

# USER MANUAL

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MODEL 2711 Series

*MicroLink-T1™*

T1/Fractional T1 CSU/DSU



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An ISO-9001  
Certified Company

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## 1.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for One Year parts and labor. If any questions or problems arise during installation or use of this product, please do not hesitate to contact Patton Electronics Technical Support at (301) 975-1007.

### 1.1 WARRANTY STATEMENT

**Patton Electronics** warrants all Model 2711 Series components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment. This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse, or unauthorized modification. This product contains no serviceable parts; therefore the user shall not attempt to modify the unit in any way. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user. In the event the user detects intermittent or continuous product malfunction due to nearby high power transmitting radio frequency equipment, the user is strongly advised to use only data cables with an external outer shield bonded to a metal or metalized connector.

### 1.2 CE NOTICE

The CE symbol on your Patton Electronics equipment indicates that it is in compliance with the Electromagnetic Compatibility (EMC) directive and the Low Voltage Directive (LVD) of the Union European (EU). A Certificate of Compliance is available by contacting Patton Technical Support.

|   |
|---|
| <p><b>WARNING!</b>  This device is not intended to be connected to the public telephone network.</p> |
|---|

### 1.3 RADIO AND TV INTERFERENCE

The Model 2711 Series generates and uses 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 Model 2711 Series has been tested and found to comply with the limits for a Class A computing device 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 Model 2711 Series does 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).

### 1.4 FCC INFORMATION

The Model 2711 Series has been tested and registered in compliance with the specifications in Part 68 of the FCC rules. A label on the equipment bears the FCC registration number. You may be requested to provide this information to your telephone company.

Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper operation of the Model 2711 Series. If this happens, the telephone company should give you advance notice to prevent the interruption of your service.

The telephone company may decide to temporarily discontinue your service if they believe your Model 2711 Series may cause harm to the telephone network. Whenever possible, they will contact you in advance. If you elect to do so, you have the right to file a complaint with the FCC.

If you have any trouble operating the Model 2711 Series, please contact Patton Technical Support at (301) 975-1000. The telephone company may ask you to disconnect the equipment from the telephone network until the problem has been corrected or until you are certain that the Model 2711 Series is not malfunctioning.

The following information may be required when applying to your local telephone company for leased line facilities:

| Service                                     | Facility Interface Code | Service Code | Network Connection |
|---|-------------------------|--------------|--------------------|
| 1.544 Mbps SF format without line power     | 04DU9-BN                | 6.0N         | RJ48C              |
| 1.544 Mbps SF and B8ZS without line power   | 04DU9-DN                | 6.0N         | RJ48C              |
| 1.544 Mbps ANSI ESF without line power      | 04DU9-1KN               | 6.0N         | RJ48C              |
| 1.544 Mbps ANSI ESF and B8ZS w/o line power | 04DU9-1SN               | 6.0N         | RJ48C              |

### 1.4.1 FCC Compliance:

The Model 2711 has been tested and found to comply with the specifications found in Part 68 of the FCC rules and regulations. A label on the equipment bears the FCC registration number. You may be requested to provide this information to your telephone company.

The Telephone Company may decide to temporarily discontinue your service if they believe that the Model 2711 may cause harm to the telephone network. Whenever possible the telephone company will attempt to notify you in advance. You have a right, if you so choose, to file a complaint with the FCC.

In accordance with FCC rules and regulation CFR 47 68.218(b)(6), the user must notify the telephone company prior to disconnection.

The Universal Service Order Code (USOC) is RJ48.

The Facility Interface Codes (FIC) are 04DU9-BN, 04DU9-DN, 04DU9-1KN, and 04DU9-1SN.

The Service Order Code (SOC) is 6.0N

### 1.5 INDUSTRY CANADA NOTICE :

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective , operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the companies inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations.

Repairs to some certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment , or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the ground connections of the power utility, telephone lines and internal metallic water pipe system, are connected together. This protection may be particularly important in rural areas.

