USER MANUAL

MODEL 2530

DigiLink-V™

All-Rate DDS CSU/DSU

PATTON Electronics Co.

Part# 07M2530-B
Doc# 099101UB
Revised 02/09/99

An ISO-9001 Certified Company

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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 2530 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. 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.

1.1 RADIO AND TV INTERFERENCE

The Model 2530 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 2530 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 2530 does cause interference to radio or television reception, which can be determined by disconnecting the unit, 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).

1.3 FCC INFORMATION

The Model 2530 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 2530. 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 2530 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 2530, 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 2530 is not malfunctioning.

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

Service Type	Digital Facility Interface Code	Service Order Code	Network Jacks
2.4 Kbps Digital Interface	04DU5-24	6.0F	RJ48S
4.8 Kbps Digital Interface	04DU5-48	6.0F	RJ48S
9.6 Kbps Digital Interface	04DU5-96	6.0F	RJ48S
56 Kbps Digital Interface	04DU5-56	6.0F	RJ48S

Note: As of this publication date, 19.2 and 64Kbps digital services have not been assigned Digital Facility Interface Codes.

1.3 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 Service 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 Model 2530. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

2.0 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.

2.1 FEATURES

- Operates over 4-wire dedicated digital lines
- **Synchronous** Data Rates: 2.4, 4.8, 9.6, 19.2, 56,nd 64 kbps
- **Asynchronous** Data Rates: 2.4, 4.8, 9.6, 19.2, and 38.4 kbps
- Field Replaceable DTE-DCE *QuikConnect™* interface modules: V.24/RS-232, V.35, RS-422/530, G.703, X.21 and ethernet bridge
- Features V.52 BER and V.54-compliant loop diagnostics
- 511 and 2047 Bit Error Rate Tests
- 24 Easy-to-read LED indicators to monitor data signals
- Internal, external, received loopback and campus clock modes
- AT&T 62310 compliant
- Can be used as a high speed modem for private twisted pair
- Made in the USA

2.2 DESCRIPTION

The Model 2530 Series *DigiLink-V™* CSU/DSUs provide DDS access in feature-filled package. Employing Patton's *QuikConnect™* interchangeable DTE/DCE interface modules, Model 2530 allows operation with a variety of devices. With sync operation up to 64 kbps or async support up to 57.6, Model 2530 is unmatched for versatility, reliability and "no hassle" connectability.

Model 2530 is AT&T 62310 compliant and supports DDS, Clear Channel 64 and other digital services available from major service providers. Configure the Model 2530 for the application environment using externally accessible hardware DIP switches or via menu-driven software switches. After installation, easy-to-read front panel LED indicators monitor data and control signals. Model 2530 also offers convenient V.52 BER and V.54-compliant loop diagnostics.

The Model 2530 features replaceable DCE-DTE interface modules. Available interfaces include V.24/RS-232, V.35, RS-422/530, G.703, X.21 and ethernet bridge. Line connection is made by RJ-48S jack. Power supply options include 100-253VAC(universal) and 48VDC.

3.0 CONFIGURATION

The Model 2530 features configuration capability via hardware switches or a software control port. This section describes all possible hardware and software switch configurations of the Model 2530.

3.1 CONFIGURING THE HARDWARE DIP SWITCHES

The Model 2530 has 24 DIP switches that allow configuration to wide range of applications. The 24 switches are grouped into three eight-switch sets, and are externally accessible from the underside of the Model 2530 (See Figure 1).

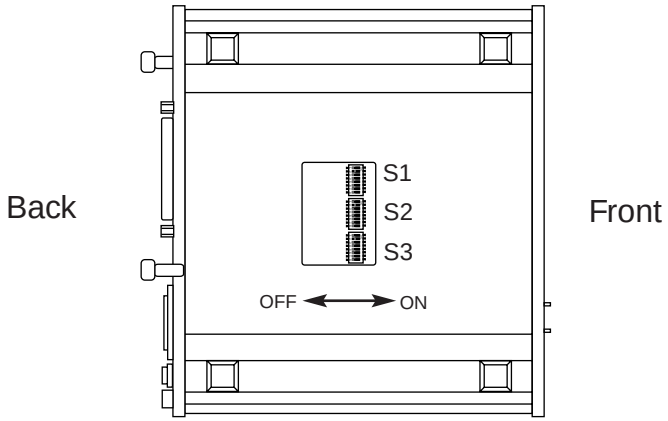


Figure 1. Underside of Model 2530, Showing Location of DIP Switches

The three sets of DIP switches on the underside of the Model 2530 will be referred to as S1, S2, and S3. Figure 2 shows the orientation of all DIP switches with respect to “ON” and “OFF” positions.

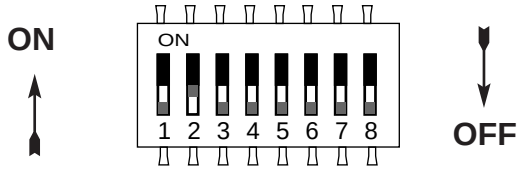


Figure 2. Close Up of Configuration Switches (all three sets are identical in appearance)

3.1.1 DIP Switch Set “S1”

The DIP switches on set S1 may be used to configure the DTE rate, RTS/CTS delay, anti-stream timer, data format, character length and Extended Signalling Rate (ESR) Default settings and detailed descriptions for each switch in the set are shown below.

