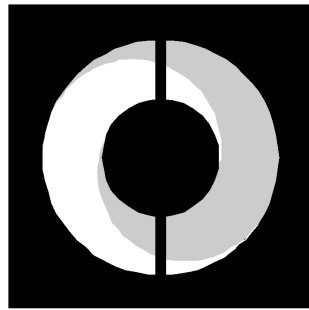


CVD 5316

ISDN Matrix Switch

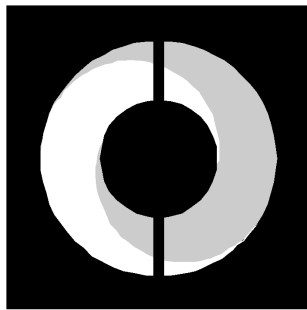


C O V I D

User's Manual

CVD 5316:
3 Input, 12 Output
Dual Mode Operation
ISDN BRI Matrix Switch

**A Simple Solution for Switching
and Routing ISDN BRI Lines
Allowing Video Connection of Any
Three Inputs to Twelve Output Options**



C O V I D

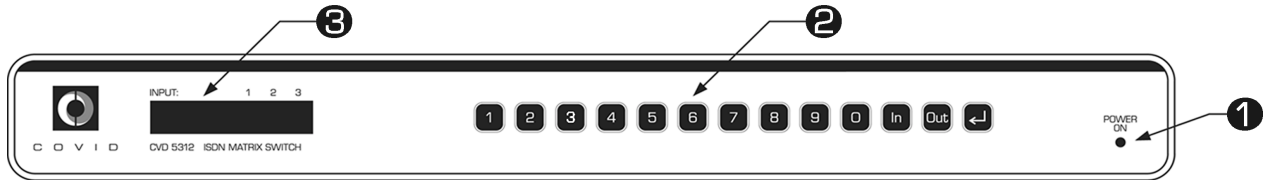
Introduction

Thank you for purchasing one of the CVD 5300 series products. Covid's CVD 5300 series provides a simple solution for switching and routing BRI (Basic Rate Interface) ISDN lines. Some of the features of the CVD 5316 ISDN BRI Matrix Switch include:

- Simple and quick switching of ISDN BRI lines.
- Instantly “ move” BRI lines.
- Routes three ISDN lines to twelve possible outputs.
- Dual-mode operation for Manual or Automatic switching.
- RS232 controllable.
- Front panel keypad control, with LCD panel. (User selectable)
- On-Demand Automatic line routing and re-routing. (User selectable)
- LCD readout of active line pairing reflects current input and output assignments.
- Active Data Lock - The CVD 5316 locks any routing command that involves an active line until the call has been disconnected.
- Cost effective choice for routing and switching of ISDN BRI lines.

Panel Descriptions

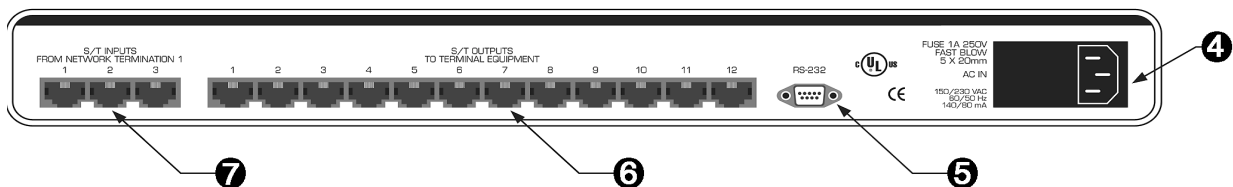
FRONT PANEL



FRONT PANEL LAYOUT

1. **POWER ON:** The red LED turns on when the unit is powered.
2. **KEYPAD:** The 13 keys are used to change the settings on the unit.
3. **LCD:** The 16 character display shows the current input and output assignments, line busy status indication, keypad entries and error messages.