**CAUTION:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

## 2.0 GENERAL INFORMATION

### 1.6 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 Support at:

tel: **(301) 975-1007**;  
email: **support@patton.com**  
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 Model 2711. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for One Year parts and labor. If any questions arise during installation or use of the unit, contact Patton Electronics Technical Services at (301) 975-1007.

### 2.1 FEATURES

- Operates over 4-Wire T1 (DS1) Circuits
- Supports Unstructured Rates at 1.544 Mbps
- Supports Common Framed nx56/64 rates up to 1.536 Mbps
- Seven Easy-to-Read LED Indicators Monitor Data & Diagnostics
- Internal or Receive Loopback Clocking
- Also Works as a High-Speed Point-to-Point Modem
- Compact Size Plugs Directly into a Router, Switch or other DTE
- Made in USA

### 2.2 GENERAL PRODUCT DESCRIPTION

The **Model 2711 Series T1 CSU/DSUs** continue Patton's tradition of high quality, *miniature* access products. The Model 2711 Series CSU/DSUs plug directly into the WAN port of a switch, router or multiplexer. The *2711 MicroLink T1™* supports a single T1 or FT1 connection at data rates of 1.544 Mbps (unstructured), nx64, and nx56 (n=1, 2, 3,...24). Moreover, the starting channel can be set to any value from 1 to 24.

The Model 2711 Series is easily configurable using pc-board mounted DIP switches. Use the DIP switches to set D4 and ESF framing modes, AMI or B8ZS line coding, clocking modes, Line Build Out, Data Rate, and starting channel. Connecting directly to the V.35 interface, the ultra-compact Model 2711 attaches without using additional cables. Twisted-pair line connections are facilitated by a modular RJ-48S jack on the rear of the unit.

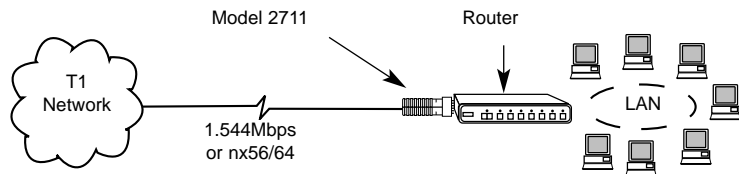
Seven easy-to-read LED indicators monitor data, network, test signals, and proper setup. Model 2711 is also available for 120 VAC or 100-240 Universal Interface (UI), or even DTE Interface power operation.

### 2.3 SUPPORTED APPLICATION

The Model 2711 CSU/DSU supplies the interface between the telephone company and customer premises equipment (CPE) such as a router. The 2711 can also be used as a high-speed short haul modem for campus applications.

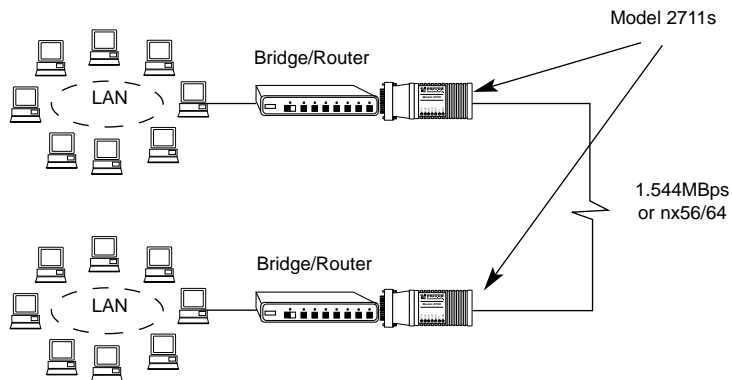
#### 2.3.1 The 2711 as the Interface between the Telco and CPE

The Model 2711 Series provides the interface between the telephone company and customer equipment, such as a router or switch (See below).



#### 2.3.2 The 2711 as a High-Speed Short Range Modem

The Model 2711 Series can also be installed into high-speed campus applications. In this application, a pair of Model 2711 Series units operate as short range modems (See below).



### 3.0 CONFIGURATION

Before placing the Model 2711 into service, the unit must be configured to match both the DTE and Network interface parameters. Configuration may be accomplished using pc board mounted DIP Switches or via software using the RS-232 control port.

