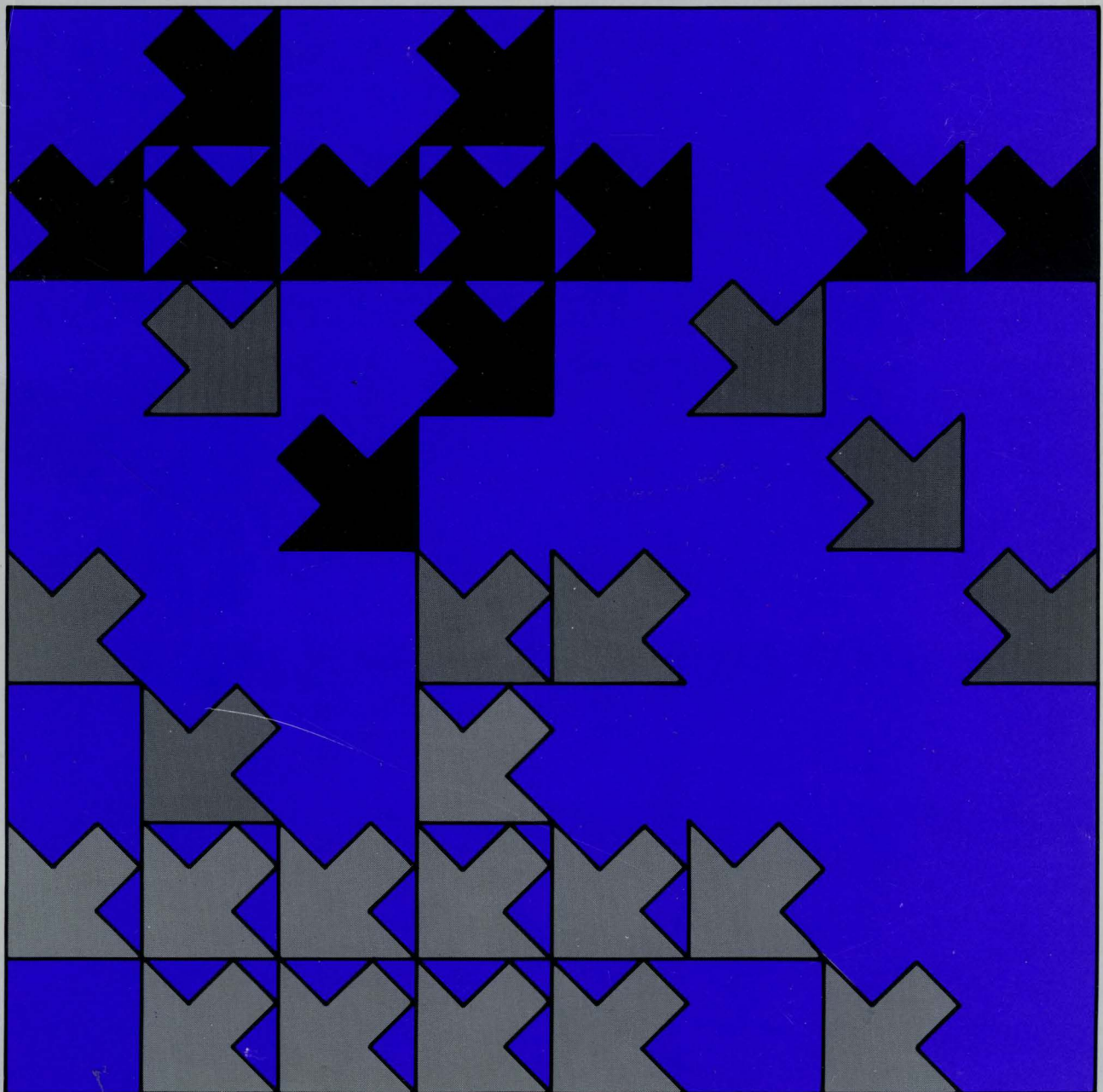




V.35 Supplement
RPQ 8Q0725
RPQ 8Q0726





5394 Remote Control Unit

SA27-3849-00

V.35 Supplement

RPQ 8Q0725

RPQ 8Q0726

First Edition (February 1989)

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The following warning statements (required by country regulatory agencies) are applicable in the countries indicated.

United States

Federal Communications Commission (FCC) Statement

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Instructions to User: Properly shielded and grounded cables and connectors must be used for connection to peripherals in order to meet FCC emission limits. Proper cables are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than the recommended cables or by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

CAUTION:

This product is equipped with a 3-wire power cord and plug for the user's safety. Use this power cord in conjunction with a properly grounded electrical outlet to avoid electrical shock.

Canadian Department of Communications compliance statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Avis de conformité aux normes du ministère des Communications du Canada

Cet équipement ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

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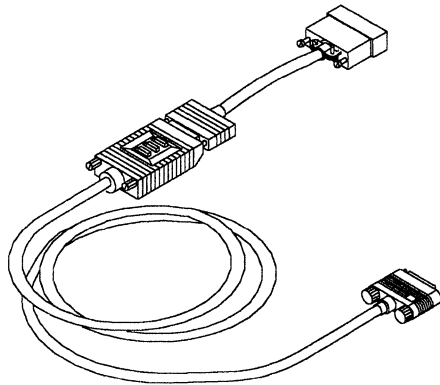
Chapter 1. Getting Started

V.35 is a communications interface that allows the IBM 5394 to use transmission speeds of up to 56K bps. A V.35 interface improves the performance of the IBM 5394 Model 01B.

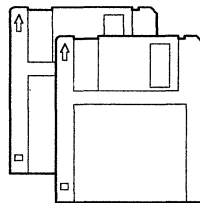
To use the V.35 interface, you must have one of the following:

- An IBM 5394 Model 01C (RPQ 8Q0725)
- An IBM 5394 Model 01B with a field upgrade (RPQ 8Q0726).

Both RPQ packages include a V.35 communications cable and a 5394 system diskette at release level 1.1 or higher.



