HEWLETT hp PACKARD

USERS GUIDE

HP 18199A

CCITT#7 Analysis Application

Serial Numbers

This manual applies to HP 18199A software for Rev. 2518.

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CHAPTER 1

INTRODUCTION

Description

The HP 18199A CCITT#7/CCS7 Analysis Application for the HP 4953A Protocol Analyzer provides users of common channel signaling number 7 protocol with a powerful tool for monitoring, capturing, decoding, displaying, and analyzing digital information flowing on the common channel. This application has many new specialized features. A few key features are:

Selective monitor/capture of all frames, LSSU and MSU frames only, or MSU frames only.

Three new signaling system specific display formats: level 2, level 3, and level 3 with all higher level data displayed.

User definable decoding parameters allowing for special and future needs.

Softkey Chart

To help you learn and find your way around this Analysis Application, Figure 1-1 shows the Top Level Menu and lower level menus of the softkeys.

Important Terminology

Care has been taken to present the Users Guide in familiar terms, however, some terms are unique to common channel signaling. For your convenience, the glossary contains definitions for many unique and frequently used terms. Let's discuss a few terms right away.

The basis for this application was taken directly from the CCITT specification for Common Channel Signaling System No. 7. Additional provisions have been made in the application for the ANSI specification for Common Channel Signaling System No. 7, which is referred to as CCS7.

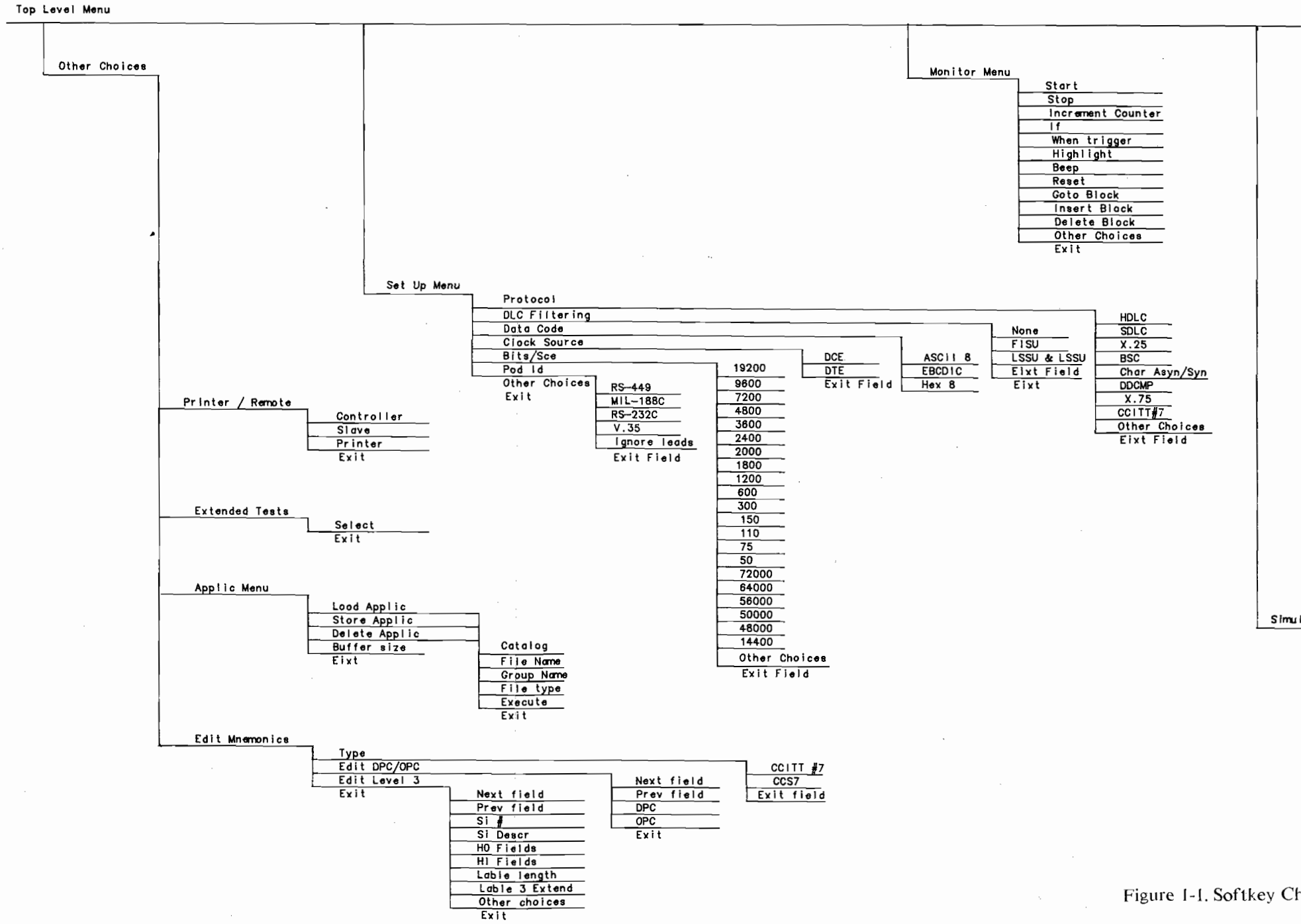
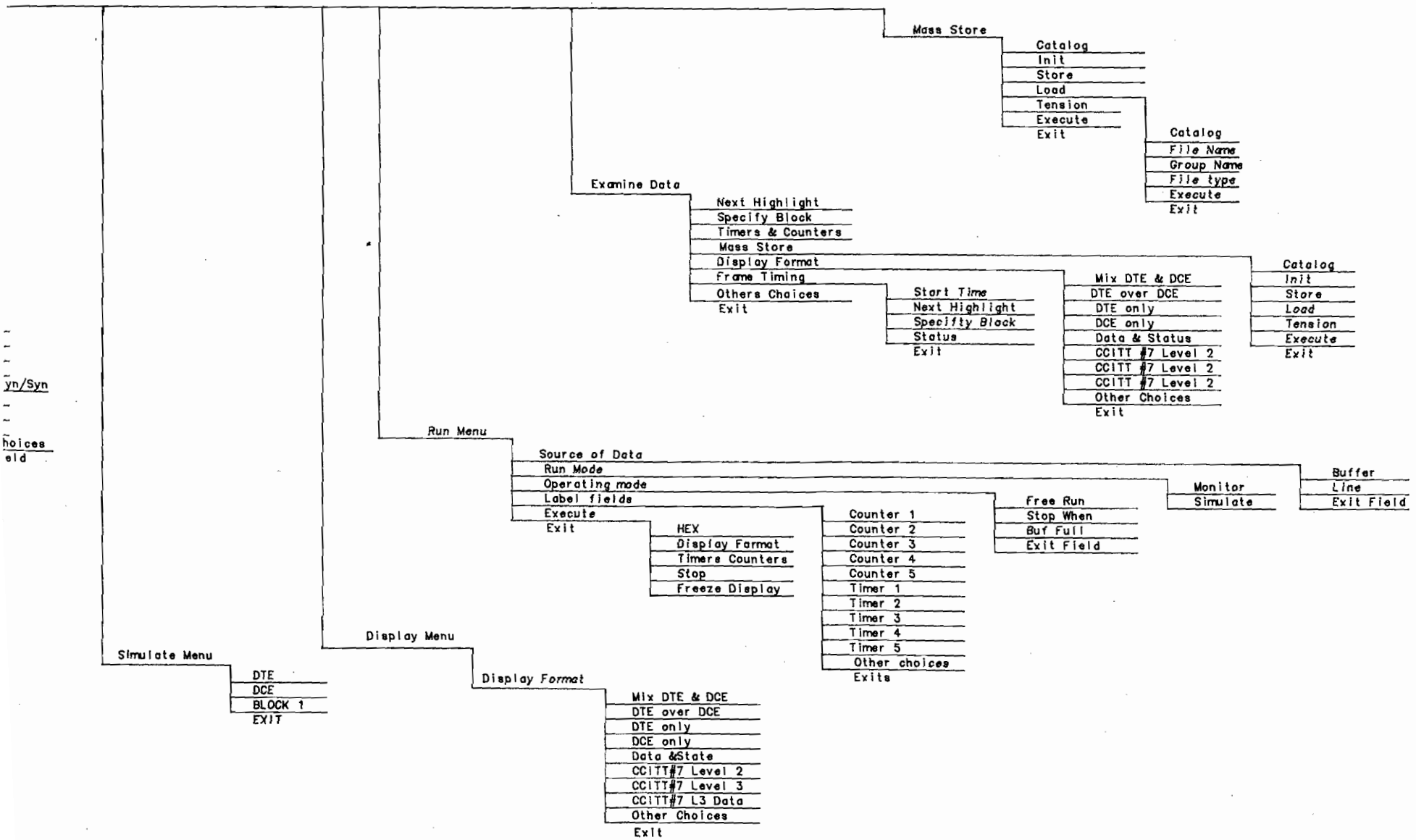


Figure 1-1. Softkey Ch



1-1. Softkey Chart

Because CCS7 differs only slightly from CCITT#7, the protocols will be collectively referred to as CCITT#7, both in the manual and in the application. The primary difference is in the length of the point codes (OPC and DPC). CCS7 uses 24 bit point codes and CCITT#7 uses 14 bit point codes.

Protocol Overview

CCITT#7 is a bit oriented protocol (BOP) which is optimized specifically for common channel signaling. Common channel signaling (as opposed to channel-associated signaling) is the most useful in situations where a common processor provides all routing functions for several voice paths at once. This method of signaling is particularly useful in applications such as digital trunking. CCITT#7 is considered to be a key element in the movement of telecommunications and data communications toward Integrated Services Digital Network (ISDN).

Equipment Supplied

The CCITT#7/CCS7 Analysis Application includes the following:

Master Tape Blank Tape User's Guide

The master tape contains the CCITT#7 Analysis Application program, sample data buffer, and several sample menus. The sample menus will be used in conjunction with the User's Guide to help learn about the CCITT#7 Analysis features. A blank tape is provided so that you can make a working copy for your day-to-day use and save the master copy as a backup. The User's Guide provides reference and tutorial information and contains the master and blank tapes.

Applications

The CCITT#7/CCS7 Analysis Application can be used for any link carrying CCITT#7 or CCS7 frames and with any physical interface supported by the HP 4953A.

The CCITT#7/CCS7 Analysis Application may be used with the HP 4953A to locate common channel signaling problems and monitor performance of the link.

The CCITT#7/CCS7 Analysis Application may be used with the HP 4953A to analyze and verify performance of common channel signaling equipment in development.

Features

- Conforms to both the CCITT and ANSI specification for Common Channel Signaling System No. 7.
- Real time capture, display, and decode of common channel frame traffic.
- Full post processing analysis capability including interframe measurements.
- Three new display formats clearly showing level 2 information, level 3 information, or level 3 with higher level undecoded data.
- User selectable FISU and LSSU filtering to analyze only the frames desired by the user.
- User definable segmentation of the point code (OPC/DPC) fields up to 5 subfields.
- User definablity of Si, H0, and H1 field mnemonics and label length assists in future addition of new user parts.

On-line & Off-line Viewing

The CCITT#7/CCS7 Analysis Application provides you not only with the capability to monitor on-line data traffic, but also to capture data traffic and view it off-line. You can store data traffic to tape, or directly into the Protocol Analyzer's data buffer. Once stored in the data buffer, you can monitor the buffer to get an instant replay of activity. In addition, you can examine the data traffic in detail in a non real-time mode.

Specifications

NOTE

To use this application, Extended Memory
Option 001 must be present (or HP 04953-62611)

- Performs at speeds up to 64 Kbps

CHAPTER 2

LOAD THE APPLICATION

Introduction

This chapter tells you how to load the CCITT#7/CCS7 Analysis Application, sample buffer data, and sample menus into your HP 4953A Protocol Analyzer. The manual assumes that you are already familiar with the basic use of the Protocol Analyzer. Refer to Chapter 7, Simulation for a brief review on entering a menu.

For detailed information concerning voltage and grounding requirements, power cords, and instrument operation refer to the HP 4953A Protocol Analyzer Operating Manual.

CAUTION

Do not plug in the HP 4953A Protocol Analyzer
until you are sure that the line voltage selection is correct.

