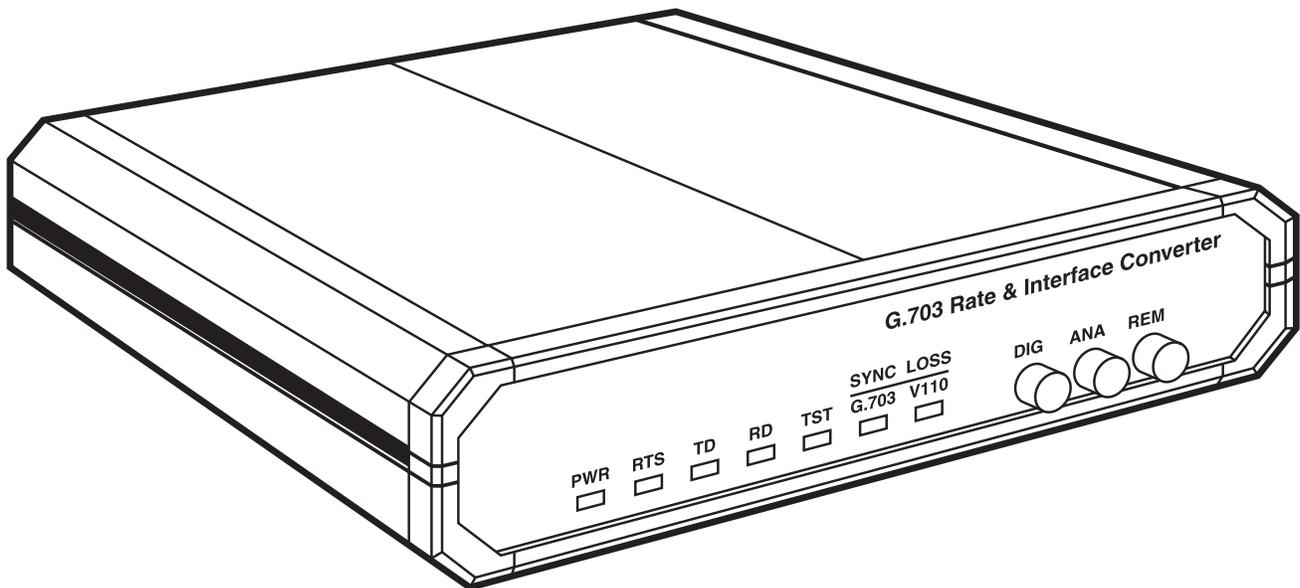




G.703 Rate and Interface Converters



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RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate 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 communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

G.703 RATE AND INTERFACE CONVERTERS

INSTRUCCIONES DE SEGURIDAD (Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

WARNING!

Always observe standard safety precautions during installation, operation, and maintenance of this product. To avoid the possibility of electrical shock, disconnect the power cord from the power source before you open up the unit or perform any repairs.

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1. Specifications

Interface —	Codirectional, 64 Kbps; connects to an EIA RS-232/CCITT V.24 terminal interface
Line —	4-wire
Maximum Range —	Up to 0.5 miles (800 m) over 24 gauge
Data Rates —	600, 1200, 2400, 4800, 7200, 9600, 14,400, 19,200 bps
Character Length in Async Mode —	Selectable 8, 9, 10, 11 (includes Start+Stop+Parity+Character Bits)
Control Signals —	RTS, DTR, DCD, DSR, CTS are passed through according to CCITT I.463; DSR may be set to constantly ON (strap-selectable)
Impedance —	120 Ω balanced
Protocol —	Sync or async, full duplex
Connectors —	IC716A: (1) 5-screw terminal block; IC716A-RJ: (1) RJ-45 female; Both: (1) DB25 female
Diagnostics —	Front-panel pushbuttons DIG (Local Digital Loopback), ANA (Local Analog Loopback), REM (Remote Digital Loopback), or (V.54) activated from RS-232/V.24 DTE; DIG is activated by a manual switch; REM is activated by a manual switch or by the DTE interface signal (Pin 21); ANA is activated by a manual switch or by the DTE interface signal (Pin 18)
Indicators —	(7) LEDs: PWR, RTS, TD, RD, TEST, G.703 SYNC LOSS, V.110 SYNC LOSS
Balance —	Better than 45 dB (up to 256 KHz)
Timing Elements —	Transmit clock (derived from 3 alternative sources: Internal oscillator, external from the DTE [Pin 24] low-speed clock, and loop clock derived from the receive signal, looped back as a transmit clock) and low-speed clock (the DCE low-speed timing signal [pins 15 and 17] is derived from the 64-KHz clock)
Return Loss —	Better than 20 dB (up to 256 KHz); Better than 14 dB (up to 384 KHz)
Clock Frequency —	64 KHz
Frequency Tracking —	± 500 ppm
“Pulse” Amplitude —	1.0V nominal
“Zero” Amplitude —	0V \pm 0.1V maximum
Operating Temperature —	32 to 122°F (0 to 50°C)

G.703 RATE AND INTERFACE CONVERTERS

Relative Humidity Tolerance —	10 to 90%, noncondensing
Power —	115 VAC (230-VAC version available)±10%, 47 to 63 Hz, 3 watts; 0.1 A slow-blow fuse; AC/DC overvoltage protection, connected via transformers to transmit or receive telephone lines (or coaxial cable)
Size —	IC716A, IC716A-RJ: 1.8"H x 7.6"W x 9.5"D (4.6 x 19.3 x 24.1 cm); IC716C: 9"H x 6.2"W x 1"D (22.9 x 15.8 x 2.5 cm)
Weight —	IC716A, IC716A-RJ: 3.1 lb. (1.4 kg); IC716C: 0.6 lb. (0.3 kg)

2. Introduction

2.1 General Description

The G.703 Rate and Interface Converter allows low-speed V.24 equipment to be connected to a G.703 codirectional (64 Kbps) interface. This conversion enables connection of low-speed data channels to the PCM network. The rate conversion is performed according to CCITT I.463 (V.110) and I.460 standards. This rate conversion also enables access to ISDN terminal adapters through the telecommunication network.

The Converter operates synchronously or asynchronously, converting V.24 rates up to 19,200 bps. For async rates of 600 bps and higher, the async-to-sync conversion is compatible with CCITT V.14. For async rates lower than 600 bps, the Converter operates in synchronous mode at 19,200 bps and multi-samples the data.

Operating full duplex at a transmission rate of 64 Kbps, the Converter has a range of up to a half mile (800 m) from the G.703 equipment. The high-speed transmit timing source is strap-selectable for either recovered clock from the G.703 interface, external timing from the V.24 interface, or internal timing.

The Converter features V.54 diagnostic capabilities for performing local loopback and remote digital loopback. When in the digital loopback mode, the operator at either end of the line may test both units and the line. The loopback is controlled either by front-panel buttons or by Pins 18 and 21 of the V.24/RS-232 interface.

All V.24 configuration parameters—such as bit rate, bit length, and sync/async—can be selected at each Interface Converter. Alternatively, parameters can be selected at a “master” Interface Converter, and downline-loaded from the “master” to a “slave” Interface Converter.

