



# Serial Changeover Unit

## Technical Reference Sheet

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**Serial Changeover Unit**  
Technical Reference Sheet

TRS-1001-04  
Aveco  
[www.aveco.com](http://www.aveco.com)

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## Table of Contents

Introduction .....	1
Overview .....	1
Description .....	1
Package Contents .....	3
Operation .....	4
Control .....	4
Status Indicators .....	4
Startup .....	4
Technical Specifications .....	5
Control Unit Specifications .....	5
RS Unit Specifications .....	7
Cabling .....	8
Cabling Between ASTRA Devices .....	8
Cables to Controlled Devices .....	9
Assembly .....	10

## List of Figures

1. Serial Changeover Control Unit .....	1
2. Serial Changeover RS Unit .....	1
3. Configuration of 3 RS Units - Front Panels .....	2
4. Control Unit - Back Panel .....	2
5. Schematic of Control Unit - Back Panel .....	5
6. Pinout of GPI Connectors - GPI 1 / GPI 2 .....	6
7. Schematic of GPI output and input .....	6
8. Schematic of RS Unit - Front Panel .....	7
9. Pinout of RS422 Ports - A1-C15 .....	7
10. Schematic of Cabling with 47x RS422 Serial Ports .....	10
11. Schematic of Rack Placement of 47x Serial Port Version .....	11
12. Schematic of Cabling with 31x RS422 Serial Ports .....	12
13. Schematic of Rack Placement of 31x Serial Port Version .....	13

## INTRODUCTION

### OVERVIEW

While control of devices in the media industry is clearly moving towards TCP/IP-based protocols and APIs, the serial ports still have a strong presence and remain relevant.

The powerful redundancy concepts of Aveco automation systems have resolved the TCP/IP connectivity as well as serial ports and GPI, and the Serial Changeover Unit (SOU) plays a key role here.

*Figure 1. Serial Changeover Control Unit*



*Figure 2. Serial Changeover RS Unit*



### DESCRIPTION

For maximum redundancy, ASTRA servers used for master control or news playout can be mirrored. Mirrored servers operate in an active-active mode and both the main and backup servers operate as if they were the main on-line server controlling all of the devices in the broadcast chain.

When transferring control from the main ASTRA server to a backup, or vice versa, all the serial lines and GPI contacts have to be re-connected from one ASTRA server to another.

The SOU's role is to seamlessly switch these lines.

Thanks to the SOU, and thanks to the proper design of ASTRA software modules, switching from one automation server to another is seamless, happens within a single frame, and does not affect the on-air presence of the automation.

Reasons for switchovers:

- Maintenance – If a server needs to go off-line for periodic maintenance or upgrades, the operator can initiate the switchover event that will be seamless with no on-air interruption.
- Hardware Failure of automation server - when the main server fails, the backup initiates the switch and continues in automation control.

There is a possibility to connect multiple Control Units to a chain for complex operations.

The Serial Changeover Unit is modular and it consists of two main components: The Control Unit and either one, two or three RS Units.

**i** The Serial Changeover Unit can be used with ASTRA Server 4U and/or ASTRA Server 3U. As ASTRA Server 1U uses the TCP/IP interface instead of RS422 serial ports, it is incompatible with the Serial Changeover Unit.

Assembly of the Serial Changeover Unit:

Unit	Qty	Control Ports for Devices
Control Unit	1	15x GPI out 8x GPI in
RS Unit	1, 2, or 3	Each RS Unit has 16x RS422 serial ports