Always turn off the Protocol Analyzer before
connecting or disconnecting an Interface Pod.

Connect an Interface Pod

Make certain that the Protocol Analyzer is turned off. Connect the Interface Pod cable to the connector in the lower left corner of the Protocol Analyzers back panel.

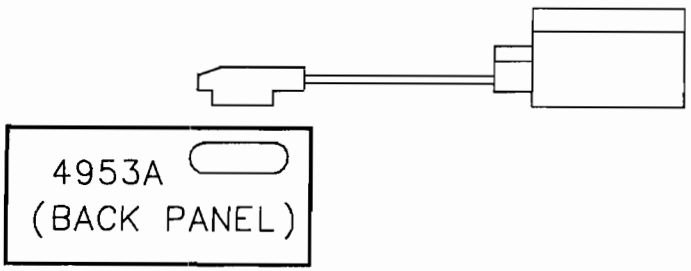


Figure 2-1. Connect an Interface Pod

Turn on the Protocol Analyzer

Press in the LINE switch on the front panel to turn on the HP 4953A Protocol Analyzer. The Protocol Analyzer begins an automatic self test sequence. After the tests are completed, the Top Level Menu is displayed.

If errors have been detected during the test, a list of errors is displayed. You can go to the Top Level Menu from the error display by pressing <Exit>. In this case, however, proper operation cannot be assumed; contact your Hewlett-Packard Sales and Service Office for assistance.

Display the Top Level Menu

The Top Level Menu is very important because it allows you to gain access to all of the features of the Protocol Analyzer.

When you turn on the Protocol Analyzer, the Top Level Menu appears. From lower level displays, you can return to the Top Level Menu by pressing the <Exit> softkey. You'll need to use this menu often, so briefly experiment going to lower levels of softkeys and returning to the Top Level Menu.

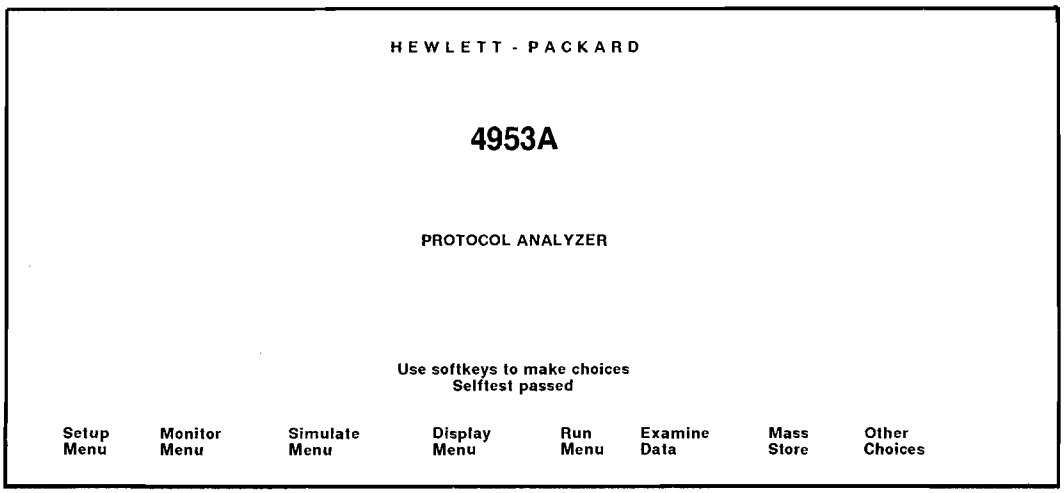


Figure 2-2. Top Level Menu

Table 2-1. Top Level Menu Softkeys

SETUP MENU	Configures the Protocol Analyzer to the system and protocol that you want to analyze. This is where you select the CCITT#7 protocol and the DLC filtering options.
MONITOR MENU	Allows you to write data traffic monitoring programs. You can monitor on-line activity or data traffic stored in the data buffer.
SIMULATE MENU	Allows you to write data traffic simulation programs.
DISPLAY MENU	Sets the protocol display formats. This is where you may select a CCITT#7 specific display format.
RUN MENU	Allows you to run a monitor or simulate program.
EXAMINE DATA	Displays data in the Protocol Analyzer's data buffer.
MASS STORE	Controls the cartridge tape functions.
OTHER CHOICES	Displays the other menu choices.
PRINTER/REMOTE	Controls the printer and remote operation functions.
EXTENDED TESTS	Allows you to perform troubleshooting tests.
APPLIC MENU	Allows you to run Hewlett-Packard software application programs.
EDIT MNEMONICS	Allows you to select user definable decode options.

Check the Application Memory Space

The CCITT#7/CCS7 Analysis Application uses 64 kbytes of application memory. Before loading the application, check the amount of application memory present in your Protocol Analyzer.

Procedure

Get the Top Level Menu.

Press <Other Choices>.

Press <Applic Menu>.

The highlighted field must show 256 kbtyes, this indicates that your Protocol Analyzer has the extended memory option. Go to "Make A Working Copy of the Master Tape".

NOTE

To use this Application, Extended Memory, Option 001 must be present (or Retrofit Kit HP 04953-62611).

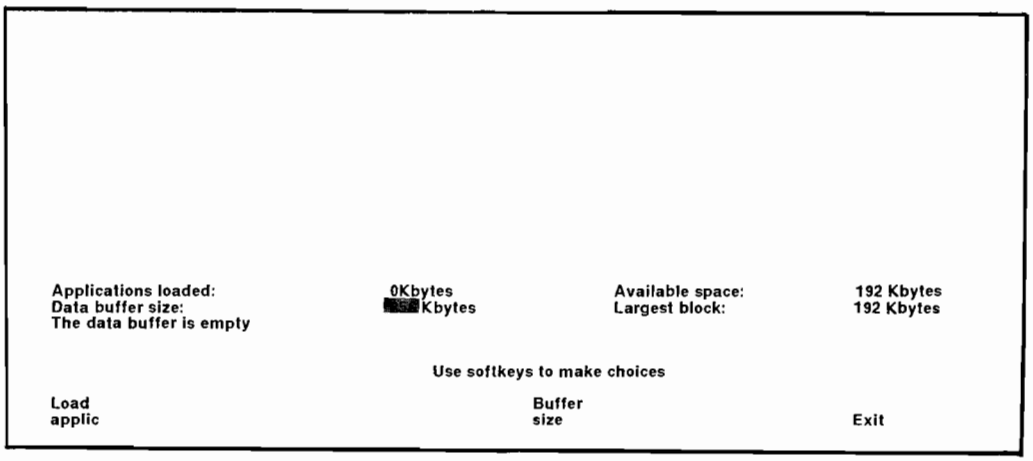


Figure 2-3. Check the Buffer Size

Make a Working Copy of the Master Tape

Hewlett-Packard recommends that you make a working copy of the master tape. Use the working copy and retain the master as a backup in case your working copy of the tape fails due to wear or accidental erasure.

Remember: Copying an application program for any reason other than your own backup violates copyright laws.

The HP 18199A CCITT#7/CCS7 Analysis Application includes a master tape and a blank tape. The blank tape is provided so you can make a working copy of the master tape. If you are not familiar with the basic features of the HP 4953A, you can use the procedures presented in Appendix A to copy the application program, sample buffer data, and sample menus.

Look at the Tape Catalog

To see what is on the CCITT#7 Analysis tape, use the catalog feature. This step simplifies loading the application and the associated files.

Procedure to Load the Tape

Locate your working copy of the tape and insert it into the tape drive.

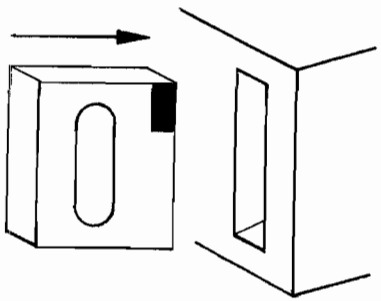


Figure 2-4. Insert a Tape

Procedure to Load the Application

Get the Top Level Menu.

Press <Mass Store>.

Press <Catalog>. The tape is read and the catalog display appears on the screen.

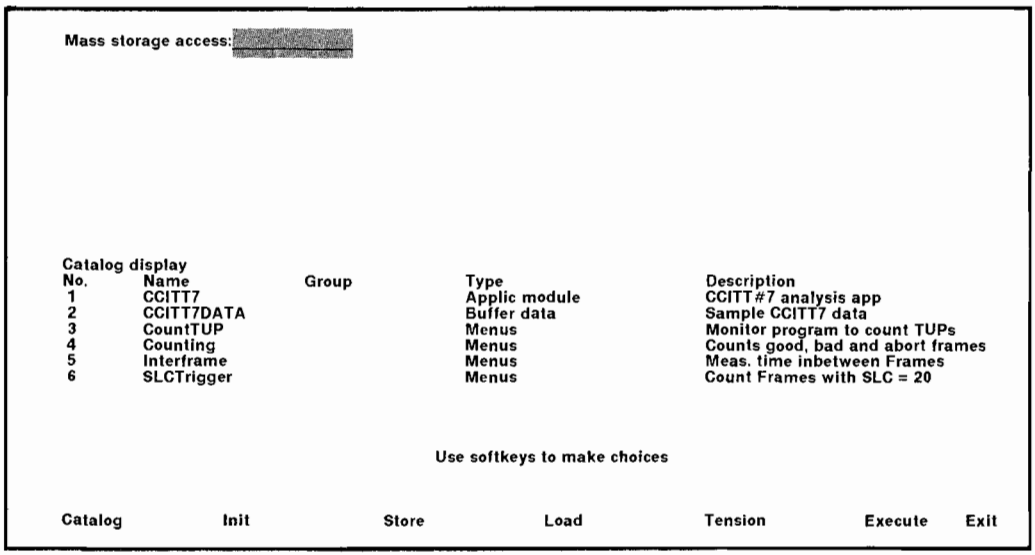


Figure 2-5. HP 18199A Catalog

Load the CCITT#7/CCS7 Analysis Application

The CCITT#7/CCS7 Analysis Application uses 64 Kbytes of application memory and can be loaded and used concurrently with the Tape Editor and ASCII Printer applications. However, in general the CCITT#7/CCS7 Analysis Application can not be used concurrently with other applications.

NOTE

To use this application, Extended Memory, Option 001 must be present (or Retrofit Kit HP 04953-62611).

Procedure

Press <Load>.

Press <Select File>.

Position the highlight bar over the file named CCITT7. Use the cursor up/down softkeys to position the highlight bar.

Press <Execute>.

The tape is read and the CCITT#7/CCS7 Analysis Program is loaded into the Protocol Analyzer memory. This takes about 15 seconds.

NOTE

The HP 18199A Application defaults to the CCITT#7 configuration. Refer to Chapter 7 in the HP 4953A Manual to change the display configurations.

If you want to load the CCITT#7/CCS7 sample buffer data, go to the next paragraph, otherwise, press the <Exit> softkey to return to the Top Level Menu.

Load CCITT#7/CCS7 Sample Buffer Data & Sample Menus

In Chapter 3, Getting Started, the examples use the CCITT#7/CCS7 sample buffer data. The sample menus are used as illustrations in other chapters. To load the sample buffer data or sample menu files, follow the simple steps below.

NOTE

The contents of the HP 4953A data buffer will be replaced by the files you load. Store any buffer data that you wish to keep before loading the sample data.

Procedure

While you are in the Mass Store Menu, load the Sample CCITT7 Data file and any other menu that you wish to use before pressing <Exit>.

Press <Load>.

Press <Select file>.

Position the highlight bar over each file to be copied in turn.

Press <Execute>.

The tape is read and the CCITT#7/CCS7 sample buffer data (Sample CCITT7 Data file) or Sample Menu is loaded into the Protocol Analyzers data buffer.

Go to Chapter 3, Getting Started for an explanation of how to use the Sample Buffer Data.

Storing & Loading Menus

A basic feature of the HP 4953A is the ability to store menus and data on tape. When you use this feature with the CCITT#7 Analysis Package loaded, in addition to storing the basic menus, you can store any new mnemonics that you may have selected(see Edit Mnemonics). The CCITT#7 display format choices once stored can be used at any later date.

NOTE

Menus, Sample Menus, or buffer data stored while CCITT#7 display formats are active can only be loaded back into an HP 4953A that has the CCITT#7 Analysis Program loaded into its memory.