REAR PANEL

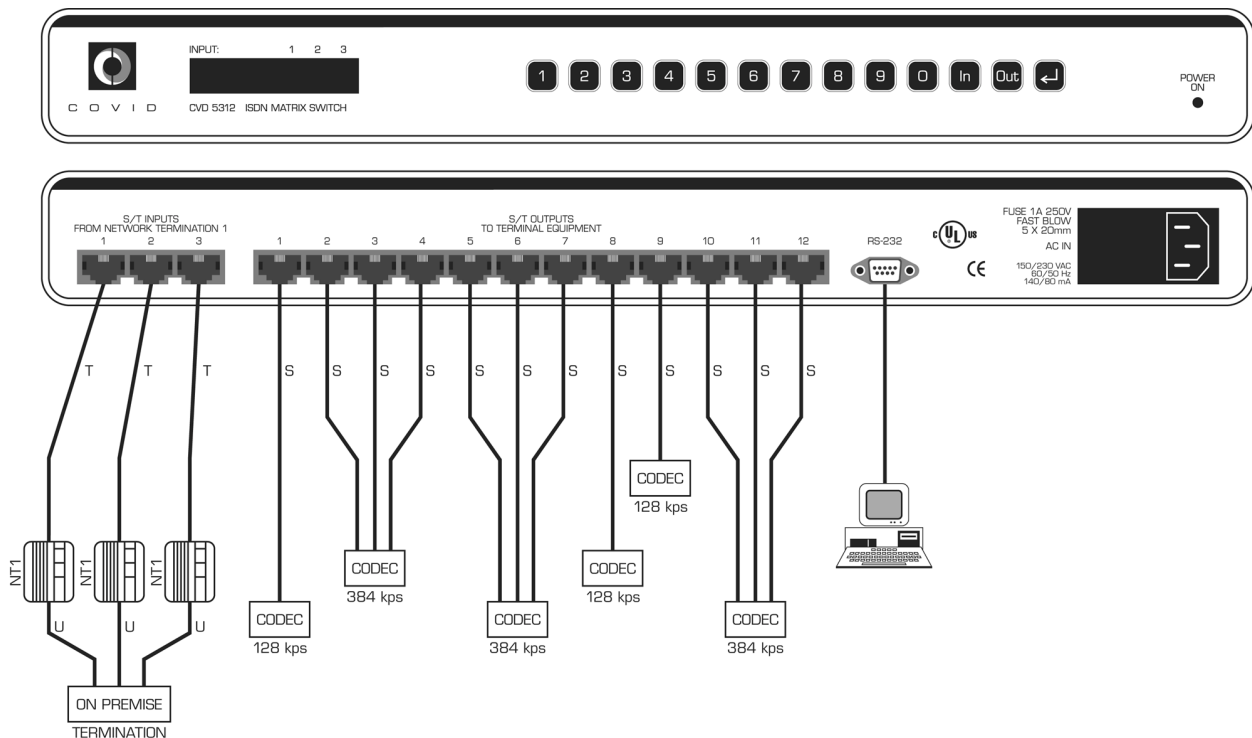


REAR PANEL LAYOUT

4. **AC IN:** AC power input module. It contains the ac inlet connector, fuse and line voltage selector. The line voltage selector allows the unit to operate on either 110 VAC or 220 VAC power.
5. **RS232 INPUT:** The DB 9 pin female connector is used for serial communication.
6. **OUTPUTS:** 12 S/T 8 pin RJ45 female connectors to be connected to TEs (Terminal Equipment) via a twisted-pair cable.
7. **INPUTS:** 3 S/T 8 pin RJ45 female connectors to be connected to NT1s (Network Terminal 1) via a twisted-pair cable.

Operational Setup

1. Check to see if the line voltage selector switch is set to match the AC power available in your area. The small window on the AC input module indicates the current setting. To change the voltage setting, pry opens the cover of the AC inlet using a small flat-head screwdriver. Take the voltage selector out and reinsert it in the appropriate direction. The desired Vac label on the voltage selector switch should be pointing towards the cover. **Do not try turning the voltage selector switch while it is in the module.**
2. Connect the necessary inputs to the NT1s using straight through twisted-pair cable.
3. Connect the necessary outputs to the videoconferencing equipment using straight through twisted-pair cable.
4. If you want to control the unit using a computer, the CVD 5316 RS232 port must be connected to the serial port of the PC via the supplied serial cable.
5. Plug in the AC power cord and check for the power on LED indicator.
6. The LCD module should display **OUTPUT: 00 00 00**.
7. The unit is now operational; make the appropriate connections using either the keypad or the computer.



Typical Setup Configuration

Operation Mode

The CVD5316 has three modes of operation:

MODE0-manual

Features:

- Upon power up, it is the default mode.
- The keypad and RS232 are fully functional. Please consult the manual mode instruction for further information.