S1 SUMMARY TABLE		
Position	**Function**	**Factory Default**
S1-1	DTE Rate	Off } DTE Rate
S1-2	DTE Rate	Off } equals
S1-3	DTE Rate	Off } Line Rate
S1-4	RTS/CTS Delay	Off Normal
S1-5	Anti-Stream Timer	Off Off
S1-6	Data Format	Off Synchronous
S1-7	Character Length	Off 10 Bits
S1-8	Extended Signal Rate	Off Off

Switches S1-1, S1-2, and S1-3: DTE Rate

Use Switches S1-1 and S1-2 to configure the DTE rate of the Model 2530. This rate represents the synchronous or asynchronous rate at which the DTE must connect to Model 2530’s *QuikConnect™* interface.

S1-1	S1-2	S1-3	DTE Rate
On	On	On	2.4 kbps
On	On	Off	4.8 kbps
On	Off	On	9.6 kbps
Off	On	Off	19.2 kbps
Off	On	On	38.4 kbps
Off	Off	Off	DTE Rate = Line Rate

Switch S1-4: RTS/CTS Delay

The RTS/CTS delay is the amount of time it takes for CTS to change logic state following an RTS transition. Use Switch S1-4 to select the RTS/CTS delay (**measured in *msec***.).

S1-4	Delay	56	19.2	9.6	4.8	2.4
Off	Normal	0.3	0.9	1.9	3.8	7.5
On	Extended	1.3	3.8	7.5	15	30

Switch S1-5: Anti-Stream Timer

The anti-stream timer protects multidrop networks from a drop that is continuously transmitting. If the DTE keeps RTS raised for more than the Time Value in seconds, the timer forces RTS off internally. This allows the rest of the multidrop network to resume operation. The CSU/DSU remains in the forced-off condition until the terminal drops RTS. Use Switch S1-5 to enable the timer.

		Timer Value in Sec at Various Line Rates				
S1-5	Timer	56	19.2	9.6	4.8	2.4
On	Disabled	*not applicable*				
Off	Enabled	2	4	8	15	30

Switch S1-6: Data Format

Use Switch S1-6 to configure the Model 2530 for synchronous or asynchronous connection to the DTE.

S1-6	Setting
Off	Synchronous
On	Asynchronous

Switch S1-7: Asynchronous Character Length

Set Switch S1-7 to configure the total number of asynchronous bits per asynchronous character (when Switch S1-6 is set to “On”).

S1-7	Setting
Off	10 bits
On	11 bits

NOTE: The total asynchronous character is determined by sum of all start bits, data bits, stop bits and parity bits. For instance:

1 start bit + ***8*** data bits + ***1*** stop bit + ***0*** parity bits = **10** bits

Switch S1-8: Extended Signaling Rate

Use S1-8 to configure the frequency tolerence the Model 2530 “looks for” in asynchronous data rates (i.e., the actual variance from a given frequency level the Model 2530 Series will tolerate).

S1-8	Setting
Off	-2.5% to +1%
On	-2.5% to +2.3%

3.1.2 DIP Switch Set “S2”

The DIP switches on set S2 may be used to configure the line rate, clock mode, force RTS, and DSR status during local loop. Default settings and detailed descriptions for each switch in the set are shown below.

SW2 SUMMARY TABLE

Position	Function	Factory Default
SW2-1	Line Rate	Off } 56 kbps
SW2-2	Line Rate	On } 56 kbps
SW2-3	Line Rate	On } 56 kbps
SW2-4	Clock Mode	Off } Network
SW2-5	Clock Mode	Off } Network
SW2-6	Force RTS Signal	Off Disabled
SW2-7	DSR During Local Loop	Off Off
SW2-8	Circuit Assurance	Off Disabled

Switches S2-1, S2-2 and S2-3: Line Rate

Use Switches S2-1, S2-2, and S2-3 to configure the signalling rate on the line (RJ-48S port). The setting should match the speed of your digital service.

S2-1	S2-2	S2-3	Line Rate
On	On	On	2.4 kbps
On	On	Off	4.8 kbps
On	Off	On	9.6 kbps
On	Off	Off	19.2 kbps
Off	On	On	56 kbps
Off	On	Off	64 kbps
Off	Off	Off	Forces configuration pointer to default to hardware control.

Switches S2-4 and S2-5: Clock Mode

Use Switches S2-4 and S2-5 to set the source of Model 2530's transmit clock.

S2-4	S2-5	Clock Mode	Description
Off	On	External (DTE)	Transmit clock derived from terminal interface
Off	Off	Network (Looped)	Transmit clock derived from the received line signal; Use this mode for Dedicated DDS operation
On	On	Internal (Master)	Transmit clock derived internally
On	Off	Campus Clock	Transmit clock derived from the received line signal. Allows remote device (in *campus clock* mode) to initiate V.54 loopback. For use only in campus short-haul configuration. (**Note:** Local device must be set in *internal* clock mode.)

Important: For X.21 or Async campus short haul modem applications, please configure one Model 2530 for internal clock mode and the other Model 2530 for receive recover clock mode.

Switch S2-6: Force RTS

Use S2-6 to force the transmitter ON, thereby ignoring the DTE's RTS signal. In the Off position, RTS controls the transmitter by forcing it to send either the DTE data or an idle pattern.