V.35 Communications Cable



System Diskette and Backup Diskette

RPQ 8Q0726 also includes a planar and a nameplate. Ask your customer service representative to install these new parts.

“V.35 RPQ Parts List” on page 26 identifies all unique part numbers.

How to Use This Book

This book is a supplement to the base IBM 5394 Remote Control Unit library. The chapters in this book are arranged to correspond to the structure of the books in the base 5394 library. For example:

- Use Chapter 2, Planning for an IBM 5394 with a V.35 Communications Interface as a supplement to the *IBM 5394 Remote Control Introduction and Installation Planning Guide*. This chapter explains how to plan the installation of an IBM 5394 using a V.35 interface.
- Use Chapter 3, Setup and Operation of an IBM 5394 with a V.35 Communications Interface as a supplement to the *IBM 5394 Remote Control Unit Setup Guide* and *IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures*. This chapter explains how to set up, configure, and operate an IBM 5394 with a V.35 interface.
- Use Chapter 4, Maintenance Information for V.35 Communications Interface as a supplement to the *IBM 5394 Remote Control Unit Maintenance Library*. This chapter explains how to service and test the IBM 5394 with a V.35 interface.

Base IBM 5394 Library

For additional information about the 5394, refer to the base IBM 5394 Remote Control Unit Library. The books in the base IBM 5394 library are listed below:

- *Introduction and Installation Planning Guide*, SK2T-0316
- *Setup Guide*, GA27-3804
- *Operator's Guide and Problem Determination Procedures*, GA27-3805
- *Maintenance Library*, SY27-0311
- *Functions Reference*, SC30-3488
- *Safety Notices Booklet*, GA27-3823.

Chapter 2. Planning for an IBM 5394 with a V.35 Communications Interface

This chapter contains information you need to plan a data communications network using an IBM 5394 Remote Control Unit with a V.35 communications interface.

Use this chapter in addition to the *IBM 5394 Remote Control Unit Introduction and Installation Planning Guide* to plan the installation of your IBM 5394.

In this chapter, you can find information about how to:

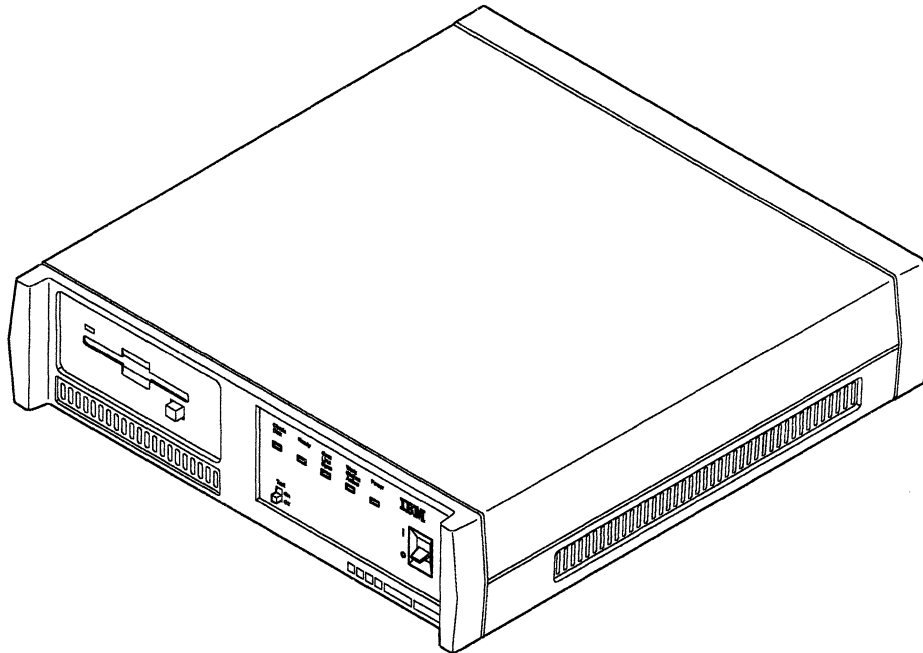
- Select your system components
- Plan the remote site
- Prepare worksheets.

Planning for System Components

The V.35 communications interface does not affect work station support. For a list of work stations supported by the IBM 5394, refer to the *IBM 5394 Remote Control Unit Introduction and Installation Planning Guide*. You should, however, keep the following considerations in mind when planning your installation.

The IBM 5394 Remote Control Unit

IBM 5394 Model 01C supports the V.35 communications interface. You can attach up to 16 work stations to this model. Model 01C also supports the EIA 232D interface.



Modems

You must use a modem or data circuit-terminating equipment (DCE) that can be configured for V.35 operation. The following IBM modems are compatible with the V.35 interface:

- IBM 5821 Model 010
- IBM 5822 Model 010.

Networks

The following types of networks support a V.35 communications interface:

- Dataphone Digital Service (DDS) using a Digital Service Unit (DSU) V.35 interface (SDLC communications mode)
- Point-to-point leased line (SDLC communications mode)
- Point-to-point high-speed private line using Limited Distance Modems (SDLC communications mode)
- X.25 Packet-Switched Network that provides a V.35 interface (X.25 communications mode).

The Host System

The IBM System/36, System/38, and AS/400™ system each require different options to support a V.35 communications interface. For information about the specific requirements of your host system, contact your IBM sales representative.

Site Planning

Power, space, and environmental requirements for attaching the IBM 5394 to a V.35 network are generally the same as those discussed in the *IBM 5394 Remote Control Unit Introduction and Installation Planning Guide*. However, you must also consider the following:

- The V.35 communications cable is 6.1 meters (20 feet) long.
- During testing, you must disconnect the V.35 cable from the modem or DCE. Your floor plan should allow ready access to the back of the modem or DCE.

Preparing Your Network and Setup Worksheets

You can use either SDLC or X.25 communications mode with the V.35 communications interface.

Follow the instructions in the *IBM 5394 Remote Control Unit Introduction and Installation Planning Guide* to complete the network and setup worksheets.