MODE1-128kbps autosense (1 BRI line)

Features:

- Only Input1 is used; Input2 and Input3 are ignored.
- Limited keypad and RS232 control.
- Every two seconds the unit scans the outputs in ascending order (this is also the output priority*):
Output1 → Output2 →...→ Output11 → Output12
*Unless there's a line busy indication on the current output, in which case it has the highest priority and cannot be switched away.
- Under no line busy conditions, if an activation signal is detected on one of the outputs, the unit stops scanning the rest of the outputs, and if the detected output is not the same as current output, makes the appropriate connection. However, if a signal is not detected on any of the 12 outputs, the unit returns to its default configuration.

MODE3-384kbps autosense (3 BRI lines)

Features:

- Limited keypad and RS232 control.
- Every two seconds the unit scans the outputs in ascending order:
Output1 → Output2 →...→ Output11 → Output12
- Under no line busy conditions, if an activation signal is detected on one of the outputs, the unit stops scanning the rest of the outputs, determines the group number, and if it is different then the current group number, makes the appropriate connections. However, if a signal is not detected on any one of the 12 outputs, the unit returns to its default configuration.
- The 12 outputs are divided into four groups in the following manner:
Group1: Outputs 1, 2, and 3
Group2: Outputs 4, 5, and 6
Group3: Outputs 7, 8, and 9
Group4: Outputs 10, 11, and 12
- Group priority is defined the following way*:
Group1 → Group2 → Group3 → Group4
*Unless there's a line busy indication in one of the groups, in which case that group has the highest priority and cannot be switched away.

User Instructions

When the CVD 5316 is powered, the LCD displays the following: **OUTPUT: 00 00 00**. This indicates that all of the inputs are disconnected. In other words, none of the three inputs are connected to any of the outputs.

To select a mode, press the appropriate number key { **1** }, { **2** }, or { **3** } on the keypad. Pressing the { **↵** } key displays the current mode setting.

By pressing the { **1** } key the LCD displays: **MANUAL MODE?**

By pressing the { **2** } key the LCD displays: **1LINE AUTO MODE?**

By pressing the { **3** } key the LCD displays: **3LINE AUTO MODE?**

To acknowledge the request press the { **↵** } key; otherwise to cancel the request press the { **In** } key. Pressing any other key will result in **FORMAT ERROR**. However, if there is a videoconferencing in progress (indicated by a star in front of the used lines) then the user cannot switch the operating mode of the unit. Attempting to do so will result in the LCD displaying **LINE BUSY** and the request will be ignored.

When the unit is not in manual mode, majority of the keypad and RS232 control is disabled. The only functioning keys on the keypad are the following: { **1** } , { **2** } , { **3** } , { **↵** } , and { **In** }. These keys are used to switch modes, given that there's no line busy indication. The { **↵** } key can also be used to check the current mode setting. Pressing any other key will result in the display of the following warning, **IN AUTO MODE!**. Similar limitations exist for the RS232 control; please consult the CVD5316 RS232 interface protocol documentation for further information.

Manual Mode Instructions

Making or changing connection on the CVD 5316 manual mode using the keypad is quite easy. Simply follow the 5 simple steps outlined below.

- **Step 1: Press the { In } key.**
The LCD displays **IN**.
- **Step 2: Press the input number key.**
The only valid keys are 1, 2, or 3. The input number must be entered as a single digit.
The LCD displays **IN (#)**.
- **Step 3: Press the { Out } key.**
The LCD displays **IN (#) OUT**.
- **Step 4: Press the output number key(s).**
The only valid keys are the numerical keys, 0 through 9. Numbers that are less than ten can be entered directly as a single digit or as a double digit, in which case the number is preceded by a zero. To select outputs 10 through 12, the 1 key should be pressed followed by the 0, 1 or 2 key. In either case, for two digit numbers the first key pressed must be a 0 or a 1.
The LCD displays either **IN (#) OUT (#)** or **IN (#) OUT (##)**.
- **Step 5: Press the { ↵ } key.**
This key executes the command.
The LCD displays either **IN (#) OUT (#) ENTER** or **IN (#) OUT (##) ENTER**.
In short, the two valid keypad entry formats are: **In (#) Out (#) ↵** or **In (#) Out (##) ↵**.