Figure 3. Configuration of 3 RS Units - Front Panels

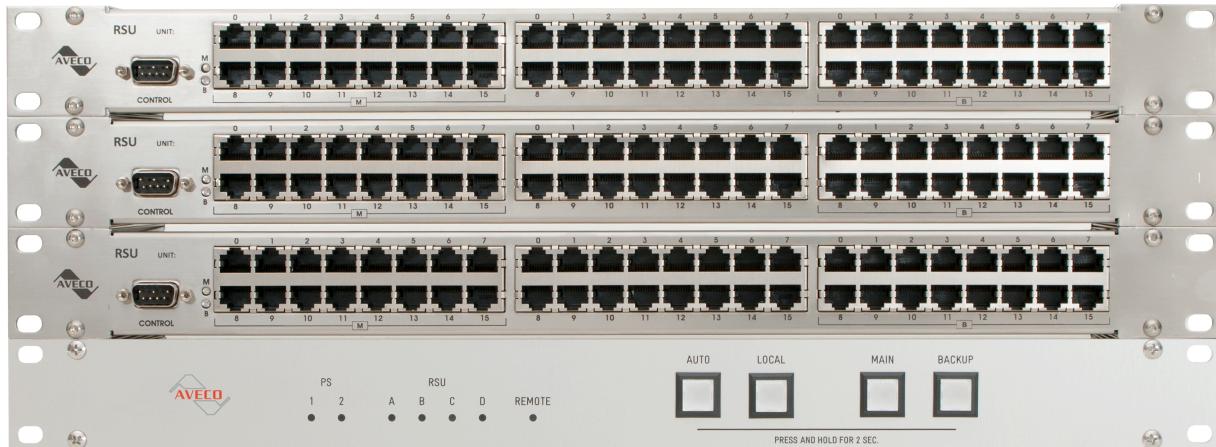


Figure 4. Control Unit - Back Panel



## PACKAGE CONTENTS

When delivering the SOU, Aveco will include one Control Unit and either one, two or three RS units and the necessary cables to interconnect the ASTRA servers and the SOU. The list of included cables is shown below:

Qty	Content
1	Control Unit
2	Power cable, 1m
2	GPI1 cable, 1m
2	GPI2 cable, 1m
2	RS422 cable, 1m
1, 2 or 3	RS Unit
1 for each RS Unit	Control cable
30 for each RS Unit	RS422 cable, 1m

## OPERATION

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The SOU has two modes of operation:

- **MAIN mode:** all serial and GPI control lines are connected to the main automation server.
- **BACKUP mode:** all serial and GPI control lines are connected to the backup automation server.

The front panel of the SOU also has two modes of operation:

- **AUTO mode:** the SOU is controlled by the automation, the MAIN/BACKUP manual controls on the front panel are inactive.
- **LOCAL mode:** the MAIN/BACKUP manual controls are active, the automation cannot control the SOU.

## CONTROL

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The Control Unit provides the following controls on its front panel:

- **AUTO button:** when held for 2 seconds, it switches to AUTO mode.
- **LOCAL button:** when held for 2 seconds, it switches to LOCAL mode.
- **MAIN button:** when held for 2 seconds in LOCAL mode, it turns on the MAIN.
- **BACKUP button:** when held for 2 seconds in LOCAL mode, it turns on the BACKUP.

## STATUS INDICATORS

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The Control Unit provides the following indicators on its front panel:

- **AUTO:** button is illuminated blue if the SOU is in AUTO mode.
- **LOCAL:** button is illuminated red if the SOU is in LOCAL mode.
- **MAIN:** button is illuminated blue when the SOU is in MAIN mode.
- **BACKUP:** button is illuminated red when SOU is in BACKUP mode.
- **PS lights 1 and 2:** when ON, power is available on the respective lead.
- **RSU lights 1 through 4:** when ON, the respective RS Unit is connected and operational.
- **Remote light:** when ON, the indicator shows that a custom remote control panel is connected.

The RS Unit provides two indicators on its front as well as rear panels:

- **M light:** when ON, the SOU is in MAIN mode.
- **B light:** when ON, the SOU is in BACKUP mode.

## STARTUP

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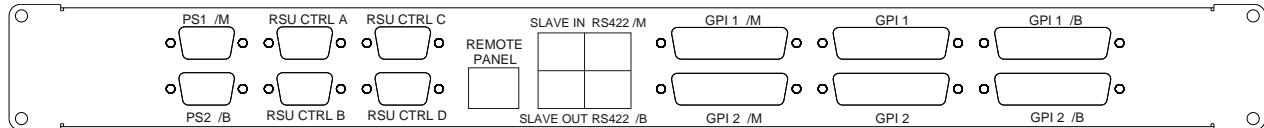
When powered up, the SOU does a self-test by turning all status indicators ON, and then starts operating in AUTO/MAIN mode.

## TECHNICAL SPECIFICATIONS

### CONTROL UNIT SPECIFICATIONS

The Control Unit is responsible for controlling the switching of serial lines, and includes the switches for GPI inputs and outputs.