The control signals RTS and DTR are passed through end-to-end to DCD and DSR, respectively, in compliance with CCITT I.463 (V.110). DSR can be optionally set separately to be continuously ON.

The Converter is coupled to the G.703 4-wire interface line through isolation transformers which, in conjunction with other circuitry, protect against AC or DC overvoltages. The protection circuitry enables operation even when DC is connected to the line.

The Interface Converter is available as a desktop unit (with either terminal blocks or RJ-45 connectors) or as a rackmount card for a 19-inch rack. The RM110A rack (power supply 100 VA) can carry up to fourteen cards. Special hardware for mounting standalone units in a 19-inch rack can be ordered separately. The special hardware enables installation of either one or two units side by side. The unit height is only 1U (1.75"), requiring minimal rack space.

G.703 RATE AND INTERFACE CONVERTERS

2.2 Functional Description

When reading this section refer to the diagram below.

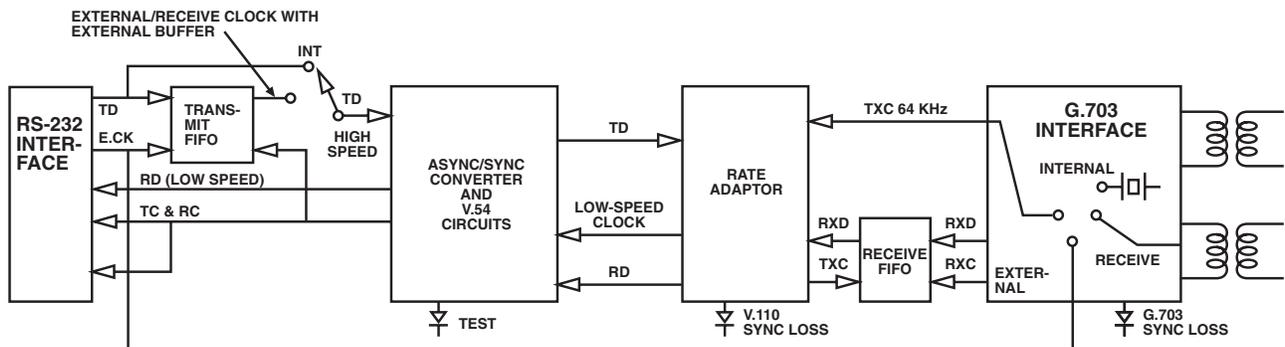


Figure 2-1. G.703 Rate and Interface Converter Block Diagram.

2.2.1 G.703 INTERFACE

The G.703 interface on the transmit side converts the analog transmit signal to a three-level signal, and inserts a bipolar violation every block of eight bits (according to the G.703 standard). On the receive side, the interface provides the digital signal (from the received analog signal) synchronized with the violation signal. If no violation signal is received, the G.703 SYNC LOSS indicator lights.

The G.703 interface also provides one of three rate-adaptor timing sources:

- Internal (a free-running crystal oscillator)
- Receive (synchronized with the received G.703 signal)
- External (synchronized with the low-speed clock provided by the DTE on Pin 24)

NOTE

The system needs one master clock. If one unit is set to Internal/External clock, the other unit must be set to Receive clock (or RCVB if needed). RCVB is a special option provided for cases in which the timing source is the Receive clock, but the incoming low-speed data is synchronized according to the External clock. In such cases, external synchronization between the G.703 network and the local DTE must be provided (refer to Figure 2-2).

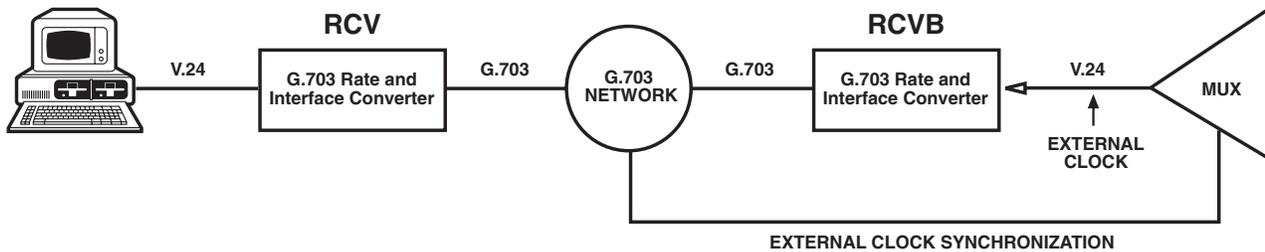


Figure 2-2. G.703 Rate and Interface Converter Synchronization Options.

2.2.2 RATE ADAPTER

The rate adapter implements the V.110 (I.463) standard. RTS, DTR, and incoming low-speed data are transmitted to the line (on 64 KHz) in frames. The receive side of the block checks the incoming frames and sends the relevant data to the low-speed channel. If the unit loses synchronization on the received frames, the V.110 SYNC LOSS indicator lights. The RTS and DTR signals are passed through as DCD and DSR.

The rate adapter also provides the low-speed transmit and receive clock.

2.2.3 ASYNC/SYNC CONVERTER AND V.54 CIRCUITS

If the DTE is an async type, an async/sync conversion is provided (as described in the V.22 standard). The V.54 circuits send and receive the pattern in order to provide the remote digital loop in the remote unit as well as the remote digital loop in the local unit.

2.2.4 TRANSMIT FIFO

The transmit FIFO compensates for phase differences if the unit is synchronized to the external low-speed clock provided on Pin 24 (DTE timing). It is also used when the Interface Converter is synchronized with the received G.703 signal, and the DTE provides the clock (Transmit Clock set to RCVB—refer to Table 3-1). In this case the DTE and digital transmission system must be externally synchronized.

2.2.5 RS-232 INTERFACE

The RS-232 interface provides a standard voltage conversion to V.24/RS-232 levels.

NOTE

1. In order to enable the DCD and RD on the remote unit, the local RTS must be in the ON state.
2. If the unit is not synchronized according to V.110 (I.463), the CTS, DSR, and DCD pins are in the OFF state.