S2-6	RTS	Description
On	Forced On	Transmitter is always ON
Off	Follows DTE Signal	The RTS input controls the transmitter

NOTE: At 64 kbps Force RTS is always on.

Switch S2-7: Data Set Ready During LOCAL Loopback Test

Use Switch S2-7 to control the behavior of the DSR signal at the DTE interface during the local loopback test.

S-3	Setting
On	DSR is on during local line loop
Off	DSR is off during local line loop

Switch S2-8: Circuit Assurance

On dedicated circuits, the transmitter and the CTS output can be configured to go ON only when a working communication circuit is established. If Circuit Assurance is used, enable it on only one end of the communication link. Use Switch S2-8 to configure circuit assurance.

S2-8	Circuit Assurance	Description
On	Enabled	CTS will go low and the transmitter will be held off if the receiver is in the No Signal state or CD is low
Off	Disabled	The transmitter and CTS will operate without regard to the receiver state

3.1.3 DIP Switch Set "S3"

The configuration switches on S3 set the BER Test pattern, response to remote loop, front panel switch activation, DTE loop request, and control port speed. The default settings and detailed descriptions for each switch in the set are shown below.

S3 SUMMARY TABLE			
Position	**Function**	**Factory Default**	
S3-1	Test Pattern	Off	511
S3-2	RDL Response	Off	Enabled
S3-3	Front Panel Switches	Off	Enabled
S3-4	DTE Loop Request	On	Disabled
S3-5	*Reserved for Future Use*	Off	
S3-6	*Reserved for Future Use*	Off	
S3-7	Control Port Speed	Off	19.2 kbps
S3-8	Control Port Speed	Off	

Switch S3-1: Test Pattern

Use Switch S3-1 to set the V.52-compliant pattern used to test the Model 2530. The two test options are the 511 and 2047 BER patterns (For descriptions of the 511 and 2047 BER options, please refer to Section 5.4).

S3-2	Setting
Off	511 Pattern
On	2047 Pattern

Switch S3-2: Response to RDL Request

Use Switch S3-2 to allow Model 2530 to enter the Remote Digital Loopback diagnostic test when requested to do so by the remote Model 2530 For example, when Switch S1-8 is set to "ON", it will enter RDL mode (See Section 5.3.2) when requested to do so by the remote Model 2530.

S3-2	Setting
Off	Response to RDL Request Enabled
On	Response to RDL Request Disabled

Switch S3-3: Front Panel Switch Enable/Disable

Use Switch S3-3 to enable or disable the front panel switches.

S3-3	Activation	Description
Off	Enabled	Front panel switches may be used to activate/terminate diagnostics
On	Disabled	Front panel switches will have no effect on operation of the unit

Switch S3-4: DTE Loop Request Line Enable/Disable

Use Switch S3-4 to activate or deactivate DTE control of the loop-back diagnostic modes and BER test patterns.

S3-4	DTE TM Line Activation	Description
Off	Enabled	DTE Loop request lines may be used to activate/terminate diagnostics.
On	Disabled	DTE loop request lines will have no effect on operation of the unit.

Switches S3-5 and S3-6: *Reserved for Future Use*

Switches S3-5 and S3-6 are *reserved for future use* and must remain in the OFF position.

Switches S3-7 and S3-8: Control Port Data Rate

Use Switches S3-7 and S3-8 to configure Model 2530's control port bit rate.

S3-7	S3-8	Setting
On	Off	9.6 kbps
Off	Off	19.2 kbps

3.2 CONFIGURING THE SOFTWARE SWITCHES

The Model 2530 features a menu-driven command system that allows you to configure the unit. Follow the instructions below to configure the Model 2530 using the software switches:

1) Connect the serial RS-232 port of a VT100 or similar DTE with terminal emulation to the EIA/TIA-561l port of the Model 2530. To construct an RS-232 to EIA-561 patch cable, refer to the control port pinout diagram in Appendix D. Refer to Appendix C to order a pre-made cable.

2) Power up the terminal and set its RS-232 port as follows:

   19,200 bps (or as defined by Switch S3-7 and S3-8)
   8 data bits, 1 stop bit, no parity
   ANSI, VT-100 emulation

3) Power up the Model 2530.

4) After the Model 2530 is powered on, the control port will display the following login screen:

```
Enter Password: *****
```

6) Enter the password 2530 Password. The initial login password is:

   PATTON

   NOTE: We recommend that you change this password after the initial login.

7) The 2530 will then display the MAIN MENU screen.

3.2.1 Introduction to MAIN MENU

The MAIN MENU shows the Model 2530 configuration options. This section describes each of the listed selections.

```
TOP LEVEL MANAGEMENT                    UNDER SOFTWARE CONTROL


 a  Software Control
 b  Hardware Control
 c  Display Hardware Configuration
 d  Software Configuration
 e  Diagnostics/Statistics
 f  Change Password
 g  Save Changes
 h  Logoff




Select [Highlighted Letter]          Go To Sub-menu [CR]
```

HELPFUL HINTS

1. To make a selection, key the highlighted letter that corresponds to a menu selection.

2. To execute the selection, type <enter/CR>

3. Select **g** Save Changes from MAIN MENU after making modifications to any Model 2530 parameter. Otherwise, changes will be lost when the 2530 is turned off.