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Chapter 3. Setup and Operation of an IBM 5394 with a V.35 Communications Interface

Use this chapter if you are responsible for setting up, configuring, and operating the IBM 5394 Remote Control Unit with a V.35 communications interface.

This chapter contains the following information about the V.35 communications interface:

- Items you need to set up the IBM 5394
- Specific modifications to the setup procedure
- A new extended test procedure.

Using a V.35 communications interface does not affect other procedures and information in the *IBM 5394 Remote Control Unit Setup Guide* or the *IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures*.

Before Setup Checklist

Answer the following questions. If the answer to any of the questions is no, or if you are not sure, contact the person who planned your communications network. Check the box as you complete each step. Make sure this checklist is complete before you begin setup.

- Do you have the following equipment?
 - An IBM 5394 Remote Control Unit Model 01C
 - At least one display station that is not an IBM PC using AS/400 PC Support or IBM Personal System/2[®] using AS/400 PC Support
 - V.35 communications cable
 - 5394 system diskette at release level 1.1 or higher and backup diskette
 - Modem or DCE with V.35 support
 - Power cord
 - Labeled work station cables.
- Do you have a completed Control Unit Setup Worksheet and completed Remote Work Station Setup Worksheets?

Note: Do not attempt setup without these worksheets. You can find copies of these worksheets and instructions for completing the worksheets in the *IBM 5394 Remote Control Unit Introduction and Installation Planning Guide*.

[®] Personal System/2 is a registered trademark of International Business Machines Corporation.

- Has the communications equipment for establishing communications with your host system been installed?
- Are properly wired and grounded electrical outlets installed?
- Are all work stations set up?
 - Are all work stations unpacked and placed in designated locations?
Note: Make sure one display station is located within 6 meters (approximately 20 feet) of the control unit. This display station cannot be an IBM PC using AS/400 PC Support or IBM Personal System/2 using AS/400 PC Support.
 - Are all work stations cabled correctly?
 - Are work station addresses set according to the Remote Work Station Setup Worksheets?

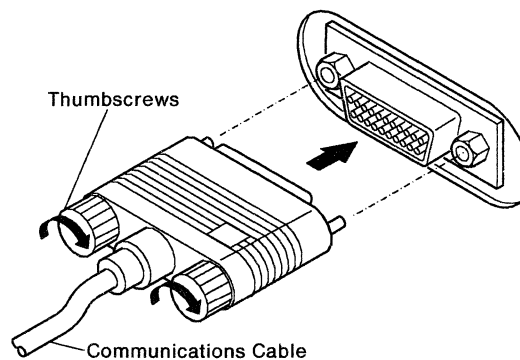
Refer to the books that came with your work stations and modem or DCE for information about entering setup parameters and addresses.

Control Unit Installation and Setup Procedure

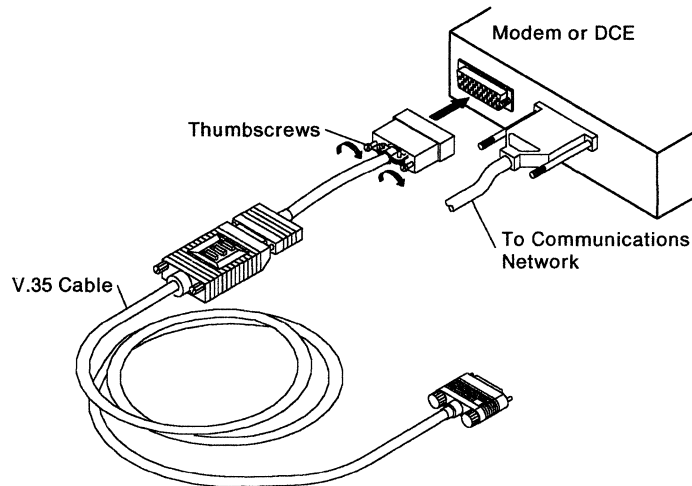
CAUTION:

Turn power off and unplug the power cord from the receptacle before connecting or disconnecting signal cables.

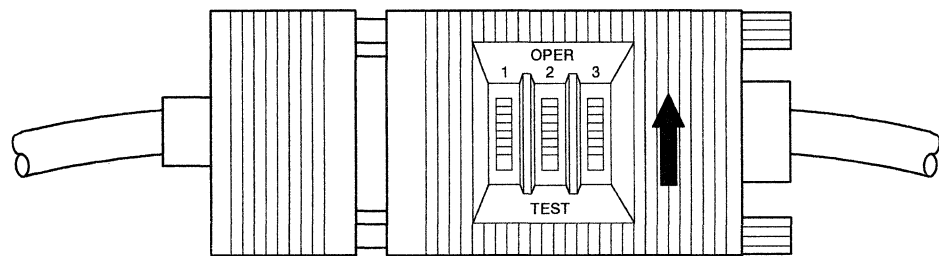
- Step 1** If you are upgrading an existing system, disconnect the old communications cable. Remove that cable from your installation.
- Step 2** Do the setup and work station attachment procedure in the *IBM 5394 Remote Control Unit Setup Guide*.
- Note:** Make sure that you use the 5394 system diskette (release level 1.1 or higher) that came with this RPQ.
- Step 3** Do the configuration procedure described in the *IBM 5394 Remote Control Unit Setup Guide*. If you are modifying an existing system, make sure that you use the configuration parameters for the V.35 network.
- Step 4** Make sure that the power switch on the control unit is set to off (O). Make sure that the control unit Test switch is set to Off.
- Step 5** Disconnect the control unit power cord from the electrical outlet.
- Step 6** Make sure that you have the V.35 cable that came with this RPQ.
- Warning:** Do not separate the two sections of the V.35 cable.
- Connect the V.35 communications cable to the IBM 5394 and turn the thumbscrews clockwise until tight.



- Step 7** Connect the V.35 cable to the modem or data circuit-terminating equipment (DCE). Turn the thumbscrews clockwise until tight.



- Step 8** Make sure that all three switches on the V.35 cable are set to OPER.



CAUTION:

For your safety, you must connect equipment only to a properly wired and grounded outlet. An improperly wired outlet can place hazardous voltage on accessible metal parts of the equipment. The customer is responsible for outlet wiring.

