PARADYNE™

Hotwire™ 5546 RTU Customer Premises Installation Instructions

Document Number 5546-A2-GN10-00

September 1998

Before You Begin

The Hotwire™ 5546 RTU (Remote Termination Unit) interoperates with the Hotwire 8546 DSL Card in the DSLAM system. Verify that the 8546 DSL card has Firmware Release 2.2 or higher.

An optional POTS (Plain Old Telephone Service) splitter is available for the Hotwire 5546 RTU. When a POTS splitter is installed, the telephone and 5546 RADSL (Rate Adaptive Digital Subscriber Line) RTU can function at the same time over the same pair of copper wires. In order to confirm the RTU installation, the POTS splitter should be installed first.

To install a POTS splitter, refer to the appropriate POTS splitter document:

Document Number	Document Title
5030-A2-GN10	*Hotwire 5030 POTS Splitter Customer Premises Installation Instructions*
5038-A2-GN10	*Hotwire 5038 Distributed POTS Splitter Customer Premises Installation Instructions*

Contact your sales or service representative to order additional product documentation. Paradyne documents are also available on the World Wide Web at:

http://www.paradyne.com

Select *Service & Support* → *Technical Manuals*

Package Checklist

Verify that your package contains the following:

- ❑ Model 5546 Remote Termination Unit (RTU)
- ❑ DSL interface cable with RJ11 connectors
- ❑ RJ45 to DB9 adapter plug (Part No. 002-0093-0031)
- ❑ One ferrite choke (Model 5546-A1-200 only)
- ❑ Power cord with power transformer
- ❑ Warranty card

Wiring and Cables You Need

The following wiring and standard connectors are used with this product:

- ❏ New or existing unshielded twisted-pair wiring (CAT3 or better). The CAT3 wiring must meet EIA/TIA-568 specifications with 24 AWG (.5 mm) or 26 AWG (.4 mm).
- ❏ DTE EIA-530A to V.35 interface cable (Model No. 3100-F1-570).
- ❏ Straight-through cable with an 8-pin, RJ45, non-keyed modular plug.
- ❏ Standard RJ11 wall jack.

Refer to *Cables & Connectors,* page 15, for cable details.

What Does the Hotwire 5546 RTU Do?

The Hotwire 5546 RTU is a component in the Hotwire DSL Access System. This system provides high-speed Internet or corporate LAN access over traditional twisted-pair copper telephone wiring.

A POTS splitter blocks out the DSL signal and allows the POTS frequencies to pass through. At the customer premises, the RADSL RTU and a telephone can function simultaneously over the same pair of copper wires when either:

- A Hotwire 5030 POTS Splitter is installed near the demarcation point for all telephones on the same POTS line as DSL, *or*
- A Hotwire 5038 Distributed POTS Filter is installed on each telephone on the same POTS line as DSL.

DSL Access with a Hotwire 5030 POTS Splitter

Copper pairs run from the central office (CO) to the customer premises (CP) to create the local loop. The local loop terminates on the customer premises at the demarcation point in a punchdown block or network interface device (NID).

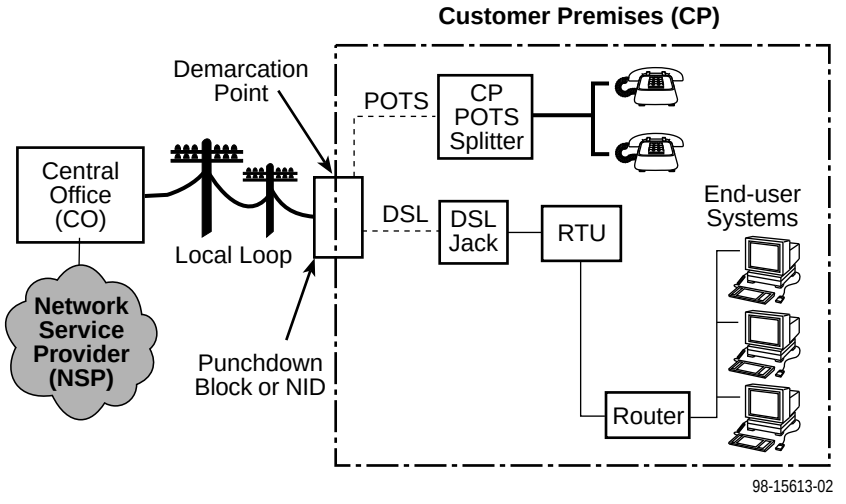
When a POTS splitter is used at both ends of the local loop, wiring is connected:

- From the demarcation point to the CP POTS splitter,
- From the demarcation point to the DSL jack.

NOTES:

— End-user system is used to represent any PC connected to a router with an Ethernet connection and DSL-based service.