4. The 2530 will display its control status as “UNDER HARDWARE CONTROL” or “UNDER SOFTWARE CONTROL” in the upper right hand corner of the MAIN MENU screen.

a Software Control

Select “Software Control” from MAIN MENU to place the Model 2530 under software switch control. When the 2530 is under software switch control, the hardware switch configuration (Switches S1, S2, S3 and and front panel switches) will not affect the operation of the unit.

b Hardware Control

Select “Hardware Control” From MAIN MENU to place the Model 2530 under hardware switch control. When the 2530 is under hardware control, the software switch configuration will not affect the operation of the unit.

c Display Hardware Configuration

Select “Display Hardware Configuration” from MAIN MENU to display the configuration of hardware Switches S1, S2 and S3. Please refer to Section 3.1 to review the DIP switch definitions.

Hardware Configuration (Display Only)

Line Rate	56 kbps
Rate adapter	19.2 kbps
Transmit Clock Source	Network
Data Format	Asynchronous
Character Length	10 Bits
Extended Signal Rate	Normal
RTS/CTS delay	Extended
Forced RTS	Off
Anti-Stream Timer	On
DSR Loop Status	On
Circuit Assurance	On
Front Panel Switches	Enabled
Response to Remote Loop	Enabled
DTE loop Request	Disabled
Test Pattern	2047
Control Port Speed	19.2 kbps

Exit = [ESC] Refresh = [r]

d Software Configuration

Select Software Configuration from MAIN MENU to display the current settings of the software switches. The software switches control the same parameters described in **Section 3.1 Configuring the Hardware Switches.** Please refer to section 3.1 to review the hardware switch definitions.

Software Configuration

a	Line Rate	56.0 kbps
b	Rate Adapter/DTE Rate	19.2 kbps
c	Transmit Clock Source	Network
d	Data Format	Asynchronous
e	Character Length	11 bits
f	Extended Signalling Rate	Extended
g	RTS/CTS Delay	Extended
h	Forced RTS	Off
i	Anti-Stream Timer	On
j	DSR Loop Status	On
k	Circuit Assurance	On
l	Response to Remote Loop	Off
m	DTE Loop Request	Off
n	Control Port Speed	19.2 kbps

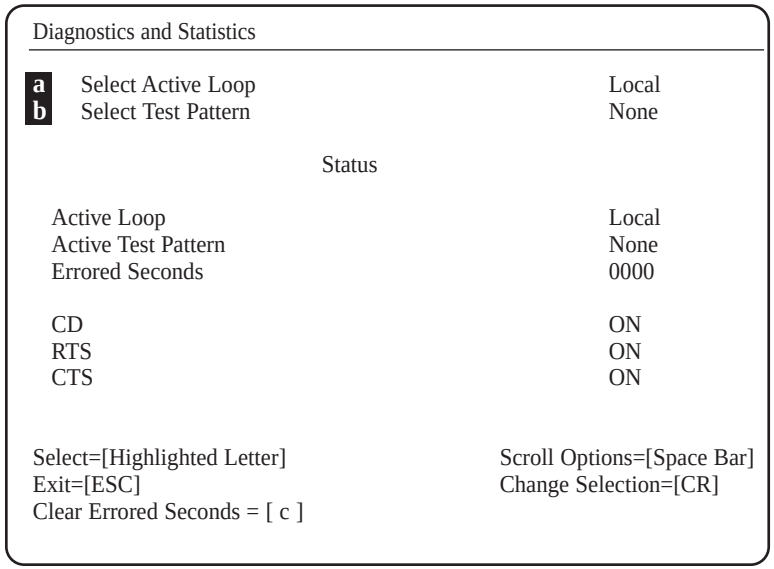
Select=[Highlighted Letter] Scroll Options=[Space Bar]
Exit = [ESC] Refresh screen = [r]

To **modify** any of the parameters listed above:

1. Key the highlighted letter that corresponds to a menu selection.
2. Press **[Space Bar]** until the desired value is highlighted.
3. Press **<Enter/CR>** to select the desired value.

e Diagnostics/Statistics

Select “Diagnostics/Statistics” from MAIN MENU to monitor or activate/deactivate Model 2530’s V.52 BER test patterns and V.54 loop diagnostics. These diagnostics and statistics can help to verify link integrity and isolate communication difficulties .



Active Loop Conditions are shown below:

Local	Local Analog Loopback test is active.
Remote	Remote Digital Loopback is active.
Under Remote Loop	The remote Model 2530 has initiated a Remote Digital Loopback test.
Under CO Loop	The CO has initiated a CSU Loop

Test Patterns are shown below:

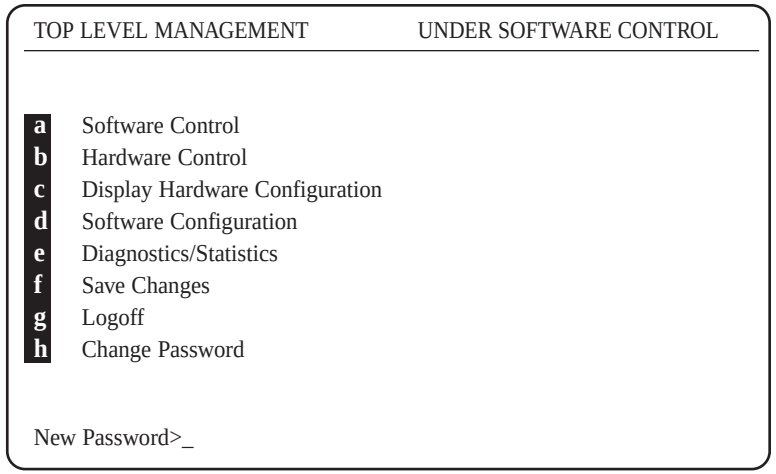
511	The 511 BER test is active.
511/E	The 511/E BER test is active.
2047	The 2047 BER test is active.
2047/E	The 2047/E BER test is active.