*Figure 5. Schematic of Control Unit - Back Panel*



Connectivity	
Automation Control	2 serial ports RS422 for communication with the ASTRA automation servers main and backup
RS Units	up to 3 RS units can be connected to a single Control Unit
Power	supplied by the main and backup automation servers
GPI inputs	8 GPI inputs
GPI outputs	15 GPI outputs (relay closing contacts)

**⚠️ WARNING:** Connections to the Astra server are not designed to be hot-swappable and disconnecting any cables while the system is powered on may lead to On Air problems and/or may cause the system to go Off Air.

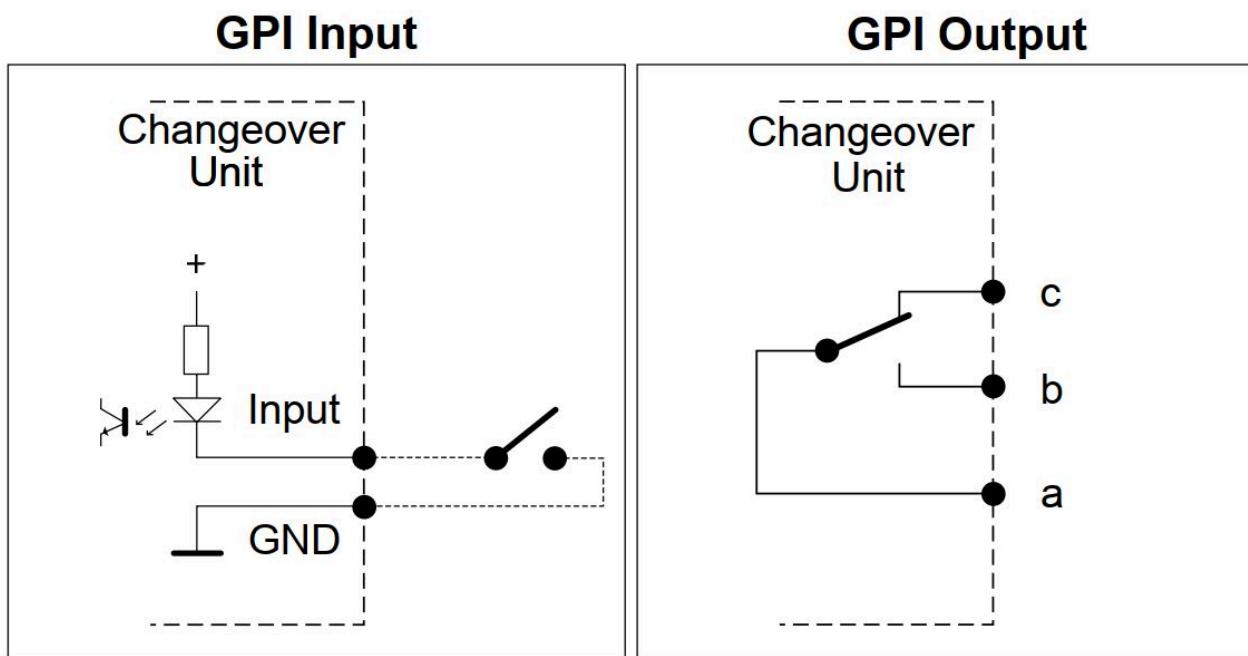
Physical	
Dimensions	1U (483mm x 45mm), depth 105mm
Weight	1.5kg

Power	
Power Supply	supplied by the main and backup automation servers
Voltage	redundant, 2x 12V
Power Consumption	in MAIN mode: max. 1W in BACK mode: max. 15W (These maximum values apply for package of 1x Control Unit and 3x RS Units)

Figure 6. Pinout of GPI Connectors - GPI 1 / GPI 2

<b>Connector GPI 1</b> D-SUB 25 pin female <b>GPI OUT, GPI IN</b>		<b>Connector GPI 2</b> D-SUB 25 pin female <b>GPI OUT, GPI IN</b>	
1	GPI OUT 1 a	14	GPI OUT 5 a
2	GPI OUT 1 b	15	GPI OUT 5 b
3	GPI OUT 2 a	16	GPI OUT 6 a
4	GPI OUT 2 b	17	GPI OUT 6 b
5	GPI OUT 3 a	18	GPI OUT 7 a
6	GPI OUT 3 b	19	GPI OUT 7 b
7	reserved	20	GPI OUT 8 a
8	reserved	21	GPI OUT 8 b
9	GPI IN 1	22	nc
10	GPI IN 2	23	nc
11	GPI IN 3	24	ground
12	GPI IN 4	25	ground
13	nc		
		13	nc