CHAPTER 3

GETTING STARTED

Learn By Doing

This chapter is a learn-by-doing presentation of the CCITT#7/CCS7 Analysis Application features. It will take you only about 15 minutes to work through the examples.

Before you turn on the HP 4953A, connect an Interface Pod. The HP 18199A Analysis Application will work with any HP 4953A Interface Pod.

The CCITT#7/CCS7 Analysis Application and the sample buffer data (Sample CCITT7 data) must be loaded into the Protocol Analyzer. If you haven't done it already, follow the instructions in Chapter 2, Load the CCITT#7/CCS7 Analysis Application. Please perform the examples in this chapter in the order given.

The CCITT#7/CCS7 Analysis Application provides you not only with the capability to monitor on-line CCITT#7/CCS7 data traffic, but also to capture data traffic and view it off-line. You can store data traffic to tape, or directly into the Protocol Analyzer's data buffer. Once stored in the data buffer, you can monitor the buffer to get an instant replay of activity.

In the following examples, we've taken advantage of these features using the CCITT#7/CCS7 sample buffer data file that you loaded into the Protocol Analyzer in Chapter 2.

NOTE

The HP 18199A Application menus default to the CCTT#7 configuration. Refer to Chapter 8, Edit Mnemonics to change the type of CCITT (CCS7), the DPC or OPC grouping or the display labels.

Setup Menu

After loading the CCITT#7/CCS7 Analysis Application, you may want to reconfigure the Protocol Analyzer to operate within your networks parameters. Follow the steps on the next page to perform any desired reconfiguration. The next section describes the DLC Filtering choices.

Figure 3-1 illustrates what the Setup Menu looks like after the CCITT#7/CCS7 application is loaded.

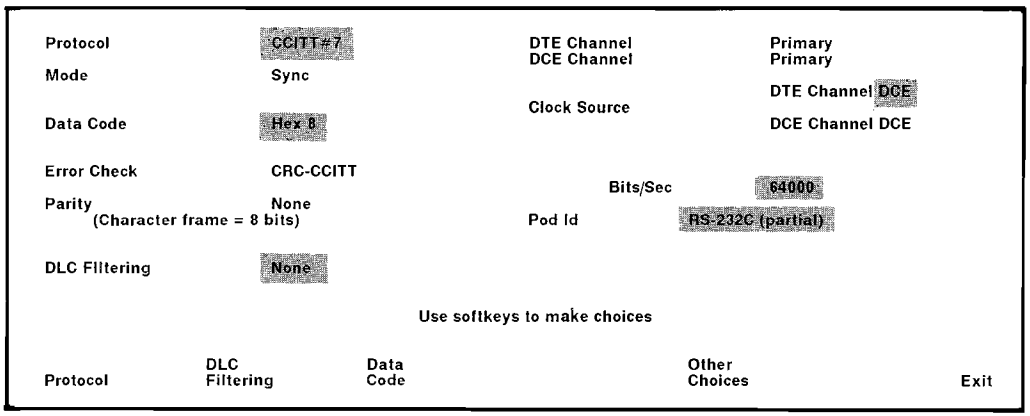


Figure 3-1. CCITT#7 Setup Menu

Procedure

Get the Top Level Menu.

Press <Setup Menu>.

Use the cursor keys to select the highlighted field to be changed (this example changes the Interface Pod selection):

Press <Other Choices>.

Press <Pod Id>.

Select the new field description:

Press <RS-232C> (or the correct name of the Interface Pod that you are using).

Press <Exit Field>.

Check all of the other highlighted fields. They should match the parameters of your network. To change any highlighted field, move the cursor to the appropriate field, press the corresponding softkey, and make your selection.

Press <Exit> to return to the Setup Menu.

NOTE

For a detailed description of each highlighted field,
refer to your HP 4953A manual.

DLC Filtering

The HP 18199A Analysis Application offers three DLC Filtering choices.

None

When you select <None>, all frames will be retained in buffer memory, whether they are MSUs, LSSUs or FISUs. One note of caution, remember that once the HP 4953A buffer is filled, additional data will push the first data stored out of the buffer. You can select <Stop when buffer is full> as one of your display set ups to avoid loosing data.

FISU

When you select <FISU>, all of the frames excluding any unchanged FISU frames will be retained in buffer memory. Since FISUs are generally sent when the line is idling, your buffer space can be filled quickly if they are not filtered out.

LSSU

When you select <LSSU>, you filter out frames containing unchanged FISUs and unchanged LSSUs. Essentially you will only see data. When an LSSU appears in a stream of data, it indicates that some maintenance or service is being performed on the line. Therefore, if an LSSU appears after an MSU or someplace other than in a series of LSSUs, it will be displayed on the HP 4953A display and put into the buffer.

Procedure

Press <Set Up>, if you are at the Top Level Menu.

Press <DLC Filtering>.

The HP 4953A display will look like Figure 3-2. Select the type of filtering that you want from the softkeys. <None> is used throughout this manual.

Press <Exit Field>.

Press <Exit> to return to the Top Level Menu.

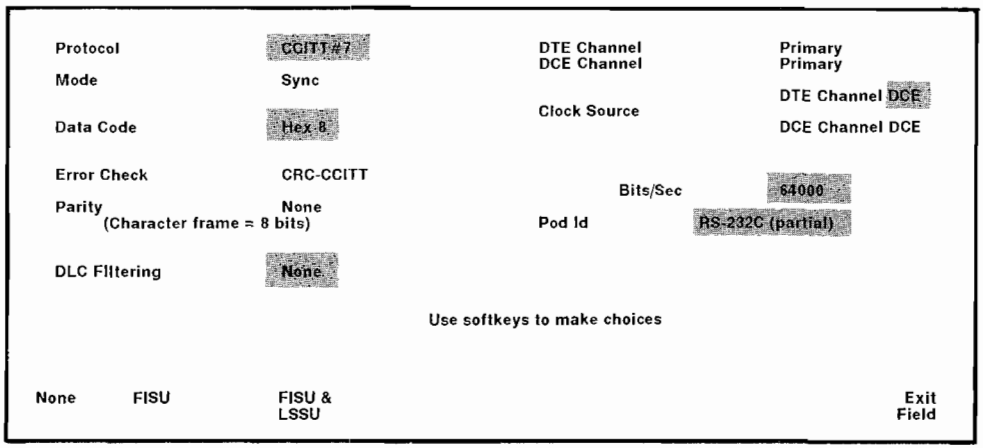


Figure 3-2. DLC FIltering Menu

Display Menu

The CCITT#7 Analysis Application provides you with the ability to choose the format for displaying data. You may choose combinations of DTE and DCE displays OR you may decide to display only level 2, level 3 or level 3 with data. Level 3 displays all of the headers and shows as much data as will fit on the line. Level 3 with data displays all of the headers and shows all of the data, wrapping it to the next line(s) as necessary.

The procedures below describe how to select your display format. Try the examples! CCITT#7/CCS7 data traffic is displayed from the data buffer just as if you were monitoring the real transmission line. Be sure that you have loaded the sample data buffer file from the HP 18199A Analysis Application Tape.

DCE and DTE Display Combinations

Procedure

Get the Top Level Menu.

Press <Display Menu>.

Press <Display format>.

Select <DTE over DCE> from the Display format menu shown in Figure 3-3 below.

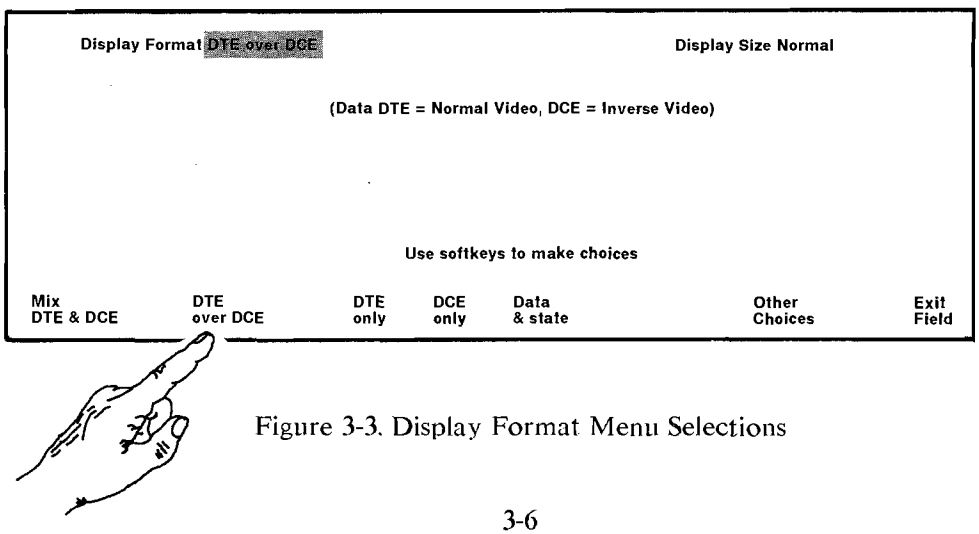


Figure 3-3. Display Format Menu Selections

Example

Press <DTE over DCE>, if you haven't already done it.

Press <Exit> to return to the Top Level Menu>.

Press <Examine Data>.

The display that you see on your Protocol Analyzer should look like Figure 3-4.

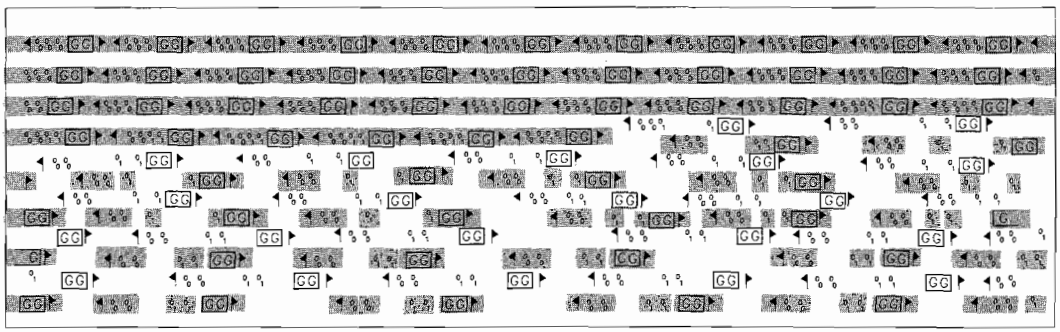


Figure 3-4. DTE over DCE Display

CCITT#7 Level 2

Procedure

You have a choice, you may return to the Top Level Menu and change the Display using the Display Menu as you did for the DTE over DCE example, or you may remain in the Examine Data menu and use the procedure below.

Press <Other Choices>.

Press <Display Format>.

Press <Other Choices>.

Press <CCITT#7 Level 2>.

NOTE

If you do not see the softkeys shown in Figure 3-5, return to the Top Level Menu and check your Set Up Menu. See Chapter 2 for the Application loading and correct set up procedures.

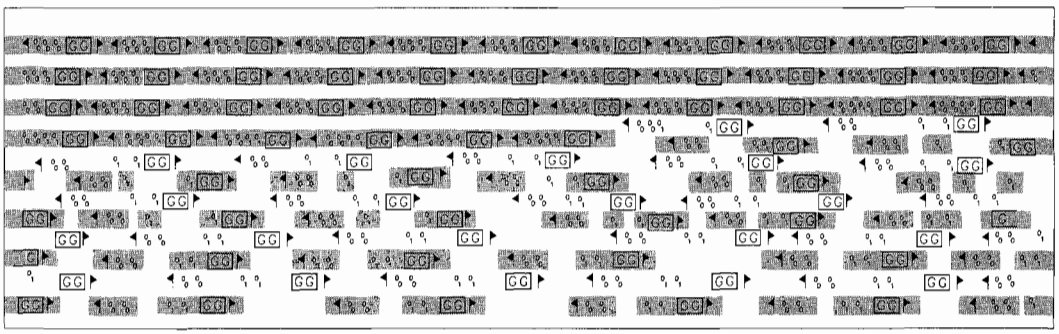


Figure 3-5. CCITT#7 Softkey Selections

Example

When you press <CCITT#7 Level 2> the display will immediately change.

The display on your HP 4953A should look like Figure 3-6.

Remember: The 2x display is not supported for the special CCITT#7 displays.