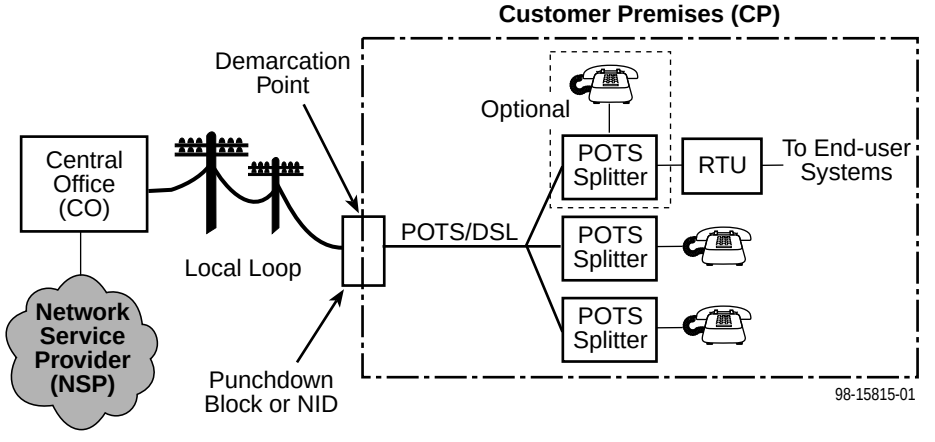
— Network Service Provider (NSP) is used to represent any Internet Service Provider (ISP) or remote LAN access provider.



DSL – Digital Subscriber Line
NID – Network Interface Device
POTS – Plain Old Telephone Service
RTU – Remote Termination Unit
-------- New Wiring Connections
——— Existing Wiring (POTS)

DSL Access with a Hotwire 5038 Distributed POTS Splitter

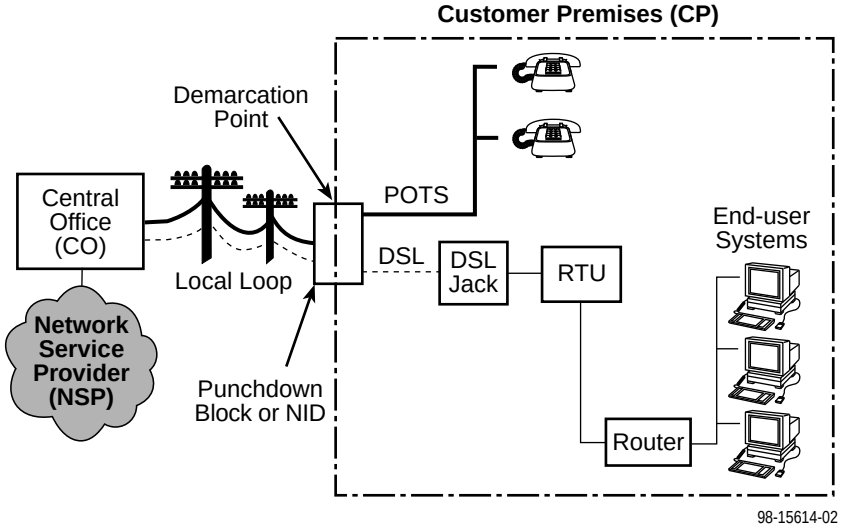
When a Hotwire 5038 Distributed POTS Splitter is used, one 5038 Distributed POTS Splitter is installed as a filter for each telephone on the same POTS line as DSL.



DSL – Digital Subscriber Line
NID – Network Interface Device
POTS – Plain Old Telephone Service
RTU – Remote Termination Unit

DSL Access without a POTS Splitter

When the Hotwire 5546 RTU is installed without a POTS splitter, a second telephone wiring pair is needed for DSL access.



DSL – Digital Subscriber Line
NID – Network Interface Device
POTS – Plain Old Telephone Service
RTU – Remote Termination Unit

-------- New Wiring Connections
——— Existing Wiring (POTS)

Installing the DSL Access Wiring

The local loop terminates at the punchdown block or NID. Wiring must be connected from the customer premises side of the punchdown block or the NID to an RJ11 wall jack. Typically, the punchdown block is installed in commercial locations and the NID is installed in residential locations.

▶ Procedure

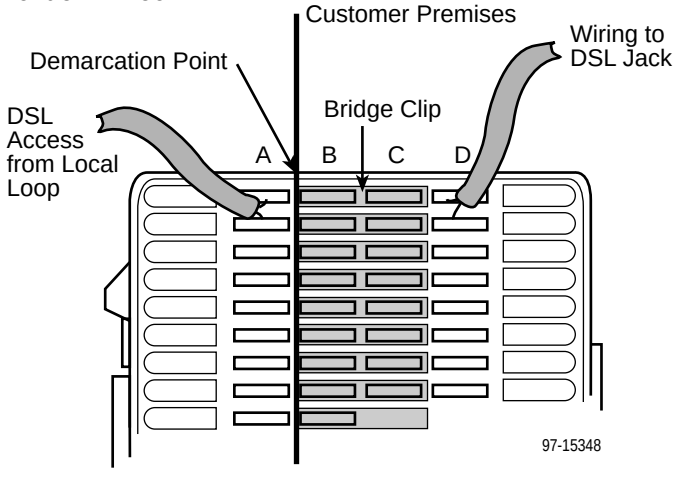
1. Access the punchdown block or NID.

