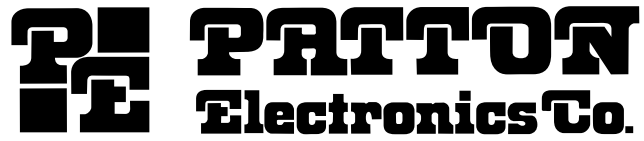


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DIGITAL BRIDGE

3040/V35

(CTS MD-V.35/TCB)

INSTALLATION AND OPERATIONS MANUAL

June 10, 1997



An ISO-9001
Certified Company

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CHAPTER 1 - OPERATION

The Patton 3040/V35 (CTS MD-V.35/TCB) is a network enhancement accessory intended for high speed synchronous or asynchronous V.35 modem, DSU/CSU, or port sharing applications. The 3040/V35 (CTS MD-V.35/TCB) allows for immediate expansion of a system without the requirement of additional communication lines. The 3040/V35 (CTS MD-V.35/TCB) allows any combination of up to four V.35 DCE or DTE devices to share a single V.35 DCE or DTE high speed link in a point-to-point or multi-point polled network.

Channel Clocking

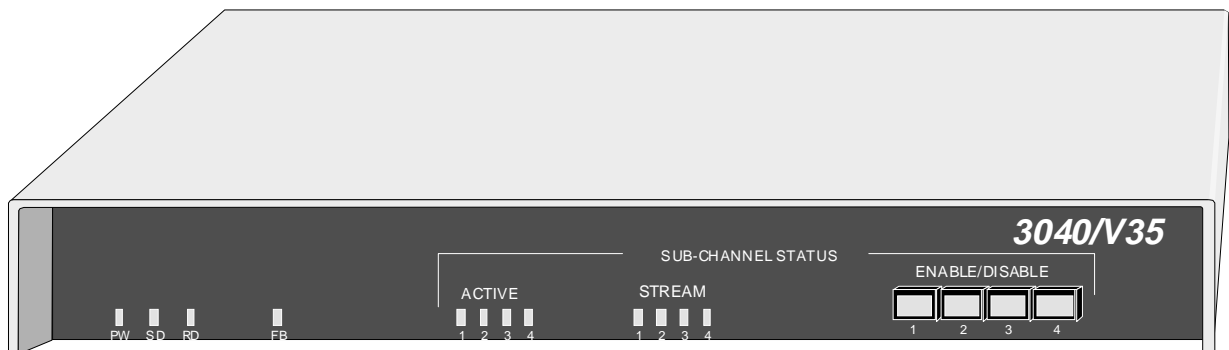
The 3040/V35 (CTS MD-V.35/TCB) is protocol transparent and operates in synchronous and asynchronous environments at data rates up to 2.048Mbps, depending on cable length and attached equipment. Clocking can be derived from the Master Port clock, (pins Y,AA for TT or U,W for ETT and V,X for RT), the internal clock generator or any Sub-Channel clock, (pins Y,AA for TT or U,W for ETT and V,X for RT).

Fallback Clocking

In the event of loss of an externally provided clock or optionally Sub-Channel 1 DCD becoming inactive, the 3040/V35 (CTS MD-V.35/TCB) has the ability to automatically fall back to the predetermined internal baud rate clock or the Sub-Channel 4 RX Clock (pins V,X).

Channel Interface

The 3040/V35 (CTS MD-V.35/TCB) has five V.35 (MR-34) female connectors located on the rear of the unit. Also a DB-25 connector is provided in parallel with the Master Port V.35 connector. Each port is DCE/DTE selectable, which eliminates the need for crossover cables. DSR or DTR can additionally be forced to the active state individually on each Sub-Channel by Jumper control.



Anti-streaming

A typical problem often encountered is a “*STREAMING*” remote terminal. The streaming problem can tie up an entire circuit until the offending device has recovered or is powered down. A streaming condition occurs when a Sub-Channel remains active, disrupting the polling sequence. The 3040/V35 (CTS MD-V.35/TCB) provides two user selectable modes of controlling a streaming condition, an automatic anti-streaming Abort Timer with eight selectable block lengths and a setting to disable anti-streaming for large data block transfers, and a manual Operator Control mode (front panel push button switch).

Automatic Anti-streaming - Automatic Anti-Streaming will block the asserted control signal from the Sub-Channel Port, releasing the 3040/V35 (CTS MD-V.35/TCB) to accept requests from any other Sub-Channel that has not been locked out due to a streaming condition. When a Sub-Channel is locked out for streaming, a visual indication, by Sub-Channel, is provided on the front panel. *The Sub-Channel will no longer receive data or CTS from the Master Port. Any data sent to the Master Port by the streaming device will be lost.* Once a Sub-Channel is locked out due to streaming, the Sub-Channel will remain locked out until the attached device removes the streaming condition. If RTS is held active, RTS must become inactive, if continuous data transitions have triggered the Anti-Stream logic, the transitions must stop before the 3040/V35 (CTS MD-V.35/TCB) will clear the Anti-Stream logic to that Sub-Channel. Removing the Sub-Channel via the front panel disable switch will not clear the Anti-stream logic for a Sub-Channel once it has been activated.

Manual Anti-Streaming - If manual Anti-Stream protection is chosen, a streaming condition caused by one of the attached terminals can be quickly corrected by the 3040/V35 (CTS MD-V.35/TCB) via the associated front panel locking switches. A switch is provided for each Sub-Channel and permits the rapid removal of a streaming terminal without having to disconnect any cables or power down the offending terminal. Terminals may be selectively removed for self-test and maintenance without affecting the remaining Sub-Channels. Once the streaming condition has been corrected, the front panel switch is simply depressed to the locked (Enable) position (Green indicator **ON**) to re-establish normal operation. Removing a Sub-Channel with the front panel switch will block data from the Sub-Channel going to the Master Port but will not block data going from the Master Port to the Sub-Channel as the Automatic Anti-Stream option did.

