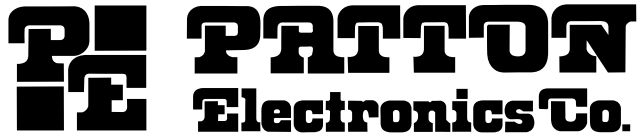


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Part #: 07M3060/X21-A



DIGITAL BRIDGE

3060/X.21

(CTS MD-X.21/TCB)

INSTALLATION AND OPERATIONS MANUAL

March 29, 2000



An ISO-9001
Certified Company

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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.

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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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The Patton MSDs generate and use radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The Patton MSDs have been tested and found to comply with the limits for Class A computing devices in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the Patton MSDs do cause interference to radio or television reception, which can be determined by disconnecting the cables, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna, and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

SERVICE

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Services at:

tel: (301) 975-1007;

email: support@patton.com;

or, www: <http://www.patton.com>.

NOTE: Packages received without an RMA number will not be accepted.

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Patton MSDs. Technical Service hours: 8AM to 5PM EST, Monday through Friday.

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CHAPTER 1 - OPERATION

The 3060/X21 (CTS MD-X.21/TCB) is a network enhancement accessory intended for high speed Synchronous or Asynchronous X.21 Modem, or port sharing applications. The 3060/X21 (CTS MD-X.21/TCB) allows for immediate expansion of a system without the requirement of additional communication lines. The 3060/X21 (CTS MD-X.21/TCB) allows up to six X.21 DCE or DTE devices to share a single X.21 DCE or DTE high speed link in a point-to-point or multi-point polled network.

Clocking

The Patton 3060/X21 (CTS MD-X.21/TCB) is protocol transparent and operates in synchronous and asynchronous environments at data rates up to 2048Kbps. Clocking can be derived from the master port clock (pins 6 &13), the internal clock generator or any Sub-Channel clock (pins 6 &13).

Fallback Clocking

In the event of loss of an externally provided clock the device has the ability to fall back to the predetermined internal baud rate clock or to the clock provided on Sub-Channel 6.

Channel Interface

The 3060/X21 (CTS MD-X.21/TCB) has seven DB-15 female connectors located on the rear of the unit. Each port is DCE/DTE selectable, which eliminates the need for a crossover cable. The Control/Indicate output leads can be individually selected to follow the Modem or be forced active. The Sub-Channel 6 Control/Indicate input lead can be forced Active or allowed to follow the interface lead.

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 3060/X21 (CTS MD-X.21/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 3060/X21 (CTS MD-X.21/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 Indicate(I) 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 Indicate (I) (*for DTE*) or Control (C) (*for DCE*) is held active, I/C lead must become inactive, if continuous data transitions have triggered the Anti-Stream logic, the transitions must stop before the 3060/X21 (CTS MD-X.21/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-Stream - A streaming condition caused by one of the attached terminals can be quickly corrected by the 3060/X21 (CTS MD-X.21/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 reestablish 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 Patton 3060/X21 (CTS MD-X.21/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. Activity is defined as raising Control on a sub-channel configured as a DCE, raising Indicate on a sub-channel configured as a DTE or data transitions while in the switch on data mode.

Scanning Mode - In the Scanning Mode the Patton 3060/X21 (CTS MD-X.21/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 3060/X21 (CTS MD-X.21/TCB). All remaining Sub-Channels are locked out until the first device becomes inactive. When the Sub-Channel device becomes inactive, the 3060/X21 (CTS MD-X.21/TCB) will resume scanning the sub-channels for another active signal.

Priority Mode - When configured for Priority Mode operation, the Patton 3060/X21 (CTS MD-X.21/TCB) monitors all Sub-Channels simultaneously with Sub-Channel 1 having the highest priority. When a sub-channel becomes inactive, the 3060/X21 (CTS MD-X.21/TCB) will automatically default to the highest priority (lowest number) Sub-Channel with activity.

Contention - Contention for the Master port is accomplished by asserting C (Control) if the Sub-Port is configured as a DCE, I (Indicate) 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, C or I, 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 C. The I returned from the Master will have an optional delay added before the signal is returned to the Sub-Channel port.

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.