   ⚠ WARNING:

   Do not continue unless the DSL access line from the local loop has been disconnected at the NID or punchdown block. Refer to *Important Safety Instructions,* page 18.

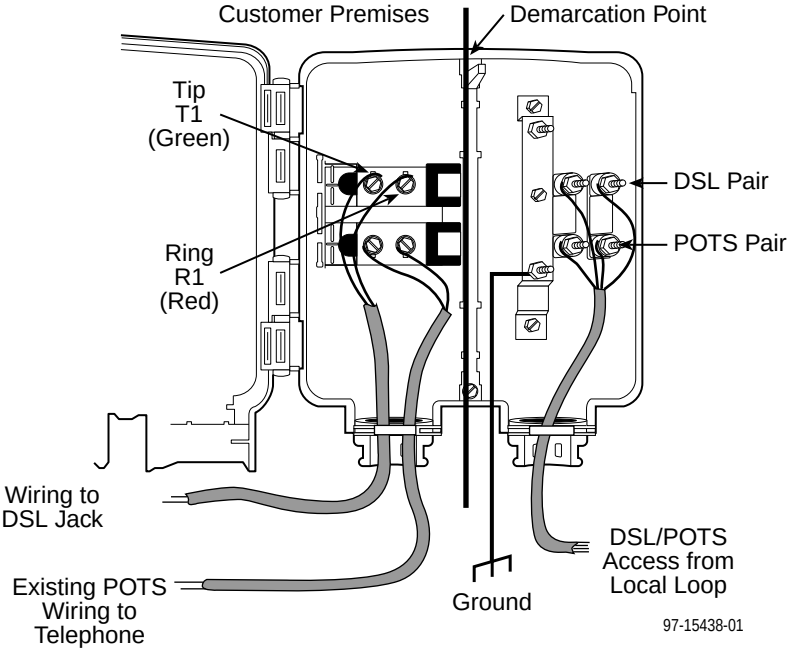
2. Disconnect the DSL access pair from the local loop. A punchdown block is used without a POTS splitter in the following example.

Punchdown Block

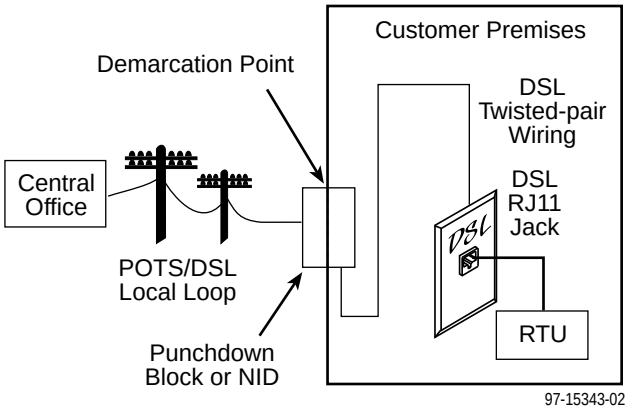


3. Locate the DSL pair of T1/R1 connectors on the the customer premises side of the NID or punchdown block. Attach the wiring that will be connected to the DSL jack. In the following example, a NID is used without a POTS splitter. It includes an existing POTS line and a second pair installed for DSL access.

Telephone Network Interface Device (NID)



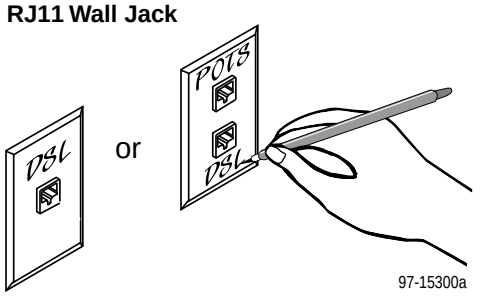
The Hotwire 5546 RTU connects to the local loop via wiring from the demarcation point to an RJ11 wall jack. The DSL twisted-pair wiring from the local loop terminates at a new or existing wall jack. It may be necessary to install a standard single RJ11 jack or replace a single jack with a double RJ11 jack.



Procedure

1. Wiring can be run from the punchdown block or NID to a new or existing wall jack. Match the pair colors on both ends.
2. Label the DSL jack.
3. Reconnect the DSL access pair at the punchdown block or NID.