To **activate** a loop diagnostic or test pattern:

1. Make sure DIP Switch 3-4 is ON.
1. Key the highlighted letter that corresponds to a menu selection.
2. Press **[Space Bar]** until the desired value is highlighted.
3. Press **<Enter/CR>** to select the desired value.

f Change Password

Select Change Password to change the active password of the software configuration menu (see below).



To change the active password:

a. Enter from **one (1)** to **six (6) alphanumeric** ASCII characters (0...9, a...z, or A...Z) at the New Password>_ prompt.

b. Press <Enter/CR>

g Save Changes

Select Save Changes to save any modifications in the previous sections. Changes not saved will be lost when the Model 2530 is powered OFF.

h Logoff

Select Logoff to exit the Software Configuration. After selecting Logoff, the 2530 will re-display the login screen.

4.0 INSTALLATION

After the Model 2530 has been properly configured it may be connected to the serial port, twisted pair interface, and to the power source. This section tells you how to make these connections.

4.1 CONNECTING THE SERIAL PORT

The serial port interface on the Model 2530 uses interchangeable *QuikConnect™* Modules to connect to your DTE. Each *QuikConnect™* Module has a 50-pin card edge connector on one side and a serial port interface on the other. Figure 3 below shows how a *QuikConnect™* Module plugs into the back of the Model 2530.

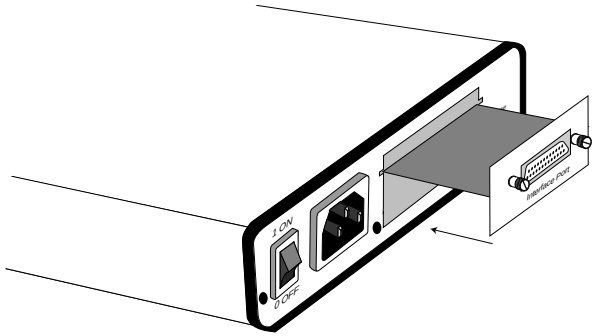


Figure 3. Installation of Model 2530 Plug-in Serial Interface Module

4.1.1 Changing *QuikConnect™* Modules

When you purchase a Model 2530, it should be shipped to you with the appropriate *QuikConnect™* Module already installed. If you need to install a different *QuikConnect™* Module, follow these steps:

Removing the Existing *QuikConnect™* Module

1) Turn the power switch off. Leave the power cord plugged into a grounded outlet to keep the unit grounded.

2) Loosen the two thumbscrews on the module by turning them counter-clockwise.

3) Grasp the two thumbscrews and gently pull the module from the unit. Apply equal force to the thumbscrews to keep the module straight during the removal process.

Installing the New *QuikConnect™* Module

1) Make sure the power switch is off. Leave the power cord plugged into a grounded outlet to keep the unit grounded.

2) Hold the module with the faceplate toward you and align the module with the guide slots in the rear panel of the Model 2530.

3) While keeping the module's faceplate parallel with the Model 2530 rear panel, slide the module straight in–so that the card edge contacts line up with the socket inside the chassis.

   NOTE: The card-edge connector should meet the socket when it is almost all the way into the chassis. If you encounter much resistance, remove the module and repeat steps 2 & 3.

4) With the card edge contacts aligned with the socket, firmly seat the module by using your thumbs to apply pressure directly to the right and left edges of the module faceplate. Applying moderate and *even* pressure should be sufficient to seat the module. You should hear it "click" into place.

5) To secure the module in place, push the thumbscrews into the chassis and turn the screws clockwise to tighten.

4.1.2 Connection to a "DTE" Device

The serial port on most *QuikConnect™* interface modules (all except the X.21 module) is hard-wired as a DCE. Therefore these modules "want" to plug into a DTE such as a terminal, PC or host. When making the connection to your DTE device, use a **straight through** cable of the shortest possible length—we recommend 6 feet or less. When purchasing or constructing an interface cable, please refer to the pin diagrams in **Appendix C** as a guide.

4.1.3 Connection to a "DCE" Device

If the Model 2530's *QuikConnect™* interface module is hard-wired as a DCE (all except the X.21 module), you must use a *null modem* cable when connecting to a modem, multiplexer or other DCE device. This cable should be of the shortest possible length—we recommend 6 feet or less. When purchasing or constructing a null modem interface cable, use the pin diagrams in **Appendix D** as a guide.

NOTE: Pin-out requirements for null modem applications vary widely between manufacturers. If you have any questions about a specific application, contact Patton Technical Support.

4.1.4 Configuring the X.21 *QuikConnect™* Module

The serial port on the X.21 *QuikConnect™* Module is default wired as a DCE, but may be switched to a DTE. This is done by reversing the orientation of the DCE/DTE strap, as described below:

To reverse DCE/DTE orientation, remove the module according to the instructions in **Section 4.1.1**. The DCE/DTE strap is located on the bottom side of the module's PC board. The arrows on the top of the strap indicate the configuration of the X.21 port (for example, if the DCE arrows are pointing toward the DB-15 connector, the X.21 port is wired as a DCE). Reverse the DCE/DTE orientation by pulling the strap out of its socket, rotating it 180º, then plugging the strap back into the socket. You will see that the DCE/DTE arrows now point in the opposite directions, showing the new configuration of the X.21 port. Re-install the module according to the instructions in **Section 4.1.1**.

