

LINE DRIVER, MULTI-DROP, 128K BPS

**1084**

(CTS LD-128K)

INSTALLATION AND OPERATIONS MANUAL

September 7, 1995



An ISO-9001  
Certified Company

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## EMISSION REQUIREMENTS

### FCC CLASS A

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### CANADIAN EMISSIONS

This digital apparatus does not exceed the Class A limits for noise emissions from a digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la Class A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

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## CHAPTER 1 - OPERATION

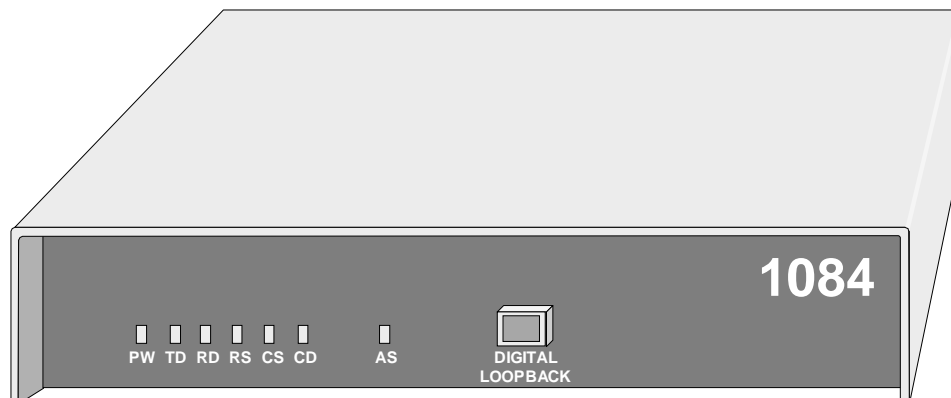
The 1084 (CTS LD-128K) is an RS-232 Line Driver. This device is a cost effective solution for interconnection of Synchronous or Asynchronous, Point to Point, or up to 32 Multi-Point, terminal devices. (Distances of up to 4000 feet, at 128Kbps may be achieved, using 24ga. wire.)

### Front Panel

The power indicator, marked PW on the front panel is green and indicates when AC voltage is applied to the unit. The two adjacent green LED indicators illuminate in conjunction with Send Data (SD) and Receive Data (RD). Request to Send (RS), Clear to Send (CS), Carrier Detect (CD) and Anti-Stream (AS) status LED's are also provided to give a clear visual indication of the 1084's (CTS LD-128K) operational status. The Digital Loop Back switch provides a convenient means to verify operation of the data communication circuit. When the button is not depressed (BLACK), the 1084 (CTS LD-128K) operates normally, providing communication from end to end. When in (YELLOW), the 1084 (CTS LD-128K) provides bilateral looping to facilitate testing of the line driver and communication circuit from either end.

### Point to Point / Multi-Point Operation

The 1084 (CTS LD-128K) utilizes RS-485 tristate drivers and receivers. Both Switched Carrier and Constant Carrier operation are possible. When Switched Carrier is selected, up to 32, 1084 devices may be connected together to form a Multi-Drop network. Distance from the master 1084 to the last 1084 in the network are dependent on data rate selected and the gauge of wire used to connect the units. The higher the data rate and thinner the gauge of wire used, the shorter the communication distance possible. During Constant Carrier operation, the 1084's are connected in a point to point configuration. As with Multi-point operation, the higher the data rate and thinner the gauge of wire used, the shorter the communication distance possible. The 1084 can also be used point to point in the switched carrier mode.



## “Switch on Data” Mode

To allow terminals that do not respond to **RS** and **CS** control leads to operate in a Multi-Point or Point to Point network, the “Switch on Data” mode has been provided. When a terminal sends data transitions, the 1084 (CTS LD-128K) will bring up its carrier and start to transmit. When the data transitions stop for a period greater than the selected “No Data Time-out” the carrier will drop and the 1084 (CTS LD-128K) will return to an idle state. **CS** is constant when in “Switch on Data” Mode.