#### 3.1 CONFIGURATION USING DIP SWITCHES

Configure the Model 2711 using a DIP switch package located on the bottom side of the printed circuit board (See Figure 1, below).

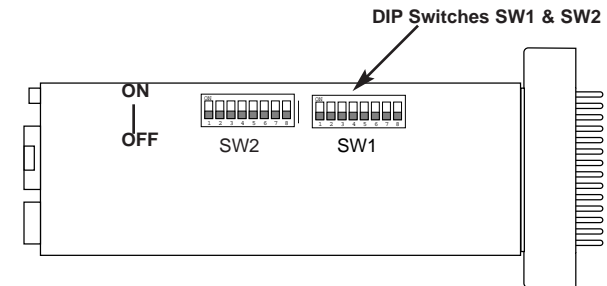


Figure 1. Model 2711 Series bottom view, showing location of DIP switches

The Model 2711 DIP switches can be configured as either "On" or "Off". Figure 2 (below) shows the orientation of the DIP switches with respect to ON/OFF positions.

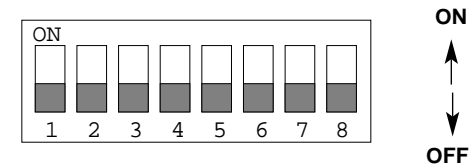


Figure 2. Close up of DIP switches showing ON/OFF positions.

### 3.1.1 DIP Switches SW1 - SW8

The configuration switches on the DIP switch pack will allow you to specify data rates, line framing and coding, DSO rate, clock mode and Line Build Out (LBO). Factory default settings of all switches are shown in the table below.

| SWITCH SETTING SUMMARY TABLE |                  |                 |                            |
|------------------------------|------------------|-----------------|----------------------------|
| Position                     | Function         | Factory Default | Selected Option            |
| SW1.8                        | Data Rate        | On              | 1.536 Mbps<br>(DTE Rate)   |
| SW1.7                        | Data Rate        | On              |                            |
| SW1.6                        | Data Rate        | Off             |                            |
| SW1.5                        | Data Rate        | Off             |                            |
| SW1.4                        | Data Rate        | Off             |                            |
| SW1.3                        | Starting Channel | Off             | Starting From<br>Channel 1 |
| SW1.2                        | Starting Channel | Off             |                            |
| SW1.1                        | Starting Channel | Off             |                            |
| SW2.8                        | Starting Channel | Off             |                            |
| SW2.7                        | Starting Channel | Off             |                            |
| SW2.6                        | Line Build Out   | Off             | 0dB                        |
| SW2.5                        | Line Build Out   | Off             |                            |
| SW2.4                        | Line Code        | Off             | B8ZS                       |
| SW2.3                        | Frame            | Off             | ESF                        |
| SW2.2                        | DS0 Rate/Clock*  | On              | 64 kbps                    |
| SW2.1                        | Clock            | Off             | Network                    |

\* In unframed mode, SW2.2 is used with SW2.1 to determine the clocking mode. In framed modes (ESF or D4) only network and internal clocking are available. In unframed mode, where the DTE data rate is 1.544 Mbps, a third clocking option is available-external clocking, in which the CSU derives its transmit timing source from the DTE (See Appendix D for external timing pin data).

| CLOCKING MODE        |            |       |               |
|----------------------|------------|-------|---------------|
| Function             | SW2.2      | SW2.1 | Clocking Mode |
| Framed Mode (ESF/D4) | Don't Care | Off   | Network       |
|                      | Don't Care | On    | Internal      |
| Unframed Mode        | Don't Care | Off   | Network       |
|                      | Off        | On    | Internal      |
|                      | On         | On    | External      |

### Switches SW1.8, SW1.7, SW1.6, SW1.5 & SW1.4

These switches set the DTE data rate. Each setting represents an nx56/nx64 setting. The chart below shows the switch settings and the achieved DTE data rate.

