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1. SAS 64000 Audio Routing Switcher

The SAS 64000 Audio Routing Switcher from Sierra Automated Systems & Engineering Corporation is a high performance microprocessor controlled audio switching system designed for large scale operations in professional broadcast facilities. The SAS 64000 employs multiple microprocessors to provide distributed control and enhanced reliability.

The SAS 64000 provides exceptional density - 256 inputs X 256 outputs in one 14 rack unit frame with all input and output modules, frame controller and power supplies. The system is modular. The system may be installed with modules for the number of inputs and outputs which are currently required and easily expanded by adding plug-in modules. Each SIA-64 Input Module provides 64 audio inputs to the system. Each SXT-256 Crosspoint / Output Module switches up to 256 audio sources to 16 audio outputs. The SXT-256 is powered by its own advanced microprocessor and provides multiple serial ports for direct communication with output control panels and the MCU-10 Frame Controller Module. The SXT-256 and its local panels form an independent system which is self sustaining and unaffected by other output modules.

The SAS 64000 can be configured to operate as a mono, stereo or a mixed mono/stereo system. The control software allows adjacent inputs or outputs to be linked as stereo pairs and treated as one source or destination. Stereo linking provides a flexible and convenient solution for facilities which have both stereo and mono sources and destinations to manage.

The MCU-10 Frame Controller handles system administration, programming of system alphanumerics and central control for all system components and functions. Total system configuration and operational control of the SAS 64000 is provided through software operating on an IBM compatible personal computer. The software package provides an intuitive interface for system configuration and operation: defining alphanumeric names, channel notes, stereo input and output links, programming button assignments for pushbutton type control panels, defining crosspoint inhibits and salvos as well as monitoring and controlling the crosspoint matrix. Off-line editing of user configuration options allows system configurations to be stored to hard disk for archiving. The PC is only required for system setup; it is not required for day to day system operation.

The SAS 64000 is based on reliability and performance. Gold plated two-piece euroconnectors are used on all circuit cards and frame-level motherboards. Hi-rel crimp contacts for customer interconnect are inserted into euroconnector housings and electrical connection is made directly to each individual circuit cards mating connector at the frames rear panel. Internal frame wiring applies only to the power input and power supply output distribution.

Break out wiring and/or patch panels to customer specifications are readily available. Popular wiring options include ‘pig tails’, terminal / punch blocks and patch fields.

2. SIA-64 Input Amplifier Modules

Each SIA-64 Input Amplifier Module has 64 independent active balanced buffer amplifiers. Four SIA-64 modules allow a full 256 audio inputs to the SAS 64000 system frame. Adjacent input pairs may be 'software linked' to operate as stereo pairs.

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.

3. SXT-256 Crosspoint / Output Modules

The SXT-256 Crosspoint / Output Module contains all the electronic switches, output amplifiers and control circuitry necessary to switch 256 audio inputs (up to 128 stereo) to 16 audio outputs (up to 8 stereo).

CMOS switching is used to ensure low distortion and noise. The output amplifiers are balanced and provide a low source impedance of 60 ohms, ideal for todays 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 to output control panels and the MCU-10 Frame Controller via ten independent RS-485 serial ports. This direct communication path provides fast response and unsurpassed reliability. Eight ports are dedicated to output control panel communications. Each port is assigned two adjacent mono or one stereo output. One panel is connected to each port for control of a stereo output or two panels may be connected for control of two independent mono outputs. Communication with the frame controller is only necessary to provide local tally to the central controllers or to process salvos and requests from X-Y devices.

4. MCU-10 Frame Controller

The Model MCU-10 is the axis for central control. It communicates to each SXT output module, gathering information on the switch status when local changes are made. It also communicates with XY panels and distributes XY and automation crosspoint commands to the SXT modules. The MCU-10 contains non-volatile memory allowing for safekeeping of all alphanumeric names, pushbutton tables and crosspoint status in the event of power loss.

The MCU-10 has ten serial communication ports. One RS-485 port is allocated to SXT communications, one RS-232 port is allocated to communication with the central control PC for system parameter programming, six RS-485 ports are allocated to XY panel or other SAS XY / automation devices and two RS-232 ports are allocated to remote computer system (user automation) control.

5. SPS-5 Power Supply Modules

The SAS 64000 main frame has locations for two Model SPS-5 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-5 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-5 will power a complete frame it is recommended to use both supplies for redundancy, lower operating temperatures and longer life. Each SPS-5 has an integral cooling fan, which directs the flow of air up through the equipment frame and exhausts to the rear.

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.

6. Control Panels

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

6.1 Single Output Control Panels

Single output controllers communicate directly to a port on an SXT-256 Crosspoint / Output Module via an 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:

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

All alphanumeric 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 selecting sources. The shaft encoders have 36 positions per revolution and no end stops for rapidly accessing the desired source. The LED display shows the currently Active input or the Selected input (preset) as ready for a Take transition. Display mode is indicated by the LEDs in the display control pushbuttons. When the Input Select shaft encoder is rotated the display automatically switches to the Select mode and the available source names 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 control of two outputs in a one rack unit package.

The Model CPI-80 is the smallest alpha controller and is designed for console or turret mounting. The entire electronics assembly, including alpha display, measures 1.4 X 3.3 inches. 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), 32 (Model PBS-32) or 64 (Model PBS-64) programmable pushbuttons in a single rack unit chassis. Each pushbutton is programmable to instantly select the programmed source. An LED in the pushbutton confirms the input status. Designation strips are provided with each panel for inserting user legends.

6.2 Full System Access 'X-Y' Control Panels

Full system access is allowed via Model AXC-8 Alphanumeric X-Y Control Panel and from an IBM compatible personal computer. X-Y panels communicate to the MCU-10 frame controller via an RS-485 serial bus running 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. Additional XY panels may be programmed to access only a selected group of destinations. Each AXC-8 panel is independently programmable to lock out any output(s)

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 display can also show the Numeric value of the source and destination. 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 computer alpha programming screens to perform a cross-reference.

7. Specifications

System

Gain	0 dB ±0.2 dB, 20-20kHz.
Frequency Response	±0.1 dB, 20-15kHz. +0/-0.25 dB, 20kHz.
Noise	<-90 dBu, 20kHz. bandwidth
Dynamic Range	>118dB, 20 kHz bandwidth noise floor
THD	<0.05%, 20-20kHz.
IM [SMPTE]	<0.05%
Crosstalk	<-80dB, 20-20kHz., adjacent inputs fed <-100dB typical, 1kHz.

Audio Inputs

Input Impedance	>40 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 +24dBm, 600 ohm load

Serial Interface

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

General

Power Requirements	115/230 VAC ±10%, 500 VA max.
Physical Size	24.5"H X 19"W X 16"D [14 EIA rack units]

Notes: 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.

8. Frame Installation

Each SAS 64000 frame occupies 14 rack units (RU) of space. Free air flow is necessary for proper cooling of the modules and power supplies. The SAS 64000 has been designed with an integral air handling system. Each power supply has a low speed fan which draws air vertically through the equipment frame and exhausts the air through vents on the rear of the frame. It is necessary to leave at least one rack unit below the frame for air intake and to ensure the air outlets on the rear of the frame are not restricted or blocked. The frame front panel should be left on to optimize vertical air flow.

Refer to the rear connector wiring diagrams for user audio connections. Input connections wire to the SIA-64 modules, and output connections wire to the SXT-256 modules. 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!

9. SIA-64 Audio Input Interconnect

Each SIA-64 module services 64 audio inputs in a SAS 64000. Each SIA-64 has two 32 pair, 96 contact connectors, A and B. Refer to Wiring Diagrams SIA96W1 and SIA96W2. When adjacent inputs are 'linked' to operate as stereo the system will address the stereo pair by the alphanumeric name given to the low number (left) source. The numeric value of the stereo pair is also the number of the 'left' channel input. The high number (right channel) alpha name should be 'masked' by giving its alpha name the right hand brace bracket '{' as the first character which will hide the alpha from all control panels.

Audio Inputs Serviced (see above)	SIA-64 Position	
1 to 32	1A	J1
33 to 64	1B	J2
65 to 96	2A	J3
97 to 128	2B	J4
129 to 160	3A	J5
161 to 196	3B	J6
197 to 224	4A	J7
225 to 256	4B	J8

10. SXT-256 Audio Output & Control Panel Interconnect

See Wiring Diagram SXT96W1. Each SXT-256 module services 16 audio outputs (up to 8 stereo). The audio outputs connect to rows 1 to 16, filling the upper half of the connector.

The SAS 64000 system provides one RS-485 data line for each stereo output or every two mono outputs. Each SXT-256 has eight RS-485 data ports to support remote control panels; each SXT-256 provides eight stereo or sixteen mono outputs. The first port 'A' is for outputs 1 & 2; the second port 'B' is for outputs 3 & 4, etc. Reference SXT wiring diagram SXT96W1. Two adjacent mono outputs may be 'linked' in software to operate as one stereo output, requiring only one panel on the port. The left channel will be an odd number channel and the right channel will be the following even number channel. The control panel for the stereo output or

for the odd number mono output associated with the RS-485 port does not require any external address connections on the mating 9 pin connector. One control panel for each mono output may be connected, or two panels per port. If the port services two mono outputs, the even number mono output panel (second panel) must have an address jumper installed on the mating connector
(pin 2 to 6 for rack mount panels, pin 6 to 7 for console mount panels).

The RS-485 cable connects serial data at 76.8 Kbaud. Low capacitance shielded data cable such as Belden 1800A (single pair) or 1805A (8 pair) is recommended. Maximum cable length should not exceed 300 feet from control panel to SAS 64000 Frame. The data cables can be terminated with a 110 ohm resistor if longer cable runs will be encountered. CAT 5 cable is also suitable for RS-485 distribution. The SAS control panels require the same ground reference as the central equipment frame. The easiest solution is to use one pair of CAT 5 for signal +/- and one pair as common i.e. 2 pairs to each panel.

The SAS 'standard' rack mounted control panel serial data interface connector is a 9 pin D subminiature, male on panel, female on cable.