Interface Connections

All connections are made via industry standard DB-15 (V.11) female connectors located on the rear of the unit. The following interface leads are implemented: T(2,9), R(4,11), C(3,10), I(5,12), S(6,13), B(7,14), Gnd (8), Chassis(1).

Front Panel Indicators

The front panel LED indicators associated with each sub-channel identify the active port. A green POWER ON LED indicates when AC voltage is applied. Two adjacent green LED indicators illuminate in union with individual port activity and identify Transmit Data (T) and Receive Data (R) activity. When in Fallback Mode the Fallback LED will illuminate.

Channel Enable / Disable Switches

Positive latching type switches are provided for each DTE port for isolating or removing a streaming terminal. When activated the switch will indicate **GREEN** in color. To disable a sub-channel push the switch inward, the switch will indicate **BLACK** in color. The port Enable / Disable, front panel switches must be pushed in (**GREEN**) for a sub-channel to access the main channel. Data will be sent from the master to the ports regardless of the Enable / Disable switch setting, only data from the ports to the master is affected.

Power Supply

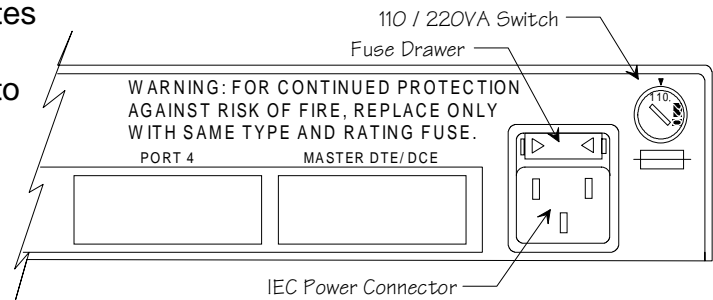
A linear power supply is located internally, an external 110/220VA switch is located on the rear of the unit. If chassis ground and signal ground need to be tied together, this can be accomplished by switch selection. The unit is Rackmountable for 19" cabinets or optional 23" cabinets, by using the provided Rack Mount Kit. Safety approvals granted are UL, CSA and TÜV, as well as emission approval for FCC Class A and VFG-243.

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 3060/X21 (CTS MD-X.21/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 110/220VA 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 110VA. 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 3060/X21 (CTS MD-X.21/TCB) is configured prior to shipment with the switches set to the following default positions:

Switch 21 - 1, 2, 3 and 5 to **OFF**, 4 and 6 to **ON**.

Baud Rate = 144K

Switch 22 - All to **ON**.

Clock Source = Master Port

Anti-Stream Timer = 1024 Bit

Switch 23 - 4 and 6 to **OFF**, 1, 2, 3 and 5 to **ON**.

No Data Time Out = 16 bits

Broadcast Data to Sub-Channels

Anti-Stream = Disabled

Master C/I Interface Follow Selected Channel

Signal Ground Not Connected to Chassis Ground

Switch 24 - All to **ON**.

Fallback Enabled

Sub-Channel 6 Input Follows Interface Lead

Switch 25 - 2 to **OFF**, 1, 3, 4, 5 and 6 to **ON**.

Synchronous Mode
Control / Indicate Gated
Priority Mode
C to I Delay = None

Switch 26 - All to **ON**

Control / Indicate Output Follows Master Port

Switch 27 - All to **ON**

Sub-Channel Activity Controlled by Interface Lead (C/I)

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 3060/X21 (CTS MD-X.21/TCB). DTE/DCE switches SW7 through SW20, interface Jumpers J1 and J2 and configuration switches SW21 through SW27 are located on the PCB as indicated on the strapping guide in the Appendix of this manual. After the switch selection activity is completed, ***reinstall 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 3060/X21 (CTS MD-X.21/TCB) should be "Straight Through", shielded and terminated with male connectors. Sub-Channels are marked PORT 1 through PORT 6. 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 3060/X21 (CTS MD-X.21/TCB). Secure the other Terminals or Modems to be serviced to the remaining "PORT" connectors. Connect the Modem or Terminal to the connector designated "MASTER".

Internal Baud Rate Selection (SW21-1,2,3,4,5,6)

Internal baud rate is selected by setting SW21-1 through SW21-6. The following 2 tables provide the switch settings for each provided rate.