BIB	BSN	FIB	FSN	LI	SI/SF	SSF	DATA	FCS
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G
0	00	0	00	00				G

BLOCK NUMBER =3

Figure 3-6. CCITT#7 Level 2 Display

CCITT#7 Level 3

Procedure

You have a choice, you may return to the Top Level Menu and change the Display using the Display Menu as you did for the DTE over DCE example, or you may remain in the Examine Data menu and use the procedure below.

Press <Other Choices>.

Press <Display Format>.

Press <Other Choices>.

Press <CCITT#7 Level 3>.

NOTE

If you do not see the softkeys shown in Figure 3-7, return to the Top Level Menu and check your Set Up Menu. See Chapter 2 for the Application loading and correct set up procedures.

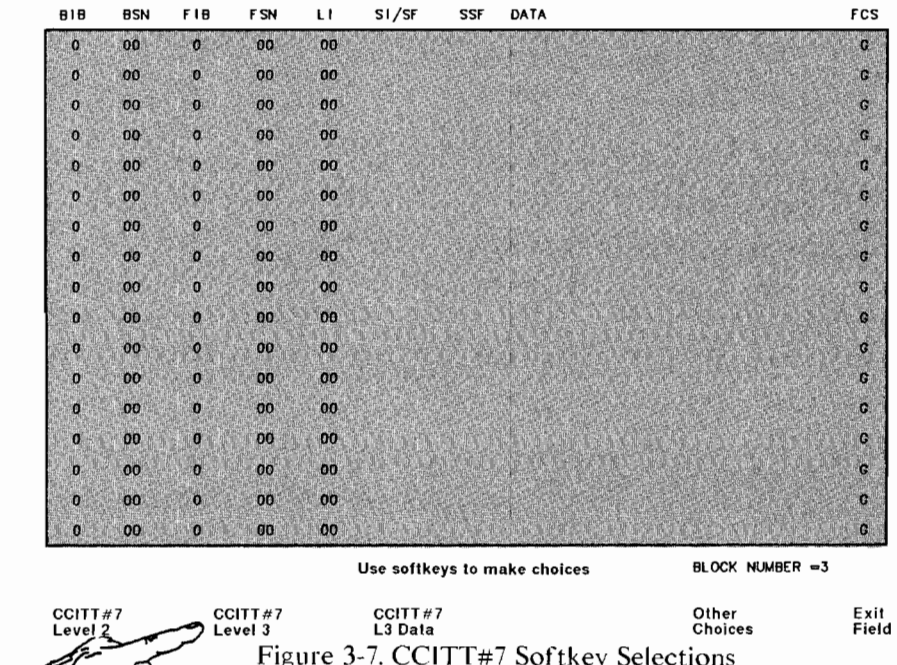


Figure 3-7. CCITT#7 Softkey Selections

Example

When you press <CCITT#7 Level 3> the display instantly changes.

The display on your HP 4953A should look like Figure 3-8.

Remember: The 2x display is not supported for the special CCITT#7 displays.

SI	DPC		OPC		SCL/OPC	H0	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0003	0005	020	CCM	RLG		G
SNTMM	0002	0006	0003	0005	00	SLT	SLT	54 48 94 53 20 94 53 2 . . . 45 20 54 4F 20 44 45 4D	G
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G

BLOCK NUMBER =2

Figure 3-8. CCITT#7 Level 3 Display

CCITT#7 Level 3 with Data

Procedure

You have a choice, you may return to the Top Level Menu and change the Display using the Display Menu as you did for the DTE over DCE example, or you may remain in the Examine Data menu and use the procedure below.

Press <Other Choices>.

Press <Display Format>.

Press <Other Choices>.

Press <CCITT#7 L3 Data>.

NOTE

If you do not see the softkeys shown in Figure 3-9, return to the Top Level Menu and check your Set Up Menu. See Chapter 2 for the Application loading and correct set up procedures.

SI	DPC		OPC		SCL/OPC	H0	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0003	0005	020	CCM	RLG		G
SNTMM	0002	0006	0003	0005	00	SLT	SLT	8 4 4 6 3 4 5 3 / 4 8 9 3 0 9 3 . . . 4 2 8 4 3 4 4 4 / 6 0 4 7 0 4 8 0	
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G

Use softkeys to make choices *BLOCK NUMBER =4*

CCITT#7 Level 2 | CCITT#7 Level 3 | CCITT#7 L3 Data | Other Choices | Exit Field

Figure 3-9. CCITT#7 Softkey Selections

Example

When you press <CCITT#7 L3 Data>, the display instantly changes.

The display on your HP 4953A should look like Figure 3-10.

Remember: The 2x display is not supported for the special CCITT#7 displays.

SI	DPC		OPC		SCL/OPC	H0	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	CBK		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0002	0005	020	CCM	RLG		G
SNTMM	0002	0006	0003	0005	00	SLT	SLT	54 48 49 53 20 49 53 20 . . . 45 20 54 4F 20 44 45 4D	
4F 4E 53 54 52 41 54 45 20 4C 45 56 45 4C 20 33 20 48 44 52 20 41 4E 44 20 44 41 54 41 20 44 49 53 50 4C 41 59									G
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G

Figure 3-10. CCITT#7 Level 3 with Data Display

ASCII or EBCDIC Display

The display can easily be changed into ACSII, EBCDIC, or format before running a menu. You can also change the display to hex while running a menu.

Procedure to Change the Display Before Running a Menu

Get the Top Level Menu.

Press <Set Up Menu>.

Press <Data Code>.

Select <ACSII8>, <EBCDIC>, or <Hex 8>.

Procedure to Change the Display While Running a Menu (assuming a menu is loaded).

Press <Run Menu>.

Only the softkeys on the display will change as shown in Figure 3-11.

Press <Hex>.

SI	DPC		OPC		SCL/OPC	H0	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	CBK		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0002	0005	020	CCM	RLG		G
SNTMM	0002	0006	0003	0005	00	SLT	SLT		
									G
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G

HEX | Display Format | Timers Counter | Stop | Freeze Display

Figure 3-11. Level 3 with Data Display with Hex Softkey

CHAPTER 4

READING CCITT#7 DISPLAYS

Introduction

Now that you have completed the chapter, "Getting Started," you are ready for the next step - Reading the Display. The examples in this chapter are from Chapter 9, the Counting Sample Menu.

First, let's review the basic mechanics of looking at data in the HP 4953A buffer.

Finding Data Traffic Information

You can roll the displayed data traffic up and down one line at a time by using the ROLL UP and ROLL DOWN keys on the HP 4953A keyboard.

You can move quickly through the data traffic by using the NEXT PAGE and PREV PAGE keys on the HP 4953A keyboard. These keys move through the display sixteen lines at a time.

Another method of display control is to use the <Specify Block> softkey. For example,

Press <Specify Block>
Type in 2
Press RETURN

For these examples, we use the last line of block 2, the last block of data in the data buffer. After you've looked at the display, specify block 1 if you want to return to the start of the data traffic display.

CCITT#7 LEVEL 2 DISPLAY

The data in Figure 4-1 was taken from the Counting Sample menu in Chapter 9. The line displayed is in CCITT#7 Level 2 format and is the last line of data in the block.

BIB	BSN	FIB	FSN	LI	SI/SF	SSF	DATA	FCS
0	03	0	04	07	TUP	I	8382C0000246	G

Figure 4-1. CCITT#7 Level 2 Display

Read the display as follows:

The backward indicator bit is 0,
the backward sequence number is 3,
the forward indicator bit is 0,
the forward sequence number is 4,
the length of the signal unit is 7 octets (MSU),
the signaling information field contains Telephone User Part data,
the subservice field indicates that it is an international TUP,
there is level 3 data,
and the frame check sequence is good.

Frame Check sequences in the HP 18199A may be:

G=good
A=abort
B=bad.

Level 3 Display

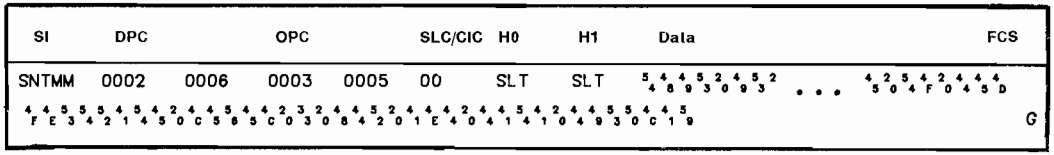
The data in Figure 4-2 is from the Counting Sample Menu in Chapter 9. The line displayed is the last line of data. It is displayed in CCITT#7 Level 3 format (Telephone Users Part).

SI	DPC		OPC		SLC/CIC	HO	H1	Data	FCS
TUP	0003	0005	0002	0006	020	CSM	CLF		G

Read the display as follows:

The signal information is in the Telephone User Part,
the Destination Point Code is 0003 0005,
the Originating Point Code is 0002 0006,
the circuit ID code is 20,
the User Part data has
(H0), the header field for the Call supervisor message is CSM,
(H1), the header field for the clear forward signal is CLF.

Level 3 with data



Read the display as follows:

The signal information is in the Signaling Network Testing & Maintenance Message,
the Destination Point Code is 0002 0006,
the Originating Point Code is 0003 0005,
the circuit ID code is 00,
the User Part data has
(H0), the header field for the call supervisor message is SLT,
(H1), the header field for the clear forward signal is SLT,
the data is data from the buffer or line.

NOTE

SLT is used for the purpose of illustration ONLY and doesn't necessarily comply with current CCITT#7 or CCS7 definitions.

CHAPTER 5

CCITT#7 BASICS

Introduction

CCITT#7 is an internationally standardized, all-purpose common channel signaling system. It is a transport system for signaling information and is used to transport other information such as data and network management. It is optimized for operation over 64 kbit/sec digital channels and can operate over analog links at lower speeds. CCITT#7 is used for point to point terrestrial and satellite links.

A single channel is used to convey information relating to a multiplicity of circuits in the case of Common Channel Signaling. Some of the advantages are:

Signaling information is separated from the voice channels.

Signaling information can be routed separately.

Provides more efficient use of channel capacity.

Although it does not include the special features for use in point to multipoint operation, it can be extended to cover such an application.

Signaling System No. 7 has also been adopted as the interexchange signaling system for the Integrated Servces Digital Network (ISDN).

Main Characteristics

CCITT#7 uses signaling links to transfer information, to do this in a reliable way, the following provisions are made.

* Error detection and correction. It uses signaling links to transfer signaling messages; each link has its own error detection and correction capabilities.

* Automatic diversion of signaling links in case of failures. Signaling traffic is automatically diverted (rerouted or changed over) to alternate paths if there is a link failure.

* Signaling points are the nodes in the common channel signaling. A signaling point at which the message is generated is also called the originating point of that message. A signaling point to which the message is destined is the destination point of that message. A signaling point that transfers the message received on a link to another link is a Signaling Transfer Point (STP).

The functional structure is specified to ensure flexibility and modularity for diverse applications. This way the system can easily be adapted to the requirements of a particular application.

Functional Parts

There are two major functional parts to CCITT#7. The first part is the Message Transfer Part which serves as a transport system to ensure reliable transfer of signaling messages. The second part, the User Part is a functional entity, which uses the transport capability provided by the MPT. Figure 5-1 illustrates the signaling network functions.