## Clocking

Rates up to 128Kbps are internally generated by the 1084 (CTS LD-128K) for Transmit clocking. Clocking may also be taken from an external device on the External Transmit Clock Lead, pin 24, to facilitate tail circuit applications. To ensure synchronization of clock through a system, Receive clock may also be utilized as the Transmit clocking source (slave clocking).

## Four Wire / Two Wire Operation

Half duplex 2 wire operation as well as 4 wire full duplex operation is selectable via configuration switches.

## Testing Modes

Local digital loop-back is easily selected via a front panel mounted switch. A positive visual indication is provided when the 1084 (CTS LD-128K) is in loop-back mode. The data line is looped bilaterally to allow both the local terminal and the remote terminal to be tested when in 4 wire mode.

## CTS Delays

CTS can be configured to respond to RTS regardless of the state of the transmitter. RTS to CTS delays can be set to constant, 0mS, 8mS or 50mS.

## Anti-Streaming

When a terminal in a Multi-drop network fails, with the **RS** signal lead active, the attached LD-128K will remain transmitting. This “Streaming” terminal will cause the entire network to fail. To prevent this type of failure, the 1084 (CTS LD-128K) provides Anti-Streaming protection. When Anti-Streaming is enabled, the control logic will turn off the 1084's (CTS LD-128K) transmitter after seeing an **RS** signal for the selected period of time. The transmitter will not turn on again until the **RS** signal is released by the terminal.

**Caution, Disconnect the POWER Before Removing The Cover.  
Vorsicht, Befor Deckung Abnehmen Mach Strom Zu.**

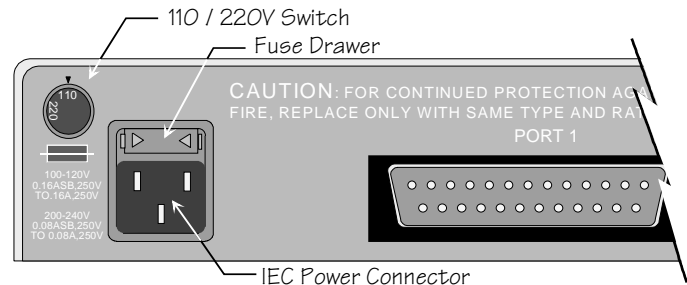
## CHAPTER 2 - SETUP AND INSTALLATION

### Power Connection

Before connecting the 1084 (CTS LD-128K) to a AC power source the top cover must be installed and secured with the supplied #4-32 screws. The unit is supplied with a 110/220V voltage switch, turn the switch with a coin or screw driver to the appropriate voltage for your

country. If the unit is set to 110V insure that the fuses are 0.16A Slow Blow (Little Fuse 218.160). For 220V operation use 0.08A (Little Fuse 218.080) Slow Blow fuses.

EXAMPLE: United States of America; set to 110V. The unit is supplied with a IEC power connector next to the voltage select switch, plug the power cord into the connector until it is firmly seated. You may now connect the power cord into your AC outlet.



### Factory Configuration Switch Settings

The 1084 (CTS LD-128K) is configured prior to shipment with the switches set to the following default positions:

**Switch 1** - 2 and 5 to **OFF**, 1, 3, 4 and 6 to **ON**

Baud rate 64K  
CS Delay 0 mS

**Switch 2** - 1, 2 and 6 **OFF**, 3, 4 and 5 to **ON**

Switch on RS  
Full Duplex  
Anti-Stream Disabled  
Signal Ground not connected to Chassis Ground

**Switch 4** - 1, 3, 5 and 6 to **OFF**, 2 and 4 to **ON**

Constant Carrier  
TX Clock From Internal  
Sync Operation  
Receiver Termination OUT

**Jumpers** - J1, J2 & J3 **IN**, J4 & J5 **OUT**

Factory test jumpers J1-J3 Must be in for proper operation.  
4 Wire Operation

If the system application requires one or more of the default settings to be changed, it will be necessary to remove the top cover of the enclosure to access and change the DIP switches located on the printed circuit board.