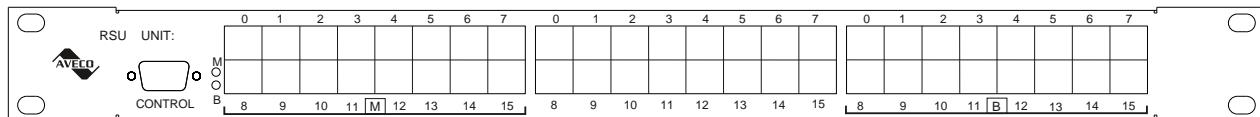
Figure 7. Schematic of GPI output and input



## RS UNIT SPECIFICATIONS

The RS Unit is a passive switch of the serial lines RS422.

*Figure 8. Schematic of RS Unit - Front Panel*



Connectivity	
Serial Ports	16x RS422
Connector Interface	RJ45

Physical	
Dimensions	1U (483mm x 45mm), depth 105mm
Weight	1.6kg

Power	
Power Supply	Powered by the Control Unit
Power Consumption	Included in the Control Unit consumption specified above

*Figure 9. Pinout of RS422 Ports - A1-C15*

Connectors A1-A15, B0-B15, C0-C15	
RJ45 8 pin female	
RS422	
1	nc
2	frame ground
3	Tx A(-)
4	Rx B(+)
5	Rx A(-)
6	Tx B(+)
7	nc
8	signal ground

## CABLING

### CABLING BETWEEN ASTRA DEVICES

The following tables define how to use the cables included in the package.

#### **Control Unit:**

Qty	Content	ID1	Connector type	Device	ID2	Connector type
1	Power cable, 1m	PS1/M	DB2W2CF	Control Unit	PS-OUT/M	DB2W2CM
1	Power cable, 1m	PS2/B	DB2W2CF	Control Unit	PS-OUT/B	DB2W2CM
1	GPI1 cable, 1m	GPI1/M	DB25M	Control Unit	GPI1.1/M GPI1.2/M	DB25M DB9M
1	GPI1 cable, 1m	GPI1/B	DB25M	Control Unit	GPI1.1/B GPI1.2/B	DB25M DB9M
1	GPI2 cable, 1m	GPI2/M	DB25M	Control Unit	GPI2/M	DB25M
1	GPI2 cable, 1m	GPI2/B	DB25M	Control Unit	GPI2/B	DB25M
1	RS422 cable, 1m	RS422/M	RJ45	Control Unit	A0/M	RJ45
1	RS422 cable, 1m	RS422/B	RJ45	Control Unit	A0/B	RJ45

#### **RS Unit A:**

Qty	Content	ID1	Connector type	Device	ID2	Connector type
1	Control cable	Control A	DB9F	RS Unit A	CTRL A	DB9M
15	RS422 cable, 1m	A1/M to A15/MRJ45	RJ45	RS Unit A	A1/M to A15/M	RJ45
15	RS422 cable, 1m	A1/B to A15/BRJ45	RJ45	RS Unit A	A1/B to A15/B	RJ45

#### **RS Unit B:**

Qty	Content	ID1	Connector type	Device	ID2	Connector type
1	Control cable	Control B	DB9F	RS Unit B	CTRL B	DB9M
16	RS422 cable, 1m	B0/M to B15/M	RJ45	RS Unit B	B0/M to B15/M	RJ45
16	RS422 cable, 1m	B0/B to B15/B	RJ45	RS Unit B	B0/B to B15/B	RJ45

#### **RS Unit C:**

Qty	Content	ID1	Connector type	Device	ID2	Connector type
1	Control cable	Control C	DB9F	RS Unit C	CTRL C	DB9M
16	RS422 cable, 1m	C0/M to C15/M	RJ45	RS Unit C	C0/M to C15/M	RJ45
16	RS422 cable, 1m	C0/B to C15/B	RJ45	RS Unit C	C0/B to C15/B	RJ45

## CABLES TO CONTROLLED DEVICES

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Cables to connect the SOU to devices to be controlled are not provided with the SOU and are to be supplied by the system integrator or the end customer.

When supplying cables to connected devices, refer to the pinout of the GPI connectors, the schematic of GPI input and GPI output, and the pinout of the RS422 connectors.