| MODEL 2711 DTE DATA RATE |       |       |       |       |                       |
|--------------------------|-------|-------|-------|-------|-----------------------|
| SW1.8                    | SW1.7 | SW1.6 | SW1.5 | SW1.4 | DTE Data Rate         |
| Off                      | Off   | Off   | Off   | Off   | 1544 kbps (unframed)  |
| Off                      | Off   | Off   | Off   | On    | 56/64 kbps (n=1)      |
| Off                      | Off   | Off   | On    | Off   | 112/128 kbps (n=2)    |
| Off                      | Off   | Off   | On    | On    | 168/192 kbps (n=3)    |
| Off                      | Off   | On    | Off   | Off   | 224/256 kbps (n=4)    |
| Off                      | Off   | On    | Off   | On    | 280/320 kbps (n=5)    |
| Off                      | Off   | On    | On    | Off   | 336/384 kbps (n=6)    |
| Off                      | Off   | On    | On    | On    | 392/448 kbps (n=7)    |
| Off                      | On    | Off   | Off   | Off   | 448/512 kbps (n=8)    |
| Off                      | On    | Off   | Off   | On    | 504/576 kbps (n=9)    |
| Off                      | On    | Off   | On    | Off   | 560/640 kbps (n=10)   |
| Off                      | On    | Off   | On    | On    | 616/704 kbps (n=11)   |
| Off                      | On    | On    | Off   | Off   | 672/768 kbps (n=12)   |
| Off                      | On    | On    | Off   | On    | 728/832 kbps (n=13)   |
| Off                      | On    | On    | On    | Off   | 784/896 kbps (n=14)   |
| Off                      | On    | On    | On    | On    | 840/960 kbps (n=15)   |
| On                       | Off   | Off   | Off   | Off   | 896/1024 kbps (n=16)  |
| On                       | Off   | Off   | Off   | On    | 952/1088 kbps (n=17)  |
| On                       | Off   | Off   | On    | Off   | 1008/1152 kbps (n=18) |
| On                       | Off   | Off   | On    | On    | 1064/1216 kbps (n=19) |
| On                       | Off   | On    | Off   | Off   | 1120/1280 kbps (n=20) |
| On                       | Off   | On    | Off   | On    | 1176/1344 kbps (n=21) |
| On                       | Off   | On    | On    | Off   | 1232/1408 kbps (n=22) |
| On                       | Off   | On    | On    | On    | 1288/1472 kbps (n=23) |
| On                       | On    | Off   | Off   | Off   | 1344/1536 kbps (n=24) |

### Switches SW1.1 SW1.2, SW1.3, SW 2.7 & SW2.8

These switches set the starting channel. The starting channel is the first channel that carries valid data. This channel can be set to any value between 1 and 24. If the starting channel is other than 1, then the maximum possible bandwidth will be less than 1536 kbps. For example, if the starting channel is set to be 12, then the maximum bandwidth is limited to 13x64 kbps (channels 12~24), or 832 kbps. This must be kept in mind when setting the starting channel. The Model 2711 will flash the ERR indicator LED if the switch setting is invalid. Refer to section 5.1 for a more detailed explanation of the ERR LED function.