G.703 RATE AND INTERFACE CONVERTERS

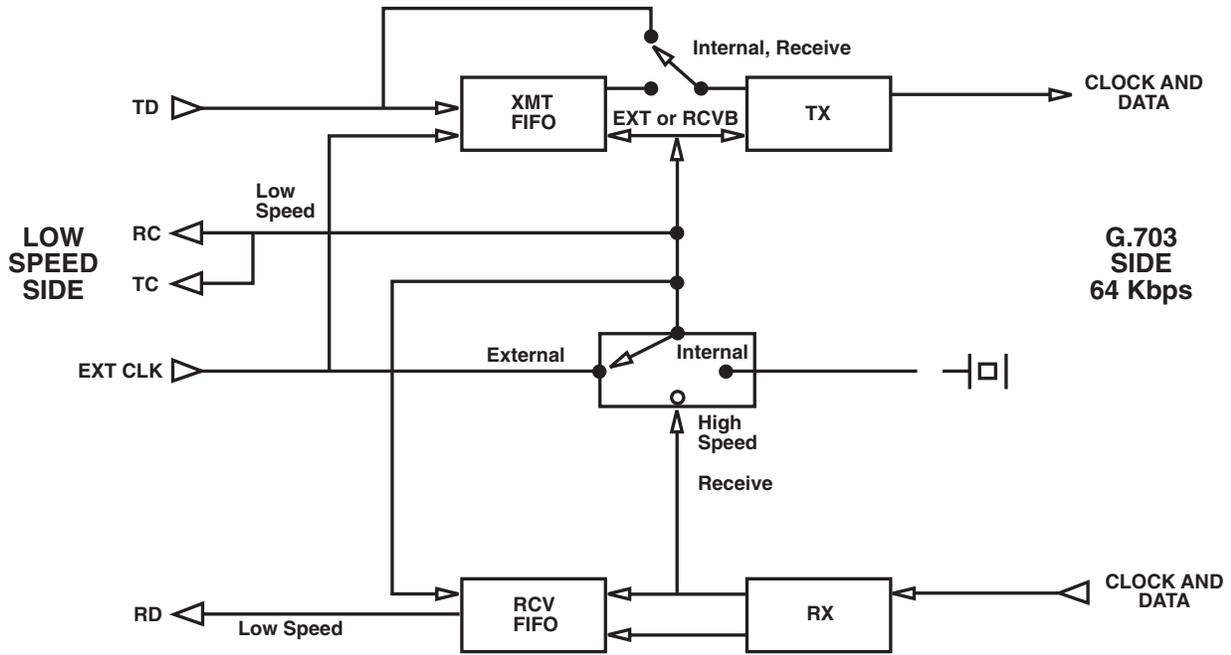


Figure 2-3. Clock Diagram.

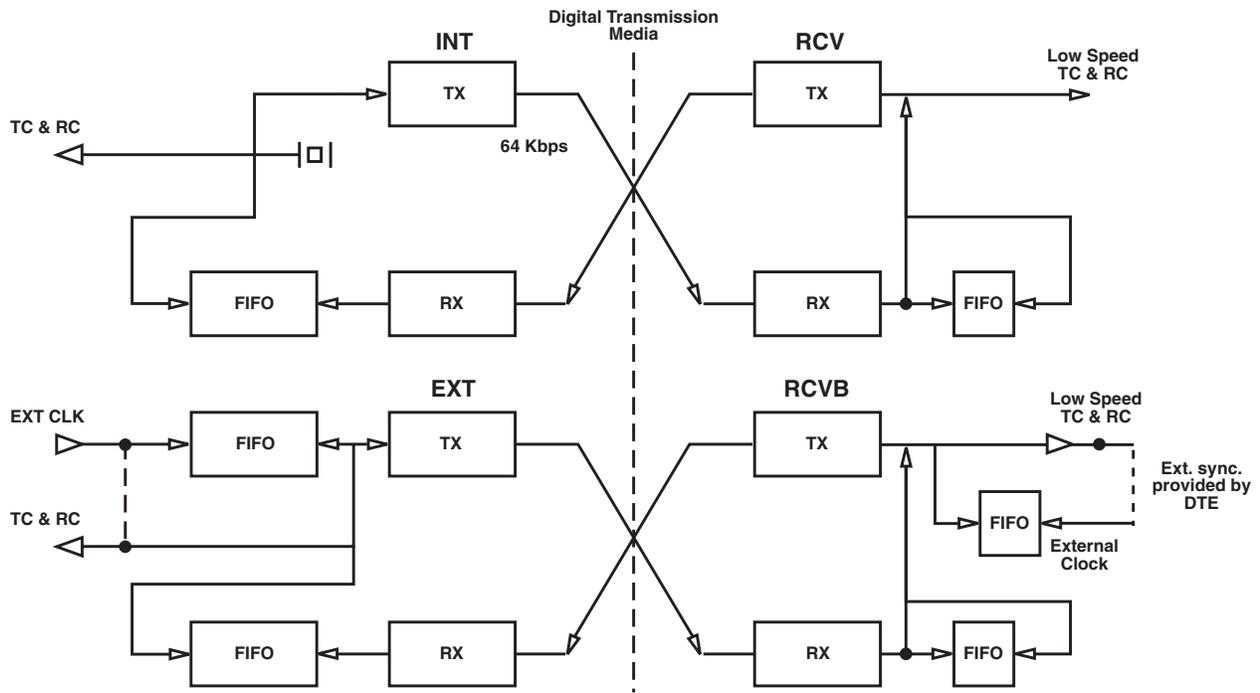


Figure 2-4. Clock Configuration.

3. Installation

This chapter provides instructions for the mechanical and electrical installation of the G.703 Rate and Interface Converter standalone models. If you need to install the Card, go to **Appendix A**.

Once you've completed the installation, refer to **Chapter 4** for operating information and system checkout to assure normal operation.

3.1 Site Preparation

Install the Interface Converter within 5 feet (1.5 m) of an easily accessible grounded AC outlet. The outlet should be capable of furnishing 115 VAC or 230 VAC, depending on the rated voltage of the unit.

Allow at least 36 inches (90 cm) of frontal clearance for operating and maintenance accessibility. Allow at least 4 inches (10 cm) clearance at the rear of the unit for signal lines and interface cables.

3.2 Mechanical Assembly

The Interface Converter standalone is designed for tabletop or bench installation, and is delivered completely assembled. No provisions are made for bolting the Converter to the tabletop.

The IC716C is the card version of the G.703 Rate and Interface Converter. It's installed in the RM110A rack.

3.3 Electrical Installation

3.3.1 POWER CONNECTION

AC power is supplied to the Converter through a standard 3-prong plug.

CAUTION!

This unit should always be grounded through the protective earth lead of the power cable.

When connecting AC power to this unit, the mains plug should only be inserted in an outlet provided with a protective earth contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding). *Interrupting the protective (grounding) conductor (inside or outside the unit) or disconnecting the protective earth terminal can make this unit dangerous.*

The line fuse is located in an integral fuse holder on the rear panel. Make sure that only fuses of the required rating, as marked on the Interface Converter's rear panel, are used for replacement. Do not use repaired fuses or short-circuit the fuse holder. Always disconnect the mains cable before removing or replacing the fuse.

Whenever it is likely that the fuse protection has been damaged, make the unit inoperative and secure it against unintended operation.

G.703 RATE AND INTERFACE CONVERTERS

3.3.2 REAR-PANEL CONNECTORS

The digital V.24/RS-232 interface on the rear panel of the Converter is a 25-pin connector. The line connector may be either an RJ-45 female or a 5-screw terminal block.

G.703 Side

RJ-45 Female Connector

The pin assignments for the RJ-45 connector are listed below.

Pin	Function
3	Receive
6	Receive
4	Transmit
5	Transmit
2	Shield (chassis ground)

Terminal Block

The 5-screw terminal block provides four screws for connecting the transmit and receive twisted-pair lines. The transmit and receive pairs are polarity-insensitive. The transmit pair is connected to the terminals marked XMT (data out), and the receive pair is connected to the terminals marked RCV (data in). The screw marked GND is connected to the AC power ground wire.

DTE Side

V.24/RS-232 Interface Connector

For the pinout, refer to **Appendix B**.