## Disassembly

**UNPLUG THE POWER CORD BEFORE PROCEEDING** then remove the top cover by unscrewing the phillips head screws located on the left and right sides of the unit. The configuration switches and jumpers are located on the Printed Circuit Board (PCB) as indicated on the appropriate strapping guide in the Appendix of this manual. After the switch selection activity is completed, **REINSTALL THE TOP COVER BEFORE CONNECTING TO AN AC POWER SOURCE.**

## Installation

Select an appropriate location, accessible to and within six feet of an AC power outlet. Use a "Straight Through", shielded cable, between the attached terminal device and the 1084 (CTS LD-128K) (*The 1084 has a female DB-25 Connector*). Connect the RS-232 terminal device to the connector marked **J4**. The 1084's (CTS LD-128K) are connected using a standard, crossed, RJ45 telephone cable. Plug the cable into connector **J2** or **J3**, which are in parallel with each other, to allow connection of multiple 1084's (CTS LD-128K) for Multi-Point operation. Standard Telephone cords can be used provided the wire pairs are reversed.

***Caution: Never connect the RJ-45 Line connectors to the Public Switched Telephone Network!***

## Equipment Grounding (SW2-6)

**SW2** Position **6** provides for grounding interconnection in those systems requiring a connection between (Frame Ground) and (Signal Ground). *Set to **ON**, ONLY if required.*

## Point to Point / Multi-Drop Connectors J2 & J3

J2 and J3 are parallel RJ-45 connectors. Pin 1 on J2 is connected to pin 1 on J3, pin 2 on J2 is connected to pin 2 on J3 and likewise for the remainder of the pins. This allows two 1084 (CTS LD-128K) to be connected by simply installing a standard crossed telephone cable between the units. When adding additional units for a Multi-Drop application, chain the J2 or J3 from one unit to another, using a standard straight through telephone cable. It is not important which connector is used, as J2 and J3 are electrically equivalent to each other. All of the Slave 1084 (CTS LD-128K) receivers (pins 7&8), must be tied together and connected to the transmitter of the Master 1084 (CTS LD-128K) and all of the Slave LD-128K transmitters (pins 1&2), must be tied together and connected to the receiver of the Master 1084 (CTS LD-128K). (see Appendix)



## Full / Half Duplex Selection (SW2-2)

**SW2** position **2** selects Full or Half Duplex Line Driver operation. When **SW2-2** is **OFF** the 1084 (CTS LD-128K) will operate in Full Duplex mode. When **SW2-2** is **ON** the 1084 (CTS LD-128K) will operate in Half Duplex mode.

## Two Wire / Four Wire (JP4 & JP5)

Half Duplex, 2 Wire Operation, install Jumpers **JP4** and **JP5**. This will connect the input pins to the output pins, 2 to 7 and 1 to 8. To operate in 4 Wire mode, remove the jumpers. (see Appendix)

## Baud Rate Selection (SW1-1,2,3,4)

Baud rates are selected via **SW1** positions **1** through **4**. The following Table outlines the available speeds and corresponding switch setting. The selected baud rate will take effect immediately upon moving the switch. It is not necessary to power cycle the 1084 (CTS LD-128K) for any switch selection to go into effect.

