

# Installation

*This chapter gives installation hints and instructions*

## 2 Unpacking & Inspection

**U**pon opening the shipping container, examine your **Prima LT Plus** for mechanical defects. Report any problems promptly to MUSICAM USA or your sales representative. Plug the unit into the main power and turn on the unit from the rear panel power switch. No adjustments for line voltage or frequency are required. The front panel LCD should illuminate and display the power-up boot sequence. The power-up sequence will take about 30 seconds to complete.

### 2.1 Location of Units

The **Prima LT Plus** has been designed to allow installation at locations with high RF fields and unstable power supplies. The **Prima LT Plus** may be used with any AC source between 85 and 250 VAC, 47 to 63 Hz. The only consideration when rack mounting your **Prima LT Plus** is that the side mounted cooling fan cannot be blocked.

#### 2.1.1 Rack Mount Or Table Top

Install the provided rack-mount ears with the hardware provided if you will be using the **Prima LT Plus** in an equipment rack. For table-top use, carefully apply the provided rubber feet to the bottom of the **Prima LT Plus**.

### 2.2 Environmental Considerations

It is important that the ambient temperature specifications are met. It is usually possible to stack **Prima LT Plus** units directly on top of other electronic equipment; however, this should be avoided if the lower

equipment produces a lot of heat. It is important that the **Prima LT Plus** not be exposed to condensing humidity or fungal environments.

### 2.3 Configuration Dependencies

The **Prima LT Plus** can be used with a variety of digital transmission facilities. Typical applications consist of ISDN, Switched-56, satellite and dedicated facilities. The cable lengths for the interconnections can be from centimeters to kilometers, and are determined by the specifications of the interface you are using. It is important to use twisted pair cable with an overall shield for the compressed audio. Flat ribbon cable should be avoided.

The audio interconnections are much less tolerant to longer cable lengths. Good cable construction is a necessity for audio cables. Remember, whatever impairments are introduced before the signal reaches the encoder will appear at the output of the decoder.

### 2.4 Connections to the Network

The **Prima LT Plus** may be equipped with a variety of digital interface modules for ISDN, Switched-56, leased circuits, and other transmission media (including V.35 and X.21/RS422 protocols). Up to three modules can be installed, allowing simultaneous connections to up to six locations.

In addition, since the RS422 interface is electrically compatible with industry standard RS449 equipment, the **Prima LT Plus** X.21/RS422 adapter can be used with RS449 equipment with the addition of an adapter cable. Each of these digital interfaces requires clock and data to be exchanged between the **Prima LT Plus** and the terminal equipment. **The standard X.21/RS422 or V.35 interface for the Prima LT Plus always expects the clock to be provided by the terminal equipment; therefore, only terminal equipment that provides clock data can be used.** Please contact MUSICAM USA if your terminal equipment does not provide network clock to the **Prima LT Plus**.

The encoder section outputs data synchronized with the clock and the decoder expects the data to be synchronized with the clock. Figures 2-1 and 2-2 show the interconnection of the **Prima LT Plus** with a generic piece of terminal equipment. The timing relationships are shown in the **CDQPrima Technical Reference Manual**, available from MUSICAM USA or on-line at [www.musicamusa.com](http://www.musicamusa.com).

If your **Prima LT Plus** is equipped only with internal terminal adapters TA101, TA201 or TA301, you can skip to Section 2.4.3



**note:**

When using X.21, RS422 or V.35 interfaces, the **Prima LT Plus** is configured as a DTE device

The data and clock lines are differential, and require a pair of wires for each signal, as does the control lines. The RS422 interface does not support any control lines. Any RS422 input control lines defined are ignored by the **Prima LT Plus** and any output control lines defined are held at constant values. Refer to Appendix B for the definition of the pins used for each type of interface.