3.3.3 STRAP SELECTION

When the electrical installation has been completed and checked, determine the required configuration of the Converter and position the straps accordingly. The PCB strap locations in Figure 3-1 correspond to the numbers listed under “Strap Identity” in Table 3-1.

CAUTION

To avoid accidental electric shock, disconnect the G.703 Rate and Interface Converter’s power cord before opening the unit.

3.3.4 INSTALLING THE INTERNAL JUMPERS AND SWITCHES

- a) Disconnect the power cord from the AC outlet.
- b) Using a flat-bladed screwdriver, loosen the two screws at the rear panel.
- c) Use the screws as levers to pull out the interior like a drawer.
- d) Adjust the jumpers and switches as required, according to Table 3-1.
- e) Push the interior section back inside the unit and tighten the retaining screws.

Table 3-1. Strap Selection
(Strap identity numbers correspond to PCB Strap Locations of Figure 3-1)

Strap Identity	Function	Possible Settings	Factory Setting
1 Baud Rates (Kbps)	Selects the low-speed data rate.	0 — 0.6 1 — 1.2 2 — 2.4 3 — 4.8 4 — 7.2 5 — 9.6 6 — 14.4 7 — 19.2	3
2 TC G.703	Selects the transmit clock (64 KHz) from either: internal clock (INT), receive clock (RCV), external clock (EXT), or receive clock plus FIFO active for transmit data with DTE timing provided (RCVB).	INT EXT RCV RCVB	RCV
3 DIP Switches	S1—Selects if the unit works according to its own (“Master”) configuration for baud rate, sync/async and bit lengths or according to the remote unit (“Slave”). S2—Provides an async/sync conversion. S3/S4—Character length (includes start bits+stop bits+data bits+parity)	Master ↑ Slave ↓ ASYNC ↑ SYNC ↓ 8↑↑ 9↓↑ 10↑↓ 11↓↓	Master ASYNC 11
4 Pin 21*	Enables Remote loopback from the DTE.	EN DIS	DIS
5 Pin 18*	Enables Local loopback from the DTE.	EN DIS	DIS
6 Switch	Enables the activation of front-panel pushbutton.	EN DIS	EN
7 DSR	Sets DSR constantly ON (space) independently of the remote DTR or reflects the remote DTR.	ON REM	ON
8 C.GND	The CONNECT setting connects Signal Ground to Chassis Ground. The DIS disconnects them.	CON DIS	DIS

*Note: If the DTE does not provide the test pins for analog and remote loopback, the “DTE command” jumper for Pin 18 and Pin 21 must be always set to DIS.

G.703 RATE AND INTERFACE CONVERTERS

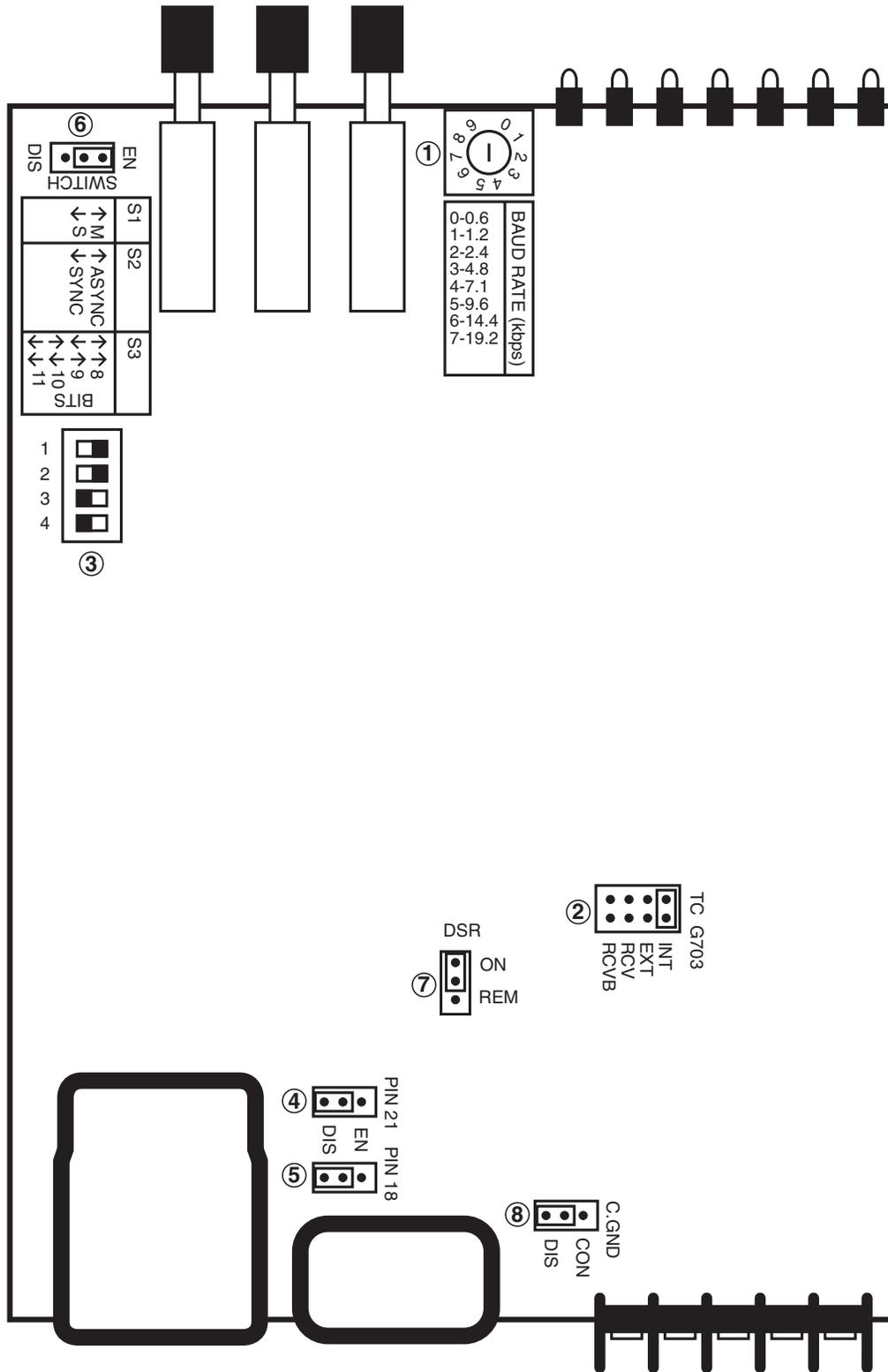


Figure 3-1. Layout of the G.703 Rate and Interface Converter Board.
 (Refer to Table 3-1 for strap selection.)

4. Operation

IMPORTANT!

Make sure you've gone through all the installation procedures in Chapter 3 before attempting to operate the G.703 Rate and Interface Converter.

4.1 Buttons and Indicators

The test buttons and LED indicators are located on the Converter's front panel. Press the button to activate (turn ON) the corresponding test. Press the button again to deactivate (turn OFF) the test. The functions of each button and indicator are described in Tables 4-1 and 4-2.