Rack Mounted Control Panel connections are:

Pin 1: Shield
Pin 4: Data +
Pin 5: Data -

Pin 2: Address Common
Pin 6: A1, address bit 1
Pin 7: A2, address bit 2
Pin 8: A3, address bit 3

Note that each control panel requires a ground reference, usually through the shield back to the central equipment area. If unshielded wiring is utilized then Pin 1 should be connected to technical ground, either through a wire to the technical ground bus close to where the panel is located or through an additional wire which runs along with the data pair back to the central equipment area. Rack mounted panels also have address straps available:

The console mounted control panels have slightly different pin outs, described here. The console mounted units are very small and this necessitated the use of one interface connector for RS-485 data, DC power and address / option bits. The CPI-80 panel was developed first, and the APC-88 expanded the addressable capabilities by adding one extra bit on the D sub connector:

Console Mounted Panels (male on panel: female on cable)
Pin 1: Shield
Pin 4: RS-485 +
Pin 5: RS-485 -

Pin 2: Power Common
Pin 3: +8 to 12 VDC, 200 mAmp

CPI-80	APC-88
Pin 6: Common	Common
Pin 7: A1, address bit 1 / Option A	A1, address bit 1 / Option A
Pin 8: Common	A2, address bit 2 / Option B
Pin 9: A2, address bit 2 / Option B	A3, address bit 3 / Option C

Pins 6 & 7 are used to strap the CPI or APC for 'even channel mono' operation.

See the section on central system programming regarding naming conventions. Sources and destinations which are unused should have the right hand brace bracket '{' as the first character of their alphanumeric name. This removes the names from the alpha directory for remote control panels. Note that the right channel of a stereo source or destination should also be 'bracketed out' to eliminate clutter or confusion.

11. MCU-10 Frame Controller & XY Device Interconnect

See Wiring Diagram MCU10W1. The Model MCU-10 Frame Controller Module is the axis for central control. The module provides ten serial communication ports: one RS-485 bus to connect with the SXT-256 output modules, six RS-485 busses for XY panels (or other XY devices such as GPI 1600 automation), one RS-232 for connection to a PC for central system parameter programming and control and two RS-232 ports for external serial control.

Please refer to your system specific documentation for device connection. The primary central X-Y panel is normally connected to 'XY Port 1': Row 1, C1=RS485+, B1=RS485- and A1=shield. Note that the XY ports are activated or disabled using the PC router control software. The PC is always connected to row 9, C9=TX, B9=RX and A9=ground.

XY PORT 1			to AXC-8 panel
J25 DIN frame conn to cable			DB9 female on cable
		(cable)	
RS-485 +	pin C1	----------	+ pin 4
RS-485 -	pin B1	----------	- pin 5
shield	pin A1	------ shield ----------	sh pin 1

12. 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 64000 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 1412A (16 pair) is recommended.

13. Central System Programming & Control

Total system configuration and operational control of the SAS 64000 is provided through software operating an IBM compatible personal computer. The software package provides an intuitive interface for system configuration and operation: defining alphanumeric names, channel notes, stereo input and output links, programming button assignments for pushbutton type control panels, defining crosspoint inhibits and salvos as well as monitoring and controlling the crosspoint matrix. Off-line editing of user configuration options allows system configurations to be stored to hard disk for archiving. The PC is only required for system setup; it is not required for day to day system operation. It may, however, provide useful information and control if it is made available.

13.1 PC Requirements

Sierra Automated Systems recommends that the IBM compatible personal computer which will run the software be dedicated exclusively to router control and not used for general computer tasks. Also, the machine should meet the following minimum requirements:

1. Intel based 80486 - 66 MHz processor.
2. VGA color monitor and video card (640x480 16 color).
3. Eight (8) megabytes of RAM (If Windows is to be used).
4. Two (2) RS-232 serial I/O ports.
5. One (1) 3 1/2" 1.44 meg floppy disk drive.
6. A fast hard drive with a 2 meg disk cache (Microsoft SmartDrive).
7. A Logitek Bus Mouse, set to COM 5, IRQ 7

Note that items 6 and 7 are recommended so that SAS Model GPI 1600 Automation can be run on the same computer simultaneously. Once the automation software is set up and operational it typically will run 24 hours per day, 7 days a week.

Connect one PC serial port to the MCU-10. Note that the SAS software defaults to COM 2, but may be changed via command line switches as required (see below).

MCU-10 Computer Port J25 DIN frame conn to cable	(cable)	to Computer RS-232 DB25 female on cable	DB9 female on cable
TX pin C9>	----------	< RX pin 3	RX pin 2
RX pin B9>	----------	< TX pin 2	TX pin 3
Gnd pin A9>	---------- shield ----------	< Gnd pin 7	Gnd pin 5

13.2 PC Software Installation

To install the SAS Automation Software insert the software disk in the computers floppy drive, switch to the drive letter for the floppy drive (either A: or B:) and type "INSTALL A: C:" (without the quotes). The install batch file will create a directory on the computers hard drive called C:\SASTERM and copy the program files into it. The software may be installed in a different drive/directory by manually creating a directory in the desired location and copying the program files into it.

To start the software, change to the SASTERM directory and type SASTERM <Enter>. There are several options which should be considered when setting up the system. Typing the command SASTERM /? will list the options on the screen. The defaults are:

19200 baud, 8 data bits, no parity, 1 stop bit, COM 2:, save settings on exit and load at startup

The options are:

/?	Display Help screen, listing command line switches.
/R=X	Recall last exit configuration, 'Y' or 'N'
/Q=X	Save configuration on exit, 'Y' or 'N'
/F=X	Download (fetch) configuration data from system frame on startup, 'Y' or 'N'
/B=19200	Set baud rate to XXXX (hardware requires 19200)
/D=8	Set data bits to 8
/S=1	Set stop bits to 1
/P=X	Set port to X, COM 1 through 4 supported
/T=N	Set parity to none

If the defaults are acceptable it is not necessary to type any options. If you wish to change any of the options, add them to the command line after a space.

e.g. C:\SASTERM /P=1

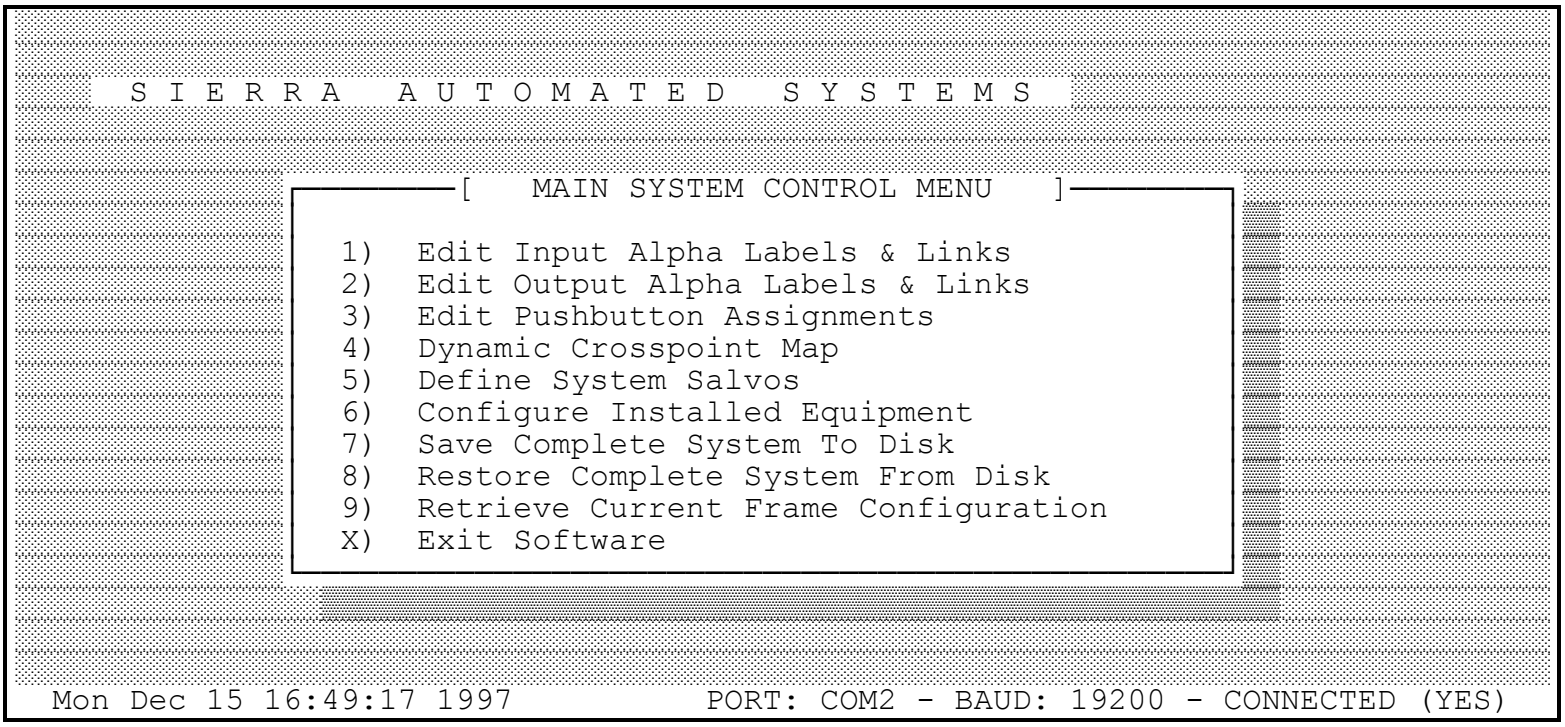
This example would cause the software to use serial port 1.

Note that the communication baud rate and other settings must match the hardware, and should not be adjusted. Only the COM port is likely to need adjustment.

The software operates under DOS. If multi-tasking software such as Microsoft Windows is used, and properly configured, the computer may also be used to run the SAS Model GPI 1600 Automation package. The GPI 1600 provides time based automation of switcher commands and 16 relays for machine control or other general purpose application.