4.2 CONNECTING THE TWISTED PAIR INTERFACE

The Network Interface is an 8 position modular connector. Connect this port to the RJ-48S jack provided by the digital data service provider. If the Model 2500 Series is being used for private short haul communication, the twisted pair cable will connect to this port. See **Appendix C** for the pin assignments of this connector.

The RJ-48S connector on the Model 2530's twisted pair interface is pre-wired for a standard TELCO wiring environment. The signal/pin relationships are shown in Figure 4 below.

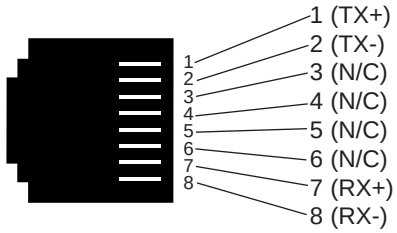


Figure 4. Model 2530 twisted pair line interface.

4.3 CONNECTING POWER

The Model 2530 is available with two power supply options:

4.3.1 Connecting to an AC Power Source

Universal Interface AC Power Supply option (**Model 2530-UI**) operates in environments ranging from 100 to 253 VAC, with no re-configuration necessary (see **Appendix B** for available domestic and international power cords). To connect the standard or universal power supply, follow these steps:

1) Attach the power cord (supplied) to the shrouded male IEC-320 connector on the rear of the Model 2530.

2) Plug the power cord into a nearby AC power outlet.

3) Turn the rear power switch ON.

4.3.2 Connecting to a DC Power Source

DC Power Supply option (**Model 2530-DC**) operates in 48 VDC environments and is equipped with a 3-pin "terminal strip" style connector. The 48 VDC power supply option uses a 3-pin terminal block with spring-type connectors. Please refer to the Model 2530 Series Service Manual for further instructions.

WARNING! There are no user-serviceable parts in the power supply section of the Model 2530. Voltage setting changes and fuse replacement should only be performed by qualified service personnel. Contact Patton Electronics Technical support at (301) 975-1007, via our website at http://www.patton.com, or by e-mail at support@patton.com, for more information.

5.0 OPERATION

After the Model 2530 is properly configured and installed, it should operate transparently. This sections describes power-up, the LED status monitors, and the built-in loopback test modes.

5.1 POWER-UP

To apply power to the Model 2530, first be sure that you have read **Section 4.3**, and that the unit is connected to the appropriate power source. Then power-up the unit using the rear power switch.

5.2 LED STATUS MONITORS

The Model 2530 features twenty-four (24) front panel LEDs that monitor the line rate, power, the DTE signals, the network connection and test modes. Figure 5 (below) shows the front panel location of each LED. Following Figure 5 is a description of each LEDs function.

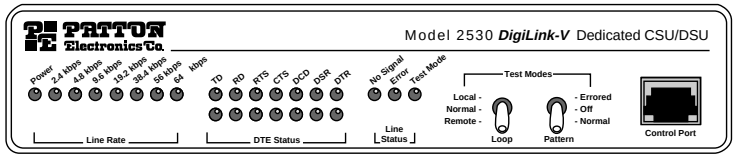


Figure 5. Model 2530 Front Panel Installation of Model

Power Glows green when power is present.

Line Rate The corresponding LED will glow red to indicate the selected line rate.

TD & RD Glows red to indicate an idle condition of Binary "1" data on the respective terminal interface signals. Green indicates Binary "0" data.

RTS Glows green to indicate that the Request to Send signal from the DTE is active.

CTS Glows green to indicate that the Clear to Send signal from the modem is active.

DSR Glows green to indicate that the 2530 has asserted the Data Set Ready signal.

DCD Glows red if no carrier signal is being received from the remote modem. Green indicates that the remote modem's carrier is being received.

DTR Glows green to indicate that the Data Terminal Ready signal from the terminal is active.

ER Glows red to indicate the likelihood of a Bit Error in the received signal. .

TM Glows red to indicate that the Model 2530 has been placed in Test Mode. The unit can be placed in test mode by the local or remote user.

NS Glows red to indicate that the local Model 2530 has not yet connected with the C.O. (or to the remote Model 2530 when used in campus short haul application).

5.3 LOOP (V.54 & TELCO) DIAGNOSTICS

The Model 2530 offers three V.54 loop diagnostics and is compatible with two Telco loop diagnostics. Use these diagnostics to test the CSU/DSU and any communication links. These tests can be activated physically from the front panel, or via signals on the *QuikConnect™* interface.

5.3.1 Operating Local Analog Loopback (LAL)

The Local Line Loopback (LAL) test checks the operation of the local Model 2530, and is performed separately on each unit. As shown in Figure 6, below, any data sent to the local Model 2530 in this test mode will be echoed (returned) back to the user device (i.e., characters typed on the keyboard of a terminal will appear on the terminal screen).