SW21-1	SW21-2	SW21-3	OPTION
ON	ON	ON	1
OFF	ON	ON	2
ON	OFF	ON	3
OFF	OFF	ON	4
ON	ON	OFF	5
OFF	ON	OFF	6
ON	OFF	OFF	7
OFF	OFF	OFF	8

SW21-4	SW21-5	SW21-6	Option 1	Option 2	Option 3	Option 4
ON	ON	ON	38,400	44,800	51,200	57,600
OFF	ON	ON	19,200	22,400	25,600	28,800
ON	OFF	ON	9,600	11,200	12,800	14,400
OFF	OFF	ON	4,800	5,600	6,400	7,200
ON	ON	OFF	2,400	2,800	3,200	3,600
OFF	ON	OFF	1,200	1,400	1,600	1,800
ON	OFF	OFF	600	700	800	900
OFF	OFF	OFF	CHANNEL 6 CLOCK			
			Option 5	Option 6	Option 7	Option 8
ON	ON	ON	384,000	448,000	512,000	576,000
OFF	ON	ON	192,000	224,000	256,000	288,000
ON	OFF	ON	96,000	112,000	128,000	144,000
OFF	OFF	ON	48,000	56,000	64,000	72,000
ON	ON	OFF	24,000	28,000	32,000	36,000
OFF	ON	OFF	12,000	14,000	16,000	18,000
ON	OFF	OFF	6,000	7,000	8,000	9,000
OFF	OFF	OFF	CHANNEL 6 CLOCK			

Clock Source Selection (SW22-1,2,3)

Clock Source is selected by **SW-22** Positions **1** through **3**. The following chart indicates the options provided by the 3060/X21 (CTS MD-X.21/TCB).

SW22-1	SW22-2	SW22-3	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	Port 5
ON	OFF	OFF	Port 6
OFF	OFF	OFF	Internal

Anti-Streaming (SW22-4,5,6) (SW23-4)

Automatic Anti-Stream protection is enabled by setting **SW23-4** to **ON** and disabled by setting **SW23-4** to **OFF**. The maximum data block size is user selectable via internal dip switch positions **SW22** positions **4**, **5**, and **6**. As shown below eight block sizes are provided to the user. To disable anti-streaming set **SW23** position **4** to the **OFF** position. The maximum block size is normally defined at the time of installation. The 3060/X21 (CTS MD-X.21/TCB) will isolate the affected sub-channel until the streaming condition has been corrected, then automatically reestablish communications as before.

SW22-4	SW22-5	SW22-6	COUNT
ON	ON	ON	1024
OFF	ON	ON	2048
ON	OFF	ON	4096
OFF	OFF	ON	16K
ON	ON	OFF	64K
OFF	ON	OFF	256K
ON	OFF	OFF	1M
OFF	OFF	OFF	2M

Control Turn-Off Delay in “DATA” Switching Mode (SW23-1,2)

When configured to switch on DATA, **SW23-1** and **SW23-2** set the number of clocks without data transitions that indicates no data. The following switch table should be used to set the number of clock periods after the data transitions stop until the channel is released.

SW23-1	SW23-2	COUNT
ON	ON	16
ON	OFF	64
OFF	ON	256
OFF	OFF	2048

Receive Data Mode (SW23-3)

Setting **SW23** position **3** to **ON** sets the Data Broadcast mode. Receive Data from the master port is sent to all terminals. Setting position **3** to **OFF** sets the 3060/X21 (CTS MD-X.21/TCB) into the Data Gated Mode. Only the sub-channel that is currently active will receive the data from the master port.

Master Interface Control Lead State (SW23-5) (Master Port set to DTE)

The state of the control interface output lead for the Master Port can be selected to follow the currently active Sub-Channel or it can be forced to an active state. Set **SW23-5** to **ON** if it is desired that the C output lead follow the Sub-Channel interface lead. Set **SW23-5** to **OFF** if it is desired that the output interface be forced Active. ***If the master port is set to DCE, the C lead on the master port is looped to the I lead on the master port.***

Equipment Grounding (SW23-6)

Switch **SW23-6** provides for grounding interconnection in those systems requiring a connection between (Frame Ground) and (Signal Ground). Connect ONLY if required.