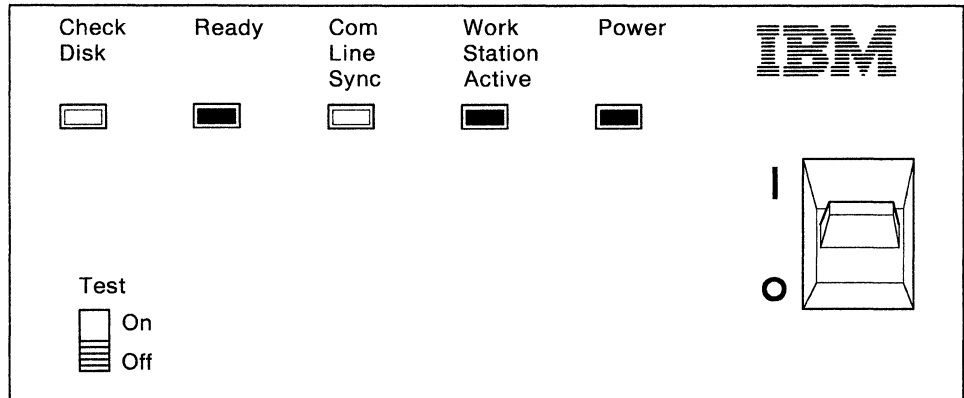
- Step 9** Connect the modem or DCE and the control unit to grounded electrical outlets.

- Step 10** Set the power switch on the modem or DCE to on. Make sure the modem or DCE is connected to the communications network.

Step 11 Make sure the system diskette is not write-protected. Insert the diskette.

Set the control unit power switch to on (I).

Step 12 All the control unit indicators come on for about 1 second. Then all indicators except the Power indicator go off. Within 2 minutes, the Ready and Work Station Active indicators come on.



Do the indicators come on?

Yes IBM 5394 setup is complete.

For normal operation, the diskette (not write-protected) must be in the diskette drive.

No Do the following:

Make sure all the cable connectors are secure.

If the indicators are still not on, refer to *IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures*.

If a D91010 system reference code (SRC) appears on the screen, contact your customer service representative and report that the RPQ is not operating correctly.

If any other SRCs appear on the screen, refer to *IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures*.

Problem Determination

If you have difficulty during any phase of operation, go to the problem determination procedures in the *IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures*. If this procedure instructs you to run the extended test procedure, use the procedure in this RPQ. See "Running the Extended Test on the V.35 Communications Interface."

Running the Extended Test on the V.35 Communications Interface

The following is a step-by-step procedure to isolate communications problems in IBM 5394 Model 01C using a V.35 communications cable.

Before you start the extended test procedure:

- Write down any SRC that appears on attached display stations.
- Make sure that you have the 5394 system diskette at release level 1.1 or higher.
- Make sure that at least one display station is attached to the control unit, powered on, and communicating with the control unit.
Note: Do not use an IBM PC using AS/400 PC Support or IBM Personal System/2 using AS/400 PC Support to run the extended test procedure.
- Make sure that your modem or DCE is set up correctly. If you changed any settings while doing the problem determination procedures, return them to their normal operating positions.
- Determine if your modem or DCE can support local and remote loopback tests. If supported, determine what adjustments are required to set up for these tests.
- Make sure that all jobs are ended on all attached work stations.

Step 1 Set the control unit power switch to off (O).

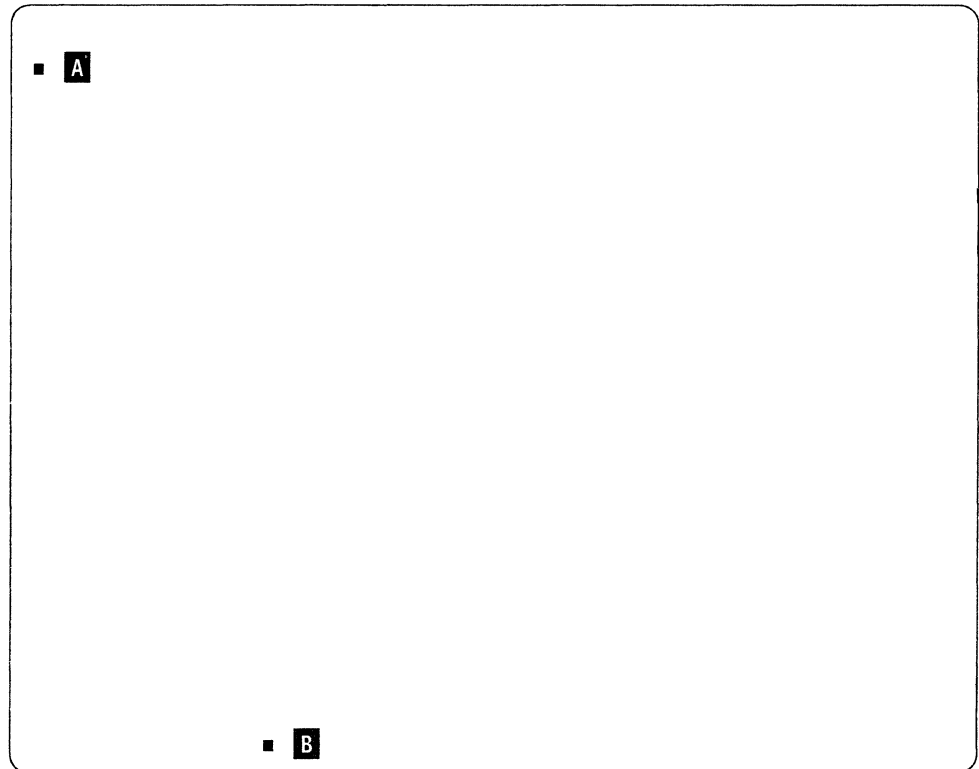
Step 2 Make sure that the control unit Test switch is in the Off position.

Step 3 Set the control unit power switch to on (I). The following indicators on the control unit should come on within 2 minutes:

- Power
- Ready
- Work Station Active.