Channel Selection Modes

The 3040/V35 (CTS MD-V.35/TCB) provides two selectable Sub-Channel service modes of operation, the Scanning Mode and Priority Mode. Depending on system requirements, either mode may be selected by internal DIP switch settings. Both modes switch on activity from the Sub-Channel.

In the Scanning Mode the CTS 3040/V35 (CTS MD-V.35/TCB) scans each Sub-Channel, in sequence, beginning with Sub-Channel 1. This rotational sequence is repeated continually with each attached Sub-Channel having equal access to the communications link. When data or control lines from a Sub-Channel become active that Sub-Channel is switched through to the master port by the 3040/V35 (CTS MD-V.35/TCB). All remaining Sub-Channels are locked out until the first device becomes inactive. When the Sub-Channel device becomes inactive, the 3040/V35 (CTS MD-V.35/TCB) will resume scanning the Sub-Channels for another active signal.

When configured for Priority Mode operation, the 3040/V35 (CTS MD-V.35/TCB) monitors all Sub-Channels simultaneously with Sub-Channel 1 having the highest priority. When a Sub-Channel becomes inactive, the 3040/V35 (CTS MD-V.35/TCB) will automatically default to the highest priority (lowest number) Sub-Channel with activity.

Contention for the Master port is accomplished by asserting RTS (Request to Send) if the Sub-Port is configured as a DCE, DCD (Data Carrier Detect) if the Sub-Port is configured as a DTE or Data Transitions from the attached Sub-Channel devices in either configuration. The active interface lead, RTS or DCD, as well as selection of contention mode, "*Data Transitions*" or "*Interface Lead*" activation, can be selected on an individual basis for each Sub-Channel. Once a Sub-Channel asserts an active control signal the control signal will be passed through to the Master Port, depending on DTE / DCE configuration of the Sub-Channel and Master Port. This control will be passed without delays. If the Master Port is configured as a DTE the signal will be passed as RTS. The CTS returned to the Master will have an optional delay added before the signal is returned to the Sub-Channel port.

Port Enable / Disable, front panel switches must be pushed in (**GREEN** indication) for a Sub-Channel to access the Master Port regardless of the mode of operation selected.

Channel Tail Circuits

A buffer is built into the unit for tail circuit (DCE to DCE) applications. An 8 bit centered ring buffer is used to correct the clock phasing errors generated between the Modem on the Master Port and the Sub-Channel port for the data transferred from the Sub-Channel to the Master Port. If the unit is operated in an asynchronous environment the buffer must be bypassed. This is accomplished by moving the **SYNC/ASYNC** switch to **ASYNC**.

Interface Connections

All connections are made via industry standard CCITT V.35 (MR-34) female connectors located on the rear of the unit. The Following interface leads are implemented, Chassis (A), TD (P,S), RD (R,T), RTS (C), CTS (D), DSR (E), Sig Gnd(B), DCD (F), TT (Y,AA), RT (V,X), DTR (H), ETT (U,W).

In addition the master port can be accessed via an DB-25 with the following pinout, Chassis (1), TD (24,11), RD (23,22), RTS (4), CTS (5), DSR (6), Sig Gnd(7), DCD (8), TT (14,1), RT (16,3), DTR (20), ETT (15,2).

Front Panel LEDs

Front panel LEDs are provided to indicate power is applied, RD and TD activity from the Master Port, Sub-Channel activity of each individual Port, Anti-Stream condition of each Sub-Channel and an indication of clock Fallback condition.

Channel Enable / Disable Switches

Front panel switches allow operator intervention to remove an individual Sub-Channel from accessing the Master Port. Positive latching type switches are provided for each Sub-Channel port for isolating or removing a streaming terminal. The Sub-Channel is activated by pushing the switch until it is in the “**IN**” position. The switch will indicate **GREEN** in color. To disable a Sub-Channel push the switch until it locks in the “**OUT**” position, the switch will indicate **BLACK** in color. Disabling a Sub-Channel with the front panel does not prevent the Sub-Channel from receiving data from the Master Port only from sending data to the Master Port.

Power Supply

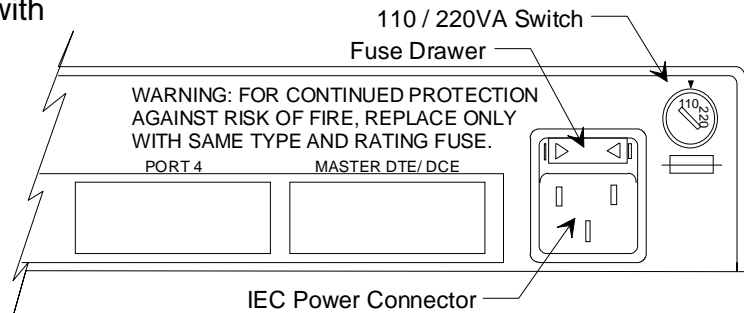
A linear power supply is located internally, an external 110/220VAC switch is located on the rear of the unit. If chassis ground and signal ground need to be tied together this can also be accomplished by switch selection. The unit is Rackmountable for 19" cabinets or optional 23" cabinets, by using the provided Rackmount Kit. Safety approvals granted are UL and CSA as well as emission approval for FCC Class A.

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 3040/V35 (CTS MD-V.35/TCB) to a AC power source the top cover must be installed and secured with the supplied #8-32 screws. The unit is supplied with a 110/220VAC voltage switch, turn the switch with a coin or screw driver to the appropriate voltage for your country. **EXAMPLE:** In the United States of America; set to 110VAC. 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 3040/V35 (CTS MD-V.35/TCB) is configured prior to shipment with the switches set to the following default positions:

Switch 15 - 1,2,3, 4 and 8 to **OFF**, 5, 6 and 7 to **ON**.

No Data Time Out = 2048 bits
 Internal Baud Rate = 56000
 Chassis Ground not connected to Signal Ground

Switch 16 - All to **ON**.