SW1-1	SW1-2	SW1-3	SW1-4	Rate
ON	ON	ON	ON	128K
OFF	ON	ON	ON	72K
ON	OFF	ON	ON	64K
OFF	OFF	ON	ON	56K
ON	ON	OFF	ON	48K
OFF	ON	OFF	ON	38.4K
ON	OFF	OFF	ON	28.8K
OFF	OFF	OFF	ON	19.2K
ON	ON	ON	OFF	14.4K
OFF	ON	ON	OFF	9.6K
ON	OFF	ON	OFF	7.2K
OFF	OFF	ON	OFF	4.8K
ON	ON	OFF	OFF	3.6K
OFF	ON	OFF	OFF	2.4K
ON	OFF	OFF	OFF	1.8K
OFF	OFF	OFF	OFF	1.2K

**“Switch on RS” or “Switch on Data” Mode (SW2-1)**

**SW2** position **1** determines the action required to turn the carrier on and off. When **SW2-1** is **OFF**, carrier is turned on whenever the RS (pin4) interface lead is active. Carrier is removed whenever the RS interface lead is inactive. Setting **SW2-1** to **ON** will select “Switch On Data” mode. Whenever data transitions are present on the TD (pin2) interface lead, the carrier will be activated.

*CTS Delay Selection When “Switch on RS” is Enabled (SW1-5,6)*

**SW1-5** and **6** determine the RS to CS (pin5) delay when **SW2-1** is **OFF**.

SW1-5	SW1-6	CS Operation
ON	ON	Constant
OFF	ON	Delayed 0 mS
ON	OFF	Delayed 8 mS
OFF	OFF	Delayed 50 mS

**Carrier Control (SW4-1)**

**SW4** position **1** determines Constant Carrier or Switched Carrier operation. Set **SW4-1** to **OFF** if “Point to Point” continuous full duplex operation is desired. Set **SW4-1** to **ON** if “Multipoint” or Half Duplex Operation is desired.

**Receiver Termination (SW4-5)**

Termination of the Master 1084 (CTS LD-128K) and the farthest 1084 (CTS LD-128K) in a “Multipoint” network is provided by setting **SW4-5** to **ON**. Only the farthest 1084 (CTS LD-128K) of the multiple slave 1084’s (CTS LD-128K) in the network should have the termination Enabled. In “Point to Point” applications, termination should be Enabled on both 1084’s (CTS LD-128K).

**Transmit Clock Source (SW4-2,3)**

**SW4** positions **2** and **3** determine the source of the transmit clock. The following table outlines the available options.

SW4-2	SW4-3	TX Clock Source
X	ON	Slave From RXC
ON	OFF	Internal
OFF	OFF	External (pin24)

### Sync or Async Operation (SW4-4)

**SW4** position **4** configures the 1084 (CTS LD-128K) for Synchronous or Asynchronous operation. Set **SW5-4** to **ON** if Synchronous operation is required and **OFF** if Asynchronous operation is required.

### Anti-Streaming (SW2-3,4,5)

Anti-Streaming protection is provided via SW2 position 3 through 5. SW2-3, 4, and 5 **ON** will Disable Anti-Streaming. When Anti-Streaming is enabled, SW2-3, 4 and 5 determine the number of bits of continuous data (*Switch on Data* mode) or RS (*Switch on RS* mode) that indicates the terminal connected to the 1084 (CTS LD-128K) is in a streaming condition. The following table gives the selections available for streaming cutoff.

SW2-3	SW2-4	SW2-5	Anti-Stream Timer
ON	ON	ON	Disabled
OFF	ON	ON	1024
ON	OFF	ON	2048
OFF	OFF	ON	4096
ON	ON	OFF	16K
OFF	ON	OFF	64K
ON	OFF	OFF	256K
OFF	OFF	OFF	1M

### Factory Straps (JP1,JP2,JP3)

JP1, JP2 and JP3 are used for testing the 1084 (CTS LD-128K) during production. These jumpers must be installed for the unit to function properly.

## APPENDIX

### TECHNICAL SPECIFICATIONS

#### Application

Full or Half Duplex, Sync or Async. Point to Point or Multi-Point

#### Data Format

Data is Transparent

#### Data Rates

1.2Kbps to 128Kbps

#### Driving Distance

4000ft up to 128Kbps

#### Timing

Internal Baud Rate Generator  
Receiver Slave  
External (pin 24)

#### Channel Interface

EIA RS-232 (V.24) female connector (DB-25)

#### Line Requirements

Two or Four Wire private line: Unloaded with no bridge taps.

