 2 IN 3 RIGHT |
| | 3 IN 4 LEFT | 3 IN 4 RIGHT | 3 IN 5 LEFT |
| | 4 IN 5 RIGHT | 4 IN 6 LEFT | 4 IN 6 RIGHT |
| | 5 IN 7 LEFT | 5 IN 7 RIGHT | 5 IN 8 LEFT |
| | 6 IN 8 RIGHT | 6 IN 9 LEFT | 6 IN 9 RIGHT |
| | 7 IN 10 LEFT | 7 IN 10 RIGHT | 7 IN 11 LEFT |
| | 8 IN 11 RIGHT | 8 IN 12 LEFT | 8 IN 12 RIGHT |
| | 9 IN 13 LEFT | 9 IN 13 RIGHT | 9 IN 14 LEFT |
| | 10 IN 14 RIGHT | 10 IN 15 LEFT | 10 IN 15 RIGHT |
| | 11 IN 16 LEFT | 11 IN 16 RIGHT | 11 IN 17 LEFT |
| | 12 IN 17 RIGHT | 12 IN 18 LEFT | 12 IN 18 RIGHT |
| | 13 IN 19 LEFT | 13 IN 19 RIGHT | 13 IN 20 LEFT |
| | 14 IN 20 RIGHT | 14 IN 21 LEFT | 14 IN 21 RIGHT |
| | 15 IN 22 LEFT | 15 IN 22 RIGHT | 15 IN 23 LEFT |
| | 16 IN 23 RIGHT | 16 IN 24 LEFT | 16 IN 24 RIGHT |
| | 17 IN 25 LEFT | 17 IN 25 RIGHT | 17 IN 26 LEFT |
| | 18 IN 26 RIGHT | 18 IN 27 LEFT | 18 IN 27 RIGHT |
| | 19 IN 28 LEFT | 19 IN 28 RIGHT | 19 IN 29 LEFT |
| | 20 IN 29 RIGHT | 20 IN 30 LEFT | 20 IN 30 RIGHT |
| | 21 IN 31 LEFT | 21 IN 31 RIGHT | 21 IN 32 LEFT |
| | 22 IN 32 RIGHT | 22 AUX L IN + | 22 AUX L IN - |
| | 23 ADDRESS 1 | 23 AUX IN R + | 23 AUX IN R - |
| | 24 OUT LT + | 24 OUT LT - | 24 AUDIO GND |
| | 25 OUT RT + | 25 OUT RT - | 25 AUDIO GND |
| | 26 ADDRESS 1 | 26 ADDRESS 2 | 26 ADDRESS 3 |
| | 27 PANEL 422+ | 27 PANEL 422- | 27 DIG GND |
| | 28 FRAME 422+ | 28 FRAME 422- | 28 DIG GND |
| | 29 AUDIO GND | 29 AUDIO GND | 29 AUDIO GND |
| | 30 ±22V INTERNAL | 30 ±22V INTERNAL | 30 ±22V INTERNAL |
| | 31 -22V INTERNAL | 31 -22V INTERNAL | 31 -22V INTERNAL |
| | 32 +8V DIG. INTERNAL | 32 DIGITAL COMMON | 32 DIGITAL COMMON |

AUDIO SOURCES FROM
SIA-8 CARDS
(INTERNAL MOTHERBOARD)



AUDIO INPUTS FROM
EXPANSION FRAMES
USER AUDIO OUTPUTS
INTERNAL
SERIAL DATA TO CTL PANEL

| | |
|--------------------------------------------------------------------------------------------------------------------------|----------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: DECIMALS ANGLES ± 1/64 .0005 ± .2 XXX=10.005 | INTERNAL |
| DRAWN | AI |
| CHECKED | |
| APPROVED | |
| DATE | 04\88 |