RJ11 Wall Jack



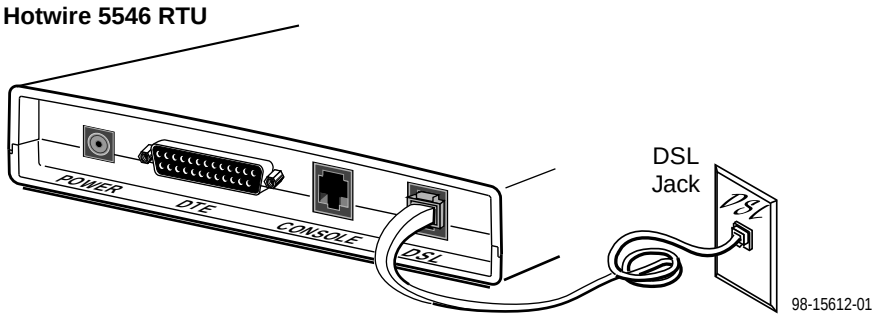
The RJ11 6-pin jack uses the center two pins. For pin assignments, refer to *Cables & Connectors*, page 15.

Installing the Hotwire 5546 RTU

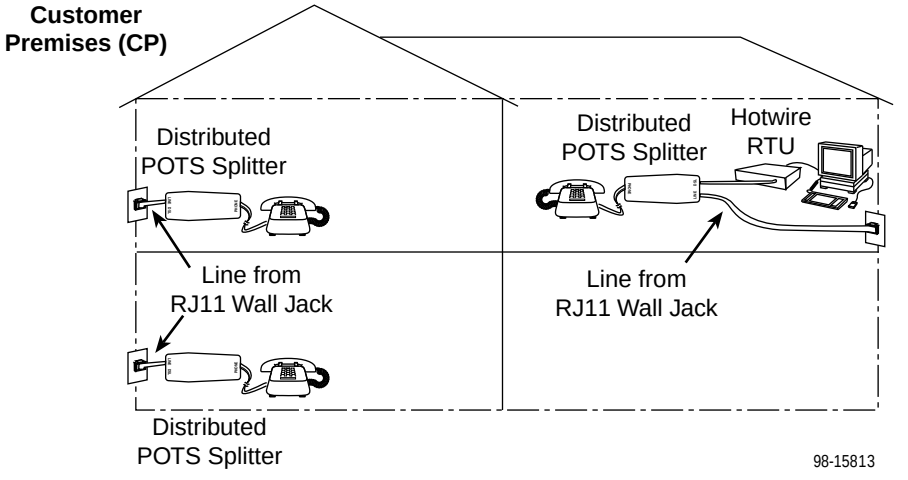
Place the Hotwire 5546 RTU on a flat surface with clearance for the rear connectors.

▶ Procedure

1. Use the RJ11 6-pin cable for the DSL connection. Insert one end of the cable into the jack labeled DSL. Insert the other end into the wall jack labeled DSL.



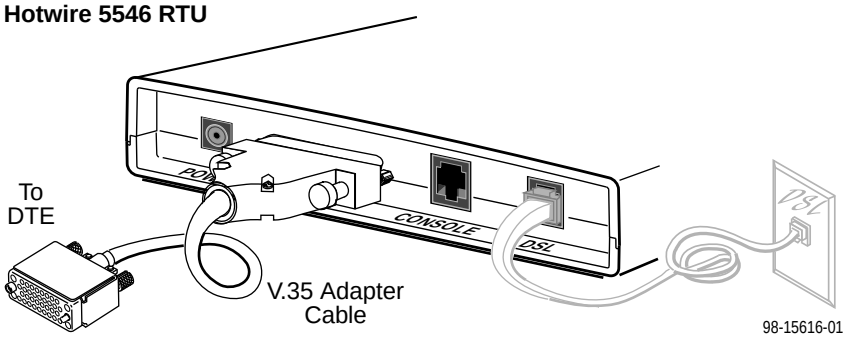
If the Hotwire 5546 RTU is installed on the same line as POTS, a Hotwire 5038 Distributed POTS Splitter can be used as a filter. One 5038 Distributed POTS splitter is installed as a filter for each telephone as shown below. To install the 5038 Distributed POTS splitter, refer to *Hotwire 5038 Distributed POTS Splitter Customer Premises Installation Instructions.*



2. The DTE port connection is configurable for EIA-530A or V.35 operation.

Insert the 25-position EIA-530A DTE cable or V.35 adapter cable into the jack labeled DTE. Tighten both screws on the DTE connector. Insert the other end into the DTE.

Hotwire 5546 RTU



NOTE:

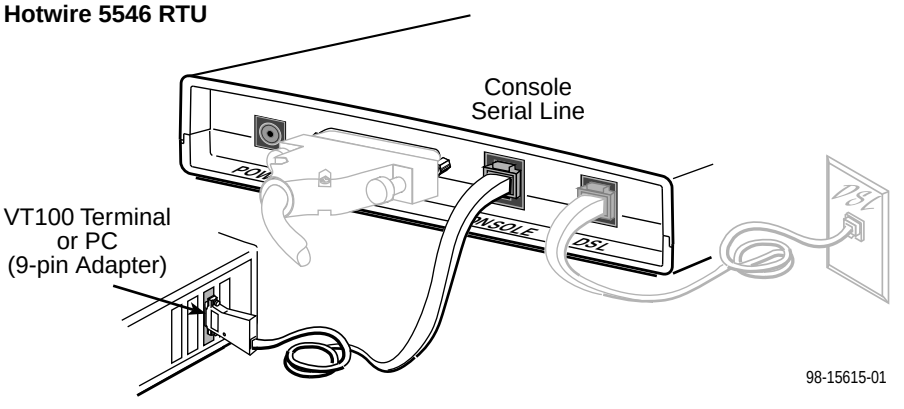
Use only well-shielded cables, including a braided metal shield and metallic hood.