Table 4-1. Pushbutton Tests

Control	Function
DIG	The Digital loopback switch causes the local Converter to loop (loop 2) received data to its transmitter. Data Set Ready goes low (see Figure 5-4).
ANA	The Local loopback (V.54 loop 3) switch causes the local Converter to loop its transmitter output back to its receiver (see Figure 5-2). The transmitter continues to send to the line. This loopback may also be activated from the DTE when "Pin 18" is set to EN.
REM	The Remote Digital Loopback (V.54 Loop 2) switch causes the remote Converter to loop received data to its transmitter (see Figure 5-3). Data Set Ready goes low. This loopback may also be activated from the terminal when "Pin 21" is set to EN.

Table 4-2. LED Indicators

Indicator	Function
PWR (green)	On when power is on.
RTS (yellow)	ON when terminal activates Request to Send.
TD (yellow)	On when steady SPACE is being transmitted. Flickers when data is transmitted.
RD (yellow)	ON when steady SPACE is being received. Flickers when data is received.
TEST (red)	ON when the Converter is in any of the three loopback modes.
SYNC LOSS G.703	OFF for normal operation. ON if violations are not present on receive signal.
V.110	OFF for normal operation. ON if synchronization is lost on more than three consecutive frames on the incoming G.703 signal.

4.2 Operating Procedure

The G.703 Rate and Interface Converter requires no operator attention once it is installed (refer to **Chapter 3**), except for occasional monitoring of the front-panel indicators. Intervention is only required when:

- The Converter has to be adapted to new operational requirements, or
- Diagnostic loops are required.

4.2.1 POWERING ON

The Converter is turned on as soon as its AC power cord is connected to the AC power mains outlet. The PWR indicator lights, indicating that the Converter is on. Verify that the local and remote Converters are in operation by checking that the front-panel LEDs on the local and remote units match the following indicator conditions:

- PWR: On
- RTS: On
- TD: Flashing or Off
- RD: Flashing or Off
- TEST: Off
- SYNC LOSS:
 - V.110 — Off
 - G.703 — Off

NOTE: If the LEDs do not match the indicator conditions listed above, verify that none of the front-panel test buttons are pressed in.

To turn off the AC power to the Converter, remove the AC power cord from the AC source.

4.2.2 TESTING

In order to verify that the Converter is operating correctly, use the loopback tests as described in **Chapter 5**.

4.3 Reconfiguring the G.703 Rate and Interface Converter

If it becomes necessary to reconfigure the Converter for a different type of operation, field straps must be changed to correspond to the new operating mode.

For guidance in repositioning the straps and switches, refer to **Section 3.3.4**. Field straps should be changed by an experienced technician.

CAUTION

To avoid accidental electric shock, disconnect the Converter power cord before opening the unit.

5. Tests and Diagnostics

This chapter contains procedures for performing system diagnostic tests and fault isolation.

5.1 Loop Tests (DIG, ANA, and REM)

The loop test buttons (DIG, ANA, and REM) and the LED indicators built into the Converter allow rapid checking of the data terminals, the Converter, and the lines. Use the test procedures provided in this chapter to verify normal system operation and to isolate faulty equipment in the event of failure.

Before testing the operation of the data-system equipment and their line circuits, make sure that all units are turned on and are configured correctly.

5.2 Self-Test

To verify that the Converter is operating correctly, initiate the self-test by pressing the ANA button (see Figure 5-1).

Press the ANA (Local Loopback) button. The TEST indicator lights. Both V.110 and G.703 SYNC LOSS indicators should not light. If one of the SYNC LOSS indicators lights up or blinks, then the Converter is faulty and should be replaced. If the test executes correctly, restore all the buttons and jumpers to the required position.

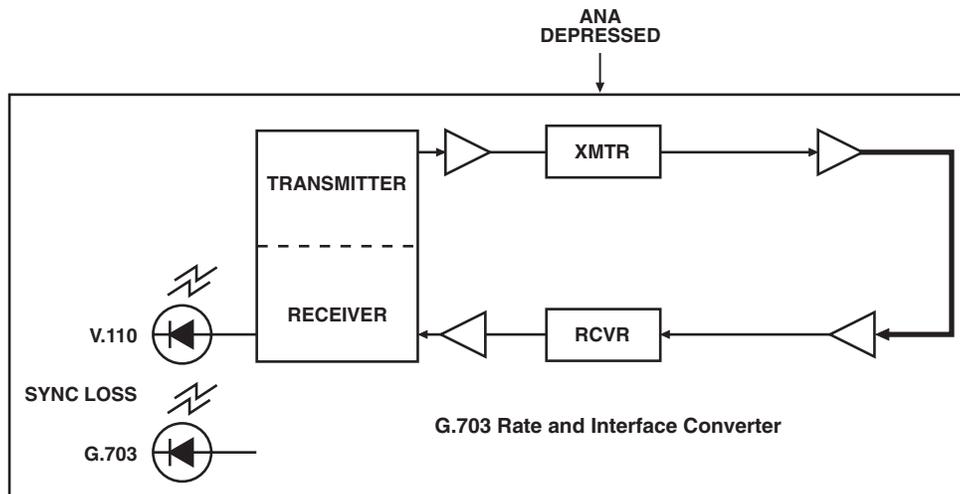


Figure 5-1. Self-Test.

5.3 Local Test—Local Loopback

This test is activated by pressing the ANA button. This test checks the performance of the local Interface Converter, the local data terminal, and the connections between them. It is performed separately at the local and the remote sites (refer to Figure 5-2).

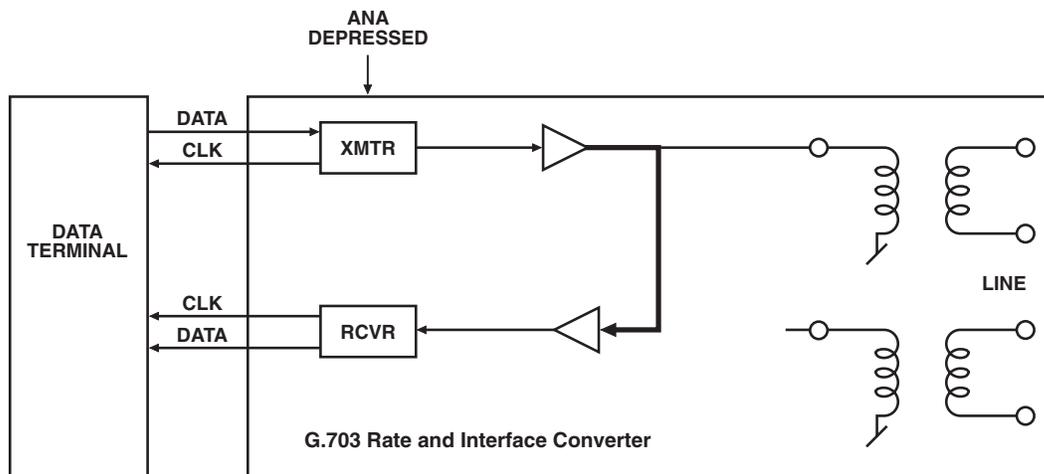


Figure 5-2. Local Interface Converter in Local Loopback.