CTS Delay = No Delay
 Sync Mode
 Contention Mode = Priority
 Fallback Clock = Disabled
 Fallback Clock Mode = Data Transitions
 Fallback Clock Source = Internal Baud Rate Generator

Switch 17 - All to **ON**.

TX Clock Source = Master pin 15
 Sub-Channel Activity Indicated by Interface Control (RTS/DCD)

Switch 18 - 1, 2, 3, 7 and 8 to **OFF**, 4, 5 and 6 to **ON**

Anti-Stream timer = 2 M bits

Anti-Stream = Disabled

Broadcast Data to Sub-Channels

RX Clock Source = Master

JP4 Thru JP7 Open

HS Option Not Enabled

JP8 thru JP12 to Open

DTR / DSR Not Forced

JP1 Thru JP3 to Installed

Factory Test Jumpers

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

Remove the top cover by removing the phillips head screws located on the left and right sides of the 3040/V35 (CTS MD-V.35/TCB). DTE/DCE switches SW5 through SW14, baud rate Jumpers JP4 through JP7, interface Jumpers JP8 through JP12 and configuration switches SW15 through SW18 are located on the PCB as indicated on the strapping guide in the Appendix of this manual. After the switch selection activity is completed, ***re-install the top cover BEFORE connecting to a AC power source.***

Installation

Select an appropriate location accessible to and within six feet of an AC power outlet, the outlet must have a ground pin receptacle for product warranty. The DCE-to-DTE cabling between each attached device and the 3040/V35 (CTS MD-V.35/TCB) should be "Straight Through", shielded and terminated with male connectors. Sub-Channels are marked PORT 1 through PORT 4, the Master Port is marked, MASTER DCE/DTE. If any terminal has a priority service mode, ensure it is connected to the port connector designated "PORT 1" on the rear panel of the 3040/V35 (CTS MD-V.35/TCB). Secure other terminals or Modems to be serviced to the remaining "PORT" connectors. Connect the MODEM or TERMINAL to the connector designated "MASTER DTE/DCE".

Equipment Grounding (SW15-1)

Switch SW15-1 provides for grounding interconnection in those systems requiring a connection between (Frame Ground) and (Signal Ground). Connect ONLY if required.

RTS To CTS Delay (SW16-1,2,3)

If a CTS delay is desired, set SW16-1, 2 and 3 to the required value as indicated below.

SW16-1	SW16-2	SW16-3	Time
ON	ON	ON	No Delay
OFF	ON	ON	1mS
ON	OFF	ON	2mS
OFF	OFF	ON	4mS
ON	ON	OFF	8mS
OFF	ON	OFF	16mS
ON	OFF	OFF	32mS
OFF	OFF	OFF	64mS

Anti-Streaming (SW18-1,2,3)

The maximum data block size is user selectable via switch SW18- 1, 2 and 3. As shown below eight block sizes are provided to the user. To disable anti-streaming set SW18-8 to the **OFF** position. The maximum block size is normally defined at the time of installation.

SW18-1	SW18-2	SW18-3	CLOCKS
ON	ON	ON	1024
OFF	ON	ON	2048
ON	OFF	ON	4096
OFF	OFF	ON	16 K
ON	ON	OFF	64 K
OFF	ON	OFF	256 K
ON	OFF	OFF	1 MEG
OFF	OFF	OFF	2 MEG

Receive Data Mode (SW18-7)

Setting switch SW18-7 to **ON** sets the 3040/V35 (CTS MD-V.35/TCB) into the Gated Mode. Only the Sub-Channel that is currently active will receive the data from the master port. Setting position 7 to **OFF** enables the Broadcast mode. Receive Data from the Master Port is sent to all Sub-Channels.

Control Turn-Off Delay in "DATA" Switching Mode (SW15-3,4)

When configured to switch on DATA, switch SW15-3 and 4 set the Sub-Channel release time in clocks. The value selected is the number of clocks at the current baud rate that must occur without any data transitions on the Sub-Channel to indicate that Sub-Channel has completed its transmission and the 3040/V35 (CTS MD-V.35/TCB) can resume servicing the other Sub-Channels. The following table should be used to set this time period.

SW15-3	SW15-4	CLOCKS
ON	ON	16
ON	OFF	64
OFF	ON	256
OFF	OFF	2048

Switch on Data / Control (SW17-5,6,7,8)

Each sub-channel is independently selectable for switch on data or switch on an active interface control lead. Set SW17 pos 5 to **OFF** if sub-channel 1 switch on Data is required. Set pos 5 to **ON** if switch on interface control lead is desired. Position 6 thru 8 are associated with sub-channels 2 thru 4.

Internal Baud Rates (SW15-5,6,7,8)

Switch SW15-5, 6, 7 and 8 select the master clock rate when Internal Clock Source is selected on TX Clock Source or RX Clock Source. In addition the Fallback clock rate is also selected with this option. When Fallback clocking is required, the RX Clock Source and TX Clock Source should not be set to **INTERNAL**. SW15-5, 6, 7 and 8 selects the clock rate of the Fallback Clock when Internal Clock Fallback is selected. The following table shows the available rates.

SW15-5	SW15-6	SW15-7	SW15-8	Rate
ON	ON	ON	ON	HS Opt.
OFF	ON	ON	ON	768K
ON	OFF	ON	ON	384K
OFF	OFF	ON	ON	192K
ON	ON	OFF	ON	128K
OFF	ON	OFF	ON	72K
ON	OFF	OFF	ON	64K
OFF	OFF	OFF	ON	57.6K
ON	ON	ON	OFF	56K
OFF	ON	ON	OFF	48K
ON	OFF	ON	OFF	38.4K
OFF	OFF	ON	OFF	28.8K
ON	ON	OFF	OFF	19.2K
OFF	ON	OFF	OFF	14.4K
ON	OFF	OFF	OFF	9.6K
OFF	OFF	OFF	OFF	4.8K

For the High Speed Option set SW15-5, 6, 7 and 8 to **ON** and select the desired rate by installing JP4 for 2048K, JP5 for 1024K, JP6 for 512K or JP7 for 256K. Only one of the four jumpers should be installed of proper operation.