SAS Sierra Automated Systems

SXT-32 CONNECTOR WIRING

SHEET 1 OF 4

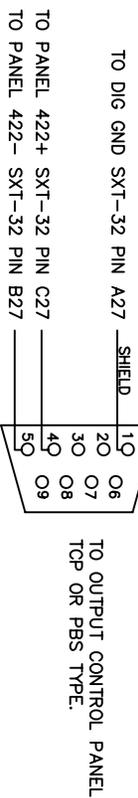
C SXT32W01

| REVISIONS | |
|-----------|-----------------------------|
| DATE | DESCRIPTION |
| MAR 93 | CORRECTED OUTPUT PIN LABELS |

| C | | B | | A | |
|----|-------------------|----|----------------|----|----------------|
| 1 | IN 1 | 1 | IN 1 | 1 | IN 2 |
| 2 | IN 2 | 2 | IN 3 | 2 | IN 3 |
| 3 | IN 4 | 3 | IN 4 | 3 | IN 5 |
| 4 | IN 5 | 4 | IN 6 | 4 | IN 6 |
| 5 | IN 7 | 5 | IN 7 | 5 | IN 8 |
| 6 | IN 8 | 6 | IN 9 | 6 | IN 9 |
| 7 | IN 10 | 7 | IN 10 | 7 | IN 11 |
| 8 | IN 11 | 8 | IN 12 | 8 | IN 12 |
| 9 | IN 13 | 9 | IN 13 | 9 | IN 14 |
| 10 | IN 14 | 10 | IN 15 | 10 | IN 15 |
| 11 | IN 16 | 11 | IN 16 | 11 | IN 17 |
| 12 | IN 17 | 12 | IN 18 | 12 | IN 18 |
| 13 | IN 19 | 13 | IN 19 | 13 | IN 20 |
| 14 | IN 20 | 14 | IN 21 | 14 | IN 21 |
| 15 | IN 22 | 15 | IN 22 | 15 | IN 23 |
| 16 | IN 23 | 16 | IN 24 | 16 | IN 24 |
| 17 | IN 25 | 17 | IN 25 | 17 | IN 26 |
| 18 | IN 26 | 18 | IN 27 | 18 | IN 27 |
| 19 | IN 28 | 19 | IN 28 | 19 | IN 29 |
| 20 | IN 29 | 20 | IN 30 | 20 | IN 30 |
| 21 | IN 31 | 21 | IN 31 | 21 | IN 32 |
| 22 | IN 32 | 22 | AUX IN 1 - | 22 | AUX IN 1 + |
| 23 | ADDRESS 1 | 23 | AUX IN 2 - | 23 | AUX IN 2 + |
| 24 | OUT 1 - | 24 | OUT 1 + | 24 | AUDIO GND |
| 25 | OUT 2 - | 25 | OUT 2 + | 25 | AUDIO GND |
| 26 | ADDRESS 1 | 26 | ADDRESS 2 | 26 | ADDRESS 3 |
| 27 | PANEL 422+ | 27 | PANEL 422- | 27 | DIG GND |
| 28 | FRAME 422+ | 28 | FRAME 422- | 28 | DIG GND |
| 29 | AUDIO GND | 29 | AUDIO GND | 29 | AUDIO GND |
| 30 | ±22V INTERNAL | 30 | ±22V INTERNAL | 30 | ±22V INTERNAL |
| 31 | -22V INTERNAL | 31 | -22V INTERNAL | 31 | -22V INTERNAL |
| 32 | +8V DIG. INTERNAL | 32 | DIGITAL COMMON | 32 | DIGITAL COMMON |

AUDIO SOURCES FROM
SIA-8 CARDS
(INTERNAL MOTHERBOARD)

DB9-S FEMALE CABLE END



AUDIO INPUTS FROM
EXPANSION FRAMES

USER AUDIO OUTPUTS

INTERNAL
SERIAL DATA TO CTL PANEL

INTERNAL

| | |
|--------------------------------------------------------|-------------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES | |
| TOLERANCES: DECIMALS | ANGLES |
| ± 1/64 | ± 2° |
| XX ±0.015 | .XXX ±0.005 |
| DRAWN | AI |
| CHECKED | |
| APPROVED | |
| DATE | 04\88 |