The following indicators should appear on all attached display stations that are powered on.

- The cursor **A** should appear in the upper left-hand corner of the screen.
- The System Available indicator **B** should appear at the bottom of the screen.



Note: The cursor style and the System Available indicator may be different on your display station screen.

If these indications do not appear on at least one display station, refer to the problem determination procedures in the *IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures*.

Step 4 Set the control unit Test switch to On.

Step 5 At the display station closest to the control unit, press the Test Request key sequence. Refer to the *IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures* for the correct key sequence for your keyboard.

Press the D key.

Note: You can use any display station except an IBM PC using AS/400 PC Support or IBM Personal System/2 using AS/400 PC Support. However, you can reach the switches more easily if you use the display station nearest the control unit.

The following screen should appear within 5 seconds.



```
600000
61
      ■
```

If this screen does not appear, repeat the procedure beginning with step 1 on page 10.

If the screen still does not appear, contact your customer service representative.

Step 6 Press the Enter key. The value of the SRC **C** should change within 5 seconds, and a test level code **D** may appear.



```
  C      D
61YYXX  N
  E
61
      ■
```

If this screen appears and the value of **E** is 61, go to step 7.

If this screen does not appear, press the Error Reset key and then press the Enter key again. If the screen still does not appear, contact your customer service representative.

If the screen changes, but the test number **E** is not 61, press the Error Reset key. Use the Cursor Up or Cursor Down key to change the test number to 61 and then press the Enter key. Go to step 7.

Step 7 Do the following to run the extended test routine.

- a. Note the value of the SRC in field **C**.
- b. Locate the SRC and test level (if present) in Table 1, which begins on page 13. Follow the instructions for that code.

Note: The SRCs in Table 1 are listed in numerical order, but they may not appear on the screen in that order.

Table 1 (Page 1 of 3). Extended Communications Test SRCs

SRC	Test Level	Instructions
600000		Press the Enter key to start the test selected in field E .
610000		The extended test is in progress.
610004	1	<ol style="list-style-type: none"> 1. Disconnect the communications cable from the modem or DCE. 2. Locate the switch assembly near the end of the communications cable. 3. Set switches 1 and 3 to the TEST position and switch 2 to the OPER position. 4. Press the Enter key on your keyboard and wait 5 seconds for the next SRC to appear on the display station screen. 5. Locate the new SRC in this table and follow the instructions to continue the test sequence.
610004	2	<ol style="list-style-type: none"> 1. Locate the switch assembly near the end of the communications cable. 2. Set switches 1 and 2 to the TEST position and switch 3 to the OPER position. 3. Press the Enter key on your keyboard and wait 5 seconds for the next SRC to appear on the display station screen. 4. Locate the new SRC in this table and follow the instructions to continue the test sequence.
610005		<ol style="list-style-type: none"> 1. Make sure the communications cable is connected to the back of the modem or DCE and that all three switches are in the OPER position. 2. If possible, set up your modem or DCE to run a local loopback test and press the Enter key. 3. If your modem or DCE does not support local loopback, press the Error Reset key to bypass this test. 4. Wait 5 seconds for the new SRC to appear on the display station screen. Locate that SRC in this table and follow the instructions to continue the extended test routine.
610006		<ol style="list-style-type: none"> 1. If possible, set up your modem or DCE to run a remote loopback test and then press the Enter key. 2. If your equipment does not support remote loopback: <ul style="list-style-type: none"> • Set up your modem or DCE for normal operation. • Call your host system operator and request that the host system modem or DCE be set up to loop data back to the communications line. • Press the Enter key when the host system is ready for the test. 3. If you were not able to complete either of the above instructions, press the Error Reset key to exit this test. 4. Wait for the next SRC to appear on screen. Locate the new SRC in this table and follow the instructions to complete the extended test routine.

Table 1 (Page 2 of 3). Extended Communications Test SRCs

SRC	Test Level	Instructions
610007	ALL LEVELS	<p>The test sequence ran without detecting any failure. Do the following:</p> <ol style="list-style-type: none"> 1. Write down the SRC and test-level digit that appear on the screen. 2. Exit the test mode as follows: <ul style="list-style-type: none"> • Set the control unit power switch to off (O). • Set the control unit Test switch to Off. • Make sure that your modem or DCE is set up for normal operation. • Make sure that the communications cable is attached to the modem or DCE and that all three switches are in the OPER position. • Set the control unit power switch to on (I). 3. If you ran the extended test because of an 004X or 005X SRC, locate that SRC in the <i>IBM 5394 Remote Control Unit Operator's Guide and Problem Determination Procedures</i> and follow the recovery procedure given there. 4. If you ran the extended test because you could not establish communications with the host system and no SRC appeared on the screen, take the action corresponding to the test-level digit that you recorded in step 1 on page 14: <ul style="list-style-type: none"> • If test level is 3, report to the host system operator that a communications problem exists. The problem does not appear to be in the control unit. • If test level is 4, report to the host system operator that: <ul style="list-style-type: none"> – A communications problem exists. – The problem does not appear to be in the control unit. – The local loopback test passed. – Remote loopback is not possible for this configuration. • If test level is 6, report to the host system operator that: <ul style="list-style-type: none"> – A communications problem exists. – The problem does not appear to be in the control unit. – The local loopback test passed. – The remote loopback test passed.

Table 1 (Page 3 of 3). Extended Communications Test SRCs

SRC	Test Level	Instructions
<p>618DXX 618EXX 618FXX</p>	<p>ALL LEVELS</p>	<p>The extended test sequence has detected a communications failure. Do the following:</p> <ol style="list-style-type: none"> 1. Write down the SRC and test-level digit that appear on the screen. 2. Exit the test mode as follows: <ul style="list-style-type: none"> • Set the control unit power switch to off (O). • Set the control unit Test switch to Off. • Make sure that your modem or DCE is set up for normal operation. • Make sure that the communications cable is attached to the modem or DCE and that all three switches are in the OPER position. • Set the control unit power switch to on (I). 3. Take one of the following actions, depending on the test-level digit that you recorded in step 1 on page 15: <ul style="list-style-type: none"> • If test level is 3, report the SRC and test-level digit to your customer service representative. • If test level is 4, contact your host system operator and report: <ul style="list-style-type: none"> – A communications problem exists. – The problem does not appear to be in the control unit. – The attached modem or DCE failed the local loopback test. • If test level is 6, contact your host system operator and report: <ul style="list-style-type: none"> – A communications problem exists. – The problem does not appear to be in the control unit. – The attached modem or DCE passed the local loopback test. – The remote loopback test failed. – The failure was caused either by the communications network or by the host system.