Notes:

1. Unless the user presses a key on the keypad, the LCD displays the current status: **OUTPUT: ## ## ##**.
2. If a valid key is pressed, the LCD displays the keypad entry for two seconds. If within this time duration the next valid key is not pressed, the LCD switches back to displaying the current status. However, the previously entered information is not lost. The unit will save the current partial valid keypad entry for 30 seconds. If more than 30 seconds have elapsed since a valid key was pressed, then the unit erases the partial entry from memory. As a result, the user must start all over again.
3. The { **In** } key also functions as a clear key. If the { **In** } key is pressed the partial entry is erased from memory and the LCD is cleared for two seconds. However if the { **In** } key is pressed while the entry memory is blank, the LCD displays **IN** meaning it is the beginning of a new valid entry.
4. Error messages are displayed for only two seconds.
5. If an invalid key is pressed the LCD displays **FORMAT ERROR** and the partial entry is erased from memory. In manual mode, the format error is a syntax error that occurs when the user deviates from the two valid keypad entry formats (**In # Out # ↵** or **In # Out ## ↵**). Either the entry sequence is wrong or the numbers are out of range. It also can occur for invalid mode selection.
6. Only one input can be connected to each output. If the user tries to connect an input to an output that is already taken the LCD displays **OUTPUT TAKEN** and ignores the request. The only valid output that all three inputs can share is 0, the disconnect state. Entering 0 or 00 as the output number for any of the three inputs disconnects the input.
7. The CVD 5316 is safeguarded to ensure no disruption of video transmission. Covid Data Lock eliminates any chance of call disconnection by “locking” active lines so that no command can interrupt current calls. If the user tries to disconnect or reroute an input on which a call is in progress the LCD displays **LINE BUSY** and disregards the request. In addition, if a particular line is busy the LCD displays a star in front of the corresponding output when showing the current status. The line busy status indicator on the LCD is updated every two seconds.

RS232 INTERFACE PROGRAM

RS232 DESCRIPTION:

The RS232 port on the CVD 5316 is a DB 9 pin female connector. The RS232 port must be connected to the serial port of the PC via a serial cable. The RS232 input has first priority. When the RS232 input is used, the keypad on the CVD 5316 is disabled.

CONNECTOR PINOUT (DB 9 PIN FEMALE):

- PIN2 – TX
- PIN3 – RX
- PIN5 – GND
- REMAINING PINS ARE NOT CONNECTED

COMMUNICATION PARAMETERS:

- ASYNCHRONOUS
- SERIAL
- 9600 BAUD RATE
- NO PARITY BIT
- 1 START BIT
- 8 DATA BITS
- 1 STOP BIT

RS232 COMMANDS:

1. MODE COMMAND

This command is used to change the operating mode of the CVD5316

PC COMMAND FORMAT: (O)(P)(D)(!)

HEX EQUIVALENT: (4F)(50)(D)(21)

D IS THE DATA (NEW MODE REQUEST)

PC	CVD5316
O ----->	
	<----- O
P ----->	
	<----- P
D ----->	
	<----- D
! ----->	
	<----- !
	<----- 0
	<----- 4 OR 5
	<----- MODE

FORMAT OF *D* AND MODE:

0(30) = MANUAL MODE

1(31) = 1LINE AUTO MODE (128KBPS)

2(32) = 3LINE AUTO MODE (384KBPS)

2. STATUS CHECK COMMAND

This command is used to check the current status of the CVD 5316 to find out what output is connected to each of the inputs.

PC COMMAND FORMAT: (S)(T)(!)

HEX EQUIVALENT: (53)(54)(21)

PC	CVD5316
S ----->	
	<----- S
T ----->	
	<----- T
! ----->	
	<----- !
	<----- 0
	<----- T1STAT
	<----- T2STAT
	<----- T3STAT

- **T1STAT** - INDICATES WHAT OUTPUT IS CONNECTED TO INPUT1 (T1)
- **T2STAT** - INDICATES WHAT OUTPUT IS CONNECTED TO INPUT2 (T2)
- **T3STAT** - INDICATES WHAT OUTPUT IS CONNECTED TO INPUT3 (T3)

3. MESSAGE COMMAND

This command is used to make/change a connection on the CVD 5316. Once this command is executed, the new status is also sent to the PC.

PC COMMAND FORMAT: (M)(G)(D)(!)