Fallback Clock Enable (SW16-7)

If Clock Fallback is required when the primary clock fails, set switch SW16-7 to **OFF**. If Fallback is not required set SW16-7 to **ON**. The Fallback clock rate is selected with the internal baud rate option. When the Fallback is activated the FBC LED will illuminate.

Fallback Clocking From Sub-Channel 4 (SW16-8)

To use the Sub-Channel 4 RX Clock as the Fallback clock set SW16-8 to **OFF**. To use the Internal Baud Rate Clock as the Fallback clock set SW16-8 to **ON**.

Fallback Mode Selection (SW16-6)

If Fallback is required, two modes are available via switch SW16-6. To Fallback when the transitions from the primary clock source stop, set SW16-6 to **ON**. To Fallback when DCD on Sub-Channel 1 becomes inactive, set SW16-6 to **OFF**.

NOTE: Both TX and RX Clock Source Select MUST Be Set !!!!

TX Clock Source Selection (SW17-1,2,3)

TX Clock Source is selected by switch SW17-1, 2 and 3. The following table indicates the source options provided by the 3040/V35 (CTS MD-V.35/TCB). When using the unit in Async Mode, the **INTERNAL** clock source must be selected.

SW17-1	SW17-2	SW17-3	Source
ON	ON	ON	Master
OFF	ON	ON	Port 1
ON	OFF	ON	Port 2
OFF	OFF	ON	Port 3
ON	ON	OFF	Port 4
OFF	ON	OFF	unused
ON	OFF	OFF	unused
OFF	OFF	OFF	Internal

Internal Must Be Selected For Async Operation

TX Clock Pin Selection (SW17-4)

The primary transmit clock can be derived from either pins Y,AA or pins U,W. If pins Y,AA are to be the source for primary TX Clock, set SW17-4 to **ON**. If pins U,W are to be the source for primary **TX & RX** Clock, set SW17-4 to **OFF**.

RX Clock Source Selection (SW18-4,5,6)

RX Clock Source is selected by SW18-4, 5 and 6. The following table indicates the source options provided by the 3040/V35 (CTS MD-V.35/TCB). If the TXC source is pins U,W, both RXC and TXC will be sourced from pins U,W. When the unit is used in an Async network select **INTERNAL** as the source of the RX Clock.

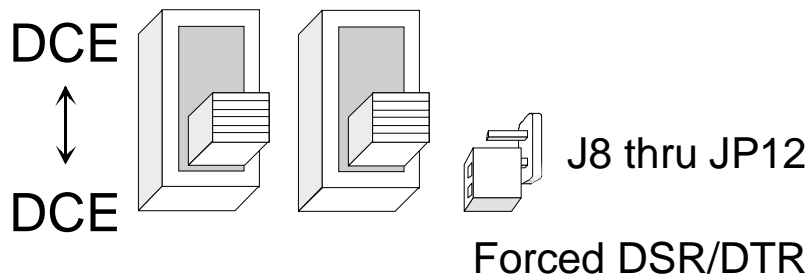
SW18-4	SW18-5	SW18-6	Source
ON	ON	ON	Master
OFF	ON	ON	Port 1
ON	OFF	ON	Port 2
OFF	OFF	ON	Port 3
ON	ON	OFF	Port 4
OFF	ON	OFF	unused
ON	OFF	OFF	unused
OFF	OFF	OFF	Internal

Tail Circuit Buffers (SW16-4)

The 3040/V35 (CTS MD-V.35/TCB) has a Tail Circuit Buffer that is automatically selected when a Sub-Channel is set as a DTE. The buffer will provide clock synchronization of the data from the Sub-Channel to the Master Port for Tail Circuit operations. The buffer is de-activated when the Sub-Channel is configured as a DCE. When operating in an asynchronous environment the Buffer must be bypassed. To bypass the buffer in a synchronous or asynchronous application, set switch SW16-4 to **OFF** (ASYNC). For normal operation in a synchronous environment set SW16-4 to **ON** (SYNC). When using a tail circuit modem with the 3040/V35 (CTS MD-V.35/TCB), the modem connected to the Sub-Channel, should be set to External Transmit Clocking. The modem at the remote end of the connection should be set to RX-TX Clocking or Slaved TX Clock. This will insure the same clock is present throughout the network and clock slippage will not occur.

Port DCE/DTE Selection (SW5 thru SW14)

Slide switches SW5 through SW14 are used to configure DTE/DCE for each port. Slide **Both** switches associated with a port to the same position. *Example:* If connecting a modem (DCE Device) to the PORT, then the port should be configured as a DTE interface. Slide both switches to the DTE position toward the interface connector. If connecting a terminal (DTE) to the Sub-Channel, the port should be configured as a DCE. Slide both switched to the DCE position away from the interface connector. The port is always configured opposite to the interface that is to be connected to it.



DTR / DSR Forced Active (JP8 thru JP12)