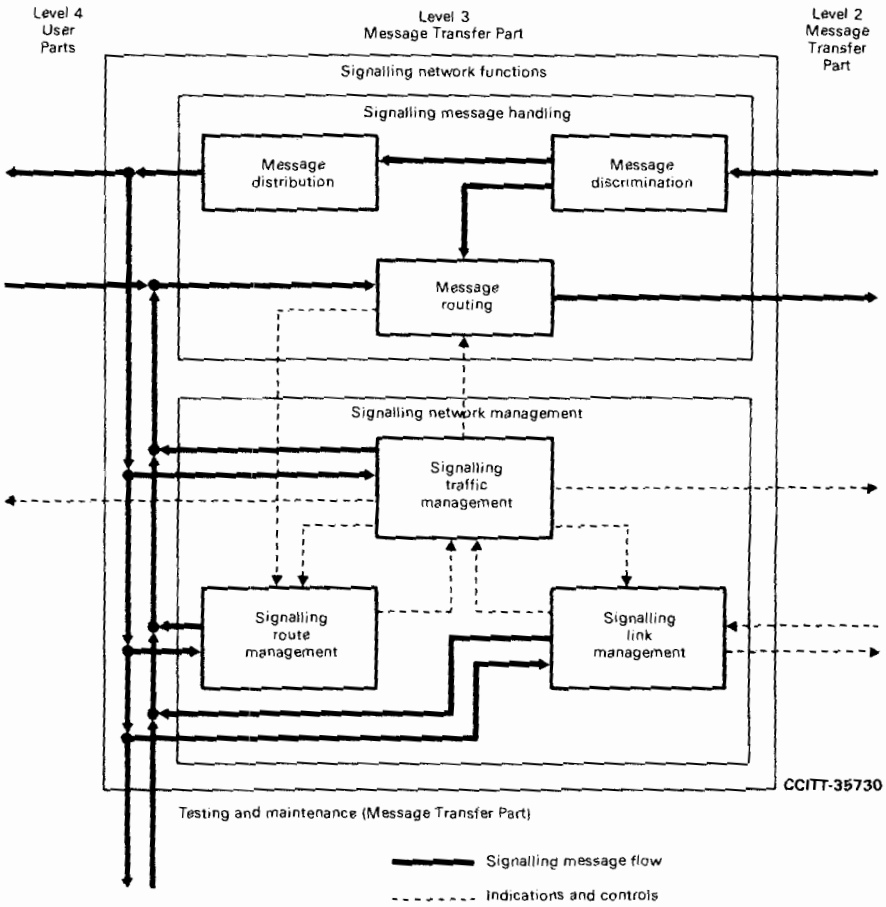


Figure 5-1. Signaling Network Functions #

LEVEL 1 - SIGNALING DATA LINK

The Signaling Data Link layer defines the physical, electrical, and mechanical characteristics of the interface.

LEVEL 2 - SIGNALING LINK FUNCTIONS

The Signaling Link Functions oversees the reliable transport (error free) of signaling messages over a signaling link. This includes functions like those listed below:

1. Use of flags to delimit frames
2. Bit stuffing (to avoid flag imitation).
3. CRC-CCITT error checking
4. Error correction using unit sequence control
5. Link failure detection using Signal Unit Error Rate Monitor link recovery.

LEVEL 3 - SIGNALING NETWORK FUNCTIONS

The Signaling Network functions control the following signaling network functions.

1. Signaling message handling, which directs the message to the appropriate user part. It is based on the label contained in the messages (DPC, OPC, SLS/SLC). It has three primary functions.
    a. Message routing, it selects the outgoing signaling link.
    b. Message discrimination, which is used at the signaling point to decide if a signal should be routed to that particular signaling point.
    c. Message distribution, it delivers the signaling message to the specified User Part.
2. Signaling network management reconfigures the signaling network in case of failures and other related tasks. There are three management functions.

a. Signaling Traffic Management, used to divert or to temporarily slow down traffic.

b. Signaling link management, used to restore failed signaling links, to activate idle links, and to deactivate aligned signaling links.

c. Signaling Route Management, to distribute information about the signaling network status.

Figure 5-2 illustrates the relationship between the level one, two, and three functions and the User Parts.

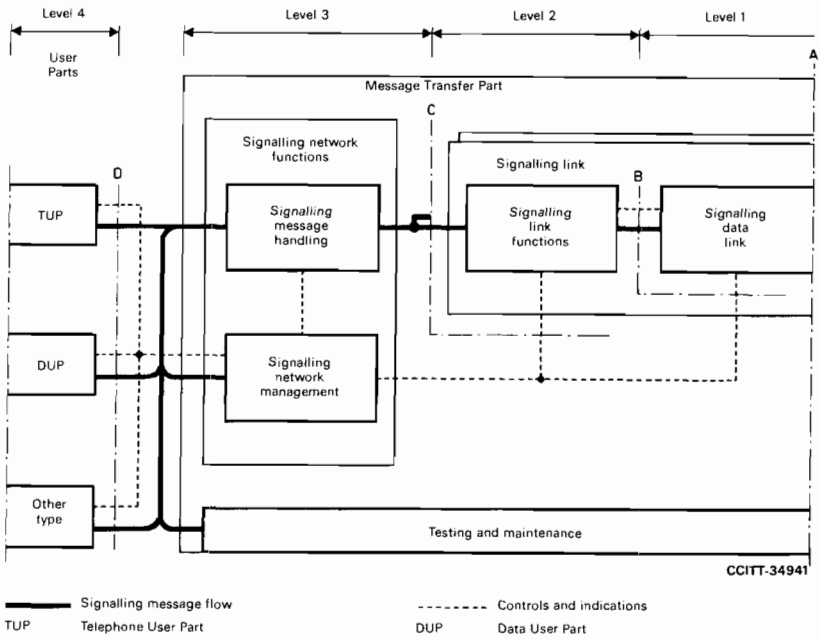


Figure 5-2. General Structure of Signaling System Functions #

USER PARTS

Each user part defines functions and procedures that are particular to a certain user of the network. Some of the user groups include:

TUP	Telephone User Part
DUP	Data User Part
ISDN-UP	ISDN User Part
	Nationally defined user parts

TUP, DUP are the most common users, therefore the best defined within the system.When the sytem is used to transfer information for management and maintenance purposes the TUP acts as a mailbox between the MTP and that user. Figure 5-3 illustrates the structure of the different signaling system functions.

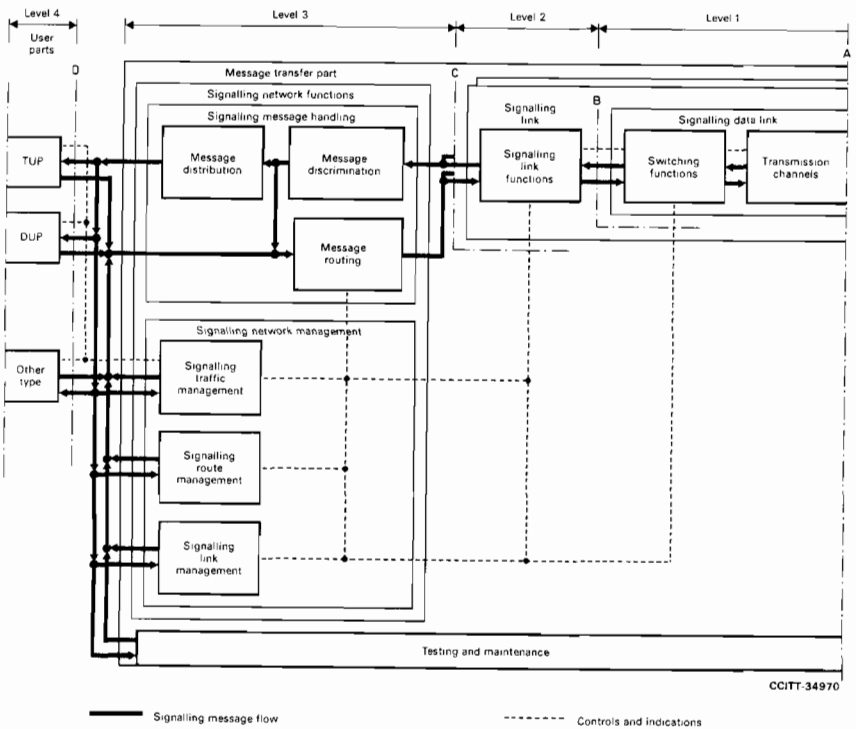


Figure 5-3. Signaling System Functions #

SCCP

The SCCP is a functional block that provides additional capabilities for the MTP and addresses operation, maintenance, and administrative services. The combination of the MTP and the SCCP is defined as the Network Service Part.

Figure 5-4 is a block diagram of how the different parts of CCITT#7 interact with each other.

Signaling Formats

CCITT#7 uses 3 different signal units to transfer the signaling message: Fill In Signal Unit (FISU), Link Status Signal Unit (LSSU), Message Signal Units (MSU).

The length indicator (LI) is what discriminates between the different signaling units.

FISU (LI=0)

The FISU or Fill In Signal Unit ensures that CCITT#7 always runs with 100% line utilization. Whenever there is idle time on the line FISUs will be sent. Figure 5-5 is an FISU frame.

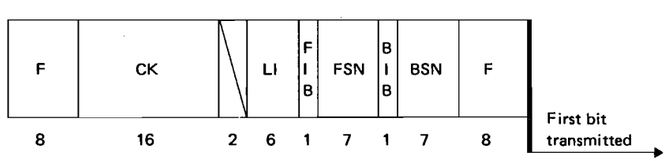


Figure 5-5. FISU Frame #

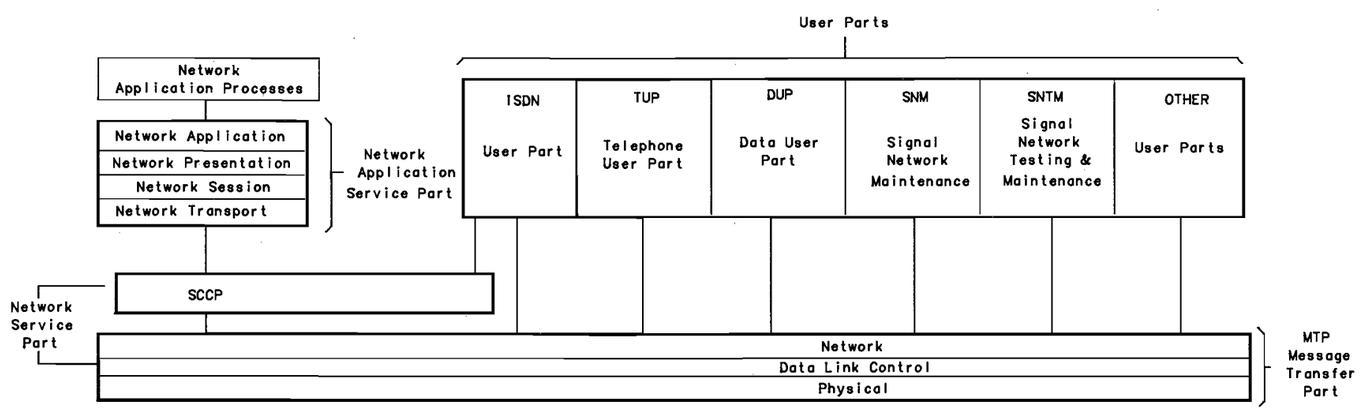


Figure 5-4. CCITT#7 Block Diagram

LSSU (LI=1 or 2)

The LSSU or Link Status Signal Unit indicates the status of the line by means of the status field. Figure 5-6 is an LSSU frame.

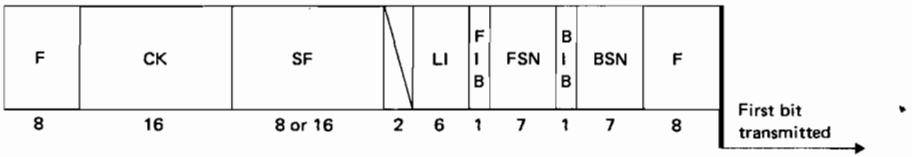


Figure 5-6. LSSU Frame #

Part of the LSSU is the SF or Status Field. It is important to remember that if LI=1 then it is one octet long, if LI=2 then the SF is two octets long. Figure 5-7 illustrates the location of the SF.

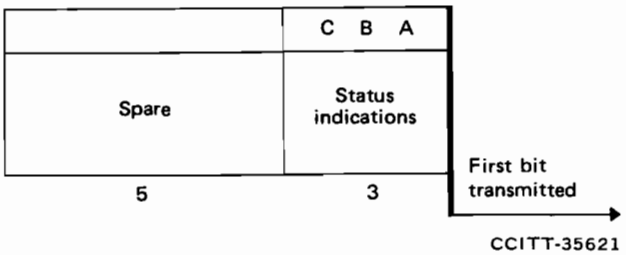


Figure 5-7. LSSU Status Field #

MSU (LI > 2)

Message signaling units (MSUs) transfer information over the signaling links. An MSU contains the information to be transmitted, a label for routing the message through the network, information about the receiving and sending points. The basic MSU or Message Signal Unit is shown in Figure 5-8.