HEX EQUIVALENT: (4D)(47)(D)(21)

D IS THE DATA (NEW CONNECTION REQUEST)

SEE BELOW FOR FORMAT:

PC	CVD5316
M ----->	
	<----- M
G ----->	
	<----- G
D ----->	
	<----- D
!----->	
	<----- !
	<----- 0
	<----- 3, 4, OR 5
	<----- MODE
	<----- T1STAT
	<----- T2STAT
	<----- T3STAT

FORMAT OF T1STAT, T2STAT, T3STAT, AND D:

MSB							LSB
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
0	0	TB1	TB0	SB3	SB2	SB1	SB0

T INTERFACE INPUTS

FORMAT:	TB1	TB0	
POSSIBILITIES:	0	1	(T1)
	1	0	(T2)
	1	1	(T3)

S INTERFACE OUTPUTS

FORMAT:	SB3	SB2	SB1	SB0	
POSSIBILITIES:	0	0	0	0	(N/C)
	0	0	0	1	(S1)
	0	0	1	0	(S2)
	0	0	1	1	(S3)
	0	1	0	0	(S4)
	0	1	0	1	(S5)
	0	1	1	0	(S6)
	0	1	1	1	(S7)
	1	0	0	0	(S8)
	1	0	0	1	(S9)
	1	0	1	0	(S10)
	1	0	1	1	(S11)
	1	1	0	0	(S12)

- POSSIBLE CONNECTIONS FOR INPUT1 (T1): 10 (HEX) - 1C (HEX)
- POSSIBLE CONNECTIONS FOR INPUT2 (T2): 20 (HEX) - 2C (HEX)
- POSSIBLE CONNECTIONS FOR INPUT3 (T3): 30 (HEX) - 3C (HEX)

EXAMPLES:

T1STAT = 1B (HEX) => T1 IS CONNECTED TO S11

T2STAT = 25 (HEX) => T2 IS CONNECTED TO S5

T3STAT = 38 (HEX) => T3 IS CONNECTED TO S8

D = 3C (HEX) => CONNECT T3 TO S12

D = 10 (HEX) => DISCONNECT T3

RS232 MESSAGES:

The CVD 5316 RS232 routine uses five types of messages to provide feedback to the user. Some of the messages denote errors while the others are used for communication protocol. After an error message, the PC command needs to be reentered from the start.

MESSAGE (0): GOOD COMPLETION

- Applies when using either command.
- If applies, sent after the termination character (!).

A message (0) is sent after a valid full command *ST!*, or *MGD!*.

MESSAGE (1): TIMEOUT ERROR

- Applies when using either command.
- If applies, sent after the following characters: *S*, *T*, *M*, *G*, *D*.

There is a 5 second time limit between valid characters. Only valid characters can start or restart the timer. Invalid characters stop the timer. If a valid character is received, a 5 second timer is started. If within this time frame, the next valid character is not received, a timeout error message (1) is sent to the PC. However, if the next valid character is received before the timer expires, the 5 second timer is restarted. The termination character (!) stops the timer.

Examples: (Using the status check command, but the same applies to the message command.)

Example 1:

```
PC COMMAND:           S
                       ↓ ↑
CVD5316 RESPONSE:     S (AFTER 5 SEC) 1
```

Since nothing else was sent after the *S* before the 5 second timer expired, the CVD 5316 sent a message (1). If any character, except *T*, is sent before the timer runs out, it will stop the timer and cause a bad command error, message (2).

Example 2:

```
PC COMMAND:           S           T
                       ↓ ↑           ↑ ↓ ↑ ↑
CVD5316 RESPONSE:     S (AFTER 5 SEC) 1   T 2
```

Since *S* timed out, *T* like every other character, except *S* and *M*, becomes a bad command in the case.

Example 3:

```
PC COMMAND:      S   (BEFORE 5 SEC) T
                  ↓ ↑                ↓ ↑                ↑
CVD5316 RESPONSE: S                   T (AFTER 5 SEC) 1
```

Here T restarts the 5-second timer.

Example 4:

```
PC COMMAND:      S_*- T--*-- !
                  ↓ ↑ ↓ ↑ ↓ ↑ ↑   ↑   ↑   ↑
CVD5316 RESPONSE: S   T   ! 0 T1STAT T2STAT T3STAT
```

(*) = <5 second time interval

Since this is a valid full command, and the time duration between the characters was less than 5 seconds, the CVD 5316 executes the command.

MESSAGE (2): INVALID DATA OR BAD COMMAND

- Applies when using either command.
- If applies, sent after every character.

This error message is sent whenever there is a command syntax error.

For the **MODE COMMAND**: It is also sent if the new connection request (*D*) is incorrect (not in range). The valid values for *D* are 0(30), 1(31), or 2(32).

For the **MESSAGE COMMAND**: It is also sent if the new connection request (*D*) is incorrect (if the inputs or outputs do not exist). The input can only be T1-T3, and the output has to be in the range of S1-S12. Output of 0 is also valid since it refers to a disconnected state. For example, if *D* is 10(hex), it simply means that T1 is not connected to any of the outputs.