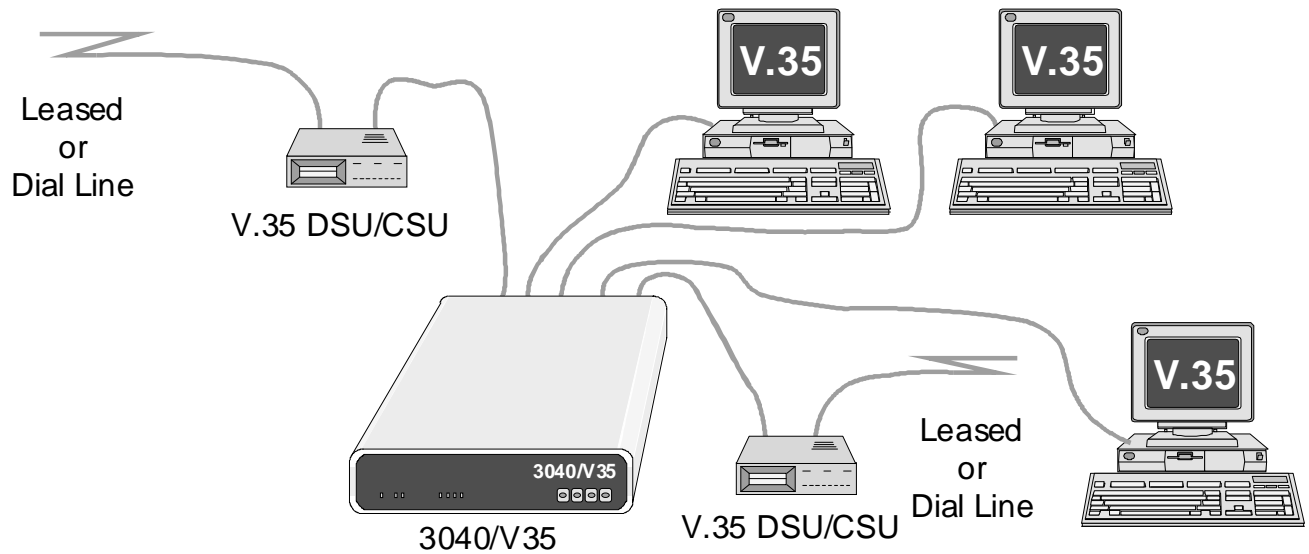
DTR is tied to DSR on each of the Sub-Channel ports. If the device connected does not supply a DTR but requires DSR (DTE) or does not supply DSR but requires DTR (DCE), installing the forced DTR/DSR jumper (JP8-JP12) for the appropriate Sub-Channel will solve this problem. The line is forced to +8V via an 820 Ω resistor, providing isolation to any driver that might be on the interface.

Channel	Jumper	Channel	Jumper
Master	JP8	3	JP11
1	JP9	4	JP12
2	JP10		

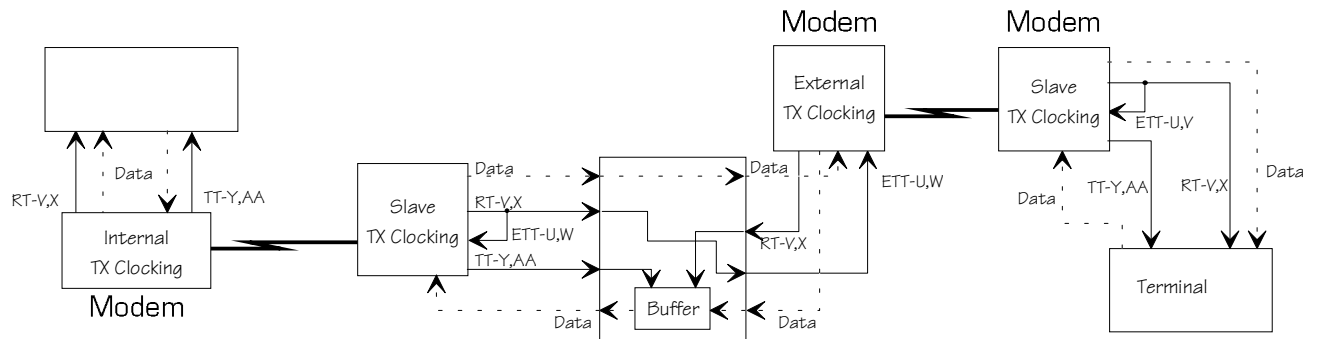
FACTORY Test Jumpers (JP1, JP2 and JP3)

The three test jumpers JP1, 2 and 3, must be installed for the unit to properly function. These jumpers are used in the manufacture and test of the product prior to shipment.