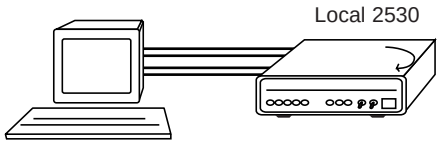


Figure 6. Local Line Loop

To perform a LLB test, follow these steps:

1. Activate LAL. This may be done in one of two ways:

   a. Move the front panel toggle switch UP to “Local”; or,

   b. Activate the “LL” signal on the DTE. If you are not sure which lead is the “LL” signal, please refer to Appendix D.

2. Verify that the data terminal equipment is operating properly and can be used for a test.

3. Perform a V.52 BER (bit error rate) test as described in **Section 5.3.3**. If the BER test equipment indicates no faults, but the data terminal indicates a fault, follow the manufacturer’s checkout procedures for the data terminal. Also, check the interface cable between the terminal and the Model 2530.

5.3.2 Operating Remote Digital Loopback (RDL)

The Remote Digital Loopback (RDL) test checks the performance of both the local and remote Model 2530s, as well as the communication link between them. Any characters sent to the remote Model 2530 in this test mode will be returned back to the originating device (i.e, characters typed on the keyboard of the local terminal will appear on the local terminal screen after having been passed to the remote Model 2530 and looped back).

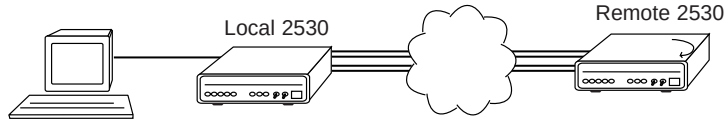


Figure 7. Remote Digital Loop

To perform an RDL test, follow these steps:

1. Activate RDL. This may be done in two ways:

   a. Move the front panel toggle switch DOWN to “Remote”;

   b. Activate the “RL” signal on the DTE. If you are not sure which lead is the “RL” signal, please refer to Appendix D.

2. Perform a bit error rate test (BERT) using the internal V.52 generator (as described in **Section 5.4**), or using a separate BER Tester. If the BER test indicates a fault, and the Local Line Loopback test was successful for both Model 2530s, you may have a problem with the twisted pair line between the modems. You should then check the twisted pair line for proper connections and continuity.

5.3.3 Telco Testing

The digital service provider's central office can perform CSU diagnostic testing. These diagnostics allow the central office to evaluate the circuit operation without making visits to the customer's premises.

CSU Loop

The CSU loop is activated when the central office reverses the DC sealing current that flows between the Transmit (TX) and Receive (RX) pairs. The Model 2530 recognizes this and loops the signals on the RX pairs back to the central office on the TX pair. While the CSU loop is activated, the TM light is illuminated.

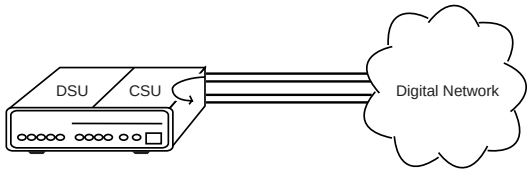


Figure 7. CSU loop

5.4 BIT ERROR RATE (V.52) DIAGNOSTICS

The Model 2530 offers two V.52 Bit Error Rate (BER) test patterns. These test patterns may be invoked along with the LAL and RDL tests to evaluate the unit(s) and the communication links.

When a 511 or 2047 test is invoked, the 2530 generates a pseudo-random pattern of 511 bits (or 2047 bits) using a mathematical polynomial. The receiving Model 2530 then decodes the received bits using the same polynomial. If the received bits match the agreed upon pseudo-random pattern, then the 2530(s) and the communication link(s) are functioning properly.

511	Initiates a built-in 511 bit pseudo-random pattern generator and detector.
511 with Errors	Initiates a built-in 511 bit pseudo-random pattern generator and detector. The test pattern generator also injects ***intentional errors*** approximately twice per second, causing the Error LED to blink.
2047	Initiates a built-in 2047 bit pseudo-random pattern generator and detector.
2047 with Errors	Initiates a built-in 2047 bit pseudo-random pattern generator and detector. The test pattern generator also injects ***intentional errors*** approximately twice per second, causing the Error LED to blink.

To perform a V.52 BER test, follow these steps:

1. Select the 511 or 2047 test pattern using Switch 3-1.

1. Locate the "Pattern" toggle switch on the front panel of the 2530 and move it DOWN to "Normal. This activates the V.52 transmission and reception of the selected test pattern. If there are errors in the received pattern, the error LED will blink accordingly.

2. If the above test indicates no errors are present, move the toggle switch UP to "Errored", activating the BER test with intentional errors. If the test is working properly, the local modem's red error LED blink approximatley twice per second.