Chapter 4. Maintenance Information for V.35 Communications Interface

Use this chapter if you are a qualified maintenance person who services the 5394 and who has completed the 5394 education course.

This chapter contains the following information about the V.35 communications interface:

- General information about the V.35 interface
- Procedures for running cable wrap tests on a V.35 interface
- New system reference codes (SRCs) and prompts that apply only to the V.35 interface
- A parts list for this RPQ.

When to Use This Information

Begin all maintenance activity at MAP 0100 in the *IBM 5394 Remote Control Unit Maintenance Library*. Refer to this supplement if:

- The MAPs direct you to run a communications wrap test
- You suspect a host communication or network problem
- You need a part number for the V.35 communications cable.

General Information about the V.35 Communications Interface

The 5394 V.35 communications cable consists of:

- 15 shielded signal lines
- A 25-pin connector at the 5394 end
- A switch assembly
- An adapter cable with a 34-pin connector at the modem or DCE end.

This cable assembly converts the physical configuration of signal lines at the back of the 5394 into the configuration required by Recommendation V.35. During test operation, the three switches near the DCE end of the cable wrap the transmit signal lines from the 5394 back to receive lines. This capability produces SRCs that you can use to identify communications failures in specific circuits.

The following table shows each signal line in the V.35 cable, indicates point-to-point wiring, and identifies the SRC corresponding to each type of circuit failure.

Table of SRCs and Signal Lines for the V.35 Communications Interface						
SRC	Failing Signal Line	Connector Pin		Wrap Path	Cable Switch	Line Type
		5394	DCE			
6X8D40	RLSD (DCD)	8	F	←	SW 1	Single-Ended Interchange
6X8D47 ¹	RTS	4	C			
6X8D41	CTS (RFS)	5	D			
6X8D42	DTR	20	H			
6X8D42	DSR	6	E			
6X8E4F ¹	TDA	10	P	←	SW 3	Differential
6X8E48	RDA	12	R			
6X8E49	RSETA	25	V			
6X8E4A	TSETA	21	Y			
6X8F4F ¹	TDB	9	S	←	SW 2	Differential
6X8F48	RDB	13	T			
6X8F49	RSETB	24	X			
6X8F4A	TSETB	19	<u>a</u> or AA			
—	Signal GND	7	B	No Wrap Path	No Wrap Path	Common
—	Shield	Shell	A			
—	ID0 (0 VDC)	14	—			
—	ID1 (+5 VDC)	16	—			
Notes: <ol style="list-style-type: none"> 1. All receivers wrapped to this driver failed. A failing driver or one or more signals shorted to ground may cause this failure. 2. Pin <u>a</u> on the DCE connector is labeled AA on the DCE connector for France and Switzerland. 3. The 'X' in the SRCs may be either a 1 or a 3, depending on which test was run. 4. For SRCs not listed in this table, refer to the <i>IBM 5394 Remote Control Unit Maintenance Library</i>. 						

For detailed information about the diagnostic tests and SRCs, see "Testing the V.35 Communications Interface" on page 20.

Signal Line Descriptions

Receive Line Signal Detect (RLSD): A signal generated by the modem or DCE that indicates to the control unit that a carrier signal is present on the communications line. This signal is also known as Data Carrier Detect (DCD).

Request to Send (RTS): A signal generated by the control unit that puts the modem or DCE into Transmit mode.

Clear to Send (CTS): A signal generated by the modem or DCE that indicates to the control unit that the modem or DCE is ready to transmit data. CTS usually becomes active in response to RTS. This signal is also known as Ready for Sending (RFS).

Data Terminal Ready (DTR): DTR is not included in Recommendation V.35, but it is included in the communications cable and used for wrap testing. This signal cannot be used by individual V.35 modems or DCEs.

Data Set Ready (DSR): A signal generated by the modem or DCE that indicates to the control unit that it is ready to begin active operation.

Transmit Data (TDA and TDB): A differential pair of digital data signals that the control unit sends to the modem or DCE. These signals contain the information that is transmitted by the control unit through the external communications network.

Receive Data (RDA and RDB): A differential pair of digital data signals that the modem or DCE sends to the control unit. These signals contain the information that is transmitted to the control unit through the external communications network.

Transmit Signal Element Timing (TSETA and TSETB): A differential pair of timing pulses generated by the modem or DCE. These pulses control the rate of data transfer from the control unit to the modem or DCE.

Receive Signal Element Timing (RSETA and RSETB): A differential pair of timing pulses generated by the modem or DCE. These pulses control the rate of data transfer from the modem or DCE to the control unit.

Signal Ground: This signal line supplies a common reference level for the single-ended interchange lines (RLSD, RTS, CTS, DTR, and DSR).

Cable ID (ID0 and ID1): A hard-wired, 2-bit code that enables the 5394 to determine when a V.35 cable is attached to the communications receptacle.

V.35 Signal Levels

The V.35 interface includes both single-ended and differential signal lines. The single-ended signals operate within the same voltage range as EIA 232D signal lines. The differential lines consist of balanced, current-mode signals that develop line voltage across 120-ohm resistors. Table 2 identifies the voltage ranges associated with both types of signal line.