- a) Press the ANA (Local Loopback) button. The TEST indicator should light. The Converter's transmit output is not connected to its own receiver. (This test can also be activated via the appropriate pin on the DTE interface.) The Interface Converter continues to send data to the line side. The V.110 and G.703 SYNC LOSS indicators should not light.
- b) Verify that the data terminal equipment is operating properly and can be used for a test. If a fault is indicated, call a technician or replace the unit.
- c) Execute the test using one of these methods: Use the DTE and check the echoed data stream, or use an "external" Bit Error Rate Tester (BERT).
- d) Perform Step (c) at both ends. If the BERT test indicates correct operation, but the data terminal indicates a fault, follow the manufacturer's test procedures for the data terminal and verify the cable connecting the terminal and the Converter. After completing the test (or when the fault has been corrected), restore the ANA button to the OFF position. Proceed to the Communication Link Test (see the next section).

5.4 Communication Link Tests

5.4.1 REMOTE DIGITAL LOOPBACK

Activate this test by pressing the REM button. The test determines the performance of both the local and the remote Converters, as well as their interconnecting lines. The Remote Digital Loopback test consists of providing a loopback at the remote unit, as shown in Figure 5-3.

- a) Press the REM (Remote Loopback) button to provide a loopback at the remote Converter. The TEST indicator should light at both the local and remote units. (This test can also be activated via the appropriate pin on the DTE interface.) The SYNC LOSS indicators on both units should not light.
- b) Perform the BERT test as explained in **Section 5.3**, Step (c).
- c) If Step (b) indicates a fault, and if the self-test described in **Section 5.2** was successful for both the local and remote units, then the line circuits are not operating properly.

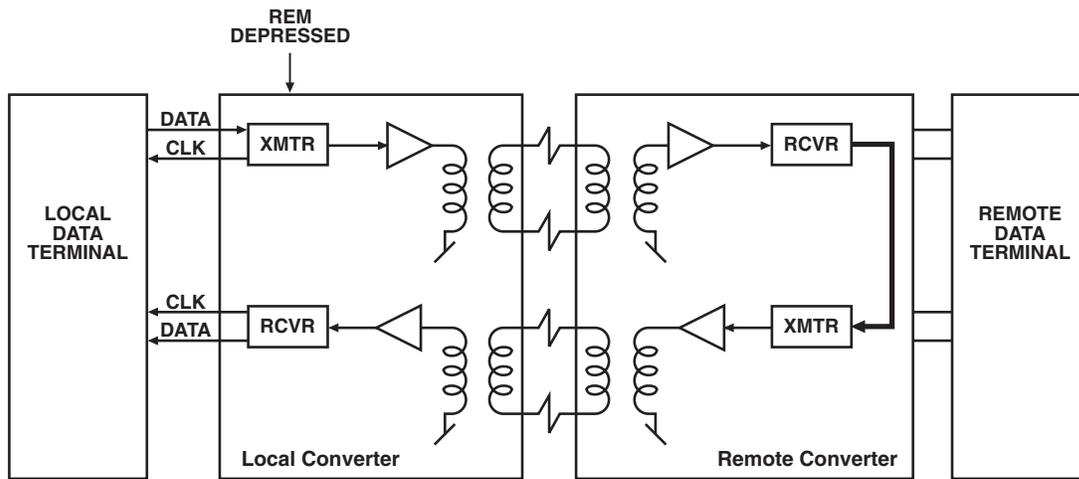


Figure 5-3. Remote Interface Converter in Digital Loopback.

5.4.2 LOCAL DIGITAL LOOPBACK

This test is activated by pressing the DIG button. The test consists of looping the received data back to the remote Interface Converter, as shown in Figure 5-4. Using this test, the operator at the remote end can determine the performance of the local and remote Converters, and of the lines interconnecting them. (The Local Digital Loopback test is equivalent to activating the remote loopback from the remote Converter.)

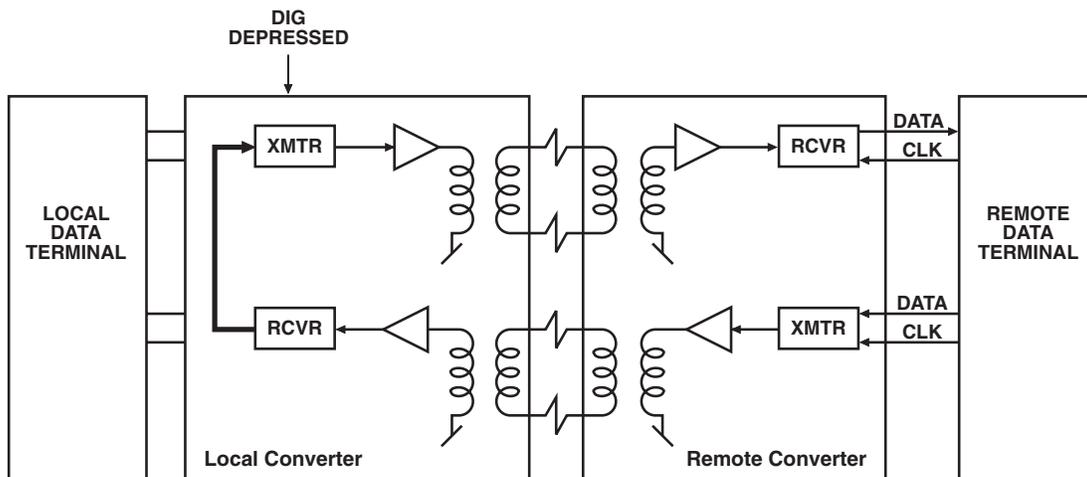


Figure 5-4. Local Interface Converter in Digital Loopback.

Appendix A. The RM110A Rack and the G.703 Rate & Interface Converter Card

A.1 Rack Description

The RM110A rack consists of a power supply and up to fourteen plug-in G.703 Rate and Interface Converter Cards. The rear panel consists of fourteen terminal blocks and fourteen connectors. Each terminal block provides five screw connections for connecting the transmit and receive lines. The transmit pair connects to the terminals marked XMT; the receive pair connects to the terminals marked RCV. A nut for optional ground connection is supplied at the left side of the rear panel. The interface connector is a DB25 female connector, which provides all digital interface signals.

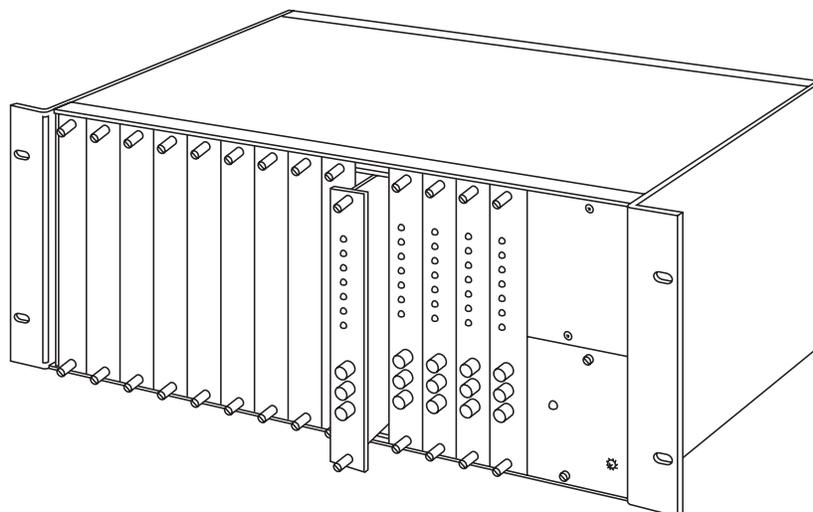


Figure A-1. RM110A Rack.