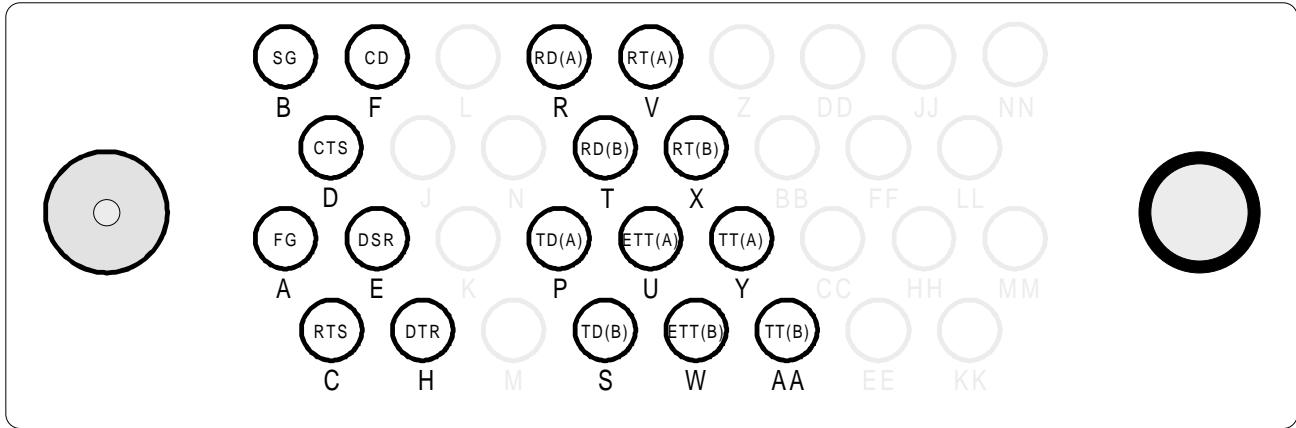
APPENDIX



Typical Application

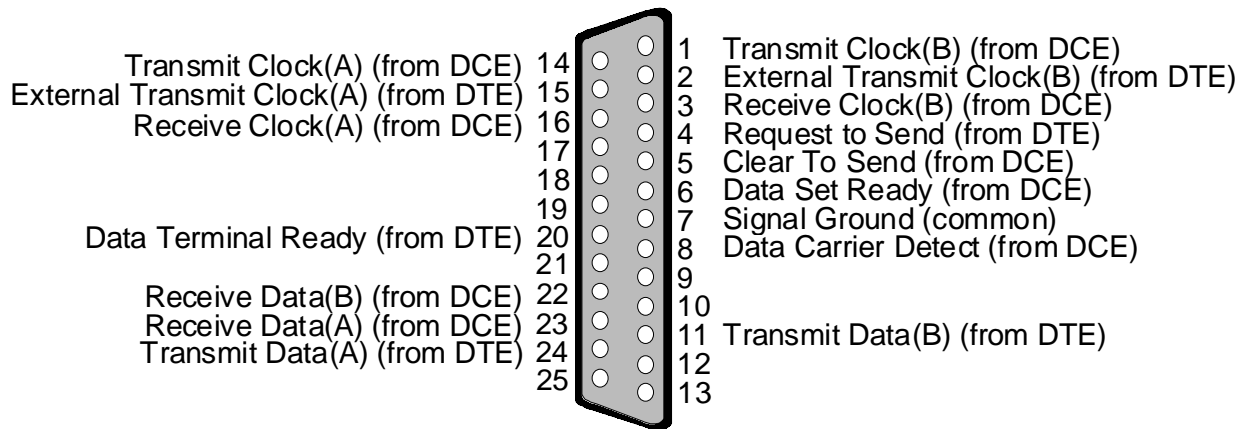


Typical Tail Circuit Configuration

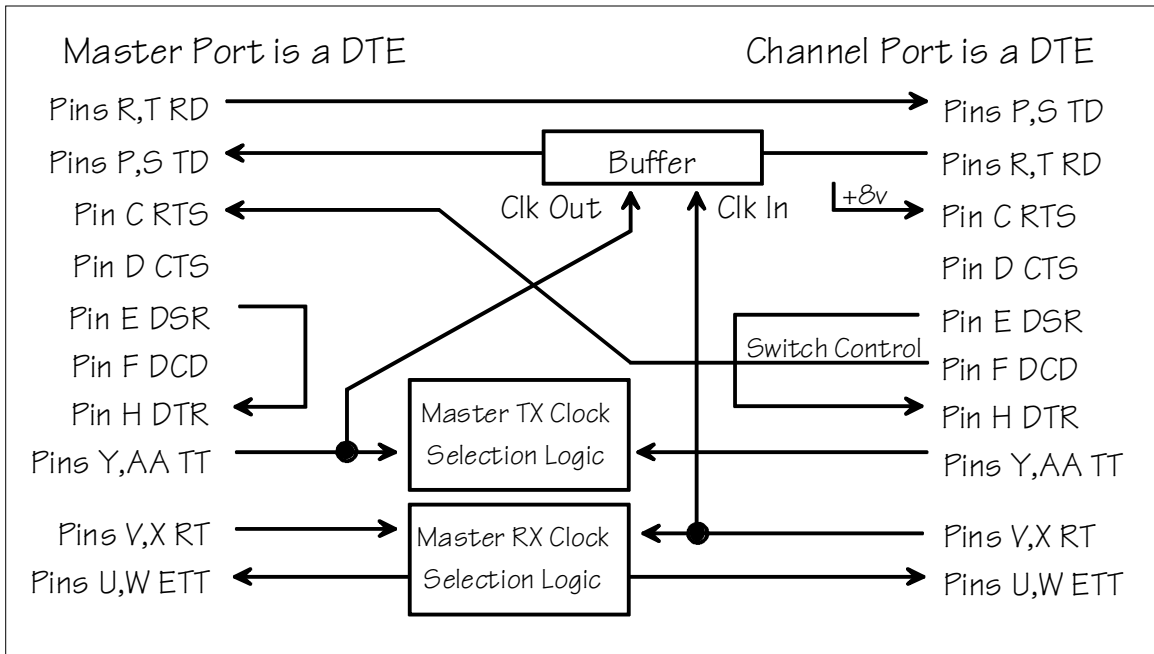


M-34 Interface Pins Supported