3. The Console port connection is optional and only necessary to change the DTE configuration defaults or to download software. This connection can be temporary and disconnected after the changes are completed. See *Hotwire 5546 RTU Configuration Setup,* page 12.

The Console port acts as a DCE and uses an 8-pin RJ45 straight-through cable for the connection to a VT100 terminal or a PC running a terminal emulation program. Use the supplied DB9 adapter to connect to a PC or laptop.

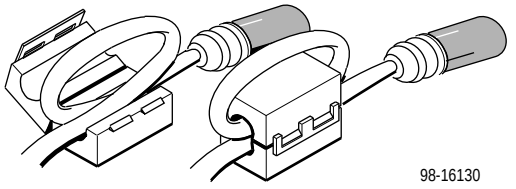
Insert the 8-pin end of the cable into the jack labeled CONSOLE. Insert the other end into the DB9 adapter for the serial port of the VT100 terminal or PC.

Hotwire 5546 RTU



4. Insert the power cord's round end into the jack labeled POWER. If you do not have Model 5546-A1-200, proceed to Step 6.

For Model 5546-A1-200 only, place the ferrite choke on the Power cable as closely as possible to the RTU. Pass the Power cable through the ferrite choke twice, creating a loop as shown.



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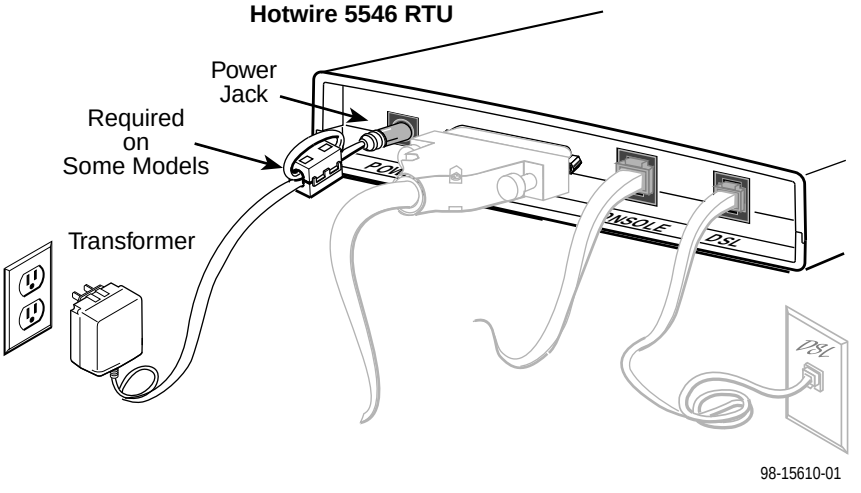
5. Close the two halves around the cable and snap the ferrite choke shut. Press down on the plastic latch to secure the ferrite choke in place around the cable.



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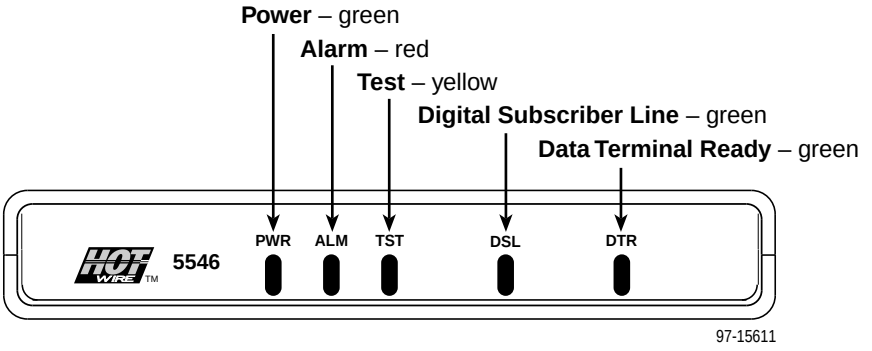
6. Plug the transformer into an AC outlet. The RTU hardware setup is now complete.

NOTE:

Use only the transformer provided with this product.

Power-On

When power is applied, the RTU performs self-diagnostics and the PWR LED is on. During the power-on self-test, all of the LEDs turn on for one second.



Refer to *Troubleshooting,* page 14, for LED indications requiring action.

Status LEDs

After a successful self-test, the LEDs should appear as indicated in **BOLD** in the Condition column below.