| T1 STARTING CHANNEL |       |       |       |       |   |
|---------------------|-------|-------|-------|-------|---|
| SW1.3               | SW1.2 | SW1.1 | SW2.8 | SW2.7 | T1 Starting Channel<br>(maximum value of n) |
| Off                 | Off   | Off   | Off   | Off   | 1 (24)                                      |
| Off                 | Off   | Off   | Off   | On    | 2 (23)                                      |
| Off                 | Off   | Off   | On    | Off   | 3 (22)                                      |
| Off                 | Off   | Off   | On    | On    | 4 (21)                                      |
| Off                 | Off   | On    | Off   | Off   | 5 (20)                                      |
| Off                 | Off   | On    | Off   | On    | 6 (19)                                      |
| Off                 | Off   | On    | On    | Off   | 7 (18)                                      |
| Off                 | Off   | On    | On    | On    | 8 (17)                                      |
| Off                 | On    | Off   | Off   | Off   | 9 (16)                                      |
| Off                 | On    | Off   | Off   | On    | 10 (15)                                     |
| Off                 | On    | Off   | On    | Off   | 11 (14)                                     |
| Off                 | On    | Off   | On    | On    | 12 (13)                                     |
| Off                 | On    | On    | Off   | Off   | 13 (12)                                     |
| Off                 | On    | On    | Off   | On    | 14 (11)                                     |
| Off                 | On    | On    | On    | Off   | 15 (10)                                     |
| Off                 | On    | On    | On    | On    | 16 (9)                                      |
| On                  | Off   | Off   | Off   | Off   | 17 (8)                                      |
| On                  | Off   | Off   | Off   | On    | 18 (7)                                      |
| On                  | Off   | Off   | On    | Off   | 19 (6)                                      |
| On                  | Off   | Off   | On    | On    | 20 (5)                                      |
| On                  | Off   | On    | Off   | Off   | 21 (4)                                      |
| On                  | Off   | On    | Off   | On    | 22 (3)                                      |
| On                  | Off   | On    | On    | Off   | 23 (2)                                      |
| On                  | Off   | On    | On    | On    | 24 (1)                                      |

### Switches SW2.6 & SW2.5 Line Build Out

These switches are used to set the line build out (LBO). The LBO controls the pulse shape and attenuation of the signal sent to the network. The amount of LBO depends on the distance to the nearest repeater. The telephone company providing the T1 service will advise you of the required LBO setting.

| SW2.6 | SW2.5 | LBO            |
|-------|-------|----------------|
| Off   | Off   | 0 dB, 0-133 ft |
| Off   | On    | -7.5 dB        |
| On    | Off   | -15.0 dB       |
| On    | On    | -22.5 dB       |

### Switch SW2.4 Line Coding

This switch is used to set the line code. There are two line coding options available through the DIP switches: B8ZS and AMI. The line code refers to the way that the signal-the sequence of ones and zeros sent to the network-is encoded. AMI reverses the polarity of consecutive pulses. B8ZS is identical to AMI, except that, under certain circumstances, the alternate polarity rule is deliberately violated.

**AMI:** This stands for "Alternate Mark Inversion." The CSU/DSU transmits data as a sequence of ones and zeros. Ones are usually sent as pulses, and zeros as spaces (no pulse). In order to maximize transmission range, every pulse is of the opposite polarity of the preceding pulse. AMI does nothing else. Maintaining network integrity requires a minimum pulse density (ones density) of the signal being transmitted on the network. AMI does not inherently provide for this feature. Thus, if a long sequence of zeros happen to be sent, the network may suffer. To meet this requirement using AMI requires one of two methods: Reduce the rate of each time slot (DS0) to 56 kbps, so that the last bit can be used to guarantee the minimum ones density. Or, make sure that the DTE sends data in such a way that ones density is always maintained. For this reason, B8ZS may be preferred over AMI.

**B8ZS:** This stands for "Bipolar 8 Zero Substitution." This line code ensures minimum ones density. Long sequences of zeros are specially encoded. This line code allows any data pattern to be transmitted without causing ones density problems. Thus, it allows the use of 64 kbps timeslots.

| <u>SW2.4</u> | <u>Line Code</u> |
|--------------|------------------|
| Off          | B8ZS             |
| On           | AMI              |

### Switch SW2.3 Line Framing

This switch is used to set the frame. There are three framing modes available in the Model 2711 Series: ESF, D4 and Unframed. When SW1.8~SW1.4 are turned off, the unit is set to unframed operation, and SW2.3 is ignored. Otherwise, SW2.3 is used to set the frame to either ESF or D4.

| <u>SW2.3</u> | <u>Frame</u> |
|--------------|--------------|
| Off          | ESF          |
| On           | D4           |

### Line Framing Options

**D4/Superframe:** The D4 framing format, as specified in AT&T TR62411 is the standard in which twelve frames make up a superframe. All signaling and synchronization is done in-band.

**Extended Superframe:** Extended Superframe, as specified in AT&T TR 54016, consists of twenty-four (24) T1 frames. The framing bits are now used for framing, CRC and the Facility Data Link (FDL). The FDL allows maintenance messages and information to be passed between the 2711 and the Central Office.