Table 2. Signal Line Voltage Levels for the V.35 Interface			
Line Type	Voltage Reference	DC Voltage Range	Network Definition
Single-Ended Interchange Lines	Signal line to GND	+3 to +15 V -3 to -15 V -3 to +3 V (exclusive)	Off or Logic 0 On or Logic 1 Invalid
Differential Lines	VA to GND VB to GND VA-VB VA-VB VA-VB	-4 to +4 V -4 to +4 V +0.44 to +0.66 V -0.44 to -0.66 V -0.44 to +0.44 V (exclusive)	Off or Logic 0 On or Logic 1 Invalid
Note: The state of data circuits is denoted by logic 0 (also called space) and logic 1 (also called mark). Corresponding states of interchange circuits are identified as Off and On.			

General Service Information

Equipment failure or equipment incompatibility can cause host communications problems. Before you attempt to run wrap tests, make sure that:

- The 5394 is a Model 01C. This RPQ cannot be used with other models.
- The 5394 system diskette is at release level 1.1 or higher.
- The customer's host system has the options and software necessary to support V.35.

Testing the V.35 Communications Interface

The wrap test procedures and Dedicated mode screens described in the *IBM 5394 Remote Control Unit Maintenance Library* have been modified for the V.35 communications interface.

If a **D91010** code appears on the screen, follow the procedures in "Verifying the Communications Cable ID" on page 22.

Entering Dedicated Mode

Note: Do not use an IBM PC or IBM Personal System/2 using AS/400 PC Support to run the Dedicated mode tests.

Warning: To prevent destruction of data, stop all work station sessions before starting any Dedicated mode test.

1. Switch the 5394 power off.
2. Set the 5394 Test switch to Off.
3. Switch power on at the 5394 and at a display station.
4. Wait about 2 minutes for the power-on sequence to complete. Reset any error condition that occurs.
5. Set the 5394 Test switch to On and press the Test Request key sequence. (Refer to the *IBM 5394 Remote Control Unit Maintenance Library* for the correct key sequence for the keyboard you are using.)
6. Press the D key. The Dedicated mode screen should appear on the screen within 5 seconds. See the following illustration.



Note: Certain fields do not appear during some phases of operation.

The following section describes the Dedicated mode screen fields.

Dedicated Mode Screen Field Descriptions

A System Reference Code (SRC) Field: This field indicates the overall status of a selected Dedicated mode test. The first two digits of the SRC indicate the test selection. The remaining four digits identify current status. These four digits remain all zeros as long as a test is running. When a test stops, this field contains either a test result code or a prompt. For information about the SRCs, see Table 3 on page 24.

B Test Counter: The value of this field depends on the current test selection and the interface type:

- During cable wrap tests on a 5394 attached to a V.35 communications cable, this field contains a 1 or a 2 to differentiate between phase A and phase B test prompts. These prompts allow you to identify which signal lines the microcode is testing.
- At the completion of test 61, field **B** indicates the wrap level (3, 4, or 6) of the SRC in field **A**.
- At the completion of test 63, 64, or 66, field **B** indicates the number of times the test ran before stopping.
- During the line speed test (69), field **B** indicates the frequency of the clock signal from the modem or DCE.

C Test Selection Field: This field allows you to select the desired Dedicated mode test. When the test screen first appears on the display station, the cursor is positioned below the second digit of the test number. Use the Cursor Up or Cursor Down key to select any Dedicated mode test supported by the control unit.

D Test Option Field: This field allows you to select between continuous loop and loop-on-error test modes. The 5394 automatically selects continuous loop testing when it enters Dedicated mode. However, you can change test modes by pressing the Cursor Up or Cursor Down key. The following describes the difference between these modes of operation:

- If this field is set to C, a selected test runs until the operator stops it or until the 5394 detects an error. Under either condition, the 5394 stops the test in progress and displays the appropriate information in fields **A** and **B**.
- If this field is set to E, a selected test runs until the operator stops it. If the 5394 detects an error, the test stops and an SRC appears in field **A**. After a brief pause, the 5394 resets the test result code to all zeros and begins running the test again.

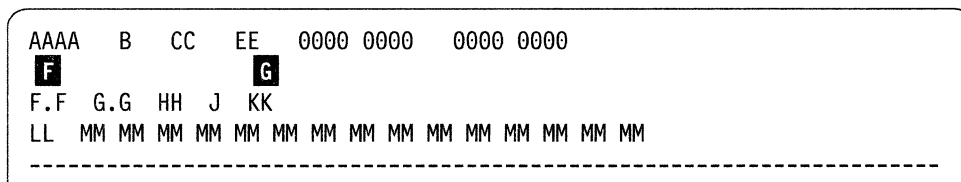
Note: Field **D** does not appear on the screen when you select test 61.

E Test Data Field: Three bytes of test data appear in this field when you select either the continuous transmit (6A) or continuous receive (6B) test. If you select test 6A, you can use the Cursor Up and Cursor Down keys to create any desired test pattern between 000000 and FFFFFFFF. If you enter the characters 7E7E7E, SDLC flags are transmitted continuously. If you select test 6B, the first 3 bytes of each new transmission received from the network appear in this field.

Verifying the Communications Cable ID

Before running any wrap tests, make sure that the attached communications cable has the correct cable ID:

1. Use the Cursor Down key to change the test selection field **C** to 6F and press the Enter key. The Concurrent mode screen should appear within 5 seconds. See the following illustration.



2. Field **F** should be 1.1 or higher. If field **F** is below 1.1, the planar is not compatible with the V.35 RPQ.
3. If field **G** is 01, go to step 4. If any other value appears in this field, do the following:
 - a. Disconnect the communications cable from the back of the 5394.
 - b. Use an ohmmeter to measure the resistance from pin 14 to pin 7 of the communications cable. This resistance should be less than 0.1 ohm.
 - c. Measure the resistance from pin 16 to pin 7 of the communications cable. This signal path should be open.
 - d. If the resistances are not correct, the communications cable is defective.
 - e. If the resistances are correct, the 5394 planar is defective.
4. The value in field **G** is 01. Do the following:
 - a. Press the Error Reset key to clear the Concurrent mode screen from the display station.
 - b. Press the Test Request key sequence and then press the D key. The Dedicated mode screen should appear.
 - c. Run the wrap tests to isolate the cause of the communications failure.