MESSAGE (3): OUTPUT TAKEN

- Only applies when using the message command.
- If applies, sent after the good completion message (0).

Only one input can be connected to a particular output. For example, if INPUT1 is connected to OUTPUT1, then INPUT2 or INPUT3 cannot be connected to OUTPUT1.

MESSAGE (4): LINE BUSY

- Only applies when using the message command.
- If applies, sent after the good completion message (0).

If there is a full duplex communication on a line, then the line is busy. In other words, a videoconference taking place on a particular line cannot be disconnected or switched away.

MESSAGE (5): CONNECTION MADE

- Only applies when using the message command.
- If applies, sent after the good completion message (0).

For the **MODE COMMAND**: If the lines are not busy, then the operating mode of the CVD5316 is changed and a message (5) is sent.

For the **MESSAGE COMMAND**: If the full command is valid, the output is not taken, and the line is not busy, then the new connection is made and a message (5) is sent.

MESSAGE (5): IN AUTO MADE

- Only applies when using the message command.
- Sent after every character.

If the CVD5316 is operating in the “Autosense” mode (1 or 2), the only valid commands are the status check and mode commands.

SPECIFICATIONS

GENERAL SPECIFICATIONS

INPUTS:

Connector Three 8 pin RJ45
Interface Three BRI (Basic Rate Interface) ISDN T interfaces to be connected to NT1s (Network Terminal 1)

OUTPUTS:

Connector Twelve 8 pin RJ45
Interface Twelve BRI (Basic Rate Interface) ISDN S interfaces to be connected to TEs (Terminal Equipment)

USER CONTROL:

Keypad 13 keys, front panel
Computer RS232 serial communication, DB 9 F connector
The RS232 input has first priority. When the RS232 input is used the keypad on the CVD 5316 is disabled.

CONNECTOR PINOUT:

Pin 2 – TX
Pin 3 – RX
Pin 5 – GND
Remaining pins are not connected.

DISPLAY:

1 front panel 16 character LCD display

INDICATOR:

1 front panel red LED, power on indicator

POWER SUPPLY:

110 VAC or 220 VAC, 50/60 Hz

PHYSICAL SPECIFICATIONS

DIMENSIONS:

1 Rack Unit high, Full Rack wide
17.00" W x 1.64" H x 8.50" D

ENCLOSURE:

Aluminum, dark gray, medium-texture finish

WEIGHT:

Net	4.5lb / 2.0kg
Shipping	6.0lb / 2.7kg

ACCESSORIES

INCLUDED:

1 power cord
1 RS232 serial communication cable, DB9 M/F, straight through
1 Windows 95/98 RS232 interface software

ALSO AVAILABLE:

CAT5 twisted-pair patch cords (various lengths)

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COMPLIANCE INFORMATION

US FCC PART 68 & INDUSTRY CANADA CS-03 REGULATORY INFORMATION

This product is classified by the United States Federal Communications Commission (FCC) and Industry Canada (IC) as a Digital On Premises ISDN Basic Rate Router. This product "is not" required to be Type Tested to FCC Part 68 or Industry Canada CS-03 Rules. This product does not carry Voice Encoded information.

INDUSTRY CANADA CS-03

In accordance with Industry Canadian CS-03, this product is equipped with a CB-1D interface connector as defined in CS-03 rules.

- Pins 4 & 5 are Terminal Equipment Receive
- Pins 3 & 6 are Terminal Equipment Transmit

UNITED STATES FCC PART 68

This product is classified by the FCC as:

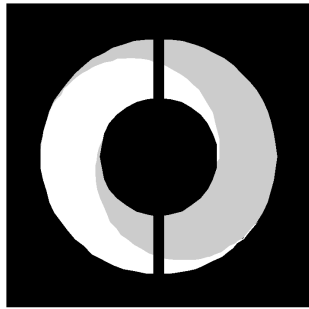
- FCC Part 68 Service Code is 6.0N
- FCC Part 68 Facilities Interface Code is 02IS5
- FCC Part 68 Equipment Code is XD, Digital ISDN ST Basic Rate XD Behind an NT-1 Interface

This product must be connected to an on premises NT-1 Interface, to remain compliant with the FCC Part 68 and Industry Canada CS-03 Rules and Regulations.

US FCC PART 15 INFORMATION

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the 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.

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.



C O V I D

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