### Switch SW2.2 DS0 Channel Rate

This switch is used to set the DS0 rate in framed modes; in unframed mode, this switch is used with SW2.1 to set the clocking mode.

| <u>SW2.2</u> | <u>DS0 Rate</u> |
|--------------|-----------------|
| Off          | 56 kbps         |
| On           | 64 kbps         |

### Switch SW2.1 Clock Mode

This switch is used to select the timing source for transmitting data to the network. External clocking is available only in unframed mode (DTE data rate of 1544 kbps).

| <b>CLOCKING AND FRAMING MODES</b> |              |              |                      |
|-----------------------------------|--------------|--------------|----------------------|
| <b>Function</b>                   | <b>SW2.2</b> | <b>SW2.1</b> | <b>Clocking Mode</b> |
| Framed Mode (ESF/D4)              | Don't Care   | Off          | Network              |
|                                   | Don't Care   | On           | Internal             |
| Unframed Mode                     | Don't Care   | Off          | Network              |
|                                   | Off          | On           | Internal             |
|                                   | On           | On           | External             |

**NOTE:** When using the Model 2711 to terminate the telephone company's T1 service, the 2711 must be set to network clock. When using the Model 2711 as a high-speed short range modem, one unit of the link must be configured for Internal Clock mode, and the unit on the opposite end must be configured for Network Clock mode.



## 4.0 INSTALLATION

The Model 2711 is equipped with a DTE, network, and power interface. This section briefly describes connection to each.

### 4.1 DTE INTERFACE CONNECTION

The DTE interface is a V.35 DCE presented as an M/34 male connector. This interface is designed to plug directly into a DTE interface (See Appendix D for V.35 interface pin assignments).

### 4.2 NETWORK INTERFACE CONNECTION

The Network Line Interface is an eight position keyed modular jack configured as a RJ-48C. This interface will need to be configured to match the line parameters (i.e. framing, line coding) supplied by the Central Office.

**NOTE:** If the Model 2711 Series is being used for private short range modem applications, the twisted pair cable connected to its port will need to be a cross-over cable. See Appendix D for Interface pin assignments.

### 4.3 POWER CONNECTION

The Model 2711 Series is powered via a supplied external transformer and is factory configured for either 120VAC or 100-240VAC operation. This connection is via the barrel jack on the rear of the 2711. The Model 2711 can also be powered via the DTE interface when supplied with +5VDC @ 300mA to Pin KK. See Appendix D for more information.

#### DC Power Supply

The 36-60 VDC DC to DC adapter is supplied with the DC version of the Model 2711. The black and red leads plug into a DC source (nominal 48VDC) and the barrel power connector plugs into the barrel power supply jack on the 2711.



## 5.0 OPERATION

Once the Model 2711 is installed and configured properly it is ready to place into operation. This section describes the function of the LED indicators, the use of the loopback test modes and the control port.

### 5.1 LED DESCRIPTIONS

The Model 2711 Series is equipped with seven LED indicators that monitor the status of communication. Figure 3 (below) shows the location of the LEDs on the Model 2711 Series front panel.

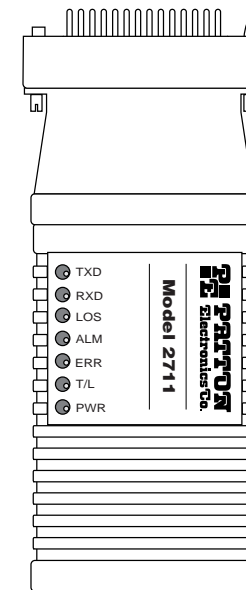


Figure 3. Top of Model 2711, Showing LED Indicators

|            |   |
|------------|---|
| <b>TXD</b> | (Transmit Data) glows green to indicate data flow to Model 2711 from the DTE.             |
| <b>RXD</b> | (Receive Data) glows green to indicate data flow from the Model 2711 to DTE.              |
| <b>LOS</b> | (Loss of Sync) glows red to indicate a network Loss of Frame or Loss of Signal condition. |