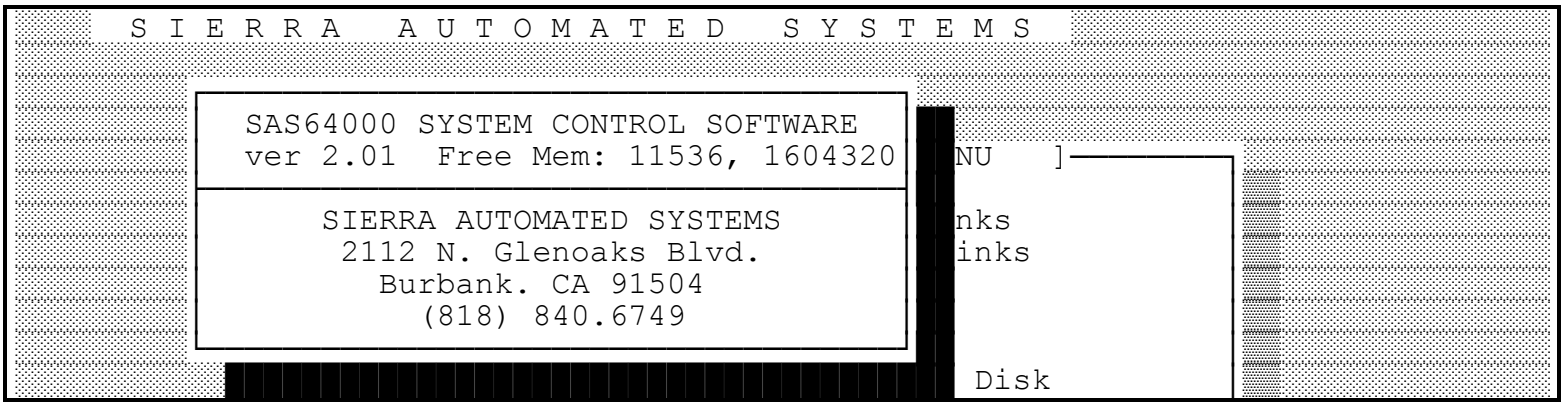
13.3 Main Menu

The Main Menu of the system control software is shown below. The selections are divided into functional groups to help you program system operating parameters. Each of the selections has comprehensive on-line Help available to guide you through any questions which may come up while programming the system. The following sections briefly describe the system programming.



The bottom line of this screen displays basic system information. The PC port and baud rate (always 19200 baud) are shown and the communication status of the PC to MCU link is displayed. If the serial communication is disrupted the (YES) will immediately reflect (NO).

You may press <F1> or click with the mouse on SIERRA AUTOMATED SYSTEMS to display the pop up box below. This information will be helpful when communicating to the factory.



13.3.1 Edit Input Alpha Labels and Links

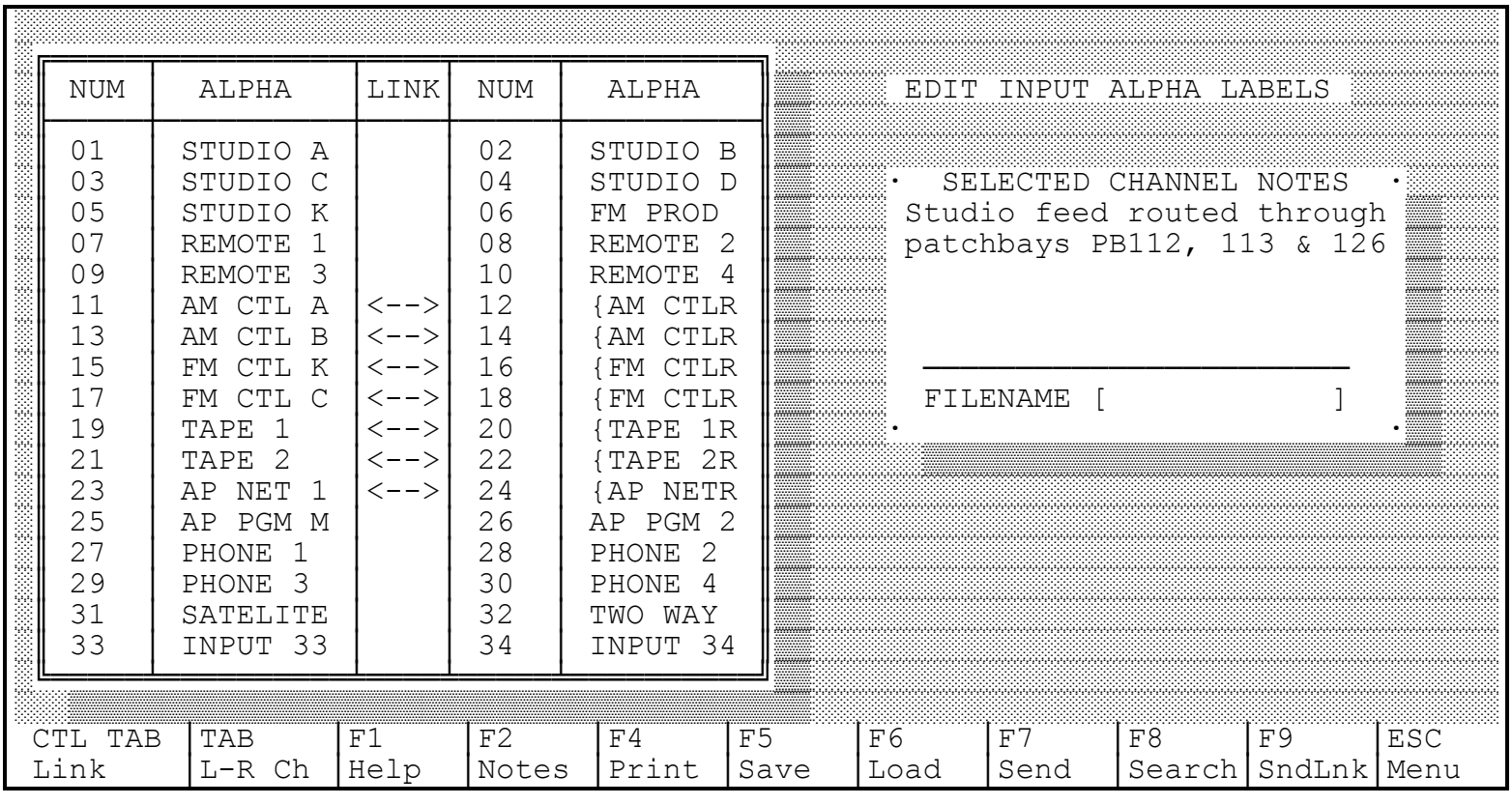
This menu is used to program the alphanumeric names which the operators will use to select sources and to program the stereo 'links'.

Each alphanumeric name can be up to 8 ASCII characters. The names will be presented to the operators in alphanumeric order. The sort routine operates based on the leftmost character first. Normally you would left justify the names. You could shift a group of names to the right by a 'space' (or any other ASCII character) if it is required to isolate a group of names.

Use the arrow and tab keys or the mouse to highlight the name which you wish to edit. The channel notes area provides a 'scratchpad' to write information about the source. Use <F2> or the mouse to enter the area and <Enter> to save the note to disk.

The naming convention allows for 'masking' or removing names which are not installed or any name that you do not want presented to the operators. The first character must be the left hand brace bracket '{' for names which you do not want displayed on remote control panels.

'Stereo linking' is provided to allow adjacent inputs to operate as a stereo pair, and to be treated as one source. Use the <Control - Tab> key combination or click with the mouse in the link area of the screen to set or remove stereo links. When two sources are linked to operate as a stereo pair the stereo source will be identified and controlled using the left channel alphanumeric name and number. The right channel alphanumeric name should be 'masked' by using the left hand brace bracket '{' as the first character. This prevents confusion when scrolling through the source names on an output control panel. The right channel will automatically follow when the stereo source is selected to a stereo linked output. If the stereo source is selected to a mono destination the left channel will be selected.



When the input list has been edited it is necessary to upload the new information to the equipment frame controller module, Model MCU-10. The <F7> key sends the complete alphanumeric and link list to the system. If changes are made only to the stereo links the <F9> key sends the link list only, which is faster than sending the complete alpha tables.

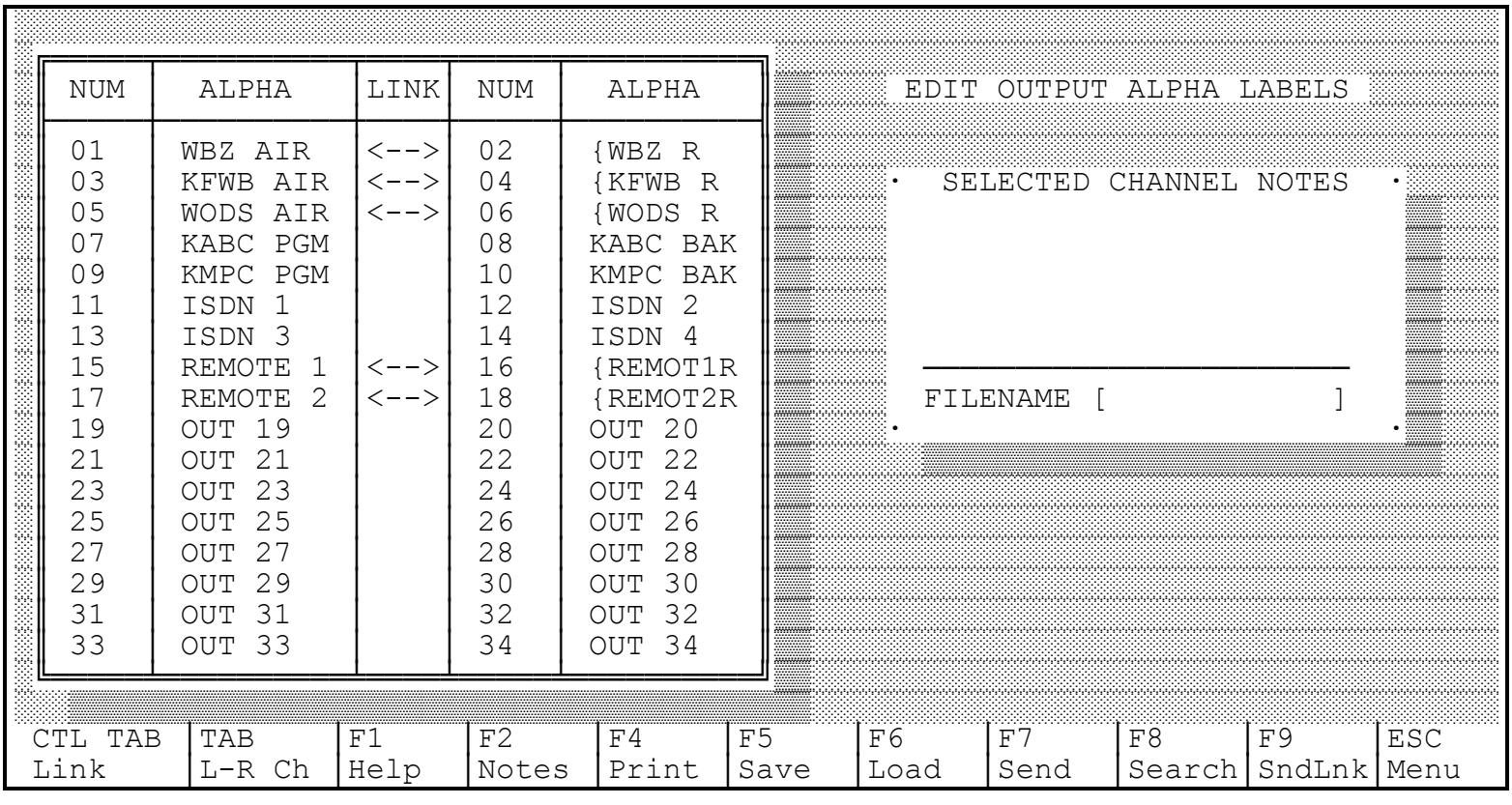
The input alpha/link list may be saved to a file on disk by pressing <F5>. The software will prompt you for a file name to save the list to. The <F6> key will recall a previously saved input alpha/link file into the software. The list must be uploaded to the system MCU using the <F7> key before the settings become active. Note that complete system settings (input & output alphas/links, pushbutton assignment tables, inhibits) may be saved to or retrieved from disk using main menu choices 7 & 8. These settings are loaded into the router control PC software only. For any list to be used by the routing system it must be uploaded using the <F7> key from the editing menu.