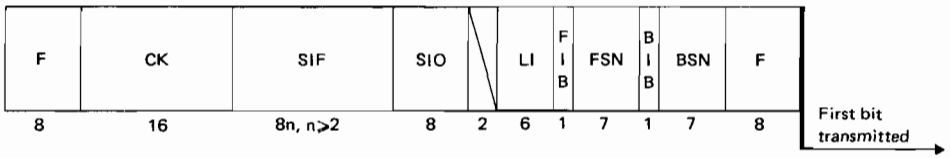


Figure 5-8. MSU Frame #

The SIO is the Service Information Octet and is divided up into the Service Indicator (SI) and the Sub-Service Field (SSF). The Service Indicator is used to associate the signal with a particular User Part and contains level 3, 4, and above information. The SSF indicates whether the User Parts is for national or international use. National networks can contain up to 272 octets.

All MSUs contain a label, this label can contain a routing label or the identity of the signaling link. SLC, the signaling link code indicates the used signaling link. CCITT#7 and ANSI use a different length for this label.

CCITT#7:	DPC and OPC are 14 bits
ANSI:	DPC and OPC are 24 bits

Figure 5-9. is an example of the label field.

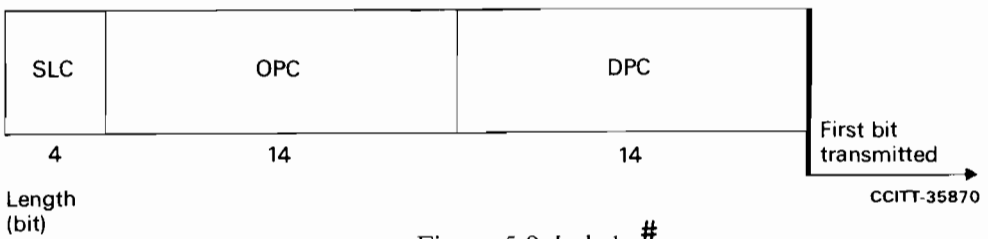


Figure 5-9. Label #

Some of the MSUs contain a heading consisting of two parts. The heading code page H0 and heading code page H1. Code H0 identifies a specific message group while H1 either contains a single code in the message group or in the case of more complex messages identifies the format of these messages. Figure 5-10 is an example of the heading codes.

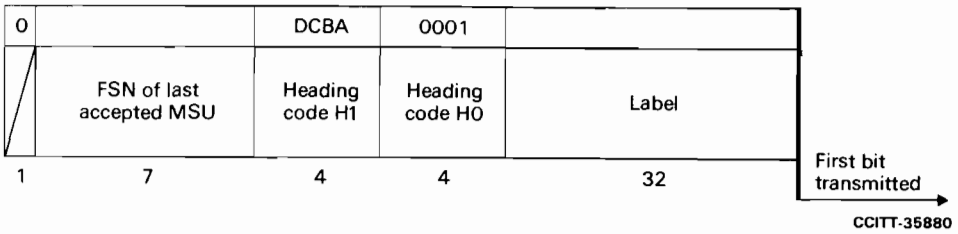


Figure 5-10. Heading Codes #

Features of CCITT#7 Protocol

Signaling Unit SU Delimitation and Alignment

The beginning and the end of an SU are delimited by a flag (0111 1110). A link will go out of alignment when more than 6 consecutive 1s in a row are received or when a certain maximum length of SU is exceeded. When loss of alignment occurs the mode of opertion will be changed to the "signal unit error monitor".

Error Detection

Error detection is done by appending a CRC-CCITT error-check at the end of the SU. The received FCS is then compared with the calculated FCS at the receiving side.

There are 2 error correction methods, the basic and the preventative cyclic retransmission.

The basic method is for signaling links using non-intercontinental terrestrial means and or intercontinental links with a one-way propagation delay of less than 15 ms. A transmitted signal unit is held at the transmitting side until a postive acknowledgement is received.

The preventative cyclic retransmission method is used for satellite links and for intercontinental links with a one-way propagation delay greater than 15 ms. A transmitted signal unit is held at the transmitting side until a positive acknowledgement is received. When there are no new signal units to be transmitted, all non-positive acknowledged signal units are cyclically retransmitted. The forced retransmission procedure ensures that forward error correction occurs during high traffic load or when high error rate occurs.

Initial Alignment

The signaling link also controls initial alignment. During alignment the two appropriate signaling points exchange status information during a predetermined period.

Error Monitoring

CCS7 provides two error rate monitors.

The signal unit error rate monitor is used while a link is in service to provide one of the criteria in the decision of taking a link out of service.

The alignment error rate monitor is also used while a link is in the proven state of the intial alignment procedure.

Figures from CCITT Yellow Book, Volume VI - Fascicle VI.6 Specifications of Signalling System No. 7 Recommendations Q.701-Q.741, VIIth Plenary Assembly, Geneva 1981

CHAPTER 6

MONITOR MENU

Introduction

Using the HP 18199A Analysis Application, you can monitor data at a speed of 64 Kbits per second. When monitoring, you can unobtrusively view data on-line or store the data in the buffer on a tape for analysis and viewing at a later date.

Load the menu labeled **CountTUPs** into your HP 4953A. Refer to Chapter 2 if you need help.

Monitor Menu

Get the Top Level Menu.

Press <Monitor Menu>.

The display will look like figure 6-1. This monitor program is designed to count TUPs or Telephone User Part frames.

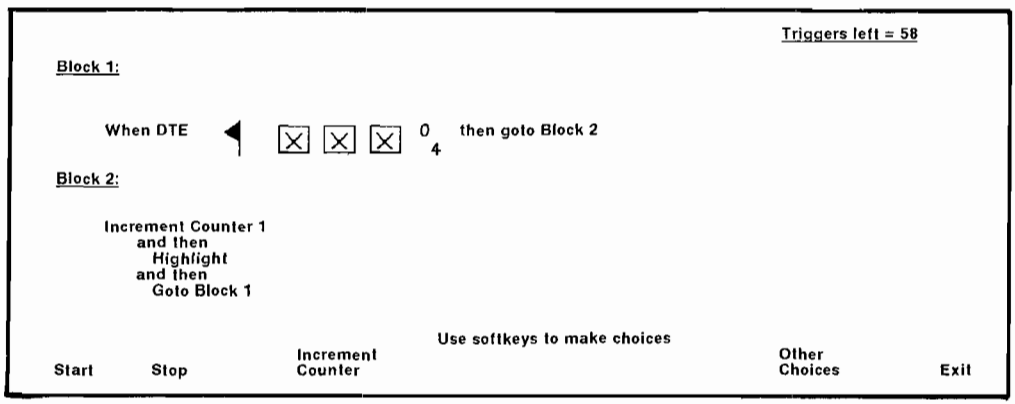


Figure 6-1. Monitor Menu

Monitor Display

Procedure

If you are still in the Monitor Menu, press <Exit> to get to the Top Level Menu.

Press <Run Menu>.

Press <Source of data>.

Press <Buffer>.

The Protocol Analyzer is ready to begin monitoring activity in its buffer. It will show data traffic when you press execute.

If you have your HP 4953A connected to a line, you may press <Line>. Remember if you press line you will get a different display than that shown in Figure 6-2.

Press <Execute>.

Observe the RUNNING message in the status field at the bottom of the screen. When all of the data in the buffer has been monitored, the display activity stops and the softkeys for the Top Level Menu are shown. The data display will remain on the screen.

Figure 6-2 displays the data in the CCITT#7 Level 3 with Data display format. If your display is different and you would like to verify your results, perform the following procedure to change the display.

Press <Examine Data>.

Press <Other Choices>.

Press <Display Format>.

Press <Other Choices>.

Press <CCITT#7 L3 Data>. The display will change instantly.

The data displayed in Figure 6-2 is from Block 5. Follow the procedure below to display the same data.

Procedure

After Running the program and accessing the Examine Data menu, it is very easy to move through the data.

While in the Examine Data menu.

Press <Specify Block>.

Type in 5.

Press <Exit Field>.

The display will automatically move and display the correct data.

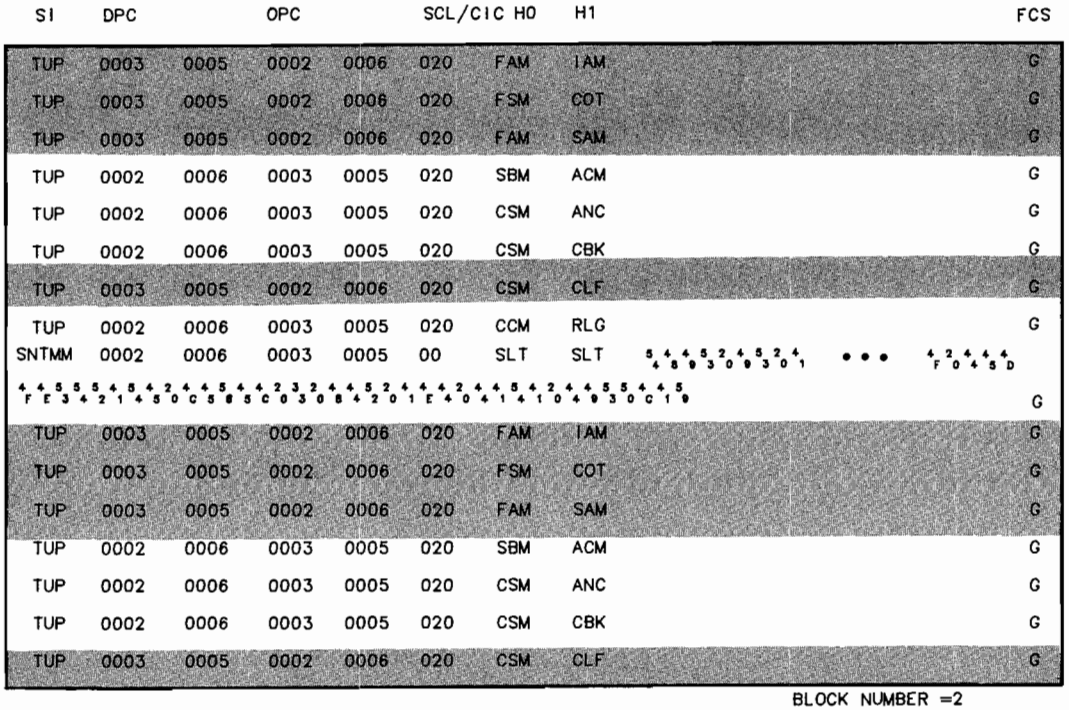


Figure 6-2. Monitor Display

Network Statistics

In addition to the ability to monitor on-line and store data for later analysis and examination, the HP 18199A Analysis Application has the ability to do network frame counts. The HP 4953A Operator's Manual has a detailed description of this display.

Procedure

While you are in the Examine Data menu,

Press <Timers & Counters>.

Figure 6-3 will be displayed.

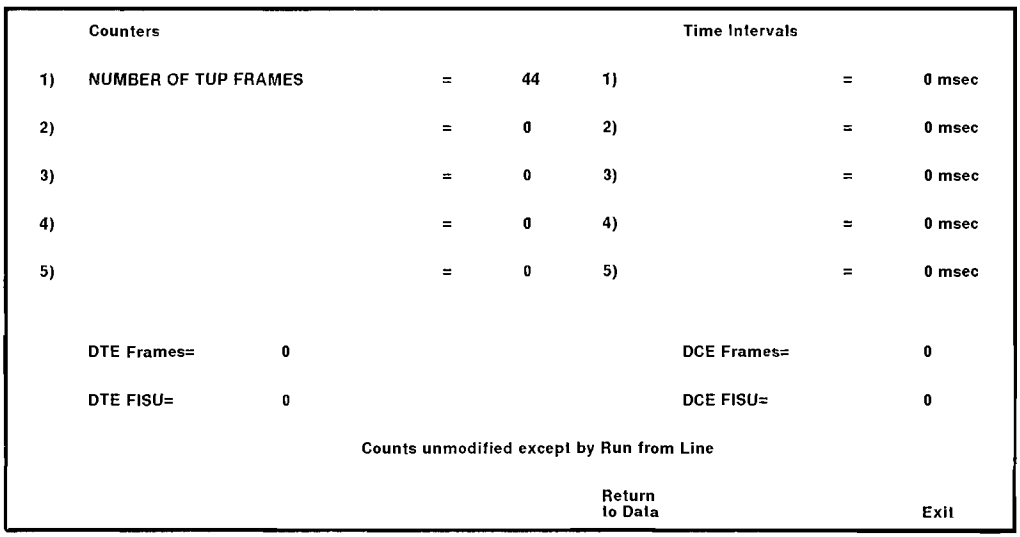


Figure 6-3. Timers and Counters Display

Using the Four Counts on the Bottom of the Display

The four counters on the bottom of the Timers and Counter display have the following abilities:

1. When you are monitoring from the line, the display is updated continuously.

2. When you monitor from the buffer the last count from the last run of the menu is displayed.

3. When you are receiving data, press the <Timers & Counters> softkey if you wish to see the monitor the activity on the line.