|            |   |
|------------|---|
| <b>ALM</b> | <p>(Alarm) glows red to indicate that one of several alarm conditions exist. These conditions may be local alarms or remote alarm conditions. Alarms may occur due to:</p> <ul style="list-style-type: none"> <li>• Loss of Synchronization</li> <li>• Loss of Frame</li> <li>• AIS (Blue Alarm)</li> <li>• Yellow Alarm</li> </ul>   |
| <b>ERR</b> | <p>(Error) flashes to indicate errors. There are several flashing patterns to indicate the type of error.</p> <p><b>Invalid Switch Configuration:</b> It is possible to request more bandwidth than is possible. For instance, if you set the starting channel to 12, and you select a number of timeslots exceeding 13, the unit will not be able to satisfy your request. In that case, the ERR LED will flash once a second (fi second on, fi second off). When the unit detects an invalid setting, it will ignore the setting and default to a full T1 (bandwidth = 24 channels, starting channel = 1). This will continue until you set the switches to a valid setting. The invalid switch configuration condition overrides other error conditions. Thus, if</p> <ul style="list-style-type: none"> <li>• <b>Errored Second:</b> In ESF or SF framing, if the unit detects a frame error, the ERR LED will flash briefly once a second.</li> <li>• <b>Framing Mismatch:</b> the ERR LED flashes briefly once a second when framing modes are mismatched.</li> <li>• <b>Loss of Signal:</b> When there is no signal at the network interface, the ERR LED will flash briefly once a second.</li> </ul> |
| <b>TST</b> | <p>(Test/Loop) glows yellow to indicate that the unit is in a test mode. The unit may be in any one of the following modes:</p> <ul style="list-style-type: none"> <li>• D4 Line Loop (CO initiated)</li> <li>• ESF Line Loop (CO Initiated)</li> <li>• ESF Payload Loop (CO Initiated)</li> </ul>  |
| <b>PWR</b> | <p>(Power) glows green to indicate that the unit is receiving power.</p>  |

## 5.2 CENTRAL OFFICE LOOPS

The 2711 also responds to central office initiated loop commands. When in D4 framing mode, the 2711 will implement the “loop up” command when it recognizes the pattern “10000” in the data stream for a minimum of 5 seconds. The “loop down” command is implemented by the pattern “100” in the data stream for a minimum of 5 seconds.

When operating in ESF framing mode, loopback commands are issued via the Facility Data Link (FDL). The line loop message will cause a loop back before data enters the framer portion of the CSU. The payload loop message will cause the 2711 to loop data after the framer portion of the CSU.

The 2711 will respond to Universal Loopback Deactivate to clear all central office loops.

## APPENDIX A

### PATTON MODEL 2711 SERIES SPECIFICATIONS

|                           |   |
|---------------------------|---|
| <b>WAN Speed:</b>         | 1.544 Mbps  |
| <b>WAN Connection:</b>    | RJ-48C  |
| <b>Nominal Impedance:</b> | 100 Ohms  |
| <b>DTE Interface:</b>     | Integral V.35, M/34 male or RS-422/RS-530 (DB-25 Male)  |
| <b>Line Coding:</b>       | AMI/B8ZS  |
| <b>Line Framing</b>       | D4/ESF  |
| <b>Receive LBO:</b>       | Automatic   |
| <b>Transmit LBO:</b>      | Selectable - 0, 7.5, 15, or 22.5 dB   |
| <b>Clock Options:</b>     | Internal, external and network clock  |
| <b>Diagnostics:</b>       | Responds to CO initiated D4 loopup and loopdown codes, ESF line loop and payload loop FDL messages, Universal Loopback De-activate message. |
| <b>Standards:</b>         | AT&T TR62411, ANSI T1.403, TR54016  |
| <b>Power Supply:</b>      | 120VAC, 60 Hz to +5VDC 300mA wall-mount transformer or UI 100-240VAC, 50 Hz to +5 VDC, 3A wall-mount transformer                            |
| <b>Dimensions:</b>        | 3.5"L x 2.1"W x 0.78"H (9.0 x 5.3 x 1.9 cm)   |