## ASSEMBLY

*Figure 10. Schematic of Cabling with 47x RS422 Serial Ports*

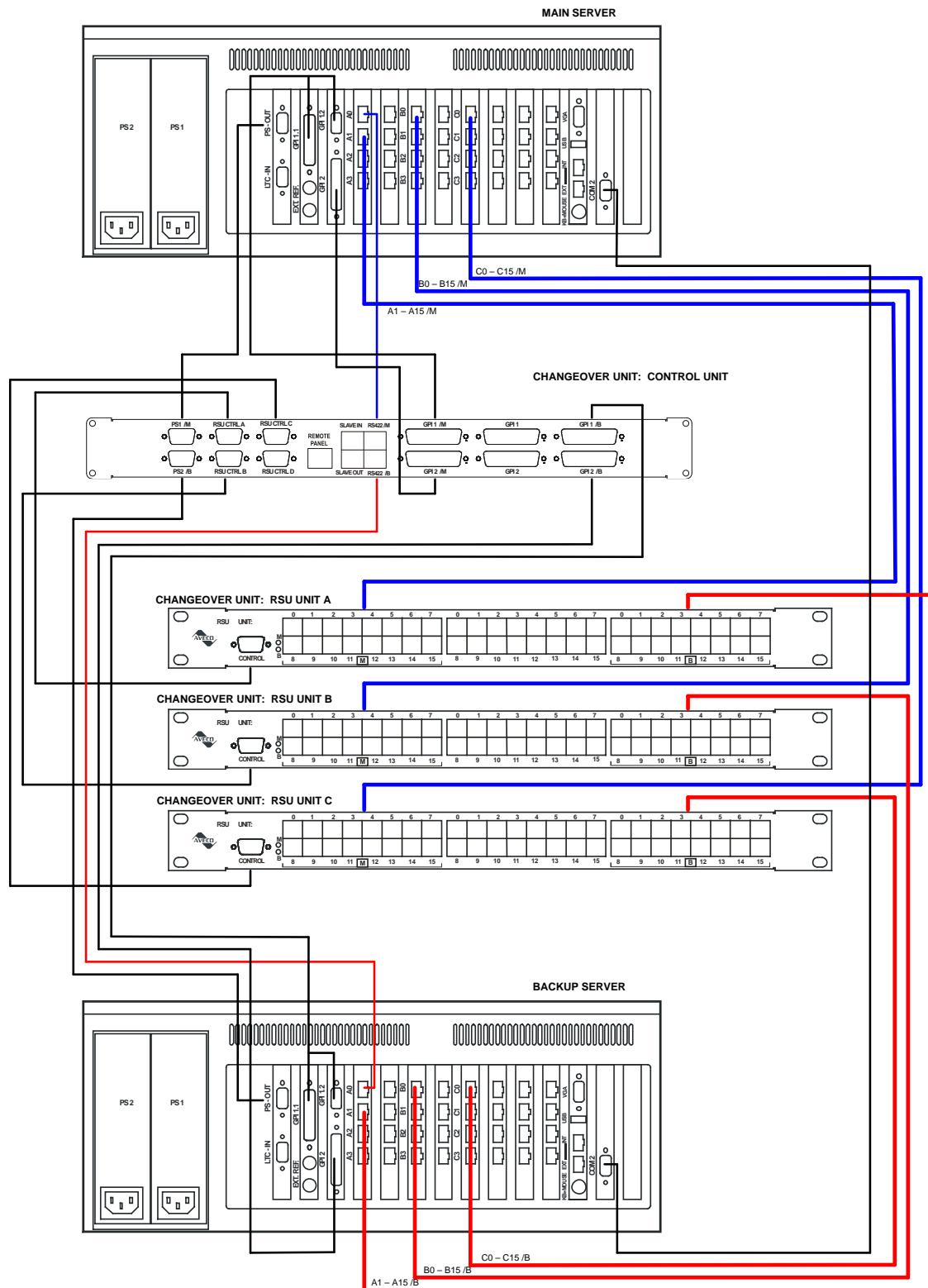