CHAPTER 7

SIMULATE MENU

Introduction

This chapter tells you how to use the Protocol Analyzer's simulation feature in conjunction with the CCITT#7 Analysis Application. If you are not familiar with simulation on the HP 4953A, you should read the basic HP 4953A Protocol Analyzer Operators Manual before proceeding.

Simulation Menu

The following menu is not on your application tape. The program is simple to enter and provides a refresher in entering menus on the HP 4953A. If you have questions about some of the procedures, please consult your HP 4953A Operator's Manual.

Procedure

Get the Top Level Menu

Press <Simulate Menu>.

Follow the Program Entry Procedure

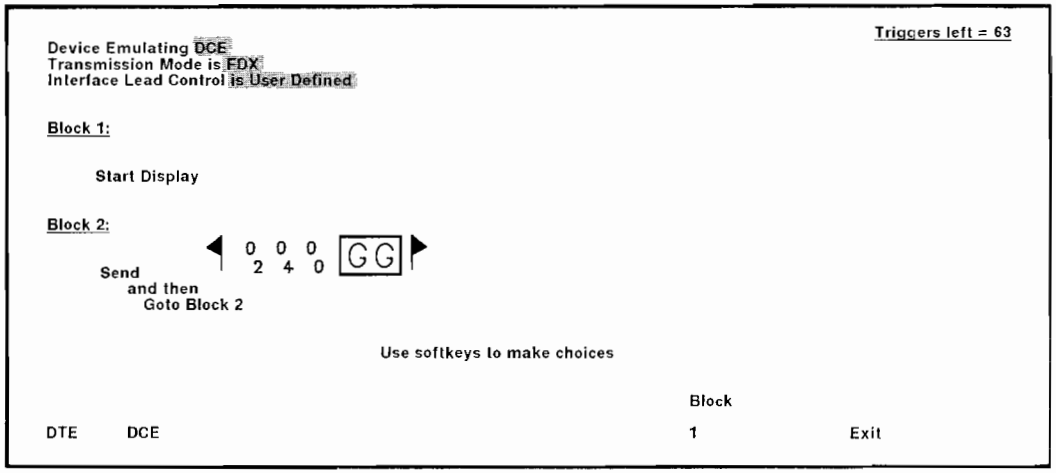


Figure 7-1. Simulation Menu Entered on HP 4953A

Program Entry Procedure

In the menu below, Select means select one of the preprinted command keys on the HP 4953A keyboard, Press means press the appropriate softkey, and Type in means use the alphanumeric keys on the HP 4953A keyboard and type in the requested information.

Press	DCE	Press	End frame Good FCS And then
Select	Cursor Down Cursor Down		Other Choices Goto Block
Press	Start Display Next block Send Text	Type in	2
		Press	Exit field Exit
Type in	02 04 00		

Run the Simulation Menu

NOTE

An Interface Pod must be connected to your line to perform this simulation exercise.

Procedure

If you are still in the Simulate Menu, press <Exit> to get to the Top Level Menu.

Press <Run Menu>.

Press <Source of Data>.

Press <line>.

Press <Run Mode>.

Press <Simulate>.

The Protocol Analyzer is ready to begin simulation. It will show data traffic when you press execute.

Press <Execute>.

Display Results

The simulate display will be the data that you entered in your program.

NOTE

When running any program on line, the buffer is cleared of any data. If you wish to do any of the other exercises in this manual, remember to reload the Sample Buffer Data from the Application Tape.

Simulate Display

The data in Figure 7-2 is displayed in CCITT#7 Level 3 with Data format. If your display is different and you would like to verify your results, perform the following procedure to change the display.

Press <Examine Data>.

Press <Other Choices>.

Press <Display Format>.

Press <Other Choices>.

Choose the display format that you would like and the HP 4953A display will instantly change.

CHAPTER 8

EDIT MNEMONICS

Introduction

The editing feature was designed into the application to allow you the flexibility to customize some mnemonics and field labels. After customizing your mnemomics, you can store the edited version of the application as your work copy.

Remember: You should have the sample buffer data (Sample CCITT7 Data) from the application tape loaded into your HP 4953A to duplicate the examples in this chapter.

Labels in the level 2 and level 3 and higher displays may be edited. To edit the labels follow the procedure below.

Procedure

Get the Top Level Menu.

Press <Other Choices>.

Press <Edit Mnemonics>.

The screen shown in Figure 8-1 will be displayed.

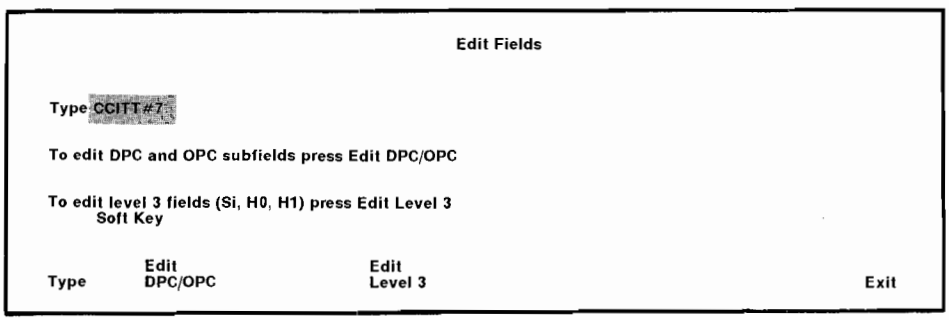


Figure 8-1. Edit Mnemonics Top Level Display

Type Field

CCITT#7 is automatically selected as the protocol. All of the examples in this chapter use CCITT#7. If your system is CCS7 use the following procedure to change the set up, after working through the examples.

Press <Type>.

Select <CCITT#7>.

Press <Exit Field> to return to the Edit Mnemonics Top Level Display.

N O T E

Select the appropriate protocol for your network after experimenting with the examples. To select ANSI standard CCS7, press <CCS7>.

Edit DPC/OPC

Use this field to change the number of bits in the DPC and/or OPC subfields. Use the Next Field and Prev Field softkeys to move the cursor to the subfield that you wish to modify. Figure 8-2 is the DPC/OPC Edit menu. Follow the procedure after Figure 8-2 for a demonstration of the editing function.

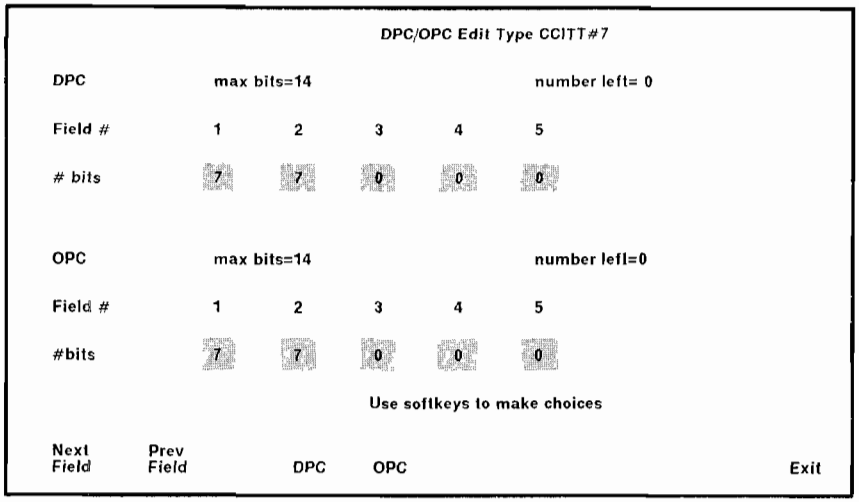


Figure 8-2. DPC/OPC Edit Display

DPC/OPC Editing Example

Procedure

Get the Edit Mnemonics Top Level Menu.

Press <Edit DPC/OPC>.

You should see the display in Figure 8-2.

Select 4 from the HP 4953A keyboard.

Press <Next field>.

Notice that the "number left" field will display a 3. This indicates that of the 7 bits that could be selected for field #1, you used 4 and consequently have 3 available.

Select 15 on the HP 4953A keyboard.

Press <Next Field>.

Notice that the field will default to the highest number of bits allowed in that subfield (7).

Select 3 on the HP 4953A keyboard.

Press <OPC>.

Select 5 on the HP 4953A keyboard.

Press <Next Field>.

Select 5 on the HP 4953A keyboard.

Press <Next Field>.

Select 4 on the HP 4953A keyboard.

Press <Exit>.

See the Display

All of the displays in this section use the Counting menu. If you haven't already loaded the menu, load it and run it so that you will have data to examine.

Press <Exit>.

Press <Exit>.

Press <Other Choices>.

Press <Examine Data>.

Figure 8-3 uses the level 3 with data display format. If you need help setting it up, please refer to Chapter 3, Getting Started.

SI	DPC		OPC		SCL/OPC	H0	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0003	0005	020	CCM	RLG		G
SNTMM	0002	0006	0003	0005	00	SLT	SLT	54 48 49 53 20 49 53 2 . . . 45 20 54 4F 20 44 45 4D	
4F 4E 53 54 52 41 54 45 20 4C 45 56 45 4C 20 33 20 48 44 52 20 41 4E 44 20 44 41 54 41 20 44 49 53 50 4C 41 59									G
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G

Figure 8-3. OPC/DPC Edited Display

Edit Level 3

Use this field to select the Si bit pattern, the Si number and to change the corresponding mnemonic (Si description) as well as the mnemonics for the H0 and H1 fields. Use the softkeys to move to the subfield that you wish to modify. Then use the appropriate alphanumeric keys to make your modifications. Figure 8-4 is the Edit Level 3 menu. Table 8-1 describes the functions of the editing softkeys and Table 8-2 describes the available Si numbers. Follow the procedure after the tables for a demonstration of this editing function.

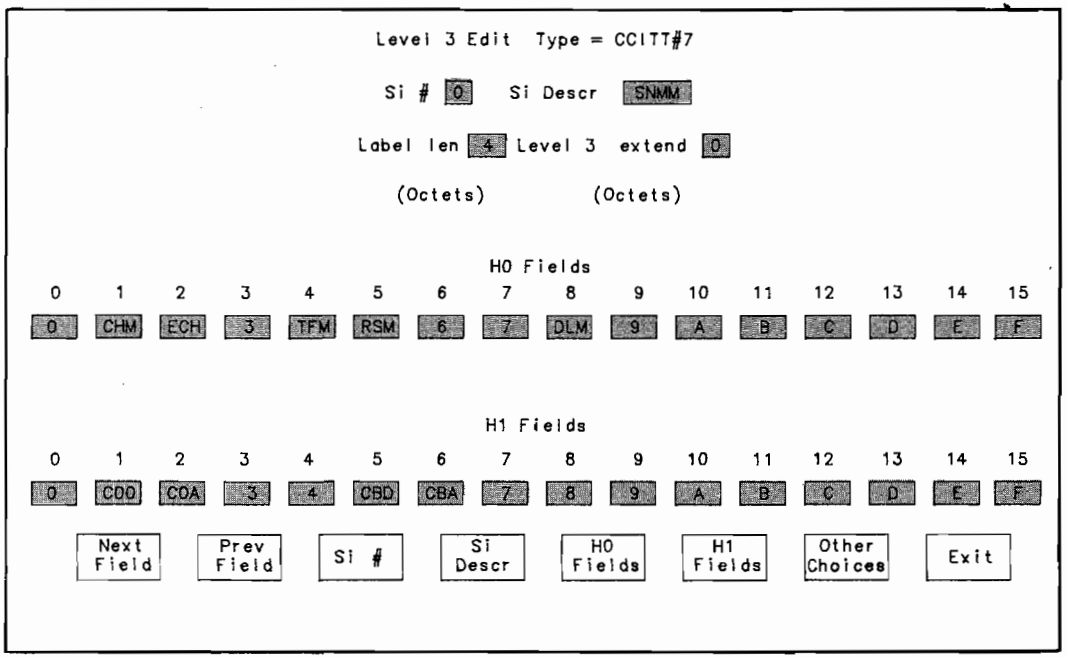


Figure 8-4. Level 3 Edit Display

Table 8-1. Level 3 Edit Softkey Descriptions

Next Field	Moves the cursor forward through the menu to the next field.
Prev Field	Moves the cursor backwards through the menu to the previous field.
Si #	Moves the cursor to the Si # field.
Si Descr	Moves the cursor to the Si Descr field.
H0 Fields	Moves the cursor to the 0 subfield in the H0 Field. Use the Next field or Prev Field keys to move to the next subfield or the Cursor movement keys to move to the next space in the subfield.
H1 Fields	Moves the cursor to the 0 subfield in the H1 Field. Use the Next Field or Prev Field keys to move to the next subfield or the Cursor movement keys to move to the next space in the subfield.
Other Choices	Press to access the other softkey functions.
Label Length	Moves the cursor to the Label Len field.
Level 3 extend	Moves the cursor to the Level 3 extend field.
Exit	Exits Level 3 edit menu and displays the Top Level Edit Mnemonics Menu.