## APPENDIX B

### PATTON MODEL 2711 SERIES CABLE RECOMMENDATIONS

The Patton Model 2711 Series operates at frequencies of 20kHz or less and has been performance tested by Patton technicians using twisted-pair cable with the following characteristics:

| <u>Wire Gauge</u> | <u>Capacitance</u>      | <u>Resistance</u> |
|-------------------|-------------------------|-------------------|
| 19 AWG            | 83nf/mi or 15.72 pf/ft. | .0163 Ohms/ft.    |
| 22 AWG            | 83nf/mi or 15.72 pf/ft. | .0326 Ohms/ft.    |
| 24 AWG            | 83nf/mi or 15.72 pf/ft. | .05165 Ohms/ft.   |

To gain optimum performance from the Model 2711 Series, please keep the following guidelines in mind:

- *Always* use **twisted pair** wire—this is not an option.
- Use twisted pair wire with a capacitance of 20pf/ft or less.
- Avoid twisted pair wire thinner than 26 AWG (i.e. avoid higher AWG numbers than 26)
- Use of twisted pair with a resistance greater than the above specifications may cause a reduction in maximum distance obtainable. Functionality should not be affected.
- Many environmental factors can affect the maximum distances obtainable at a particular site.

**APPENDIX C**

**PATTON MODEL 2711 SERIES FACTORY REPLACEMENT PARTS  
AND ACCESSORIES**

| <u>Patton Model #</u> | <u>Description</u>                 |
|-----------------------|------------------------------------|
| 2711/CM/120 .....     | T1 Nx64 CSU/DSU(M/34 Male, 120VAC) |
| 2711/CM/UI .....      | T1 CSU/DSU (V.35 M/34 Male, UI)    |
| 07M2711 .....         | User Manual                        |

**APPENDIX D**

**PATTON MODEL 2711 SERIES INTERFACE PIN ASSIGNMENT**

**RJ-48C T1 (DS0) Network Interface  
(RJ-48S Female Modular Jack)**

| <u>Pin #</u> | <u>Signal</u>  |                |
|--------------|----------------|----------------|
| 1            | RX Data (RING) | } From Network |
| 2            | RX Data (TIP)  |                |
| 4            | TX Data (RING) | } To Network   |
| 5            | TX Data (TIP)  |                |

APPENDIX D

(continued)

PATTON MODEL 2711 SERIES INTERFACE PIN ASSIGNMENT

**M/34 Connector, Terminal Interface**

| <u>Pin #</u> | <u>Signal</u>                         |
|--------------|---------------------------------------|
| A            | GND (Earth Ground/Shield)             |
| B            | SGND (Signal Ground)                  |
| D            | CTS (DCE Source)                      |
| E            | DSR (DCE Source, Always On)           |
| F            | CD (DCE Source)                       |
| L            | LL (Local Loop, DTE Source)           |
| M            | TM (Test Mode Indicators, DCE Source) |
| N            | RL (Remote Loop, DTE Source)          |
| P            | TD (Transmit Data +, DTE Source)      |
| R            | RD (Receive Data +, DCE Source)       |
| S            | TD/ (Transmit Data -, DTE Source)     |
| T            | RD/ (Receive Data -, DCE Source)      |
| U            | XTC (Transmit Clock +, DTE Source)    |
| V            | RC (Receive Clock +, DCE Source)      |
| W            | XTC/ (Transmit Clock -, DTE Source)   |
| X            | RC/ (Receive Clock -, DCE Source)     |
| Y            | TC (Transmitter Clock +, DCE Source)  |
| AA           | TC/ (Transmitter Clock -, DCE Source) |
| KK           | Aux. Power Input (+5VDC @ 300mA)      |

APPENDIX E

PATTON MODEL 2711 SERIES POWER SUPPLY INTERFACE

Main 5VC power jack (J1)  
Center Pin: +5VDC @ 300 mA  
Outer Barrel: Ground

Auxillary Power: Supplied to Pin KK on V.35 connector