Fallback Clock Selection (SW24-1)

If clock Fallback is required, set SW24-1 to **ON**. In this mode, if the clock provided from the primary source is interrupted, the internally selected baud rate clock or the clock provided on Sub-Channel 6, is used as the system clock source. See Internal Baud Rate Chart for selection of Sub-Channel 6 Fallback Clock.

Channel 6 Input State (SW24-2)

Setting **SW24-2** to **OFF** forces Sub-Channel 6 to be active constantly. This mode locks channel 6 as the only Sub-Channel to be able to pass data back to the Master Port. All Sub-Channels will still receive data from the Master Port. Setting **SW24-2** to **ON** allows the 3060/X21 (CTS MD-X.21/TCB) Sub-Channel 6 to operate normally. The Sub-Channel will only be selected when an active contention signal is presented on the port.

Tail Circuit Buffers/Asynchronous Operation (SW25-1)

The 3060/X21 (CTS MD-X.21/TCB) has a Tail Circuit Buffer that is automatically selected if a Sub-Channel is configured as a DTE. This buffer is an 8 bit unidirectional buffer. Data is buffered from the Sub-Channel to the Master Port. The buffer will provide clock synchronization for Tail Circuit operations. The buffer is De-Activated when the Sub-Channel is configured as a DCE. If you want to remove the buffer during synchronous operation, or if asynchronous operation is desired the buffer is disabled by setting **SW25-1** to **OFF** (*Must be OFF for Async Operation*). Setting **SW25-1** to **ON** allows the buffer to be operational anytime a Sub-Channel is configured as a DTE.

Control / Indicate Output Lead Mode (SW25-2)

Setting **SW25-2** to **ON** sets the 3060/X21 (CTS MD-X.21/TCB) into the C/I Broadcast Mode. The Control/Indicate Output interface from the master port is broadcast to all terminals. Setting position **2** to **OFF** sets the C/I Gated mode. Only the sub-channel that is currently active will receive the C/I interface signal from the master port.

Priority / Scan Mode Select (SW25-3)

To select Priority Mode set **SW25-3** to **ON**. To select Scan Mode set **SW25-3** to **OFF**

Control To Indicate Delay (SW25-4,5,6)

If a Control To Indicate delay is desired, set **SW25-4** through **SW25-6** to the appropriate position.

SW25-4	SW25-5	SW25-6	TIME
ON	ON	ON	No Delay
OFF	ON	ON	0.5mS
ON	OFF	ON	1.0mS
OFF	OFF	ON	2.0mS
ON	ON	OFF	4.0mS
OFF	ON	OFF	8.0mS
ON	OFF	OFF	16.0mS
OFF	OFF	OFF	32.0mS

Sub-Channel Interface Control Lead State (SW26-1,2,3,4,5,6)

The state of the control interface output lead for the Sub-Channel Port can be selected to follow the Master Port or they can be forced to an active state. Set **SW26-1** to **ON** if it is desired that the C (DCE selected) / I (DTE selected) output lead for Sub-Channel 1, follow the Master Port interface lead. Set **SW26-1** to **OFF** if it is desired that the output interface be forced Active.

Switch on Data / Control (SW27-1,2,3,4,5,6)

Each sub-channel is independently selectable for switch on data or switch on an active interface control lead. Set **SW27-1** to **OFF** if sub-channel 1 "Switch on Data" is required. Set position 1 to **ON** if "Switch on Interface Control Lead" is desired. Position 2 through 6 are associated with sub-channels 2 through 6.

Port DCE/DTE Selection (SW7 through SW20)

Slide switches **SW7** through **SW20** 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 switches **SW7** & **SW8** to the DTE position (toward the DB-15 connectors).

Factory Test Jumpers (JP1,JP2)

The two test jumpers **JP1** and **JP2**, must be installed for the unit to properly function. These jumpers are used in the manufacture and test of the product prior to shipment.