#### Line Interface

RJ-45 Plug, RS-485 Electrical Specification

#### Front Panel

Indicators: . Power, TD, RD, RS, CS, CD & AS

Switches:... Digital Loop Back

#### Power Source

100-120/200-240VAC, 50 to 60Hz, 0.16/0.08A switchable

#### Environmental

Oper Temp: .... 32° to 122°F (0° to 50°C)  
Rel Humidity: .. 5 to 90% non-condensing  
Altitude: ..... 0 to 10,000 feet

#### Protection

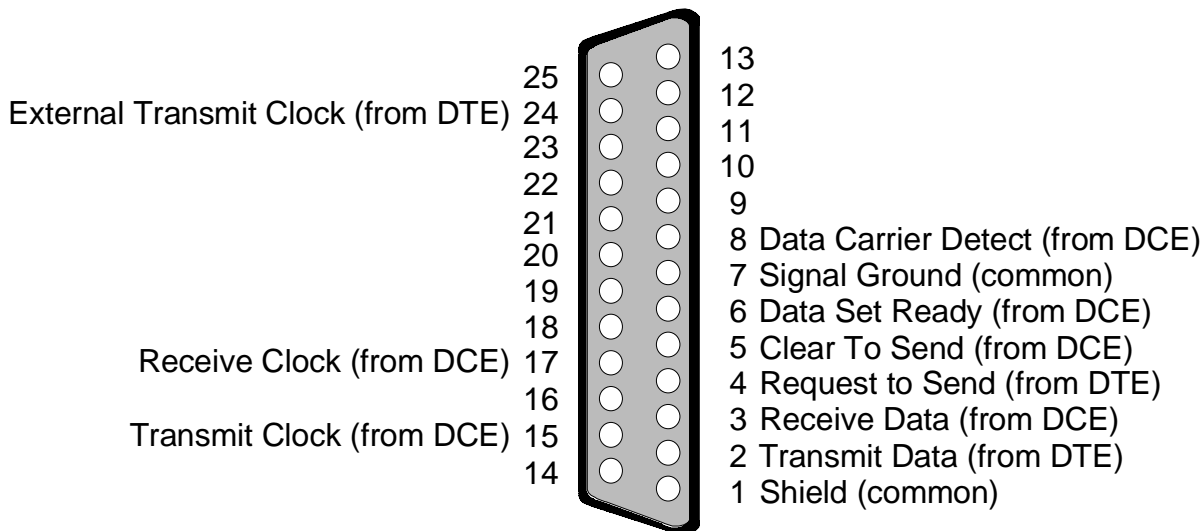
Both Common Mode (Longitudinal) and Differential (Metallic) surge suppressors are provided on the line transmit output and receive input connections.