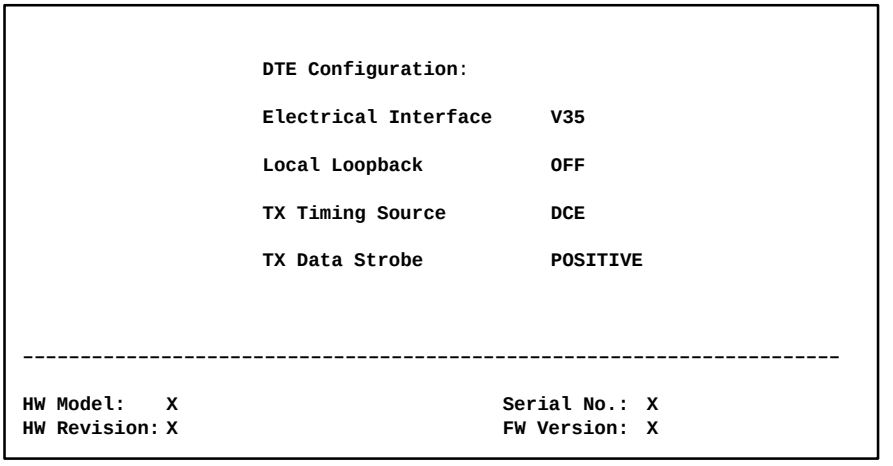
LED	Condition	Status
PWR	**ON**	RTU has power.
ALM	**OFF**	No active alarms.
TST	**OFF**	No active tests.
DSL	**ON**	The DSL link is now active and ready to transmit and receive data.
DTR	**ON**	The Data Terminal Ready connection to the DTE data interface is active.

Hotwire 5546 RTU Configuration Setup

The Console cable is connected to a VT100-compatible terminal or a PC running a terminal emulation program. Verify the terminal settings:

- Data rate set to 9.6 kbps
- Character length set to 8
- Parity set to None
- Stop bits set to 1
- Flow control is Off

When the Console cable is connected, the DTE Configuration screen appears with the following default settings:



If the DTE Configuration screen does not appear, press Ctrl-l. Use the following keyboard keys to navigate within the screen:

To . . .	Press . . .
Move to the next field	Tab key or Down Arrow key.
Move to the previous field	Ctrl-k or Up Arrow key.
Toggle between the two valid settings	Spacebar.
Redraw the screen	Ctrl-l.
Save changes made since the last Return	Enter (Return).

Configuration Options Table

The DTE Configuration screen provides the following options and settings.

Configuration Option Field	Settings	Description
Electrical Interface	■ V35 ■ EIA530A	■ V.35 DCE to DTE interface. ■ EIA-530A DCE to DTE interface.
Local Loopback	■ OFF ■ ON	■ Local loopback is not active. ■ Local loopback is active and the TST LED is on. Local loopback causes any data received from the DTE to be returned to the DTE. The clock is locally generated by the DCE.
TX Timing Source	■ DTE ■ DCE	■ The DTE clock is used for the RTU Transmit Timing Source. ■ The DCE generates an internal synchronous clock for the RTU Transmit Timing Source.
TX Data Strobe	■ POSITIVE ■ NEGATIVE	■ Clocking uses positive edge of clock. ■ Clock is inverted to use the negative edge of the clock.

Save configuration option changes by pressing Enter. The message **`Configuration Updated`** appears above HW Model on the bottom left of the screen. The next key pressed causes the message to disappear.

NOTES:

— The Hotwire 5546 RTU configuration setup is now complete. Disconnect the Console cable.

— Setting the Electrical Interface option to EIA530A without the proper router interface connector will result in unexpected errors.

Troubleshooting

LED Symptom	Action
All LEDs remain on.	The RTU is not functional. If the LEDs remain on after five minutes, contact the NSP.
ALM LED remains on.	The power-on self-test may have failed. Unplug the unit and reapply power. If the alarm light is still on, contact the NSP.
ALM and TST LEDs are on.	Firmware download may be in progress. If the LEDs remain on after five minutes, contact the NSP.
DSL LED is off.	Verify that the DSL cable is securely installed on both ends. If the problem continues, contact the NSP.
DSL LED continues to blink after the power-on self-test.	The RTU is attempting to establish the DSL link or is adjusting the rate of the DSL line due to line conditions. If the LED continues to blink for more than five minutes, contact the NSP.
DSL LED is on and there is no data transmission.	The DSL link has been established but there is no data transmission. First, verify the DTR connection. If the problem persists, contact the NSP.
DSL and DTR LEDs are on and there is no data transmission.	The DSL and DTR links have been established but there is no data transmission. If the problem persists, contact the NSP.
DSL and DTR LEDs are off.	Firmware download may be in progress. Verify that the ALM and TST LEDs are on.
DTR LED is off.	Verify that the DTE cable is securely installed at both ends, and that the DTE is connected and powered on.
	Verify that the correct V.35 or EIA-530A DTE cable is installed. Refer to *Installing the Hotwire 5546 RTU,* page 8.
PWR LED is off.	Check that the power cord is securely installed on both ends.
	If no LEDs are on, the power supply may be defective. Test the outlet to verify power. If the problem persists, contact the NSP.
	If other LEDs are on, the PWR LED may be burned out. Unplug the unit and reapply power; watch all LEDs during the power-on self-test to verify that the PWR LED is functioning.
TST LED is on.	A local loopback test may be active. Refer to *Hotwire 5546 RTU Configuration Setup,* page 12.
	A test initiated by the NSP may be active. Wait five minutes. If the TST LED does not go off, contact the NSP.