Control/Indicator/Connector	Location	Function
Card Slots 1 through 14	Front panel	Card slots. Slot 1 is on the left-hand side. Unused slots are closed with blank panels.
Power-Supply Module	Front panel, right side	Provides power to enclosure models.
POWER Indicator	On the power-supply module	Indicates when power is ON.
Power Connector	Rear panel, left side	Line power connector (3-prong) with integral fuse.
Main Channel Connectors	Rear panel, bottom row	DB25 female connectors for V.24 connection.
4-wire Terminal Blocks	Rear panel, top row	For connection of G.703 (balanced) 4-wire lines. Each card has a separate terminal-block connector.

A.2 Power Supply

The power supply can accept either 115 or 230 VAC, depending upon the rated voltage of the unit. Essentially, it consists of a power-line transformer, a fuse, and an operating switch. All power-regulating circuitry is located on the Converter cards themselves. Each Converter card has 5- and 12-VDC fuses which protect the system and power supply against a short circuit in the card. Primary power needed is 115/230 VAC±10%, 47 to 63 Hz, at 24 VA maximum.

AC power should be supplied through a 5-foot (1.5-m) standard power cord between the AC mains socket at the rear of the power-supply module and a standard, *grounded*, easily accessible AC outlet. An integral fuse is located in the AC mains socket of the power supply.

CAUTION!

This unit should always be grounded through the protective earth lead of the power cable.

When connecting AC power to this unit, the mains plug should only be inserted in an outlet provided with a protective earth contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding). *Interrupting the protective (grounding) conductor (inside or outside the unit) or disconnecting the protective earth terminal can make this unit dangerous.*

The line fuse is located in an integral fuse holder on the rear panel. Make sure that only fuses of the required rating, as marked on the RM110A rear panel, are used for replacement. Do not use repaired fuses or short-circuit the fuse holder. Always disconnect the mains cable before removing or replacing the fuse.

Whenever it is likely that the fuse protection has been damaged, make the unit inoperative and secure it against unintended operation.

A.3 Installation

After installing the RM110A in the 19-inch rack:

- a) Insert the G.703 Rate and Interface Converter cards. Do not use excessive force. If the card does not go in easily, remove the card, realign it with the enclosure guides, and reinsert it.
- b) Push the bottom of the cards further into the rack to ensure they are fully inserted into the edge connectors.
- c) Tighten the screw on the top of each card.

A.4 Operation

The supply of power to all cards is provided by the power module on the right hand side of the RM110A rack. There is no ON/OFF switch. Once you plug the rack in, the power is ON (as noted by the lit POWER LED).

When the power supply is ON, exposure is limited to 30V on any card or accessible area of the rack.

Appendix B. V.24/RS-232 Interconnection

Table B-1. DTE Interface Signal Assignments

V.24	RS-232C	DTE Pin	Signal Name	Description
101	AA	1	Protective Ground	Chassis ground. May be isolated from Signal Ground (refer to GND Strap in Table 3-1).
102	AB	7	Signal Ground	Common signal and DC power supply ground.
N/A	N/A	9 10	+5 volts —	Output +5VDC. —
103	BA	2	Transmitted Data	Serial digital data from a terminal or other source. If accompanied by an external data-rate clock, data transitions must occur on positive-going transitions of the external transmit output clock.
104	BB	3	Received Data	Serial Digital data at the output of the unit receiver. The data transitions occur on the rising edge of the clock.
105	CA	4	Request to Send	A positive level to the Converter when data transmission is desired.
106	CB	5	Clear to Send	A positive level from the Converter, after receipt of Request to Send and when the Converter is ready to transmit.
107	CC	6	Data Set Ready	A positive level from the Converter when the power is on and the Converter is not in the DIGITAL LOOP mode or has not received a REMOTE LOOPBACK signal from the remote unit; otherwise, Data Set Ready follows the remote DTR.
109	CF	8	Receive Line Signal Detector (Carrier Detect)	A positive level from the Converter, except when a loss of the received input signal is detected or when remote RTS is negative.
113	DA	24	External Trans. Serial Clock	A serial data-rate clock input from the data source. Positive clock transitions correspond to data transitions.
114	DB	15	Transmitter Signal Element Timing	A transmit data-rate clock for use by external data source. Positive clock transitions correspond to data transitions.

Table B-1 (continued). DTE Interface Signal Assignments

V.24	RS-232C	DTE Pin	Signal Name	Description
115	DD	17	Receiver Signal	A receive data-rate clock output for use by external data sink. Positive clock transitions correspond to data transitions.
142	—	25	Test Indicator	A control-signal output from the Converter. Positive during any test mode.
141	—	18	Loop 3 Test Command	A control-signal input; when on, commands the Converter into Local Analog Loopback (V.54 Loop 3).
140	—	21	Loop 2 Test Command	A control-signal input; when on, commands the Converter to send a remote Loopback Command (V.54 Loop 2) to the remote Converter.
108	—	20	Data Terminal Ready	This input signal is passed through to the remote Converter as DSR.

Appendix C. Rack Adapter Installation Kits

The G.703 Rate and Interface Converter's exterior casing was designed to simplify access to the interior strap settings and to simplify installation in 19-inch racks.

You can access the Converter's interior by releasing two rear-panel screws and then using them as levers to pull out the interior like a drawer.

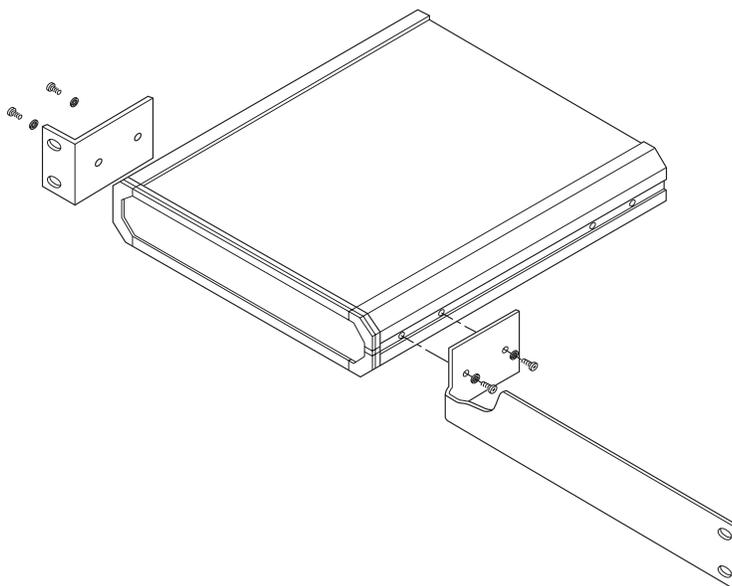
Unit height for installation in 19-inch racks corresponds to 1U (1.75"), with the width slightly less than half the available mounting width. A rack adapter kit (part number RM523) is available for installation of either a single unit or two units side by side.