13.3.2 Edit Output Alpha Labels and Links

This menu is used to program the alphanumeric names which the system provides for destination names and to program the stereo output 'links'. These destination names will be available on the XY control panel display.

Each alphanumeric name can be up to 8 ASCII characters. The names will be presented to the operator in alphanumeric order. The sort routine operates based on the leftmost character first. Normally you would left justify the names. You could shift a group of names to the right by a 'space' (or any other ASCII character) if it is required to isolate a group of names.

Use the arrow and tab keys or the mouse to highlight the name which you wish to edit. The channel notes area provides a 'scratchpad' to write information about the source. Use <F2> or the mouse to enter the area and <Enter> to save the note to disk.



The naming convention allows for ‘masking’ or removing names which are not installed or any name that you do not want presented to the operators. The first character must be the left hand brace bracket ‘{‘ for names which you do not want displayed on remote control panels.

‘Stereo linking’ is provided to allow adjacent outputs to operate as a stereo pair, and to be treated as one destination. Use the <Control - Tab> key combination or click with the mouse in the link area of the screen to set or remove stereo links. When two outputs are linked to operate as a stereo pair, the stereo destination will be identified with the left channel alphanumeric name and number. All control of the stereo output shall use the left channel name/number. The right output channel is not controllable independently: the right channel alphanumeric name should be ‘masked’ by using the left hand brace bracket ‘{‘ as the first character. This prevents confusion when scrolling through the destination names on an XY control panel. The right channel input will automatically follow when a stereo source is selected to a stereo linked output. If a mono source is selected to a stereo destination it will be selected to both left and right outputs.

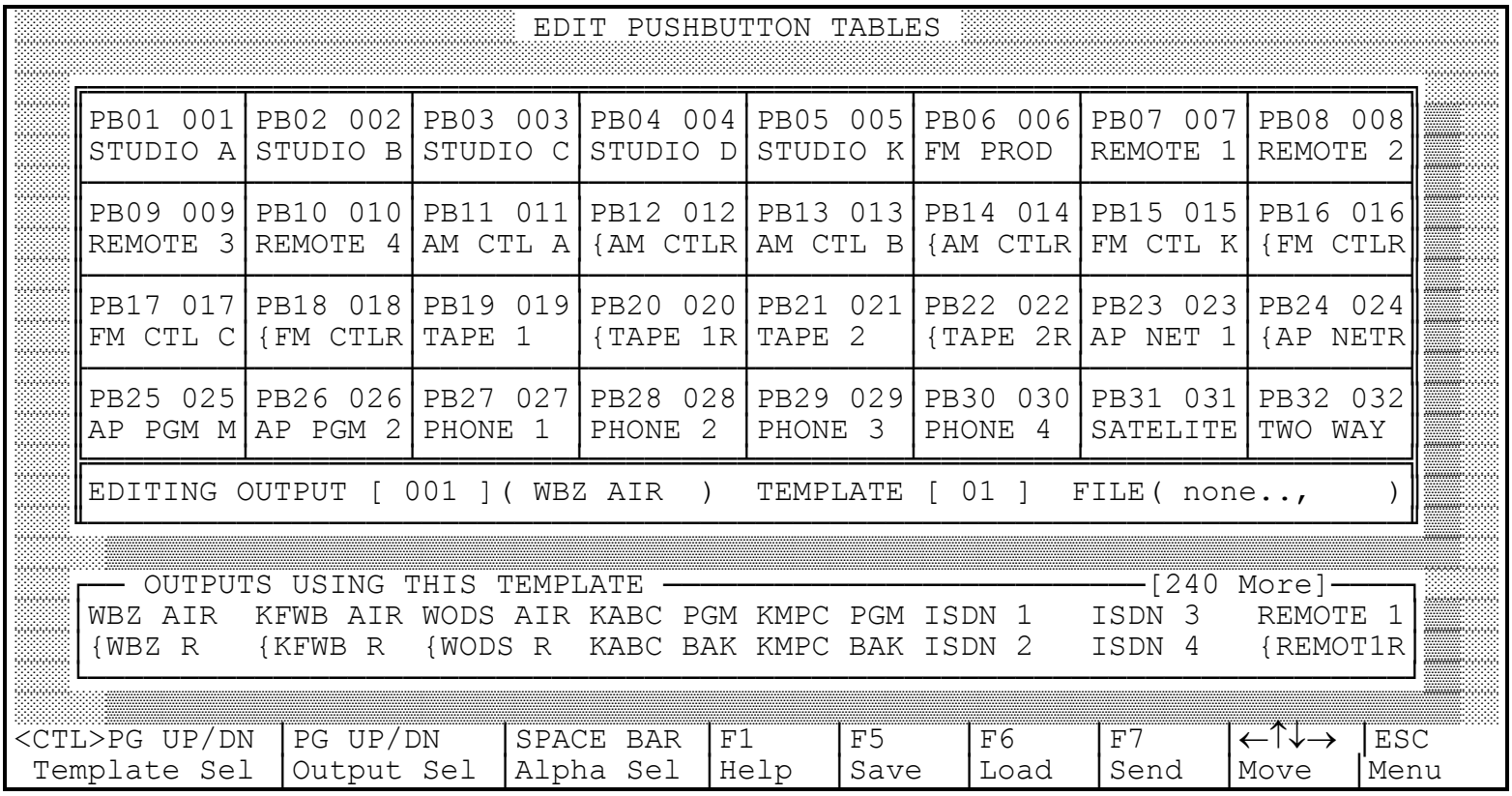
When the output list has been edited it is necessary to upload the new information to the equipment frame controller module, Model MCU-10. The <F7> key sends the complete alphanumeric and link list to the system. If changes are made only to the stereo links the <F9> key sends the link list only, which is faster than sending the complete alpha tables.

The output alpha/link list may be saved to a file on disk by pressing <F5>. The software will prompt you for a file name to save the list to. The <F6> key will recall a previously saved output alpha/link file into the software. The list must be uploaded to the system MCU using the <F7> key before the settings become active. Note that complete system settings (input & output alphas/links and pushbutton tables) may be saved to or retrieved from disk using main menu choices 5 & 6. These settings are loaded into the PC software only. For any list to be used by the routing system it must be uploaded using the <F7> key from the editing menu.

13.3.3 Edit Pushbutton Tables

This menu is used to program the source to be selected by pushbuttons on output remote control panels which provide ‘hot punch’ programmable pushbuttons. Output control panels are available with 8, 16, 32 and 64 pushbuttons. Each pushbutton list provides 64 button locations. When programming the list for a panel with 8 pushbuttons, the first eight button selections will determine the source assignments. The other buttons selections become ‘don’t care’.

The SAS 64000 provides 64 Templates of 64 Buttons each for pushbutton programming. Each destination (output) may use any template. Each output control panel is downloaded the button selections for the output to which that panel is connected. The software defaults with all outputs utilizing template 1. Using the <Page Up> <Page Down> keys scroll to the output which you wish to program. You may also click with the mouse in the field and type in the output number. Select a template to use. Other outputs which are currently using the template will show up in the lower area of the screen. If more outputs use the template than will fit in the area provided, the number of additional outputs using the template will be indicated. The template table may be freely edited in this screen. Use the arrow keys or the mouse to position the cursor in the field to be edited. Type the number of the source to be assigned to the pushbutton and press <Enter>. If you make a mistake press <Escape> and start again. You may also scroll through the list of sources by pressing <Spacebar> to pop up the input list and <Enter> to select the desired source.



When the pushbutton list has been edited it is necessary to upload the new information to the equipment frame controller module, Model MCU-10. The <F7> key sends the complete list of all pushbutton assignments to the system.

The pushbutton assignment list may be saved to a file on disk by pressing <F5>. The software will prompt you for a file name to save the list to. The <F6> key will download a pushbutton assignment file into the software. The list must be uploaded to the system MCU using the <F7> key before the settings become active. Note that complete system settings (input & output alphas/links, pushbutton tables, inhibits) may be saved to or retrieved from disk using main menu choices 7 & 8. These settings are loaded into the router control PC software only. For any list to be used by the routing system it must be uploaded using the <F7> key from the editing menu.

13.3.4 Dynamic Crosspoint Display

This menu choice provides a means to control the matrix and to visually monitor crosspoint activity.

The Dynamic Crosspoint Display is organized with outputs down the left side of the screen and inputs across the screen, left to right. Each page shows 16 outputs, or the outputs of one SXT-256 module. To 'page' up and down to the different groups (16 output modules) use the <Page Up> and <Page Down> keys or click in the top of the outputs to page up and the bottom of the outputs to page down. To page across to higher input numbers use the <Tab> key or click in the inputs area of the screen. The arrow keys and the mouse may be used to move the cursor around the screen. As the cursor is moved the alphanumeric designation of the input and output for that crosspoint are shown in a box in the upper left of the screen. The <T> key will Take the

crosspoint where the cursor is located. If you move to the crosspoint location with the mouse, click to position the underscore cursor and then activate with the <T> key or by clicking the mouse in the (T)ake box at the bottom of the screen. An 'X' indicates the successful crosspoint connection.