NOTE:

Firmware download is available via the Console Port. Contact the NSP for details.

Cables & Connectors

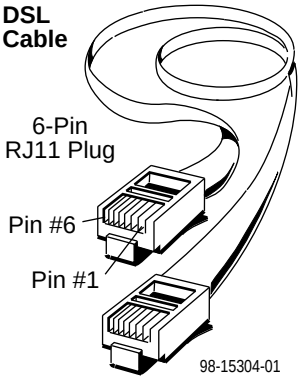
Obtain standard twisted-pair CAT3 or better cables.

This section is reference only.

- The DSL interface connector uses a 6-pin, non-keyed modular plug.

RJ11 6-Pin Connector

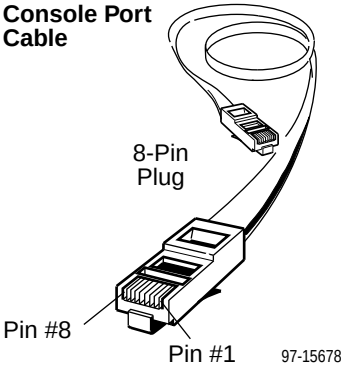
Pin #	Function
1 & 2	Not used
3	DSL Ring
4	DSL Tip
5 & 6	Not used



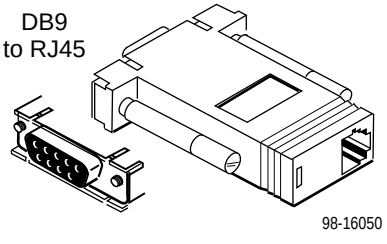
- The Console connector uses an 8-pin RJ45 non-keyed modular plug and DB9 adapter. Only use this connection when the DTE Configuration defaults need to be changed. See *Hotwire 5546 RTU Configuration Setup,* page 12.

RJ45 8-Pin Connector

Pin #	Circuit	Direction
1	Not used	—
2	DTR	Input
3	TXD	Input
4	Signal Ground	—
5	Signal Ground	—
6	RXD	Output
7	DSR	Output
8	Not used	—



DB9 Adapter Plug (Supplied)

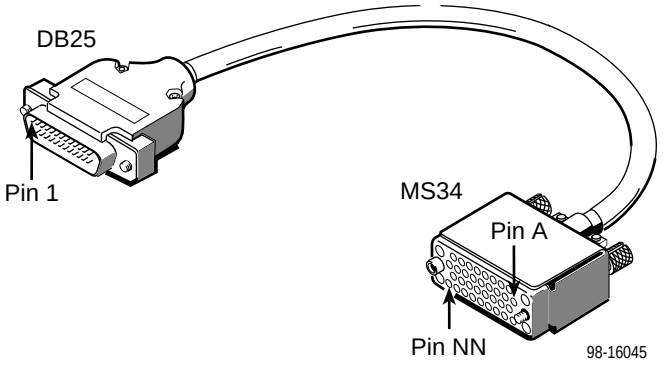


- The DTE connector uses a 25-position D-subminiature plug. The following table provides the pin assignments for the EIA-530A and the V.35 connector to the RTU. Signals that are not listed are not supported.

DB25 DTE Port Connector Pin Assignments

Signal Name	DB25 Plug	Signal Direction	MS34 Socket
Shield	1	—	
Transmitted Data (TxD+)	2	To RTU (In)	P
Received Data (RxD+)	3	From RTU (Out)	R
Request to Send (RTS+)	4	To RTU (In)	C
Clear to Send (CTS+)	5	From RTU (Out)	D
DCE Ready (DSR)	6	From RTU (Out)	E
Signal Ground (SG)	7	—	B
Received Line Signal Detector (DCD+)	8	From RTU (Out)	F
Receiver Timing DTE (RxC–)	9	To RTU (In)	X
Received Line Signal Detector (DCD–)	10	From RTU (Out)	—
Transmit Timing DTE (TxCE+)	11	To RTU (In)	W
Transmitter Timing DCE (TxC–)	12	From RTU (Out)	AA
Clear to Send (CTS–)	13	From RTU (Out)	—
Transmitted Data (TxD–)	14	To RTU (In)	S
Transmitter Timing DCE (TxC+)	15	From RTU (Out)	Y
Received Data (RxD–)	16	From RTU (Out)	T
Receiver Timing DCE (RxC+)	17	From RTU (Out)	V
Local Loopback (LL)	18	To RTU (In)	N
Request to Send (RTS–)	19	From RTU (Out)	—
DTE Ready (DTR)	20	To RTU (In)	H
Transmit Timing DTE (TxCE+)	24	To RTU (In)	U
Test Mode (TM)	25	From RTU (Out)	NN

The EIA-530A-to-V.35 Adapter Cable provides the V.35 interface shown below. The V.35 cable includes a 25-pin to 34-pin adapter.