TECHNICAL SPECIFICATIONS

Applications

Multiple X.21 synchronous or asynchronous DCE or DTE devices sharing one X.21 DCE or DTE link

Capacity

One to Six X.21, DTE or DCE devices One X.21 DCE or DTE Master Channel

Data Format

Data transparent at all data rates

Data Rates

Up to 576,000 bps

Timing

Internal: DIP switch selectable
Normal: From Modem
External: ... Clock provided on any 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 X.21 female connectors (DB-15)

Modem Interface

CCITT X.21 female connector (DB-15)

Front Panel

Indicators: ... Power, Send/Receive Data, Channel Active, Channel Stream, Fallback

Switches: Enable/Disable each Sub-Channel

Power Source

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

Environmental

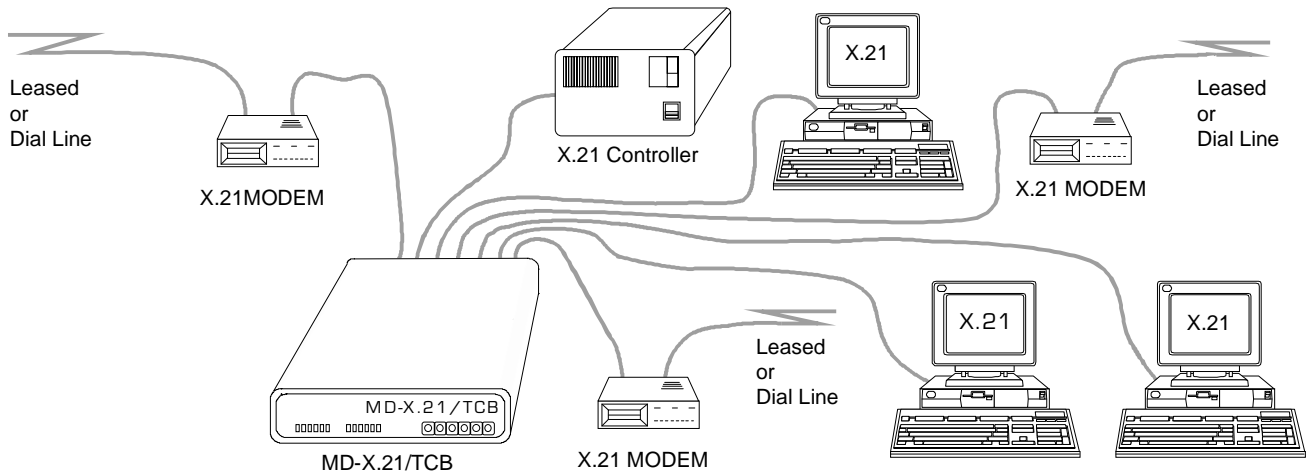
Op. Temp: 32° to 122°F (0° to 50°C)
Rel Humidity: . 5 to 90% non-condensing
Altitude: 0 to 10,000 feet

Dimensions

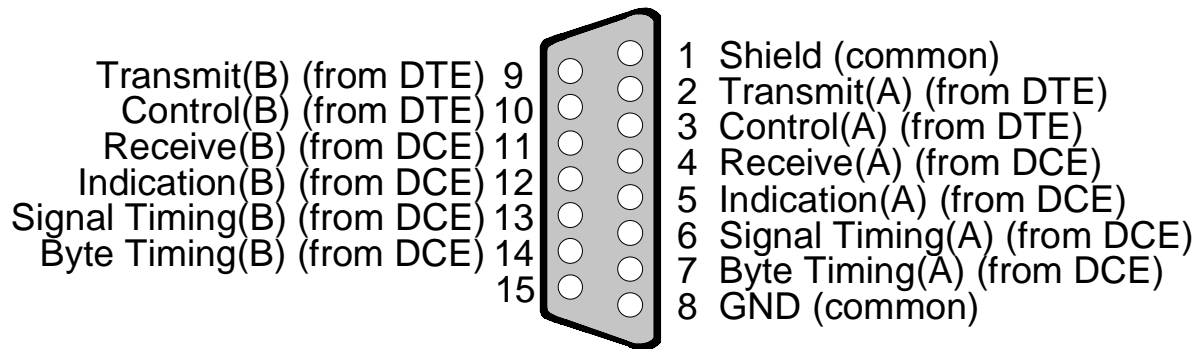
Height: .. 1.75 inches (4.44 cm)
Width: ... 17.00 inches (43.18 cm)
Length: .. 11.00 inches (18.93 cm)