Stereo linked output pairs are shown with a red vertical 'link bracket' connecting left (upper) and right (lower) channels. Stereo linked input pairs are shown with a red horizontal 'link bracket'. The system will not allow direct control of a right channel output. The source which is selected to the right output channel is <u>always</u> calculated from the left channel selection. To select sources to stereo destinations, make your selection to the left channel and the right will automatically follow. When the left channel of a stereo input pair is selected to a left output, the right channel input will be automatically selected to the right output. If a mono source is selected it will be connected to both the left and right outputs. The alphanumeric names of the crosspoint are shown in the upper left corner of the screen, and are helpful for source / destination identification.

A light blue 'p' to the left of an output indicates an active single output control panel controlling that output. The panel is connected on the RS-485 port of the SXT-256 module (see Section 10).

DYNAMIC CROSSPOINT DISPLAY SCREEN

User Alphas

AM Ctl A
Record A

	1 ⊓⊓⊓ 123456789	10 0123456789	20 0123456789	30 0123456789	40 0123456789	50 — 60 01234567890
Out 01	X-II-----	----------	----------	----------	----------	----------
Out 02	-XII-----	----------	----------	----------	----------	----------
p Out 03	----X----	----------	--I-------	----------	----------	----------
Out 04	-----X---	----------	--I-------	----------	----------	----------
p Out 05	X--------	----------	----------	----------	----------	----------
Out 06	X--------	----------	----------	----------	----------	----------
Out 07	X---I----	----------	----------	----------	----------	----------
Out 08	X---I----	----------	----------	----------	----------	----------
Out 09	X-----I--	----------	----------	----------	----------	----------
Out 10	X------I-	----------	----------	----------	----------	----------
Out 11	X-------I	----------	----------	----------	----------	----------
Out 12	X--------	----------	----------	----------	----------	----------
Out 13	X--------	----------	----------	----------	----------	----------
Out 14	X--------	----------	----------	----------	----------	----------
Out 15	X--------	----------	----------	----------	----------	----------
Out 16	X--------	----------	----------	----------	----------	----------

(T)ake Take Xpoint	(I)nhibit Set Inhibit	TAB Input Page	Pg Up/Dn Outs -/+	F1 Help	F7 Send Inhibits	←↑↓→ Move	Esc Menu

<u>Inhibits</u> will prevent the selection of a source to the destination. Move the cursor to the desired input/output on the screen and press the 'I' key or click in the (I)nhibit box at the bottom of the screen. A red 'I' will now be shown at the output/input location showing the inhibit status. After marking the Inhibits you must 'Send' the inhibit list to the SAS 64000 using the <F7> key. If you attempt to Take an Inhibited input to an output using the SAS 64000 front panel controls

the display will not show any change, since no change is allowed. If a remote output control panel attempts to Take an Inhibited source it will briefly flash the word 'Inhibit' in the display before returning to Active display mode, showing the source which is currently selected to that destination.

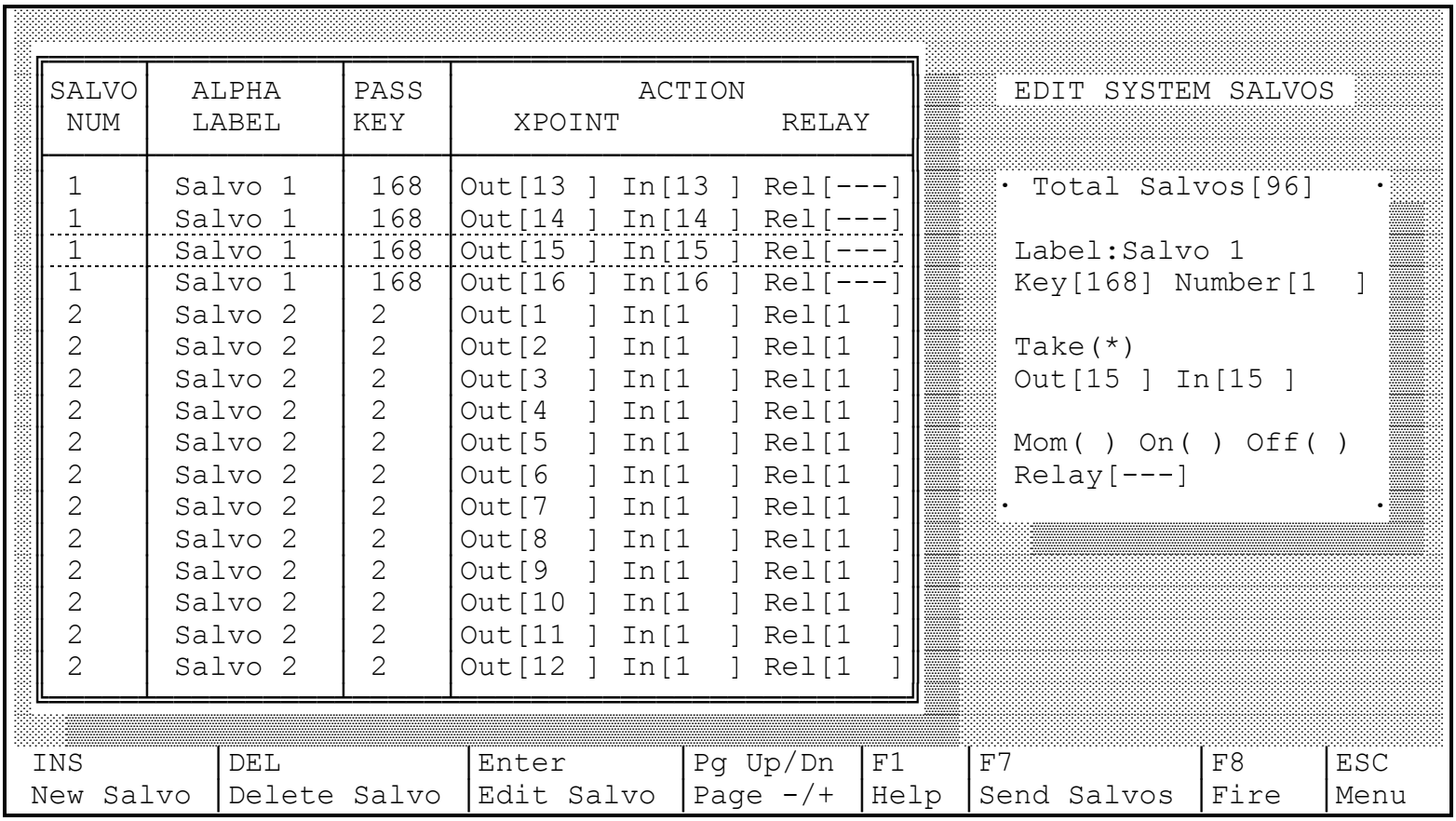
Another feature which is available from this matrix screen is 'stereo reverse'; the right channel input is selected to the left channel output and the left channel input is selected to the right channel output. If the right channel of a stereo input pair is selected to the left channel output, the system will automatically select the left channel of the stereo input pair to the to the right output using the stereo link. This feature is not typically accessed from remote control panels, although it can be made available. Remote control panels on the SAS 64000 system always control the left channel output of a stereo pair. Pushbutton panels may have any pushbutton programmed to any source. If a right channel source is programmed to a pushbutton, the panel will be able to select the 'stereo reverse'. There are limited applications where this feature may be useful. We recommend that the right channel alphanumeric name be 'masked' so that it does not appear on the display of alphanumeric remote control panels. To make the 'stereo reverse' feature accessible from alphanumeric remote control panels the right channel name should not be masked. The name should be chosen to make it clear to the operator that the right, or reverse, channel will be selected.

13.3.5 Salvo Programming

The SAS 64000 system has the ability to execute multiple events with a single command. This command is called a 'Salvo'. A Salvo is given a Number, Name and a Pass Key. The Salvos will be displayed on the edit screen in the order of the Number. The Name is an eight character alphanumeric name which will be displayed by remote control panels when in Salvo mode. The panels will display the Salvos in alphanumeric order. The Pass Key is a number between 1 and 256 which can provide extra security. If a Salvo Key is set to '1' the salvo will execute without asking for further input. If the key is any other number the panel will demand that the proper key number be selected before executing the Salvo (see below).

The system allows up to 128 Salvo Names and a maximum of 1000 total crosspoint / relay events. To create a Salvo, press the Insert key and enter the required information in the information box on the right side of the screen. The information box allows you to type in or edit the Salvo Name (label), the Key, the Number and the action. To edit the highlighted event press the Enter key. To enter multiple events which contain similar information enter the first event and save it <F10>; then select the event by pressing Enter, edit as required, and press the <F5> key to save the changes as a new event while maintaining the original event. If you edit or enter a Number which is currently in use, the Name and Key fields will update (revert) to the currently stored values when you cursor away from the Number field. Be careful not to accidentally re-number or re-name salvos when entering or editing. Each Salvo may have several events. Each event may Take a crosspoint and / or actuate a relay. The crosspoint is specified as In / Out numbers. Relays are available by adding an optional GPI 1600 chassis.