SAS Sierra Automated Systems

SXT-32 CONNECTOR WIRING, 32 X 32 MONO

SHEET 1 OF 1

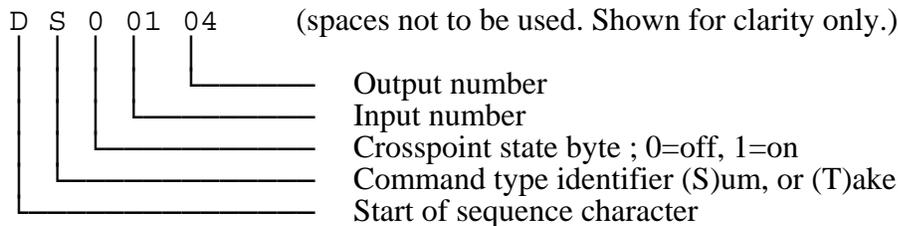
C SXT32WM1

Conventional Command Protocol from MCU-3 port

The Model MCU-3 Frame Controller may be ordered with an optional RS-232C serial port. This port is normally configured for 9600 baud, 1 start bit, 1 stop bit, no parity.

Command Sequence: Crosspoint Manipulation

All characters are standard ASCII, capital letters only. The following will illustrate the command sequence:



All commands must begin with the 'start of sequence character' capital "D".

The 'command type identifier' must follow the start of sequence character. There are two command types for invoking crosspoint control; 'S' for summing mode operations (add or subtract crosspoints) or 'T' for 'take and replace' single crosspoint commands. The take and replace function will turn on the crosspoint desired and simultaneously turn off the previously selected crosspoint(s).

The next character is the 'crosspoint state byte'. The desired state of the crosspoint when using a sum type sequence is defined by this byte. A '1' will turn the crosspoint on while a '0' will turn the crosspoint off. The crosspoint state byte must be "1" for Take type command sequences.

The next two digits determine the input number. Always use two digits (01, 07, 16, 32, etc.). Valid input numbers are 01 up to max installed. The Take command sequence will accept input number '00' causing all crosspoints to be turned off. This provides a convenient method of clearing all crosspoints on a selected output. The take command sequence DT10001 will clear all crosspoints previously assigned to output number 1.

The final two digits determine the output number. Valid output numbers are 01 up to max installed.

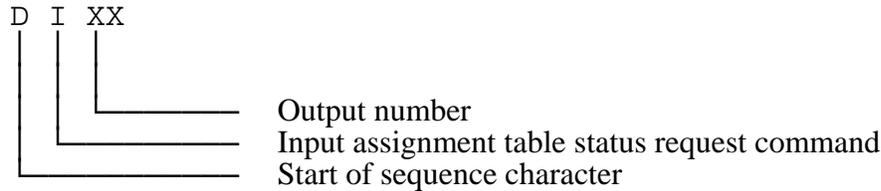
The command sequence 'DT10203' will turn on input 2 to output 3 and turn off previously selected crosspoints (Take). The command sequence 'DS11604' will turn on input 16 to output 4, adding it to any previous selections (Sum).

The SAS32000 will respond with the ASCII character '1' to indicate receipt of a valid command sequence. An ASCII '0' will be sent if an invalid request is received.

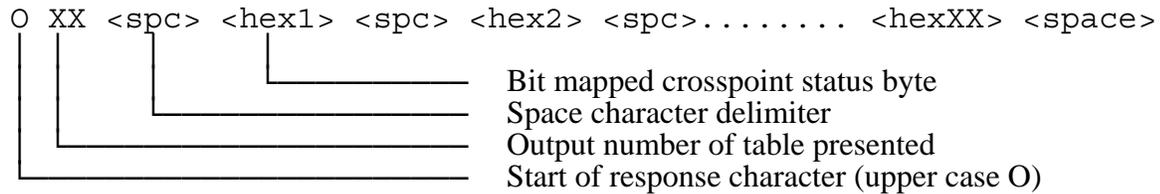
Crosspoint Status Request Sequence

The status request command allows interrogation of the crosspoint status of any output. The input crosspoint status is returned in ASCII hex values which represent a bit mapped table of the inputs that are on or off.