Weight

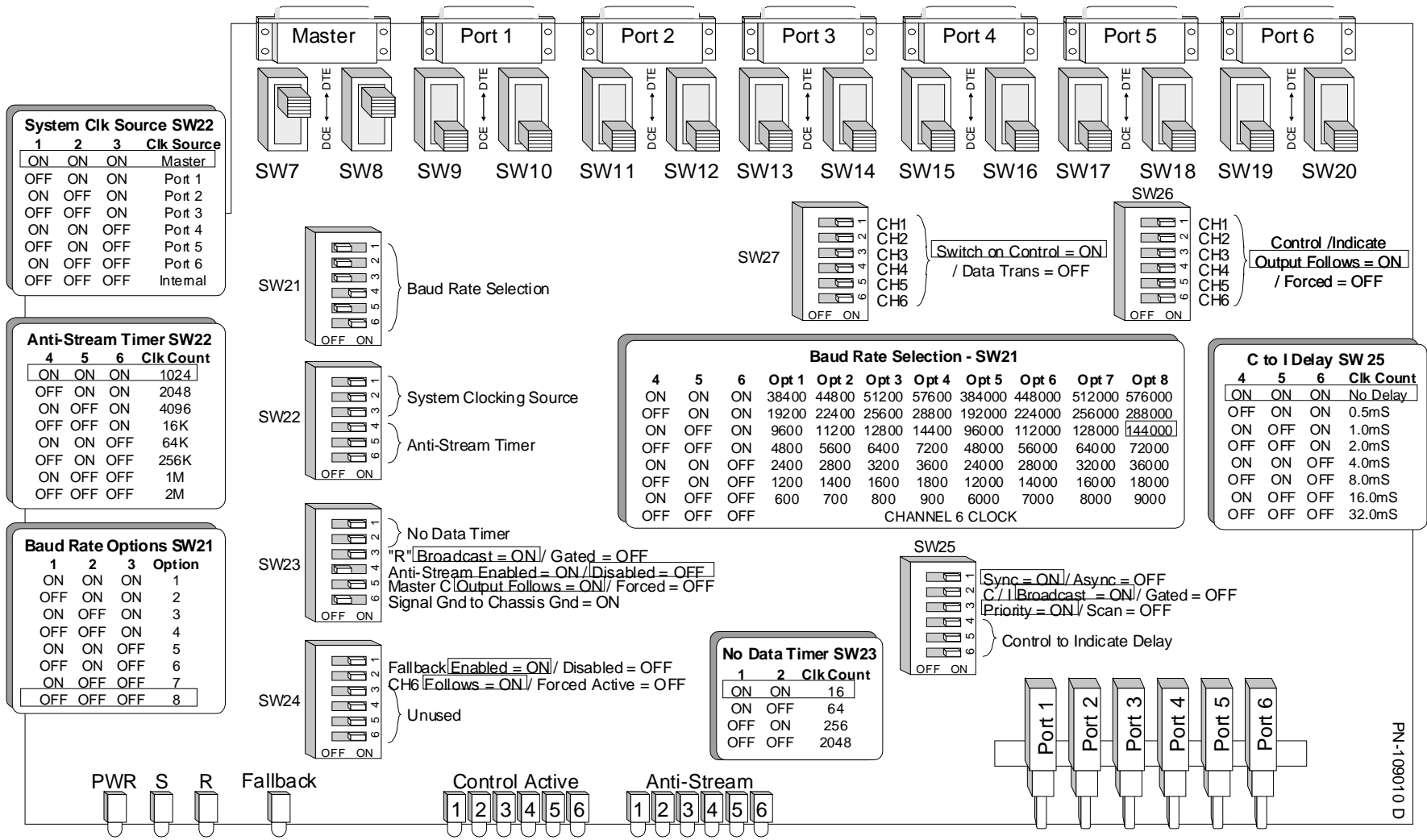
4.5 lbs (2.1 Kg)



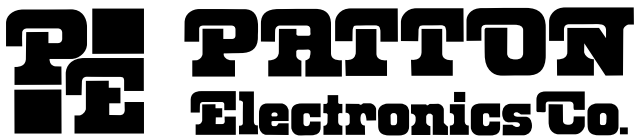
Typical Application



Connector Pinout



Enabled = GREEN / Disabled = BLACK



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