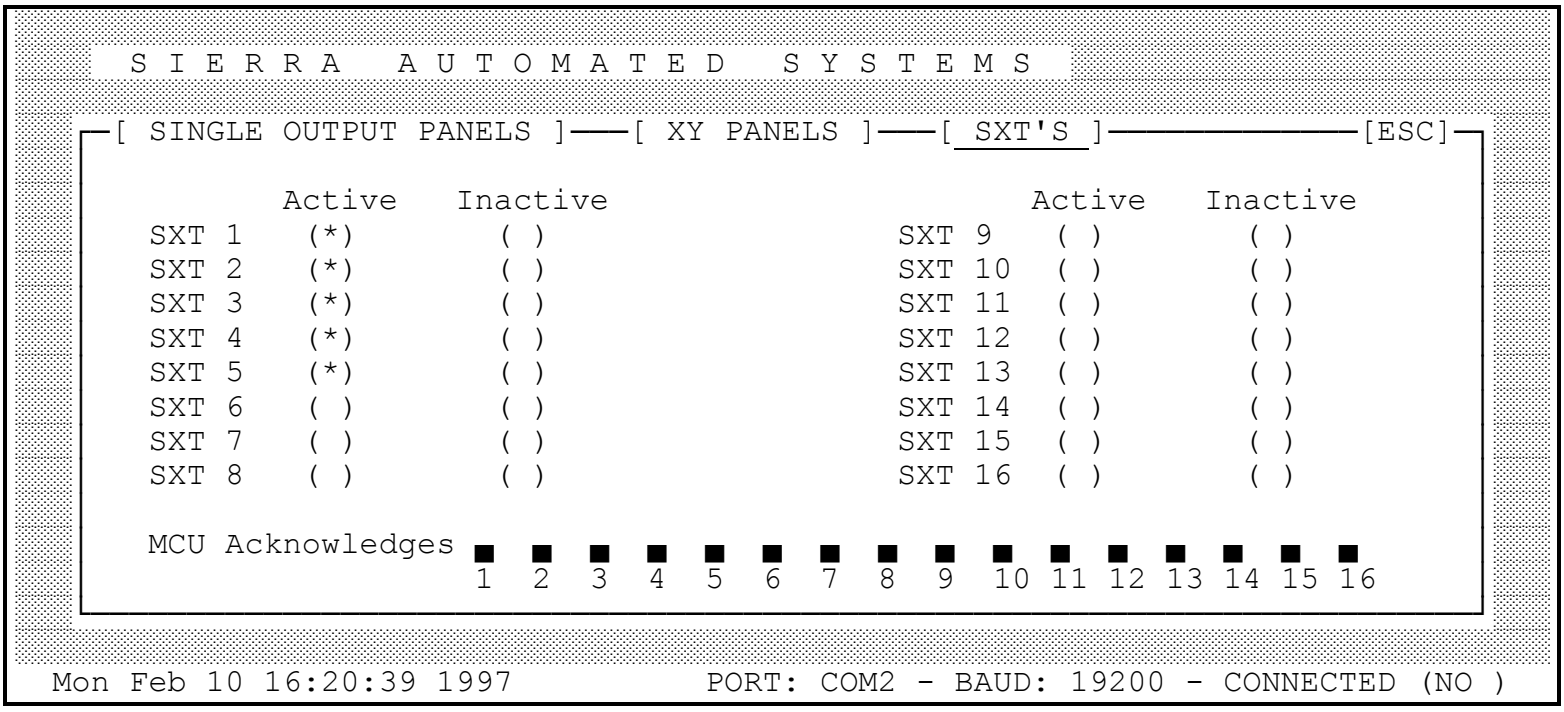
The Salvo information must be sent to the system controller, MCU-10, by pressing the <F7> key before the Salvos will be available to the routing system.



The Salvo may be accessed, or triggered, from this computer control screen using the <F8> key or from a single output remote control panel. Single output alphanumeric remote control panels will switch to Salvo Mode by depressing and holding the Select display control switch. On the CDS-8 panel, which does not have a display control pushbutton, depress the shaft encoder knob to enter Salvo Mode. Once Salvo Mode has been entered the available Salvo names may be scrolled through in alphanumeric order. When the Take switch is depressed the panel will check the Pass Key. If the Key is 1 (one) the panel will send the command and the Salvo will be executed. If the Key is any other number the panel will prompt for the number to be selected by scrolling the shaft encoder. Once the number has been selected the Take switch is again depressed. If the correct Pass Key number has been selected the panel will send the command and display 'Executed'. The panel then returns to input select mode. If the key is incorrect the panel will display 'No Access' for a few seconds and then return to input select mode.

13.3.6 Configure Installed Equipment

These screens are used to activate SXT-256 output modules, XY devices and single output control panels to optimize system access speed. The installed resources must be 'enabled' before they will be recognized by the system. There are up to 16 SXT-256 modules which may be installed in the equipment frame. The screen below tells the MCU-10 frame controller which modules are installed. When modules are added in the field they must be 'enabled' before they can be used.



The screen below tells the MCU-10 frame controller which XY ports will have devices installed. Examples of XY devices are the central XY control panel, GPI 1600 Automation and multi-output control panels. Each XY bus will automatically poll two addresses when the port is enabled. The first XY device connected to the port does not require any addressing. If a second XY device is installed on the same port, the second device must have an address strap soldered on to the mating connector, connecting pins 2 to 6. Since each XY bus supports 2 devices, the system will allow for 12 XY devices with all 6 ports enabled. Note that you do not have to connect two XY devices to the port. The primary reason for connecting two XY devices on a port would be to connect more than 6 devices. Once you have determined that you require two XY devices on a port, the second device must have the address strap installed on the mating connector.

```
  S I E R R A   A U T O M A T E D   S Y S T E M S

┌─[ SINGLE OUTPUT PANELS ]──[ XY PANELS ]──[ SXT'S ]──────────────[ESC]─┐
│                                                                        │
│          XY-BUS 1 ->    ACTIVE(*)         INACTIVE( )                  │
│          XY-BUS 2 ->    ACTIVE(*)         INACTIVE( )                  │
│          XY-BUS 3 ->    ACTIVE( )         INACTIVE(*)                  │
│          XY-BUS 4 ->    ACTIVE( )         INACTIVE(*)                  │
│          XY-BUS 5 ->    ACTIVE( )         INACTIVE(*)                  │
│          XY-BUS 6 ->    ACTIVE( )         INACTIVE(*)                  │
│                                                                        │
│          MCU Acknowledges ■ ■ ■ ■ ■ ■                                  │
│                           1 2 3 4 5 6                                  │
└────────────────────────────────────────────────────────────────────────┘

 Mon Feb 10 16:23:35 1997          PORT: COM2 - BAUD: 19200 - CONNECTED (NO )
```

The following screen shows the single output control panel status. This screen is useful during installation or any other time when you have a question about the status of a communication circuit. If a single output control panel is connected and communicating to an SXT-256 it will be shown by an asterisk under the port to which the panel is connected. Each port may have two single output control panels connected. A left hand asterisk indicates a panel controlling the low, or odd number output. A right hand asterisk indicates a panel controlling the high, or even number output (panel has an address jumper installed on mating connector. See Sec 10).

```
  S I E R R A   A U T O M A T E D   S Y S T E M S

┌─[ SINGLE OUTPUT PANELS ]──[ XY PANELS ]──[ SXT'S ]──────────────[ESC]─┐
│                                                                        │
│   PORT -> A  B  C  D  E  F  G  H      PORT -> A  B  C  D  E  F  G  H   │
│                                                                        │
│    SXT 1 [-- *- ** -- -- -- -- --]     SXT 9  [-- -- -- -- -- -- -- --]│
│    SXT 2 [-- -- -- -- -- -- -- --]     SXT 10 [-- -- -- -- -- -- -- --]│
│    SXT 3 [-- -- -- -- -- -- -- --]     SXT 11 [-- -- -- -- -- -- -- --]│
│    SXT 4 [-- -- -- -- -- -- -- --]     SXT 12 [-- -- -- -- -- -- -- --]│
│    SXT 5 [-- -- -- -- -- -- -- --]     SXT 13 [-- -- -- -- -- -- -- --]│
│    SXT 6 [-- -- -- -- -- -- -- --]     SXT 14 [-- -- -- -- -- -- -- --]│
│    SXT 7 [-- -- -- -- -- -- -- --]     SXT 15 [-- -- -- -- -- -- -- --]│
│    SXT 8 [-- -- -- -- -- -- -- --]     SXT 16 [-- -- -- -- -- -- -- --]│
│  L Outputs 1  3  5  7  9  11 13 15   L Outputs 1  3  5  7  9  11 13 15  │
│  R Outputs  2  4  6  8  10 12 14 16  R Outputs  2  4  6  8  10 12 14 16 │
│                                                                        │
│   *Indicates control panel present.                                    │
└────────────────────────────────────────────────────────────────────────┘

 Tue Jan 27 17:36:51 1998          PORT: COM2 - BAUD: 19200 - CONNECTED (YES)
```

13.3.7 Save Complete System to Disk

This menu choice allows you to archive the system alphanumeric labels, stereo link assignments and pushbutton templates & assignments to a file on your computer disk drive. When you have your system properly configured for operation you should save these assignments and store the file on a floppy disk as a back up. The system automatically saves the 'current configuration' when exiting the software. However, it is prudent to archive the information when changes are made which affect the system configuration.

13.3.8 Restore Complete System from Disk

This menu choice will load an archived configuration into the router control PC software. The settings will not be transferred to the system equipment (MCU-10) unless you intentionally enter into menu choices 1, 2, 3 & 4 and Send the settings to the system frame. Using this command will overwrite the current system settings. Be sure to save the current configuration to an archive file before restoring settings from an archive file. If you load a new system configuration from an archive file without first archiving the 'current' configuration you can recover the settings from the system frame with #9 below.

13.3.9 Retrieve Current Frame Configuration

This option will download the configuration information from the equipment frame into the software on the PC. This is useful if you are using a PC like a laptop which may not have the current system settings in memory or on disk.

13.3.10 Exit

This option exits the software and saves the 'current' system settings to a file on disk (default).

14 Control Panel Operation

14.1 AXC-8 Alphanumeric XY Control Panel

The Model AXC-8 Alphanumeric 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.

14.1.1 Alphanumeric / Numeric Display Toggle

The front panel displays may show the numeric number of the source and destination to allow the engineer to easily cross-reference the Alphanumeric to Numeric designations. When the display is in Active mode the Active display control pushbutton may be depressed and held to show the number of the source and destination. Numeric mode will show only the number, from 001 to 256, of the input and output. Stereo sources and destinations are represented by their 'left' channel number. The numeric equivalent may also be seen when the panel is on Select mode by holding the Select pushbutton.

14.1.2 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 from alphanumeric to numeric). 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.

14.1.2.1 '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.

14.1.2.2 Computer Port Baud Rate

The SAS 64000 version of the AXC-8 does not support Computer port automation. Not applicable.

14.1.2.3 Gain Control

The SAS 64000 is not available with digitally controlled gain. Not applicable.

14.1.2.4 Modem Disconnect

The SAS 64000 version of the AXC-8 does not support modem capabilities. Not applicable.

14.1.2.5 Activity Auto Report

The SAS 64000 version of the AXC-8 does not support Computer port automation. Not applicable.

14.1.2.6 Output Restriction

SAS 64000 systems may be provided with additional AXC-8 panels for 'multiple output control' in addition to the central system control panel. Each additional panel may be programmed to access only a selected group of destinations. This feature is useful in systems where an additional AXC-8 panel is used for control of a group of outputs in a particular location. The operator will likely only want access to the outputs which are in the area, rather than having to scroll through all system outputs. This feature can also be used to remove system outputs which are not currently installed, although the global alpha brace bracket '{' will remove these outputs from all panels in alphanumeric mode.