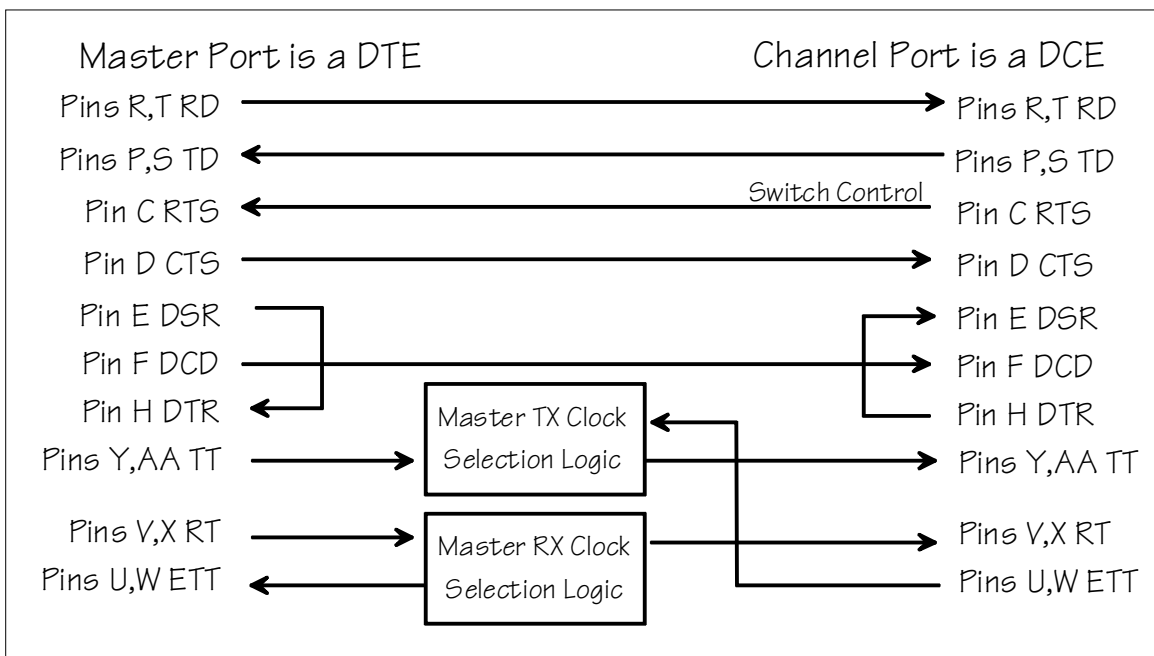
DB-25 V.35



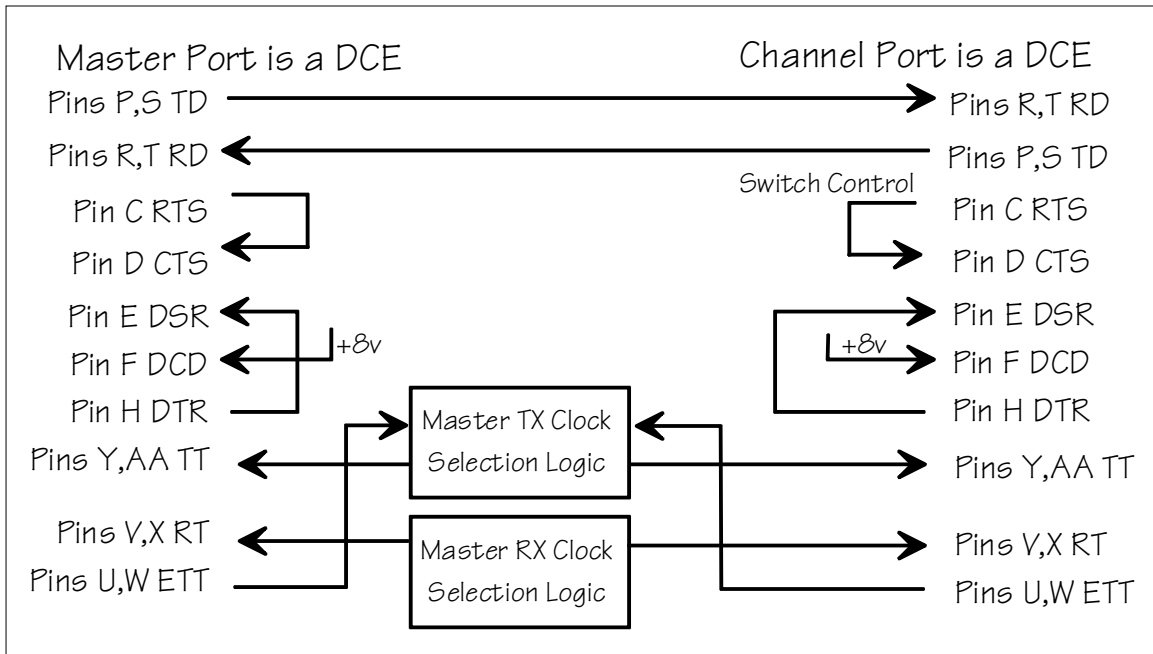
DB-25 Interface Pins Supported



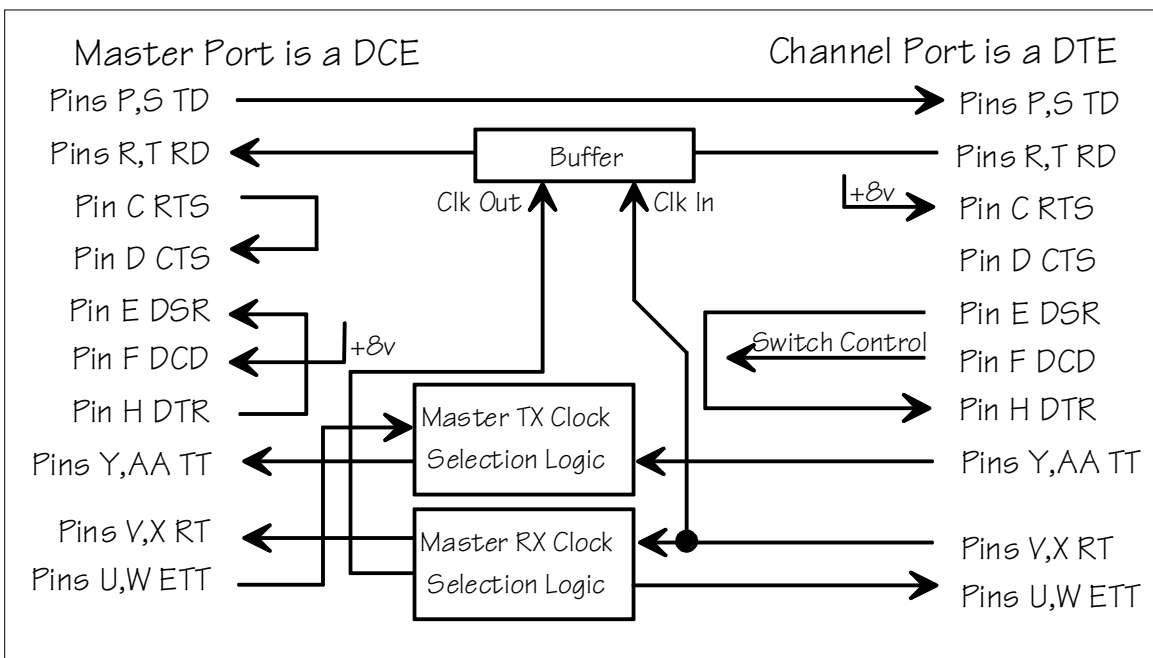
Master DTE / Sub-Channel DTE Interface Flow Diagram