Model 5546 RTU Technical Specifications

Item	Specification*
Height x Width x Depth	1.43″ x 6.00″ x 8.75″ (3.64 cm x 15.24 cm x 22.23 cm)
Weight	1 lb. 1 oz. (0.48 kg)
Power Class 2 Transformer normal service input voltage range	Input: 100 Vac (±10%), 50 Hz; 120 Vac (±10%), 60 Hz; or 230 Vac (±10%), 50/60 Hz Output: 15 Vdc nominal, 0.6A
Approvals FCC Part 15 CISPR 22 Safety Certifications	 Class B Subpart B digital device Class A Refer to equipment's label for approvals on product
Physical Environment Operating temperature Storage temperature Relative humidity Shock and vibration	 32° F to 140° F (0° C to 40° C) –4° F to 158° F (–20° C to 70° C) 5% to 95% (noncondensing) Withstands normal shipping and handling
Heat Dissipation	25.0 Btu/hr. (max.) at nominal input voltage
Interface Connectors DSL Interface Console Interface DTE Interface	 RJ11 6-pin RJ45 8-pin D-subminiature 25-pin
*Technical Specifications subject to change without notification.	

Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
3. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
4. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
5. General purpose cables are used with this product for connection to the network. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer. Use a UL Listed, CSA certified, minimum No. 24 AWG line cord for connection to the Digital Subscriber Line (DSL) network.
6. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
7. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are **interconnected**, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
8. Input power to this product must be provided by one of the following: (1) a UL Listed/CSA certified power source with a Class 2 or Limited Power Source (LPS) output for use in North America, or (2) a certified transformer, with a Safety Extra Low Voltage (SELV) output having a maximum 240 VA available, for use in the country of installation.
9. In addition, since the equipment is to be used with telecommunications circuits, take the following precautions:
   - Never install telephone wiring during a lightning storm.
   - Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
   - Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
   - Use caution when installing or modifying telephone lines.
   - Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
   - Do not use the telephone to report a gas leak in the vicinity of the leak.

CE Marking

When the product is marked with the CE mark on the equipment label, this demonstrates full compliance with the following European Directives:

- **Directive 73/23/EEC** – Council Directive of 19 February 1973 on the harmonization of the laws of the member states relating to electrical equipment designed for use within states relating to electrical equipment designed for use within certain voltage limits, as amended by Directive 93/68/EEC.
- **Directive 89/336/EEC** – Council Directive of 3 May 1989 on the approximation of the laws of the member states relating to Electro-Magnetic Compatibility (EMC), as amended by Directive 93/68/EEC.

Japan

Class 1 ITE

注意
　この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づく第一種情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class 1 product based on the standard of the Voluntary Control Council for interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Declaration of Conformity

This Declaration of Conformity is made by Paradyne Corporation pursuant to Parts 2 and 15 of the Federal Communications Commission's Rules. This compliance information statement pertains to the following products:

Trade Name: Hotwire
Model Number: 5546-A1-200

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The name, address, and telephone number of the responsible party is given below:

Paradyne Corporation
8545 126th Avenue North
Largo, FL 33773-1502
Phone: (727) 530-2000

The authority to operate this equipment is conditioned by the requirement that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Paradyne Corporation.

In order to maintain compliance with Part 15, FCC rules, the clamp-on ferrite choke must be installed on the Power cable in accordance with the installation instructions.

Canada

EMI Warnings

⚠ WARNING:

To Users of Digital Apparatus in Canada:

This Class B digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du règlement sur le matérial brouilleur du Canada.

Notice to Users of the Canadian Telephone Network

The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). 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. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative 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 to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution 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.

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

If your equipment is in need of repair, refer to *Warranty, Sales, and Service Information.*

Document Feedback

We welcome your comments and suggestions about this document. Please mail them to Technical Publications, Paradyne Corporation, 8545 126th Ave. N., Largo, FL 33773, or send e-mail to userdoc@eng.paradyne.com. Include the number and title of this document in your correspondence. Please include your name and phone number if you are willing to provide additional clarification.

Trademarks

All products and services mentioned herein are the trademarks, service marks, registered trademarks or registered service marks of their respective owners.

Warranty, Sales, and Service Information

Contact your local sales representative, service representative, or distributor directly for any help needed. For additional information concerning warranty, sales, service, repair, installation, documentation, training, distributor locations, or Paradyne worldwide office locations, use one of the following methods:

- **Via the Internet:** Visit the Paradyne World Wide Web site at http://www.paradyne.com
- **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
  - Within the U.S.A., call 1-800-870-2221
  - Outside the U.S.A., call 1-727-530-2340