Enter concealed programming mode: while holding the display control pushbuttons rotate the shaft encoder five clicks clockwise. The display will show Out_ENBL, for Output Enable. Depress the Take pushbutton. You may release the two display control pushbuttons after entering this layer. The shaft encoder will toggle between *Insert* and *Delete*. The default is *Insert* which indicates that the output shown in the Output display is enabled, i.e. not restricted during normal operation. Rotate to *Delete* to remove the output from the operational directory for this panel only. The Output shaft encoder is rotated to allow selection of all outputs.

14.2 Model ANC-8 and ANC-8D Single Output Alphanumeric Control Panels

The ANC rack mounted single output alphanumeric control panels may be operated in three distinct **Input Selection modes**:

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

The panels default on power up to Preset Exchange, where the preset source is taken and the previously active source is put into the Select memory. By repeatedly depressing the Take pushbutton the two sources are alternately taken. This can be very useful if comparison of the two sources is desired.

The input selection mode may be changed by depressing and holding the two display control pushbuttons and then pressing the large Take pushbutton. The display will show the mode as

SEL w/EX for Select and Take with Preset Exchange
SEL noEX for Select and Take without exchange
Dyn Take for Dynamic Take

Select and Take Mode without exchange will not automatically update the Select or preset location. The operator must manually select the next source to be taken.

Dynamic Take simply emulates a rotary switch. Each click of the shaft encoder will Take the next source in alphabetical order. The Take pushbutton is inactive.

The panels may be put into **'Salvo Mode'** where the panel is able to select one of the defined salvos (group of crosspoint commands. See Sec 13.5). To enter Salvo Mode, press and hold the Select pushbutton for 2 seconds. The display will flash 'Salvos' to indicate the change of function. Then the available Salvo Names will be displayed in alphanumeric order by scrolling the shaft encoder. Pressing Select again will display 'End Salvo' and exit Salvo Mode. If there are no Salvo events defined the display will show 'No Salvos' and return to normal crosspoint mode. If you scroll to the Salvo Name which is desired and press the Take switch, the panel will evaluate the Pass Key and, if it is '1' will execute the Salvo and display 'Executed'. If the Pass Key is any value other than '1' the panel will prompt 'Key =xxx' and you must scroll to the

correct Key number and again press the Take switch. If the key is correctly chosen the panel will execute the Salvo and display 'Executed'. If the key is not chosen correctly the panel will display End Salvo' and exit Salvo Mode. Note that when using an ANC-8D panel, only the 'A' controls may be used to access Salvo Mode.

14.2.1 Address Jumpers

The SAS 64000 system provides one RS-485 data line for each stereo output or every two mono outputs. Each SXT-256 has eight RS-485 data ports to support remote control panels; each SXT-256 provides eight stereo or sixteen mono outputs. The first port 'A' is for outputs 1 & 2; the second port 'B' is for outputs 3 & 4, etc. Reference SXT wiring diagram SXT96W1. Two adjacent mono outputs may be 'linked' in software to operate as one stereo output, requiring only one panel on the port. The left channel will be an odd number channel and the right channel will be the following even number channel. The control panel for the stereo output or for the odd number mono output associated with the RS-485 port does not require any external address connections on the mating 9 pin connector.

If the port services two mono outputs, one control panel for each mono output may be connected, or two panels per port. The even number mono output panel (second panel) must have an address jumper installed to connect bit A1 to common on the mating connector. The address jumper is installed on the mating connector (female cable end) of the 9 pin D RS-485 connector P1, pins 2 to 6.

Frame SXT-256		To ANC-8/D (P1)
(96 pin Euro)	(cable)	Rear DB9 Male (RS-485/power)

```
AXX gnd >-------- shield ----------------< pin 1
BXX  -  >-------------------------------------< pin 5
CXX  +  >-------------------------------------< pin 4
```

(see wiring diagram SXT96W1 for row pin numbers, XX above)

Address Strap

```
Address Common >--------------------< pin 2
Address A1 >------------------------< pin 6
```

14.3 Model CPI-80 and APC-88 Alphanumeric Control Panels, Console Mounted

The Model CPI-80 and APC-88 control panels are compact assemblies which may be mounted in most commercial audio consoles and other 'custom' applications. A 9 pin D sub-miniature connector is provided on the rear of the module for connection to the SXT-32 data port and to a local power supply. These units require a DC power source, 8 to 12 volts DC with a current requirement of 200 milliAmps maximum. Each unit is shipped with a wall mount power supply and mating connector. For installations where several console mounted control heads will be located a 1.5 amp 12 volt DC power source will suitably supply up to 8 control panels. At each location where multiple console mounted control panels are required, a splitter as detailed in drawing SP8W01 is recommended for distributing power and RS-485 data to each panel. A splitter panel, Model SPA-80, may be ordered from Sierra Automated Systems for this purpose. Many engineers prefer the distributed nature of the wall mount supplies. Connection from the APC-88 to the SXT-256 connector of the SAS 64000 frame is as follows:

Frame SXT-256 To CPI-80 (P1)
(96 pin Euro) (cable) Rear DB9 Male (RS-485/power)

```
AXX gnd >-------- shield ----------------< pin 1
BXX  -  >-----------------------------------< pin 5
CXX  +  >-----------------------------------< pin 4
```

(see wiring diagram SXT96W1 for row pin numbers, XX above)

Power Supply

```
+12v  >---------------------------------------< pin 3
Gnd   >---------------------------------------< pin 2
```

Address Strap (see Option A section following)

```
Address Common >--------------------< pin 6
Address A1 >-----------------------< pin 7
```

14.3.1 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-256. 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.

14.3.2 Jumper Options.

Option A: 'Even' Address Jumper

The SAS 64000 system provides one RS-485 data line for each stereo output or every two mono outputs. Each SXT-256 has eight RS-485 data ports to support remote control panels; each SXT-256 provides eight stereo or sixteen mono outputs. The first port 'A' is for outputs 1 & 2; the second port 'B' is for outputs 3 & 4, etc. Reference SXT wiring diagram SXT96W1M. Two adjacent mono outputs may be 'linked' in software to operate as one stereo output, requiring only one panel on the port. The left channel will be an odd number channel and the right channel will be the following even number channel. The control panel for the stereo output or for the odd number mono output associated with the RS-485 port does not require any external address connections on the mating 9 pin connector.

If the port services two mono outputs, one control panel for each mono output may be connected, or two panels per port. The even number mono output panel (second panel) must have an address jumper installed to connect bit A1 to common on the mating connector. Option A is an address jumper that is installed on the mating connector (female cable end) of the 9 pin D RS-485 connector P1.

Option A not installed:
CPI-80 will control and display status of the ‘odd’ or lower number channel to which the RS-485 port is assigned. If an output is ‘linked’ by SAS 64000 operating software to operate as stereo the control panel is connected without the jumper.

Option A installed (pin 6 jumpered to pin 7):
CPI-80 will control and display status of the ‘even’ or higher number mono audio channel to which the RS-485 port is assigned. If the audio channels are ‘linked’ for stereo operation the panel will not be able to control the output if the address jumper is installed, since the ‘right’ channel source will be calculated solely based on the ‘left’ channel selection.

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. The first 8 of the 64 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. 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.

Salvo Mode.

The console mounted control panels may be put into ‘Salvo Mode’ where the panel is able to select one of the defined salvos (group of crosspoint commands. See Sec 13.5). To enter Salvo Mode, press and hold the Select pushbutton for 2 seconds. The display will flash ‘Salvos’ to indicate the change of function. Then the available Salvo Names will be displayed in alphanumeric order by scrolling the shaft encoder. Pressing Select again will display ‘End Salvo’ and exit Salvo Mode. If there are no Salvo events defined the display will show ‘No Salvos’ and return to normal crosspoint mode. If you scroll to the Salvo Name which is desired and press the Take switch, the panel will evaluate the Pass Key and, if it is ‘1’ will execute the Salvo and display ‘Executed’. If the Pass Key is any value other than ‘1’ the panel will prompt ‘Key =xxx’ and you must scroll to the correct Key number and again press the Take switch. If the key is correctly chosen the panel will execute the Salvo and display ‘Executed’. If the key is not chosen correctly the panel will display End Salvo’ and exit Salvo Mode.

15. USI RS-232 User Serial Interface

The USI ports allow external serial control of the SAS 64000 system. The MCU-10 provides two USI ports. The protocol is ASCII based. Each port runs at 9600 baud, 8, n, 1. Pin outs are:

MCU-10 USI Ports J25 DIN frame connector	Port A	Port B
TX	C7	C8
RX	B7	B8
Gnd	A7	A8

15.1 TAKE COMMAND

< CONTROL CHAR > < INPUT > < OUTPUT >

CONTROL CHAR: ^T (ctl-T)
INPUT: Three digit ASCII number between 1 and 256 (001 - 256)
OUTPUT: Three digit ASCII number between 1 and 256 (001 - 256)
EXAMPLE: ^T004001 - TAKE Input 4 to Output 1.

RETURNS: OK(CR / LF) -> If reply's are enabled.
Txxx:yyy(CR / LF) -> If tally is ASCII Style and enabled (ASCII chars).
xx:yy(CR / LF) -> If tally is HEX Style and enabled (ASCII/HEX).
ERROR(CR / LF) -> If out of range request and reply's are enabled.
Nothing -> If no feedback is enabled.

15.1.2 TAKE COMMAND OPTION TWO

< CONTROL CHAR > <ID> < INPUT > < OUTPUT >

CONTROL CHAR: ^DT (ctl-D, T)
ID: 1 (the number 1)
INPUT: Two digit ASCII/HEX number between 00 and FF (001 - 256)
OUTPUT: Two digit ASCII/HEX number between 00 and FF (001 - 256)
EXAMPLE: ^DT10300 - TAKE Input 4 to Output 1.

RETURNS: OK(CR / LF) -> If reply's are enabled.
Txxx:yyy(CR / LF) -> If tally is ASCII Style and enabled (ASCII chars).
xx:yy(CR / LF) -> If tally is Hex Style and enabled (ASCII/HEX).
ERROR(CR / LF) -> If out of range request and reply's are enabled.
Nothing -> If no feedback is enabled.

15.2 INQUIRY COMMAND

< CONTROL CHAR > < OUTPUT >

CONTROL CHAR: ^I (ctl-I)
OUTPUT: Three digit ASCII number between 001 and 256. Or 999 for all outputs.
EXAMPLE: ^I001 - Show the Input assigned to Output 1.