Figure 11. Schematic of Rack Placement of 47x Serial Port Version

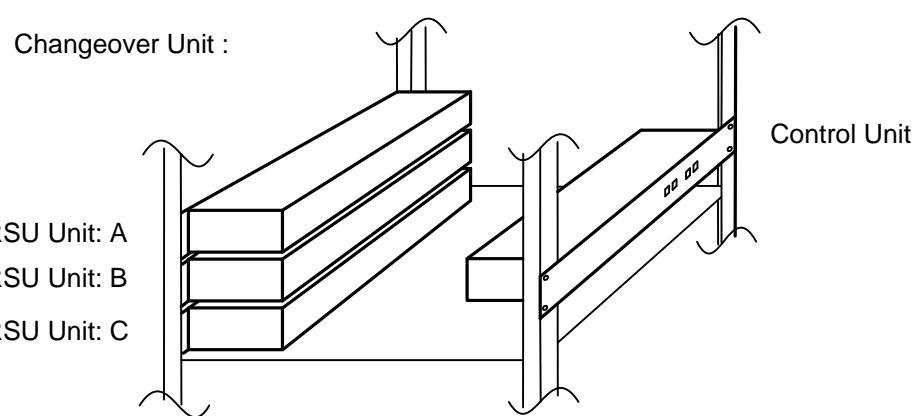
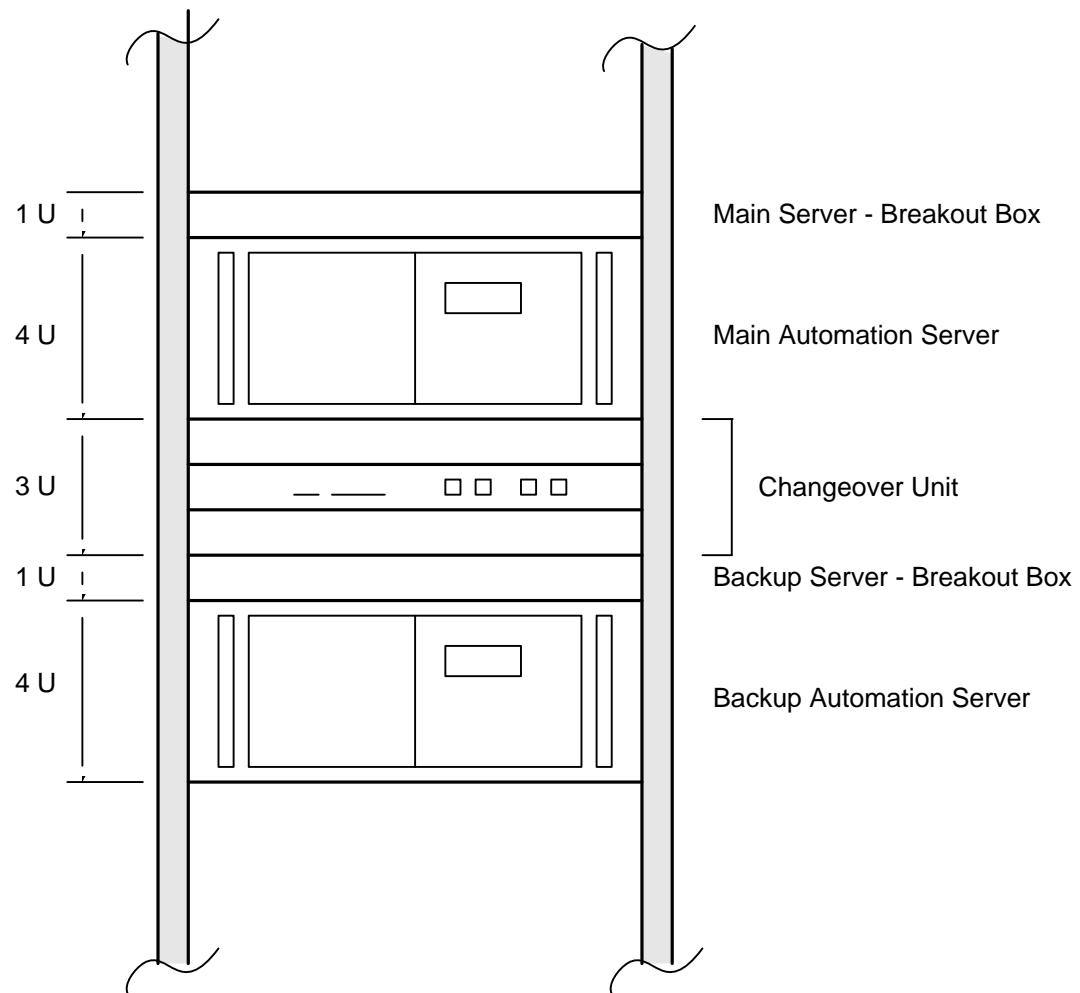