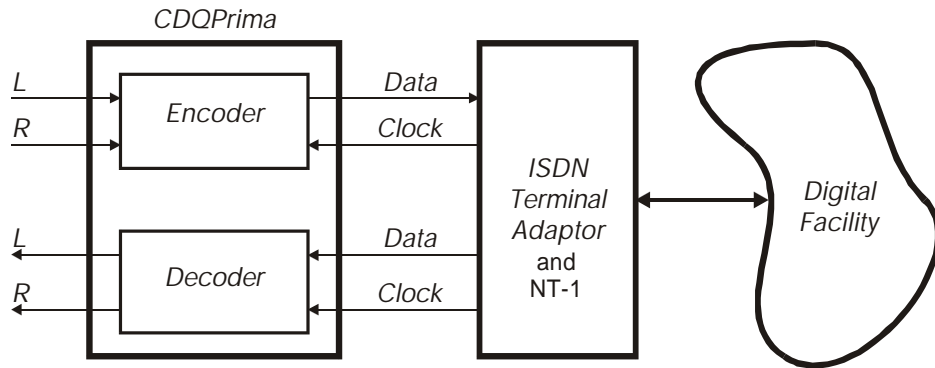


Figure 2-1 Basic Interconnection to Digital Network - RS422/V.35

#### 2.4.1 V.35 Using the DIF102 Digital Interface Module

Each interface defines a voltage level for each of the signals. In the case of V.35 and X.21, a connector type is also defined. The large, rectangular connector defined in the V.35 specification is not used by the DIF102 module because of its size. Instead, a smaller DB15 connector is used. In the case of the V.35 interface, the DIF102 module conforms to the electrical specification but requires an adapter cable to convert the DB15 connector to the connector specified in the V.35 specification. The connector and the pin-out chosen for the DIF102 module are a common deviant found in many systems. An adapter cable is available, or can be made following the diagram found in Appendix A. It is important to remember that V.35 has a separate clock for transmitted and received data. The control lines in the V.35 interface are single-ended and require only one wire for each signal

#### 2.4.2 X.21, RS422/RS449 Using the DIF101 Digital Interface Module

The RS422 interface specification defines only the electrical voltages at the interface and leaves the pin-out and meaning of the pins to the hardware designer. The RS449 interface specification utilizes the electrical specifications of RS422 but specifies a mechanical connector.

RS449 equipment is therefore electrically compatible with the DIF101 module when an adapter cable is used. RS449 also specifies numerous control signals besides clock and data, which are not used by the **Prima LT Plus**. The DIF101 module pin-out is specified in Appendix B.

The RS422 interface also has a separate clock for the transmitted and received data. The RS422 interface can also echo the transmitter clock. If the terminal equipment clocks the encoder data with the echoed clock, then the **Prima LT Plus** may be located up to 4000 feet (1219 meters) from the terminal equipment without concern for the encoder-to-clock skew.

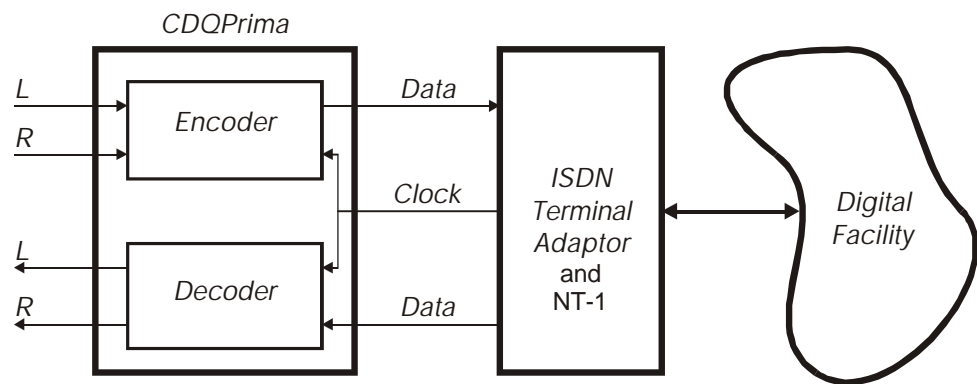


Figure 2-2 Basic Interconnection to Digital Network - X.21 interface

The X.21 interface specification is, in general, a very complex specification. The general specification allows a mechanism for communication between the customer equipment and the network. This communication path can be used for things such as dialing. A subset of the specification, called the leased circuit, restricts the interconnection to only clock and data and a very simple control signal. The mechanical connector required is the DB15 with the pin-out specified in the **CDQPrima** Technical Reference Manual. The electrical specification for X.21 is identical to those of RS422. The X.21 interface has only one clock for both the transmit and receive signals.

Since the X.21 uses the RS422 electrical interface, the **Prima LT Plus** can use the same connector and module for both interfaces. In the case of the X.21 interface, the single clock is used internally for both the transmit and receive timing. The selection of the type of digital interface is governed by software setup. See Chapter 5 for the appropriate settings. **To change the hardware configuration of the DIF101 interface card between X.21 and RS422, change the position of**



If your **Prima LT Plus** is not equipped with internal terminal adapters, you can skip to Section 5.

**jumper J4 on the interface module.** The jumper on positions 1 and 2 is used for X.21, and when on positions 2 and 3, the card is set for RS422 operation.