#### Dimensions

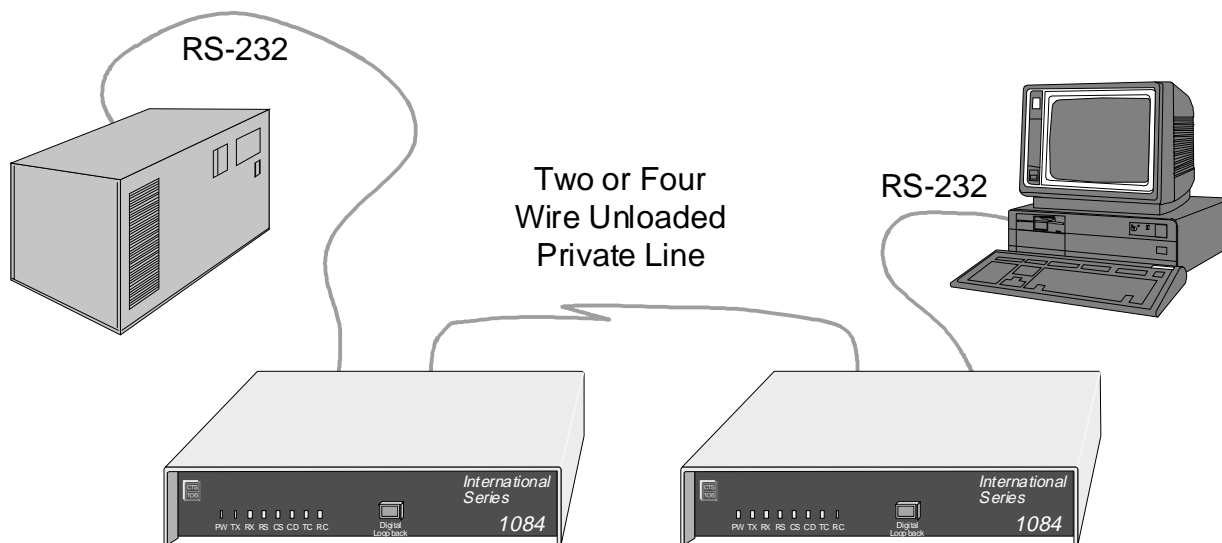
Height: ..... 1.75 inches (4.44 cm)  
Width: ..... 8.90 inches (22.60 cm)  
Length: .... 10.00 inches (25.40 cm)