IMPORTANT!

Before you open the Converter, disconnect the unit from AC power.

C.1 Rack Adapter Kit—Single-Unit Installation

The rack adapter components for single-unit installation include one short bracket and one long bracket. The brackets are fastened by means of screws to the side walls of the case, as shown in the illustration below. The short bracket attaches to the left side of the unit, and the long bracket to the right side of the unit.

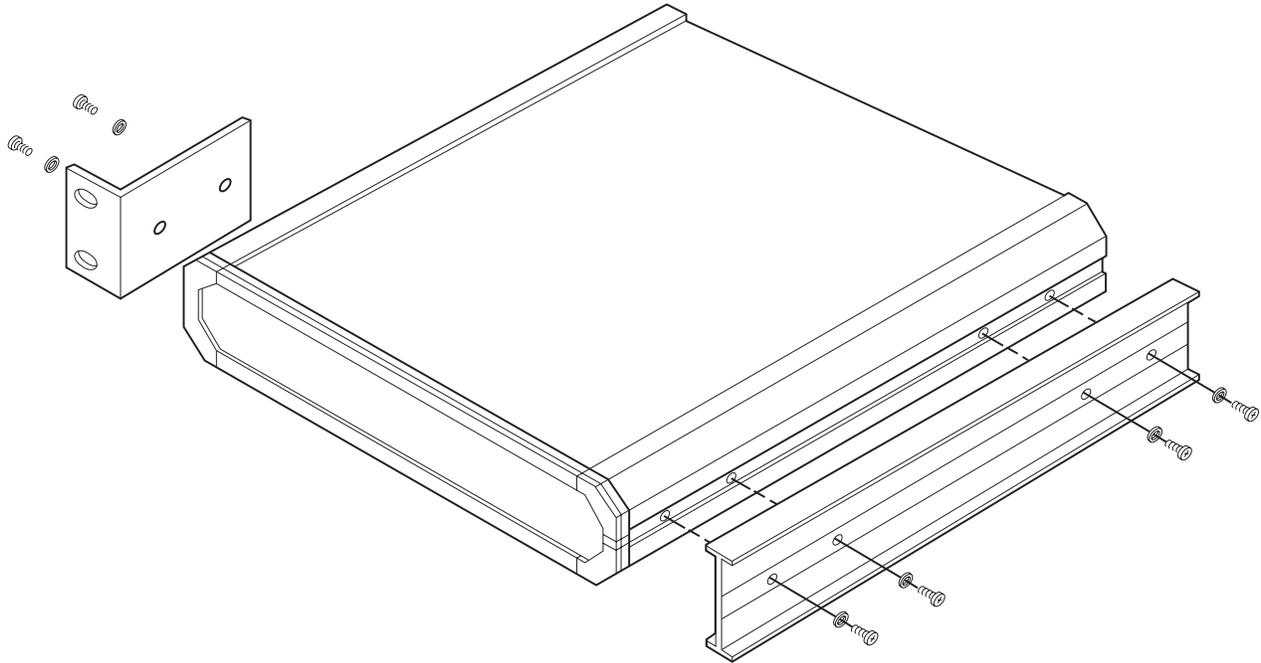


To prepare the unit for rack installation, attach the two brackets to the side walls of the unit. Each bracket is fastened by means of two screws (with flatwashers), which are inserted into the two front holes on the side wall (nuts are already in place, on the inner side of the wall).

After attaching the brackets, the unit is ready for installation in the 19-inch rack. Fasten the brackets to the side rails of the 19-inch rack by means of four screws (not included in the kit).

C.2 Rack Adapter Kit—Dual-Unit Installation

The rack adapter components for two units include two long side rails (one for each unit) which slide one within the other to fasten the two units together, and two short side brackets which fasten the two units to the 19-inch rack. (See the illustration below.)

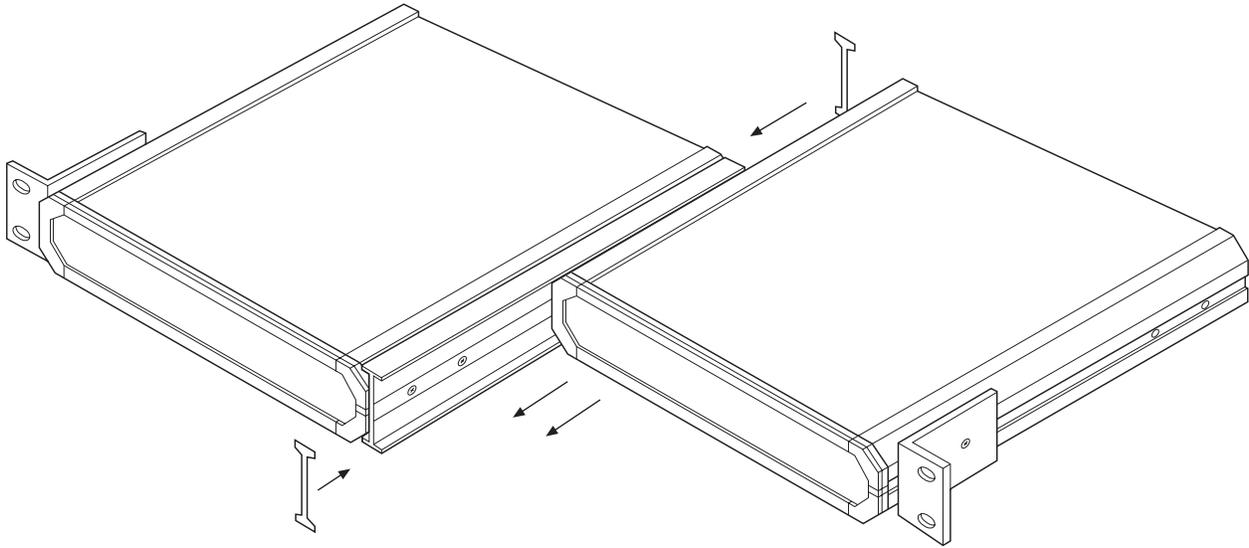


To install two units:

- 1) Attach a long side rail to each unit (right side for one unit, left side for the other unit) using the four screws and flat washers supplied. The long side rails must be attached in opposing fashion, the narrow flange of the first rail opposite the wide flange of the second rail.
- 2) Attach a short bracket to the other side of each unit using the four screws and flat washers supplied.
- 3) Slide one unit side rail within the other, so as to fasten the two units together (see the illustration on the next page).
- 4) Secure the plastic caps supplied to the ends of the joined rails, to prevent sliding of the units and to protect the rail ends.

The assembled units can now be fastened to the side rails of the 19-inch rack, by means of four screws (not included in the kit), to each side.

G.703 RATE AND INTERFACE CONVERTERS





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