#### 2.4.3 ISDN Using the TA101 Terminal Adapter

Although your **Prima LT Plus** does support the TA101 terminal adapter, the TA101 is only available in Australia and is no longer supported by MUSICAM USA. For use in Australia, contact your local distributor for support. If you would like to use a TA101 elsewhere with the **Prima LT Plus**, please refer to the *CDQPrima* Users Guide, available on-line at [www.musicamusa.com](http://www.musicamusa.com), for setup instructions.

#### 2.4.4 ISDN Using the TA201 or TA301 Terminal Adapter

The TA201 ISDN interface provides connections for one BRI S/T interface and requires an external NT-1 for North American operation. The TA301 is essentially the same as the TA201 but has a built-in NT-1 and therefore can only be used in North America and countries that require the user to provide an NT-1.

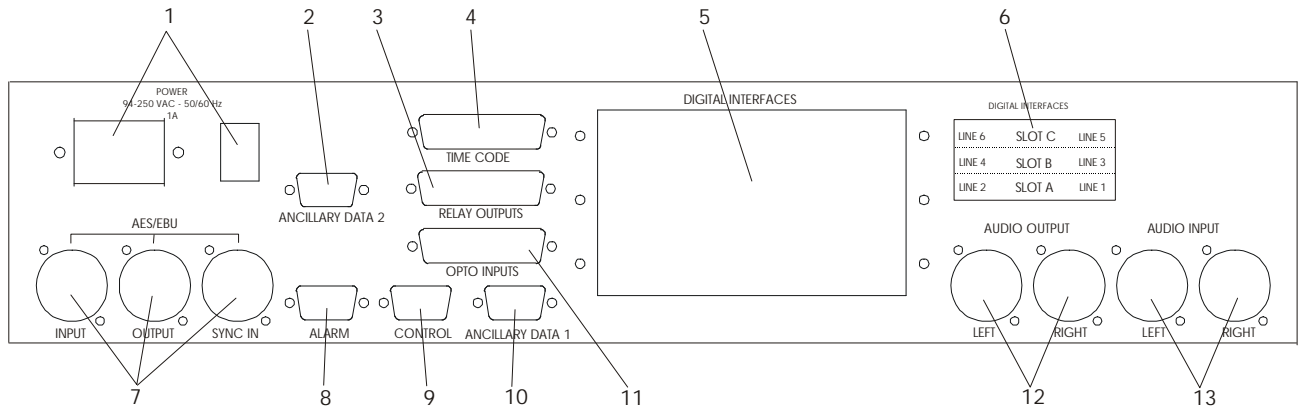
The TA201 has every country specific protocol software built in, and does not require any ROM chip changes to be used anywhere in the world with the exception of Australia. In Australia use the model TA101. Contact MUSICAM USA for availability. Each TA201 or TA301 ISDN interface adapter supports 2 ISDN 56 or 64 kb/s “B” channels that can be used independently or bonded together into a 112 or 128 kb/s channel. One single RJ-45 connector is used for the ISDN S/T connection to an external Network Termination (NT-1) on the TA201. The TA301 has one RJ-45 connector used for the ISDN ‘U’ connection directly to the North American ISDN network. See Chapter 5 for details on TA configuration.

### 2.5 Rear Panel Connectors

Refer to Figure 2-3 for the locations and types of the connectors discussed below. The pin designations for all rear panel connectors can be found in Appendix B.

#### 2.5.1 Power Connector & Power Switch (1)

The power switch is used to control the main power to the **Prima LT Plus**. The **Prima LT Plus** is equipped with a world power supply, and operation is possible at all standard world voltages and mains frequencies. No internal or external adjustments or jumpers are required.



<b>INDEX #</b>	<b>DESCRIPTION</b>	<b>CONNECTOR</b>
<b>1</b>	Power connector and switch	
<b>2</b>	Ancillary data port 2	DB9-M
<b>3</b>	Relay output connector	DB25-F
<b>4</b>	Time Code I/O connector	DB25
<b>5</b>	Digital Interface Module ports	
<b>6</b>	Digital Interface Module port legend	
<b>7</b>	Digital Audio I/O with sync input	XLR
<b>8</b>	Alarm relay port	DB9-M
<b>9</b>	RS232 and RS485 remote control port	DB9-F
<b>10</b>	Ancillary data port 1	DB9-M
<b>11</b>	Opto-isolator inputs	DB25-M
<b>12</b>	Analog audio output	XLR-M
<b>13</b>	Analog audio input	XLR-F

Figure 2-3 **Prima LT Plus** Rear Panel Connections

### 2.5.2 RS232 Ancillary Data Port 2 (2)

The RS232 I/O DB9-M connector provides an additional port into the **Prima LT Plus's** internal data multiplexer and/or the command processor. This port can be used as an additional RS232 ancillary data path. It is now possible to have two independent RS232 ancillary data paths. Details on using ancillary data can be found in the [CDQPrima Technical Reference Manual](#).