#### Warranty

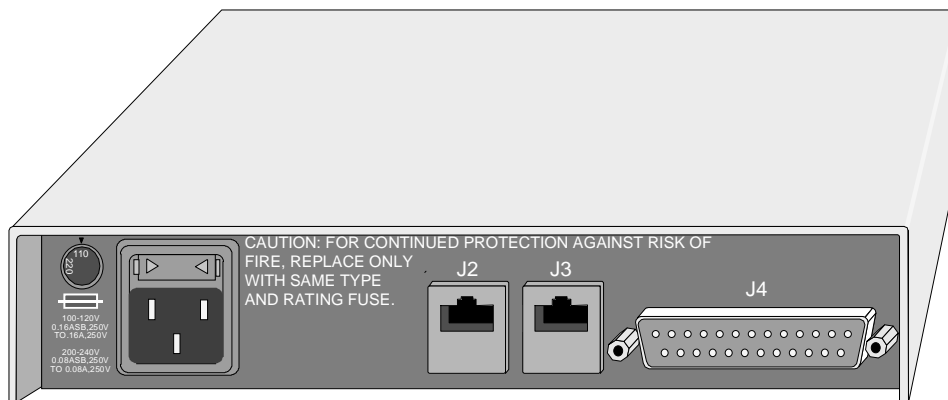
Two Years, Return to Factory



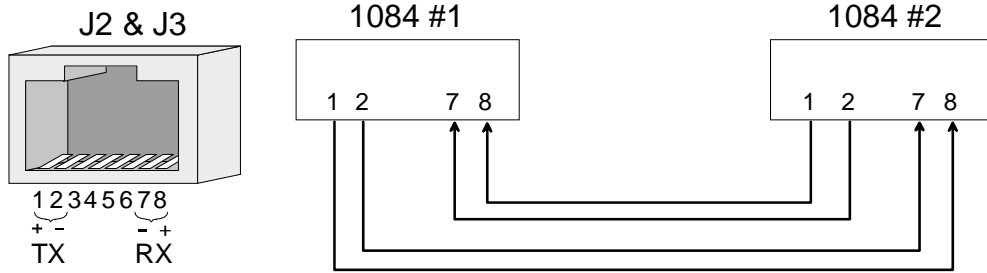
**RS-232 Pin Out**



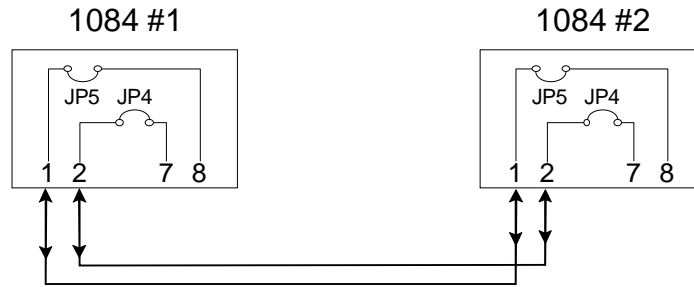
**Application Diagram**



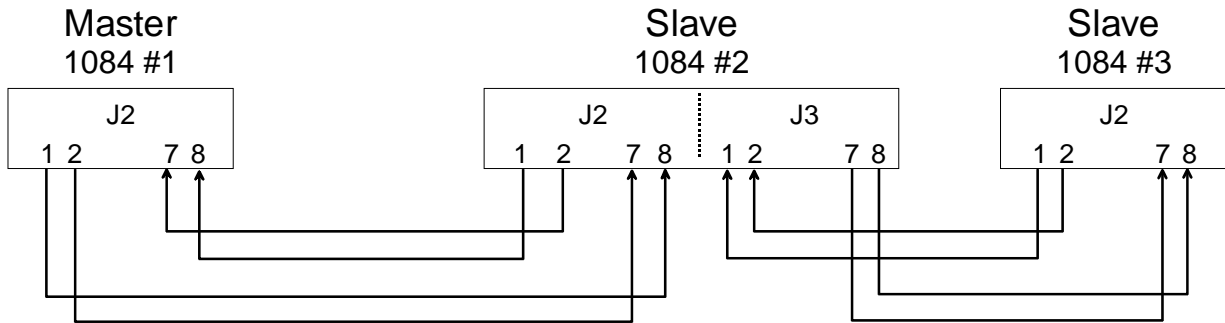
**Rear Panel View**



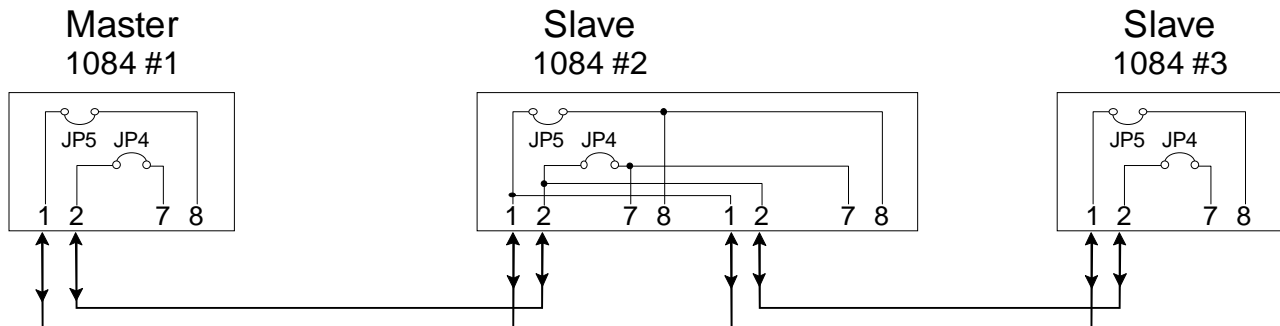