RETURNS: xxx(CR / LF) -> Three digit input assigned to specified output.
xxx xxx ... xxx(CR / LF) -> Inputs assigned to each output in order (001 thru 256).

15.2.2 INQUIRY COMMAND OPTION TWO

< CONTROL CHAR > < OUTPUT >

CONTROL CHAR: ^DI (ctl-D, I)
OUTPUT: Two digit ASCII/HEX number between 00 and FF (001 - 256)
EXAMPLE: ^DI00 - Show the Input assigned to Output 1.

RETURNS: Oyy xx(CR / LF) -> yy = ASCII/HEX Output,
xx = ASCII/HEX Input (00 to FF).

15.3 FEEDBACK COMMAND

<CONTROL CHAR> < REPLY'S > < TALLY > <FORMAT>

CONTROL CHAR: ^F (ctl-F)
REPLY'S: 1 or 0 (1-Enables Reply's 0- Defeats Reply's)
TALLY: 1 or 0 (1-Enables Tally 0- Defeats Tally)
FORMAT: 1 or 0 (1-HEX style tally 0- ASCII style tally)
EXAMPLE: ^F110 - Enable Reply's and Tally and use ASCII style Tally.
RETURNS: OK(CR / LF) -> If reply's are enabled.
ERROR(CR / LF) -> If incorrect entry and reply's are enabled.

15.4 HELP SCREEN

< CONTROL CHAR >

CONTROL CHAR: ^H (ctl-H)

REVISIONS	
DATE	DESCRIPTION

C	B	A
1 INPUT 1 +	1 INPUT 1 –	1 AUDIO GND
2 INPUT 2 +	2 INPUT 2 –	2 AUDIO GND
3 INPUT 3 +	3 INPUT 3 –	3 AUDIO GND
4 INPUT 4 +	4 INPUT 4 –	4 AUDIO GND
5 INPUT 5 +	5 INPUT 5 –	5 AUDIO GND
6 INPUT 6 +	6 INPUT 6 –	6 AUDIO GND
7 INPUT 7 +	7 INPUT 7 –	7 AUDIO GND
8 INPUT 8 +	8 INPUT 8 –	8 AUDIO GND
9 INPUT 9 +	9 INPUT 9 –	9 AUDIO GND
10 INPUT 10 +	10 INPUT 10 –	10 AUDIO GND
11 INPUT 11 +	11 INPUT 11 –	11 AUDIO GND
12 INPUT 12 +	12 INPUT 12 –	12 AUDIO GND
13 INPUT 13 +	13 INPUT 13 –	13 AUDIO GND
14 INPUT 14 +	14 INPUT 14 –	14 AUDIO GND
15 INPUT 15 +	15 INPUT 15 –	15 AUDIO GND
16 INPUT 16 +	16 INPUT 16 –	16 AUDIO GND
17 INPUT 17 +	17 INPUT 17 –	17 AUDIO GND
18 INPUT 18 +	18 INPUT 18 –	18 AUDIO GND
19 INPUT 19 +	19 INPUT 19 –	19 AUDIO GND
20 INPUT 20 +	20 INPUT 20 –	20 AUDIO GND
21 INPUT 21 +	21 INPUT 21 –	21 AUDIO GND
22 INPUT 22 +	22 INPUT 22 –	22 AUDIO GND
23 INPUT 23 +	23 INPUT 23 –	23 AUDIO GND
24 INPUT 24 +	24 INPUT 24 –	24 AUDIO GND
25 INPUT 25 +	25 INPUT 25 –	25 AUDIO GND
26 INPUT 26 +	26 INPUT 26 –	26 AUDIO GND
27 INPUT 27 +	27 INPUT 27 –	27 AUDIO GND
28 INPUT 28 +	28 INPUT 28 –	28 AUDIO GND
29 INPUT 29 +	29 INPUT 29 –	29 AUDIO GND
30 INPUT 30 +	30 INPUT 30 –	30 AUDIO GND
31 INPUT 31 +	31 INPUT 31 –	31 AUDIO GND
32 INPUT 32 +	32 INPUT 32 –	32 AUDIO GND

USER AUDIO INPUTS

NOTE: Connector B services Inputs 33 to 64

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS ± 1/64 DECIMALS .XX =±0.015 .XXX=±0.005 ANGLES ± 2°	
DRAWN	TJH
CHECKED	
APPROVED	
DATE	10/04/95

Sierra Automated Systems

SAS 64000 ROUTING SWITCHER
SIA–64 CONNECTOR A WIRING

SHEET 1 OF 2 | A | SIA96W1M

REVISIONS	
DATE	DESCRIPTION

	C	B	A	
1	OUT 1 +	OUT 1 −	AUDIO GND	USER AUDIO OUTPUTS
2	OUT 2 +	OUT 2 −	AUDIO GND	
3	OUT 3 +	OUT 3 −	AUDIO GND	
4	OUT 4 +	OUT 4 −	AUDIO GND	
5	OUT 5 +	OUT 5 −	AUDIO GND	
6	OUT 6 +	OUT 6 −	AUDIO GND	
7	OUT 7 +	OUT 7 −	AUDIO GND	
8	OUT 8 +	OUT 8 −	AUDIO GND	
9	OUT 9 +	OUT 9 −	AUDIO GND	
10	OUT 10 +	OUT 10 −	AUDIO GND	
11	OUT 11 +	OUT 11 −	AUDIO GND	
12	OUT 12 +	OUT 12 −	AUDIO GND	
13	OUT 13 +	OUT 13 −	AUDIO GND	
14	OUT 14 +	OUT 14 −	AUDIO GND	
15	OUT 15 +	OUT 15 −	AUDIO GND	
16	OUT 16 +	OUT 16 −	AUDIO GND	
17	ADDRESS 2	ADDRESS 1	ADDRESS 0	INTERNAL
18	ADDRESS 5	ADDRESS 4	ADDRESS 3	
19	DIGITAL GND	ADDRESS 7	ADDRESS 6	
20	DIG OUT 2	DIG OUT 1	DIG OUT 0	
21	DIG OUT 5	DIG OUT 4	DIG OUT 3	
22	DIGITAL GND	DIG OUT 7	DIG OUT 6	
23	A+ (OUT 1,2)	A− (OUT 1,2)	DIGITAL GND	PANEL RS−422 SERIAL DATA CONNECTIONS
24	B+ (OUT 3,4)	B− (OUT 3,4)	DIGITAL GND	
25	C+ (OUT 5,6)	C− (OUT 5,6)	DIGITAL GND	
26	D+ (OUT 7,8)	D− (OUT 7,8)	DIGITAL GND	
27	E+ (OUT 9,10)	E− (OUT 9,10)	DIGITAL GND	
28	F+ (OUT 11,12)	F− (OUT 11,12)	DIGITAL GND	
29	G+ (OUT 13,14)	G− (OUT 13,14)	DIGITAL GND	
30	H+ (OUT 15,16)	H− (OUT 15,16)	DIGITAL GND	
31	FRM 1 422+	FRM 1 422−	DIGITAL GND	INTERN
32	FRM 2 422+	FRM 2 422−	DIGITAL GND	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONS ± 1/64 DECIMALS .XX =±0.015 .XXX=±0.005 ANGLES ± 2°

DRAWN	TJH
CHECKED	
APPROVED	
DATE	05/28/96

SAS Sierra Automated Systems

SAS 64000 ROUTING SWITCHER
SXT−256 CONNECTOR WIRING

SHEET 1 OF 1 | A | SXT96W1M

REVISIONS	
DATE	DESCRIPTION

	C	B	A
1	RS485+ XY BUS1	RS485− XY BUS1	DIGITAL GND
2	RS485+ XY BUS1	RS485− XY BUS1	DIGITAL GND
3	RS485+ XY BUS2	RS485− XY BUS2	DIGITAL GND
4	RS485+ XY BUS2	RS485− XY BUS2	DIGITAL GND
5	RS485+ XY BUS6	RS485− XY BUS6	DIGITAL GND
6	RS485+ XY BUS6	RS485− XY BUS6	DIGITAL GND
7	RS232 TX AUTO1	RS232 RX AUTO1	DIGITAL GND
8	RS232 TX AUTO2	RS232 RX AUTO2	DIGITAL GND
9	RS232 TX CMPTR	RS232 RX CMPTR	DIGITAL GND
10	RS232 TX CMPTR	RS232 RX CMPTR	DIGITAL GND
11	RS485+ XY BUS3	RS485− XY BUS3	DIGITAL GND
12	RS485+ XY BUS3	RS485− XY BUS3	DIGITAL GND
13	RS485+ XY BUS4	RS485− XY BUS4	DIGITAL GND
14	RS485+ XY BUS4	RS485− XY BUS4	DIGITAL GND
15	RS485+ XY BUS5	RS485− XY BUS5	DIGITAL GND
16	RS485+ XY BUS5	RS485− XY BUS5	DIGITAL GND
17	UNUSED	UNUSED	DIGITAL GND
18	UNUSED	DIGITAL OUT 1	DIGITAL GND
19	DIGITAL INPUT 1	DIGITAL OUT 2	DIGITAL INPUT 2
20	DIGITAL GND	DITITAL OUT 3	DIGITAL GND
21	DIGITAL INPUT 3	DIGITAL OUT 4	DIGITAL INPUT 4
22	DIGITAL GND	DIGITAL OUT 5	DIGITAL GND
23	DIGITAL INPUT 5	DIGITAL OUT 6	DIGITAL INPUT 6
24	DIGITAL GND	DIGITAL OUT 7	DIGITAL GND
25	DIGITAL INPUT 7	DIGITAL OUT 8	DIGITAL INPUT 8
26	DIGITAL GND	RAM CLEAR PIN	DIGITAL GND
27	UNUSED	UNUSED	DIGITAL GND
28	RS485+ SXT BUS	RS485− SXT BUS	DIGITAL GND
29	UNUSED	UNUSED	UNUSED
30	UNUSED	UNUSED	UNUSED
31	UNUSED	UNUSED	UNUSED
32	+8VDC INTERNAL	DIGITAL GND	DIGITAL GND

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONS ± 1/64 DECIMALS .XX =±0.015 .XXX=±0.005 ANGLES ± 2°

DRAWN	TJH
CHECKED	
APPROVED	
DATE	12/23/96

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SAS 64000 ROUTING SWITCHER
MCU−10 CONNECTOR WIRING

SHEET 1 OF 1 | A | MCU10EC

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