### 2.5.3 Relay Outputs (3)

The **Prima LT Plus** can be equipped with up to eight relay outputs. These dry contact relays may be controlled from the far end or by local events. In addition, fused 5 volts and ground levels are also available on the connector for pull-up and pull-down purposes. Refer to the [CDQPrima Technical Reference Manual](#) for the configuration of the DB25-F connector.

#### 2.5.4 SMPTE Time Code (optional) (4)

The **Prima LT Plus** may be optionally equipped to transmit and receive SMPTE time code at standard rates of 24, 25, 29 and 30 frames per second, drop-frame is supported. The **Prima LT Plus** automatically detects the presence and type of time code at the encoder, converts it into a digital form and then multiplexes it into the ancillary data stream for transmission with the audio. At the decoder side, the ancillary data is separated from the audio and then de-multiplexed. The time code is then regenerated. SMPTE time code is bi-directional, and can work in conjunction with sending high quality, stereo audio with bit rates as low as 112 kb/s. Details for using this feature can be found in the [CDQPrima Technical Reference Manual](#).

#### 2.5.5 Digital Interface Module Ports (5)

The **Prima LT Plus** accommodate up to three Digital Interface Modules. Currently, five different Digital Interface Modules are available: TA101, TA201 and TA301 for ISDN, DIF101 for RS422/X.21 and DIF102 for V.35.

#### 2.5.6 Digital Interface Module Legend (6)

This legend helps to identify ports on installed Digital Interface Modules.

#### 2.5.7 Digital Audio I/O (7)

The AES/EBU professional digital audio interface provides a method to directly input and output digital audio. This standard allows interconnection of equipment without the need for Analog/Digital conversions. It is always best to reduce the number of A/D conversions since each time the conversion is performed, noise is generated. Internal or external sync sources may be used.

The **Prima LT Plus** can also accept consumer standard S/PDIF digital audio I/O through the same XLR connectors; however, the **Prima LT Plus** must be reconfigured (three internal jumpers must be moved) for this. These jumpers, J5, J9 and J10, are located on the main circuit board behind the power supply. Use position "P" for professional AES/EBU digital audio (default), and position "C" for consumer grade S/PDIF digital audio.

An external Sync input is provided to allow the **Prima LT Plus** to use studio clock.

#### 2.5.8 Alarm Port (8)

This is a DPDT relay output whose function is controlled by the RLS (Summary Alarm Relay) action. See the [CDQPrima Technical Reference Manual](#) for information on the use of this feature. These relay contacts are often used as a summary alarm output to indicate the failure of any major subsystem or loss of the transmission facility, but can be re-programmed using Prima Logic Language.

#### 2.5.9 Remote Control Port (9)

This I/O port on the **Prima LT Plus** provides for RS232 or RS485 remote control. For a detailed description of all remote control commands, see the [CDQPrima Technical Reference Manual](#) and the [CDQPrima Remote Control Manual](#). Please note that since both RS232 and RS485 interfaces share the same connector, special cables are required. A description of the required cables and the connector pin-outs can be found in Appendix A and B.

#### 2.5.10 Ancillary Data Port 1 (10)

The Ancillary Data connector provides an RS232 bi-directional interface for the transmission of asynchronous data. Data rates range from 300 to 38,400 bps. The data is transmitted in the same bit stream as the compressed audio. The cable configuration can be found in Appendix A. Refer to the [CDQPrima Technical Reference Manual](#) for the required setup and configuration of this port.

#### 2.5.11 Analog Audio I/O (12, 13)

The **Prima LT Plus** is equipped with 24 bit A/D and D/A converters for superior audio quality. The analog sections of the **Prima LT Plus** are factory set to +18 dBu maximum input levels, but can be adjusted to +12 or +15 dBu maximum. Please contact MUSICAM USA if you require additional information or non-standard I/O levels or impedance. The **Prima LT Plus** uses industry standard XLR audio connectors for analog audio. Input impedance can be set to 600 ohms or >25 kOhms balanced. Output impedance is 600 ohms or <60 ohms balanced.