Figure 12. Schematic of Cabling with 31x RS422 Serial Ports

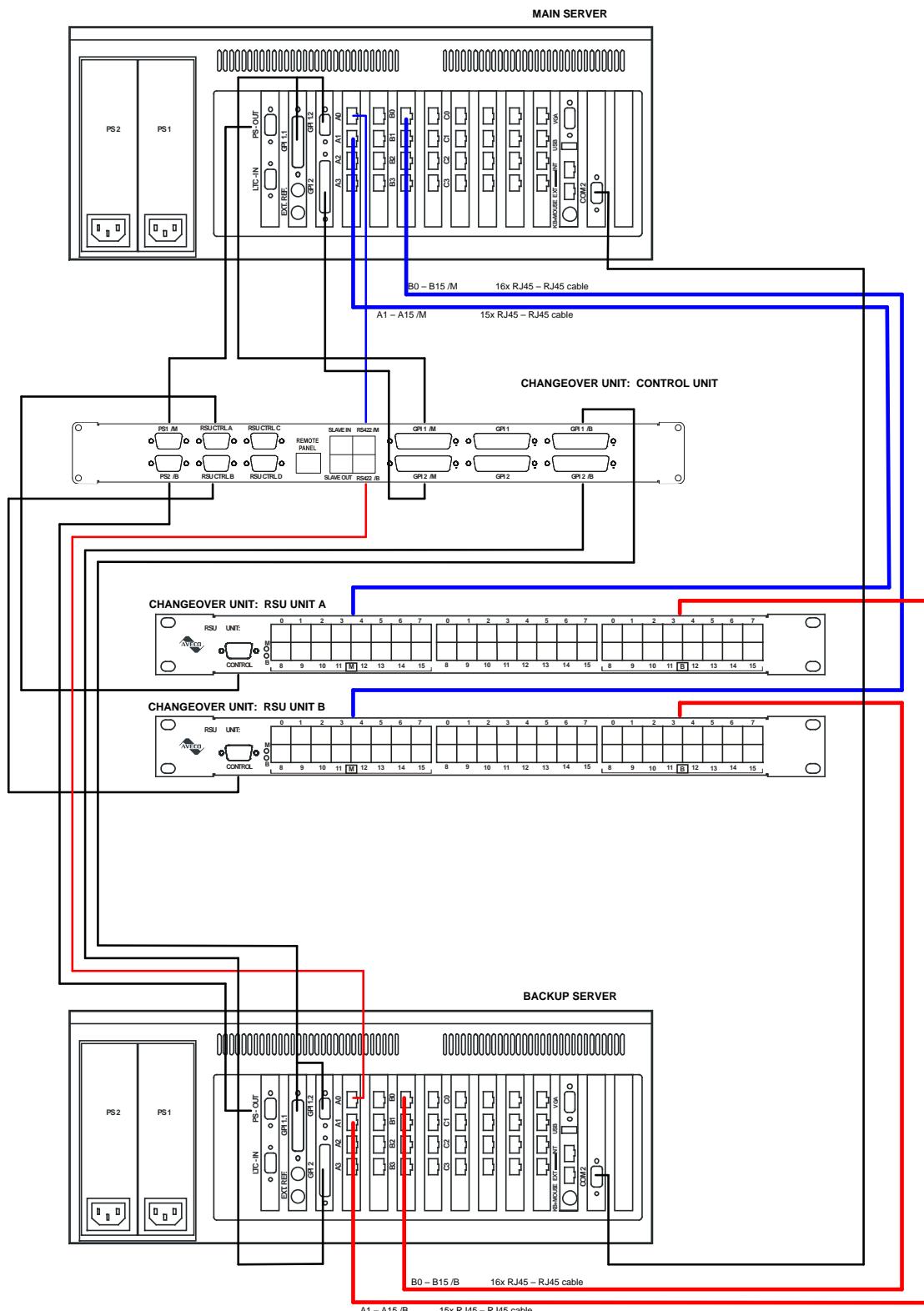


Figure 13. Schematic of Rack Placement of 31x Serial Port Version