Status Request Command (spaces not to be used. Shown for clarity only)



The system will respond with the following:



The <hex> bytes are two ascii characters representing a hexadecimal value which is a bit mapped representation of the crosspoint states. The number of bytes returned is determined by the overall system input size. For example, input status for 32 inputs is presented in 4 bytes.

<hex1> = input table byte 1, inputs 1 thru 8 (ascii hex 00-FF)
 <hex2> = input table byte 2, inputs 9 thru 16 (ascii hex 00-FF)
 <hex3> = input table byte 3, inputs 17 thru 24 (ascii hex 00-FF)
 <hex4> = input table byte 4, inputs 25 thru 32 (ascii hex 00-FF)

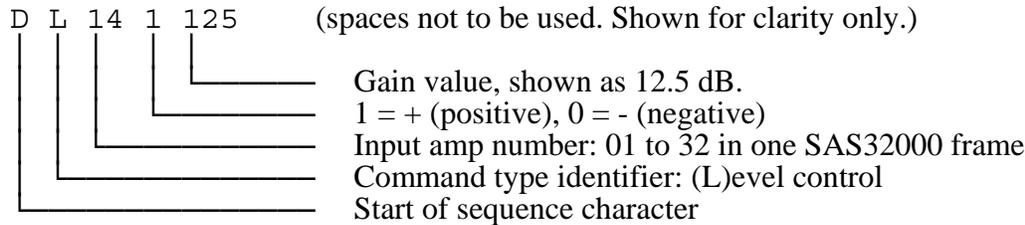
Input Crosspoint Status Bit Map

| | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|-------|----|----|----|----|----|----|----|----|
| byte1 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| byte2 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| byte3 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 |
| byte4 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 |

**note that a bit value of '1' represents an input which is 'ON' while a bit value of '0' represents an input which is 'OFF'.

Command Sequence: Level Control

All characters are standard ASCII, capital letters only. The following will illustrate the command sequence:



All commands must begin with the 'start of sequence character' capital "D".

The 'command type identifier' follows the start of sequence character: 'L' for level control.

The next two characters identify the amplifier to be adjusted. In a single SAS32000 frame the numbers 01 to 32 are valid. In a single DAS9600 frame the numbers 01 to 96 are valid. In a multi-frame system consult the system specific documentation for amplifier numbers.

The next four characters specify the gain. The first number identifies positive (1 = gain) or negative (0 = attenuation) level. The next three numbers numerically specify the gain with the decimal place implied. Gain is adjustable in 0.5 dB increments from -99.5 to +28.0 dB.

Positive 12.5 dB gain is specified as '1125'.

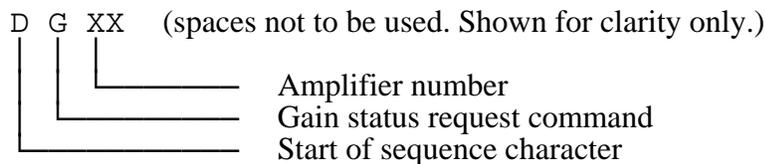
Minus 60 dB is specified as '0600'.

Unity gain, or 0 dB, is specified as '0000' or '1000'.

The SAS32000 will respond with the ASCII character '1' to indicate receipt of a valid command sequence. An ASCII '0' will be sent if an invalid request is received.

Gain Status Request

The gain status request provides the master computer system with the ability to confirm the gain setting of any input channel.



When a request for current gain value is issued to the system the following response is generated.