Running Wrap Tests

The V.35 communications cable includes three separate wrap switches:

- Switch 1 controls wrap of interchange lines
- Switch 2 controls wrap of TDB to RDB, TSETB, and RSETB (phase B wrap)
- Switch 3 controls wrap of TDA to RDA, TSETA, and RSETA (phase A wrap).

Because logic on the planar combines the phase A and phase B signals before they reach the communications interface module, running a wrap test with all three switches in the TEST position can obscure failure indications. The cable wrap test for a V.35 interface includes two phases:

- Phase A wrap with switches 1 and 3 in the TEST position, and switch 2 in the OPER position
- Phase B wrap with switches 1 and 2 in the TEST position, and switch 3 in the OPER position.

At the start of either test 61 or test 63, the 5394 reads the cable ID to determine if a V.35 communications cable is attached. If the cable is attached, the prompts and result codes for the cable wrap test are modified, but the general test sequence remains the same.

The general procedure for running all wrap tests is as follows:

1. Enter the Dedicated mode.
2. Use the Cursor Up or Cursor Down key to select the desired test number in field **C**.
3. For test 63, 64, or 66, use the Cursor Up or Cursor Down key to select either the continuous (C) or loop-on-error (E) test mode (field **D**).
4. Press the Enter key to start the test sequence.
5. Respond to any prompts that appear in field **A** as indicated in Table 3 on page 24.
6. To control test progress:
 - Press the Error Reset key once to stop the test progress.
 - Press the Enter key to continue the test sequence.
 - Press the Error Reset key twice to exit the test.
7. After you complete all desired tests:
 - Record any SRC that appears on the screen.
 - Exit the Dedicated mode.
 - Make sure that the communications cable is connected to the modem or DCE.
 - Return all switches to their normal operating position.
 - Use the list of SRCs in this book and in the *IBM 5394 Remote Control Unit Maintenance Library* to determine appropriate recovery procedures.

The SRCs for tests 61 and 63 are listed in Table 3 on page 24.

Table 3 (Page 1 of 2). Cable Wrap Test Description for the V.35 Interface

Test Number	SRC	Test Level	Instructions
	600000		Default SRC that appears in field A at entry into the Dedicated mode. Press the Enter key to start the test selected in field C .
61	610000		Dedicated test 61 (the extended communications test) is in progress.
61	610004	1	Prompt. To start the phase A wrap test, disconnect the communications cable from the modem or DCE. Set switches 1 and 3 to the TEST position and switch 2 to the OPER position. Press the Enter key.
61	610004	2	Prompt. To start the phase B wrap test, set switches 1 and 2 to the TEST position and switch 3 to the OPER position. Press the Enter key.
61	610005		Prompt. Make sure that the communications cable is connected to the back of the modem or DCE and that all three switches are in the OPER position. Set up for local loopback testing and press the Enter key. If you cannot set up for this test, press the Error Reset key.
61	610006		Prompt. Set up for a remote modem or DCE loopback test and press the Enter key. If you cannot set up for this test, press the Error Reset key.
61	610007	3	The test sequence has ended. The 5394 passed the cable wrap test; local loopback is not possible for this configuration.
61	610007	4	The test sequence has ended. Local loopback passed; remote loopback is not possible for this configuration.
	610007	6	The test sequence has ended. Local and remote loopback tests passed.
61	618DXX	3	The cable wrap test failed on interchange lines of a V.35 communications cable.
61	618EXX	3	The cable wrap test failed on phase A lines of a V.35 communications cable.
61	618FXX	3	The cable wrap test failed on phase B lines of a V.35 communications cable.
61	6180XX	4	Cable wrap test passed, but local loopback test failed.
61	6180XX	6	Remote loopback test failed.
63	630000		Dedicated test 63 (cable wrap) is in progress.
63	630004	1	Prompt. To start the phase A wrap test, disconnect the communications cable from the modem or DCE. Set switches 1 and 3 to the TEST position and switch 2 to the OPER position. Press the Enter key.
63	630004	2	Prompt. To start the phase B wrap test, set switches 1 and 2 to the TEST position and switch 3 to the OPER position. Press the Enter key.

Table 3 (Page 2 of 2). Cable Wrap Test Description for the V.35 Interface			
Test Number	SRC	Test Level	Instructions
63	630007		Cable wrap test passed.
63	638DXX		The cable wrap test failed on interchange lines of a V.35 communications cable.
63	638EXX		The cable wrap test failed on phase A lines of a V.35 communications cable.
63	638FXX		The cable wrap test failed on phase B lines of a V.35 communications cable.

Notes:

1. The XX in the SRCs identify specific failure conditions. For test-level 3, the table on page 18 defines codes relating to individual circuits in the communications cable. All other SRCs are defined in *IBM 5394 Remote Control Unit Maintenance Library*.
2. After completing a cable wrap test, make sure that you connect the communications cable back to the modem or DCE and return all switches to the OPER position.
3. All other Dedicated mode tests supported by this control unit run as described in the *IBM 5394 Remote Control Unit Maintenance Library*.

V.35 RPQ Parts List

Part Number	Units	Description
96X6154	1	V.35 RPQ 8Q0725 for 5394 Model 01C
6423325	1	• Cable Assembly, V.35 Communications Interface
6423326	1	• Cable Assembly, V.35 Communications Interface (Use in France and Switzerland only)
15F9913	2	• 5394 System Diskette, Release 1.1
25F7270	1	• <i>V.35 Supplement</i> , SA27-3849
25F9843	1	V.35 RPQ 8Q0726 for 5394 Model 01B
6423325	1	• Cable Assembly, V.35 Communications Interface
6423326	1	• Cable Assembly, V.35 Communications Interface (Use in France and Switzerland only)
15F9913	2	• 5394 System Diskette, Release 1.1
25F7270	1	• <i>V.35 Supplement</i> , SA27-3849
39F7846	1	• Replacement planar
96X6154	1	• Nameplate

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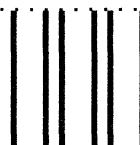
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