Master DTE / Sub-Channel DCE Interface Flow Diagram



Master DCE / Sub-Channel DCE Interface Flow Diagram



Master DCE / Sub-Channel DTE Interface Flow Diagram

TECHNICAL SPECIFICATIONS

Applications

Multiple V.35 Sync or Async DCE or DTE devices sharing one V.35 DCE or DTE link

Capacity

One to Four V.35 Sync or Async DTE or DCE devices One V.35 DCE or DTE Master Channel

Data Format

Data transparent at all data rates

Data Rates

Up to 2.048Mbps

Timing

Internal: DIP switch selectable
Normal: From Modem
External: Clock provided on any Sub-Channel

Anti-streaming

Automatic: Selectable timeout intervals or disable

Terminal Service Modes

Scanning Mode: Channels are continuously scanned for activity on a sequential basis.
Priority Mode: Channels are simultaneously monitored channel one has highest access

Sub-Channel Interface

CCITT V.35 female connectors (MR-34)

Master Interface

CCITT V.35 female connector (MR-34 & DB-25)

Front Panel

Indicators: Power, Send Data, Receive Data, Clock Fallback, Sub-Channel Active, Sub-Channel Stream

Switches: Enable/Disable each Sub-Channel

Power Source

100-120/200-240 Vac, 50 to 60 Hz, 0.16/0.08 A, Switch Selectable

Environmental

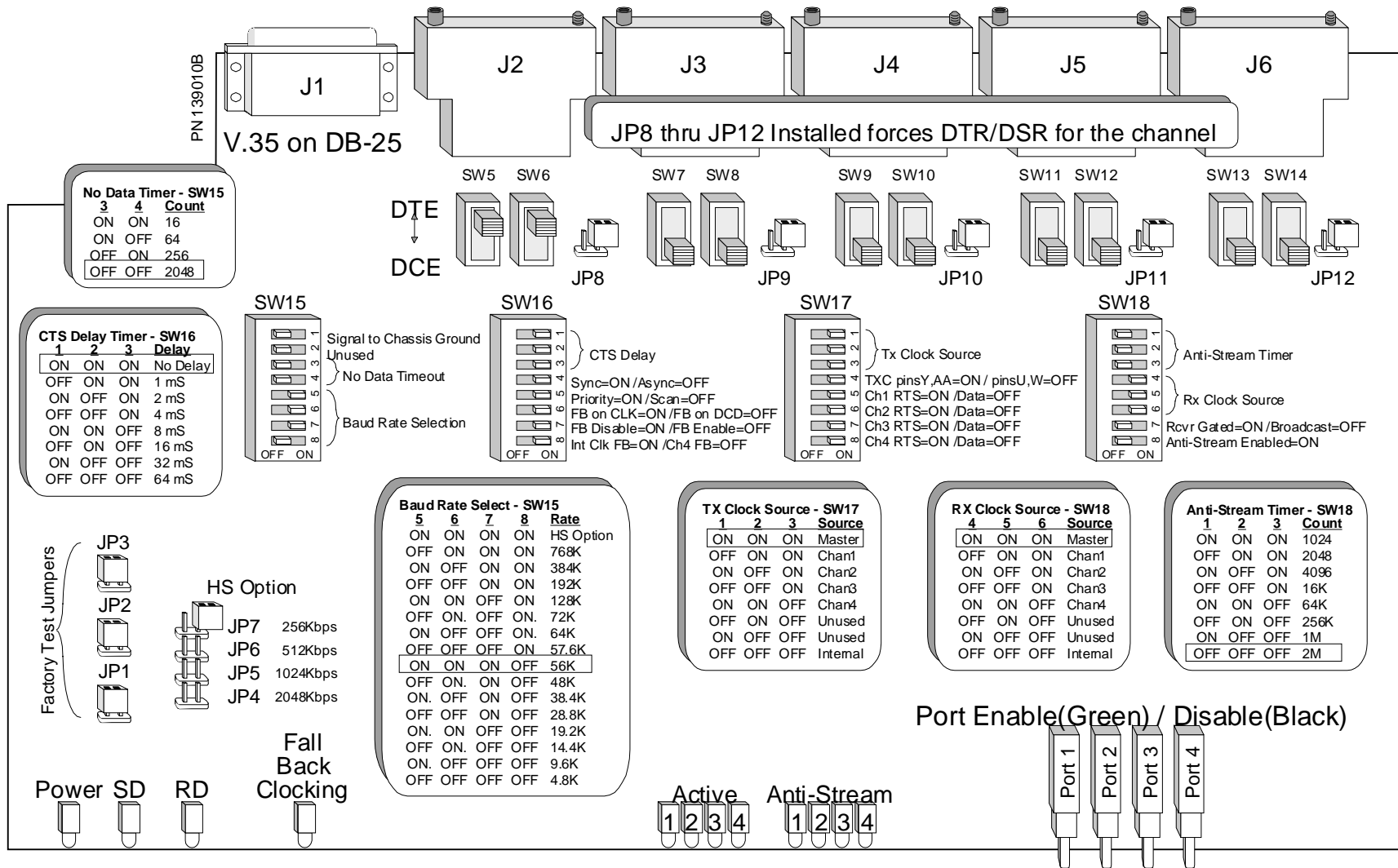
Operating Temp: 32° to 122°F (0° to 50°C)
Relative Humidity: 5 to 90% non-condensing
Altitude: 0 to 10,000 feet

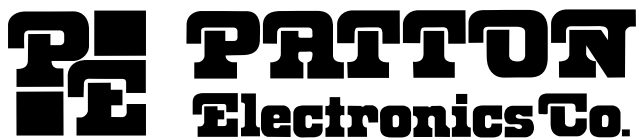
Dimensions

Height: 1.75 inches (4.44 cm)
Width: 17.00 inches (43.18 cm)
Length: 11.00 inches (18.93 cm)

Weight

4.5 lbs (2.1 Kg)





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