**Four Wire Hookup "Point to Point"**



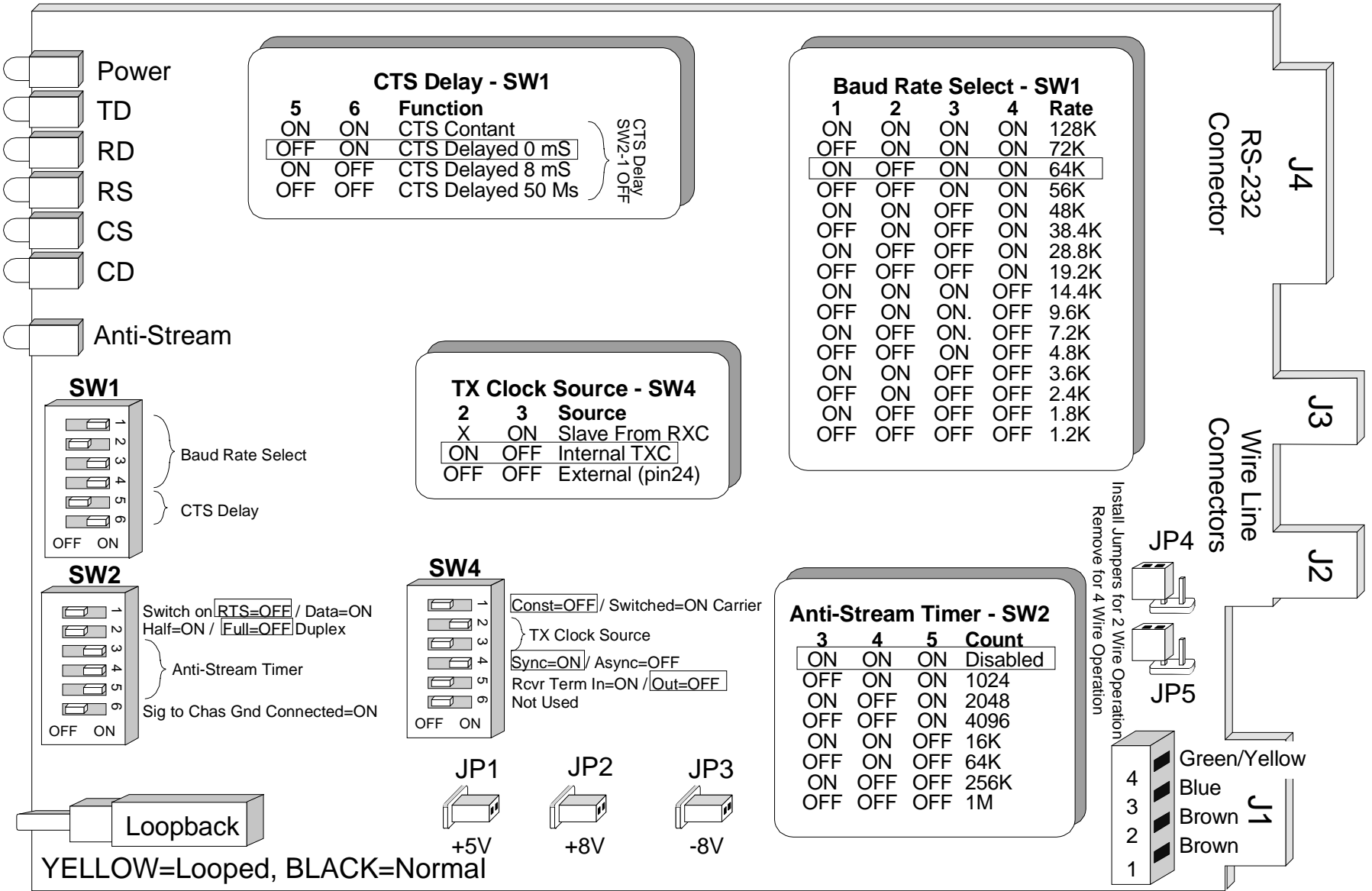
**Two Wire Hookup "Point to Point"**

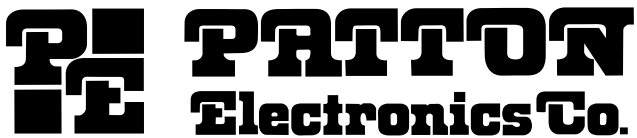


**Four Wire Hookup "Multi-Point"**



**Two Wire Hookup "Multi-Point"**





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