APPENDIX A

PATTON MODEL 2530 SPECIFICATIONS

Compatibility:	AT&T 62310
DDS Line Interface:	Externally accessible RJ-48S
Transmission Format:	Synchronous or asynchronous
Transmission Line:	Two unconditioned twisted pair
Clock Options:	Internal, external, receive loopback and campus
DTE/DCE Interfaces:	Patton *QuikConnect™* Modules: EIA RS-232/CCITT V.24, RS-232/530, CCITT V.35 and CCITT X.21
DTE/DCE Speeds:	Synchronous: 2.4, 4.8, 9.6, 19.2, 56, and 64 kbps; Asychronous: 2.4, 4.8, 9.6, 19.2, 38.4, and 57.6 kbps
Diagnostics:	V.54 compliant local and remote loopbacks; V.52 compliant 511 and 2047 BER tests
Front Panel LEDs:	DDS line rates (2.4, 4.8, 9.6, 19.2, 56, and 64 kbps), Power, TD, RD, RTS, CTS, DCD, DSR, DTR, No Signal, Test Mode, Error indication.
Distance:	-49 dBm receiver sensitivity or better
RTS/CTS Delay:	0 ms/30 ms
Front Panel Switches:	Loopback indication and Bit Error Rate Test
Power:	Universal Input (UI): 100 - 253VAC Input; DC: 18VDC - 72VDC, 48V Nominal
Temperature Range:	32-122°F (0° -50°C)
Altitude:	0-15,000 feet
Humidity:	5 to 95% noncondensing
Dimensions:	7.3” x 6.6” x 1.62” (185mm x 168mm x 41mm)
Weight:	2.01 lbs. (1.0kg)
Approvals:	FCC Part 68, FCC Part 15, UL and cUL Approvals.
Surge Protection:	600W Power Dissipation
Lightning Protection:	Gas Tube
Isolation:	1500V via Isolation Transformers

Model 2530 Series Distance Table (miles)

Data Rate	Wire Gauge		
	22	24	26
64 Kbps	7.1	4.9	3.4
56 Kbps	7.6	5.2	3.6
19.2 Kbps	8.7	6.2	4.5
9600 bps	10.4	7.7	5.8
4800 bps	13.7	10.6	9.7
2400 bps	15.1	14.2	9.1

APPENDIX B

PATTON MODEL 2530 FACTORY REPLACEMENT PARTS AND ACCESSORIES

Patton Model #	Description
IM1/A	V.24 with DB25F
IM1/B	RS422/RS530 with DB25F
IM1/C	V.35 with M34F
IM1/D	X.21 with DB15F
IM1/E	V.35 with DB25F
IM1/F	G.703 with RJ45
IM1/G	High Speed Asynchronous with DB-25F
0805US	American Power Cord
0805EUR	European Power Cord CEE 7
0805UK	United Kingdom Power Cord
0805AUS	Australia/New Zealand Power Cord
0805DEN	Denmark Power Cord
0805FR	France/Belgium Power Cord
0805IN	India Power Cord
0805IS	Israel Power Cord
0805JAP	Japan Power Cord
0805SW	Switzerland Power Cord
07M2530	User Manual
07M1090SVC	1090 Series Service Manual

PATTON MODEL 2530 INTERFACE PIN ASSIGNMENT

RS-232, RS-530 Interface Pin Description
(DB-25 Female Connector)
(DCE Configuration)

Pin #	Signal
1	FG (Frame Ground)
2	TD (Transmit Data)
3	RD (Receive Data)
4	RTS (Request to Send)
5	CTS (Clear to Send)
6	DSR (Data Set Ready)
7	SGND (Signal Ground)
8	CD (Carrier Detect)
9	RC/ (Receive Timing-B)
10	CD/ (Carrier Detect-B)
11	XTC/ (External Transmit Clock)
12	TC/ (Transmit Clock - B)
13	CTS/ (Clear to Send)
14	TD/ (Transmit Data-B)
15	TC (Transmit Clock)
16	RD (Receive Data)
17	RC (Receive Clock)
18	LLB (Local Line Loop)
19	RTS/ (Request to Send)
20	DTR (Data Terminal Ready)
21	DL (Remote Digital Loop)
22	DSR/ (Data Set Ready)
23	DTR/ (Data Terminal Ready - B)
24	XTC (External Transmit Clock)
25	TM (Test Mode)

PATTON MODEL 2530 INTERFACE PIN ASSIGNMENT (Continued)

V.35 Interface
(M/34F Female Connector)
(DCE Configuration)

Pin #	Signal
B	SGND (Signal Ground)
C	RTS (Request to Send)
D	CTS (Clear to Send)
E	DSR (Data Set Ready)
F	CD (Carrier Detect)
H	DTR (Data Terminal Ready)
L	LLB (Local Line Loop)
M	TM (Test Mode)
N	RDL (Remote Digital Loop)
P	TD(Transmit Data-A)
R	RD (Receive Data-A)
S	TD/ (Transmit Data-B)
T	RD/ (Receive Data-B)
U	XTC (External Transmit Clock)
V	RC(Receive Clock)
W	XTC/ (External Transmit Clock)
X	RC/ (Receive Clock-B)
Y	TC(Transmit Clock-A)
AA	TC/ (Transmit Clock-B)

APPENDIX C

PATTON MODEL 2530 INTERFACE PIN ASSIGNMENT (Continued)

X.21 Interface (DB-15 Female Connector) (DTE /DCE Configuration)

Pin #	Signal
1	Frame Ground
2	T (Transmit Data-A)
3	C (Control-A)
4	R (Receive Data-A)
5	I (Indication-A)
6	S (Signal Element iming-A)
8	SGND (Signal Ground)
9	T/ (Transmit Data-B)
10	C/ (Control-B)
11	R/ (Receive Data-B)
12	I/ (Indication-B)
13	S/ (Signal Element Timing-B)

APPENDIX D

PATTON MODEL 2530 Pin Out Control Port

The 2530 control port is an 8 position connector, compliant with EIA/TIA-561.

Pin Function	RJ45 Pin No.
Ground	4
Receive data (to DTE)	5
Transmit data (from DTE)	6