Table 8-2. Si Numbers and Description

Si #	Description	Label Length (octets)	L3 extend (octets	Description
00	SNMM	4	0	Signal Network Management Message
01	SNTMM	4	0	Signal Network Testing Maintenance Messages
02	INTL2	4	0	**User Definable** (International 2)
03	INTL3	4	0	**User Definable** (International 3)
04	TUP	5	0	Telephone User Part
05	INTL5	4	0	**User Definable** (International 5)
06	DUP_C	5	0	Data User Part C
07	DUP_F	4	0	Data User Part F
08	INTL8	4	0	**User Definable** (International 8)
09	INTL9	4	0	**User Definable** (International 9)
10	INTLA	4	0	**User Definable** (International A)
11	INTLB	4	0	**User Definable** (International B)
12	NATLC	4	0	**User Definable** (National C)
13	NATLD	4	0	**User Definable** (National D)
14	NATLE	4	0	**User Definable** (National E)
15	NATLF	4	3	**User Definable** (National F)

Level 3 Editing Example

Procedure

Get the Edit Mnemonics Top Level Menu.

Press <Level 3 Edit>.

You should see the display in Figure 8-4.

Press <Si #>.

Type in 04 on the HP 4953A keyboard.

Press <Si Descr>.

Type in INTL4 on the HP 4953A keyboard.

Press <Exit>.

Press <Exit>.

See the Display

Press <Other Choices>.

Press <Examine Data>.

Figure 8-5 uses the level 3 with data display format. If you need help setting it up, please refer to Chapter 3, Getting Started.

SI	DPC		OPC		SCL/CIC		H0	H1	DATA	FCS
INTL4	0003	0050	0002	0018	0000	020	FAM	IAM		G
INTL4	0003	0050	0002	0018	0000	020	FSM	COT		G
INTL4	0003	0050	0002	0018	0000	020	FAM	SAM		G
INTL4	0002	0060	0003	0014	0000	020	SBM	ACM		G
INTL4	0002	0060	0003	0014	0000	020	CSM	ANC		G
INTL4	0002	0060	0003	0014	0000	020	CSM	CBK		G
INTL4	0003	0050	0002	0018	0000	020	CSM	CLF		G
INTL4	0002	0060	0003	0014	0000	020	CCM	RLG		G
INTL4	0003	0050	0002	0018	0000	020	FAM	IAM		G
INTL4	0003	0050	0002	0018	0000	020	FSM	COT		G
INTL4	0003	0050	0002	0018	0000	020	FSM	SAM		G
INTL4	0002	0060	0003	0014	0000	020	SBM	ACM		G
INTL4	0002	0060	0003	0014	0000	020	CSM	ANC		G
INTL4	0002	0060	0003	0014	0000	020	CSM	CBK		G
INTL4	0003	0050	0002	0018	0000	020	CSM	CLF		G
INTL4	0002	0060	0003	0014	0000	020	CCM	RLG		G
INTL4	0003	0050	0002	0018	0000	020	FAM	IAM		G

BLOCK NUMBER =2

Figure 8-5. Si Edited Display

Restore the Level 3 Edit menu

Press <Exit>.

Press <Other Choices>.

Press <Edit Mnemonics>.

Press <Edit Level 3>.

Press <Si Descr>.

Type in TUP on the HP 4953A keyboard.

Edit H0 Field

Procedure

Press <H0 Fields>.

Press <Next Field>.

Type in 1(space space) from the HP 4953A keyboard.

See the Display

Press <Exit>.

Press <Exit>.

Press <Other Choices>.

Press <Examine Data>.

Figure 8-6 uses the level 3 with data display format. If you need help setting it up, please refer to Chapter 3, Getting Started. Notice that under the H0 display column FAM is now displayed as a 1.

SI	DPC		OPC		SCL/CIC	H0	H1	DATA	FCS
TUP	0003	0050	0002	0018	020	1	IAM		G
TUP	0003	0050	0002	0018	020	FSM	COT		G
TUP	0003	0050	0002	0018	020	1	SAM		G
TUP	0002	0060	0003	0014	020	SBM	ACM		G
TUP	0002	0060	0003	0014	020	CSM	ANC		G
TUP	0002	0060	0003	0014	020	CSM	CBK		G
TUP	0003	0050	0002	0018	020	CSM	CLF		G
TUP	0002	0060	0003	0014	020	CCM	RLG		G
TUP	0003	0050	0002	0018	020	1	IAM		G
TUP	0003	0050	0002	0018	020	FSM	COT		G
TUP	0003	0050	0002	0018	020	1	SAM		G
TUP	0002	0060	0003	0014	020	SBM	ACM		G
TUP	0002	0060	0003	0014	020	CSM	ANC		G
TUP	0002	0060	0003	0014	020	CSM	CBK		G
TUP	0003	0050	0002	0018	020	CSM	CLF		G
TUP	0002	0060	0003	0014	020	CCM	RLG		G
TUP	0003	0050	0002	0018	020	1	IAM		G

BLOCK NUMBER =2

Figure 8-6. Display FAM as I

Remember: Now that the demonstration of the editing features is complete, practice using the editing features by modifying the DPC/OPC and level 3 fields to match your needs and the constraints of your network.

Level 3 Extended Field

The Level 3 extended field decodes up to four supplementary octets in between MTP and the User Part (between the label and H0).

The following procedure demonstrates how to use the level 3 extended field.

Procedure

Get the Top Level Menu.

Press <Other Choices>.

Press <Edit Mnemonics>.

Press <Other Choices>.

Press <Edit Level 3>

Press <Si #>.

Type in 4.

Press RETURN.

Press <Si Descr>.

Press RETURN.

Press <Other Choices>.

Press <Level 3 Extend>.

Type in a 2 on the Keyboard.

Press RETURN.

Press <Exit> twice.

Procedure to see the Display

Get the Top Level Menu.

Press <Other Choices>.

Press <Examine Data>.

Press <Display Format>.

Press <Other Choices>.

Press <Level 3 data>.

You will see the display in Figure 8-7.

SI	DPC		OPC		SCL/CIC	H0	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	1	1		G
TUP	0003	0005	0002	0006	020	3	2		G
TUP	0003	0005	0002	0006	020	3	1		G
TUP	0002	0006	0003	0005	020	1	4		G
TUP	0002	0006	0002	0005	020	1	6		G
TUP	0002	0006	0003	0005	020	3	6		G
TUP	0003	0005	0002	0006	020	4	6		G
TUP	0002	0006	0003	0005	020	1	7		G
TUP	0003	0005	0002	0006	020	1	1		G
TUP	0003	0005	0002	0006	020	3	2		G
TUP	0003	0005	0002	0006	020	3	1		G
TUP	0002	0006	0003	0005	020	1	4		G
TUP	0002	0006	0003	0005	020	1	6		G
TUP	0002	0006	0003	0005	020	3	6		G
TUP	0003	0005	0002	0006	020	4	6		G
TUP	0002	0006	0003	0005	020	1	7		G
TUP	0003	0005	0002	0006	020	1	1		G

BLOCK NUMBER =2

Figure 8-7. Level 3 with Data Extended Display

CHAPTER 9

SAMPLE MENUS

Introduction

Now that you understand the basic operation of the CCITT#7 Analysis package, it is time to practice. This chapter contains several sample menus for you to try. They are designed for specific applications that you might need or have occasion to use. If you wish you can load the application tape version of the menu, modify it to suit your needs and store your customized version for later use. Look through the chapter, try the applications that fit your needs and enjoy this practice session.

Each Sample Menu contains a brief description of its purpose, the program, and the resultant HP 4953A display (which assumes that you have the Sample Buffer Data File from the application tape loaded).

Remember: As you load each menu, the previous menu will be overwritten.

SAMPLE 1 - Counting

Description

This menu counts good, bad and abort frames.

Display Set Up

Data Source:	Buffer
Data Displayed from:	Block 4
Display Format:	Level 3

HP 4953A Sample Menu

Triggers left = 45

Block 1:

When DTE	GG	then goto Block 2
When DCE	GG	then goto Block 3
When DTE	BB	then goto Block 4
When DCE	BB	then goto Block 5
When DTE or DCE	AA	then goto Block 6

Block 2:
Increment Counter 1
and then
Goto Block 1

Block 3:
Increment Counter 2
and then
Goto Block 1

Block 4:
Increment Counter 3
and then
Goto Block 1

Block 5:
Increment Counter 4
and then
Goto Block 1

Block 6:
Increment Counter 5
and then
Goto Block 1

SI	DPC		OPC		SCL/CIC	H0	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	CBK		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0002	0005	020	CCM	RLG		G
SNTMM	0002	0006	0003	0005	00	SLT	SLT	54 48 45 53 20 93	G
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0003	0005	020	CCM	RLG		G

BLOCK NUMBER =4

Figure 9-1. Counting Menu Display

Counters				Time Intervals			
1)	Good DTE Frames	=	117	1)	=	0 msec	
2)	Good DCE Frames	=	126	2)	=	0 msec	
3)	Bad DTE Frame FCS	=	0	3)	=	0 msec	
4)	Bad DCE Frame FCS	=	0	4)	=	0 msec	
5)	Total Aborted Frames	=	0	5)	=	0 msec	
	DTE Frames=	0		DCE Frames=	0		
	DTE FISU=	0		DCE FISU=	0		

Counts unmodified except by RUN from line

Return to Data | Exit

Figure 9-2. Counting Timers & Counters Display

Sample 2 - Interframe Timing

Description

Measures the time in between frames.

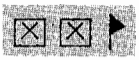
Display Set Up

Data Source:	Buffer
Data Displayed from:	Block 5
Display Format:	Level 2

HP 4953A Sample Menu

Triggers left = 59

Block 1:

When DTE  then goto Block 2

Block 2:

Start Timer 1

When DTE  the goto Block 3

Block 3:

Stop Timer 1
and then
Increment Counter 1

If Counter 1 is > 100 then goto Block 5

Block 4:

Goto Block 1

Block 5:

Stop Tests

BIB	BSN	FIB	FSN	LI	SI/SF	SSF	DATA	FCS
0	00	0	02	07	TUP	I	$8_3\ 8_2\ C_0\ 0_0\ 0_2\ 3_2$	G
0	00	0	03	07	TUP	I	$8_3\ C_3\ A_0\ 0_0\ 0_2\ 3_1$	G
0	03	0	01	07	TUP	I	$0_2\ C_3\ A_0\ 0_0\ 0_2\ 1_4$	G
0	03	0	02	07	TUP	I	$0_2\ C_3\ A_0\ 0_0\ 0_2\ 1_6$	G
0	03	0	02	00				G
0	03	0	03	07	TUP	I	$0_2\ C_3\ A_0\ 0_0\ 0_2\ 3_6$	G
0	03	0	04	07	TUP	I	$8_3\ 8_2\ C_0\ 0_0\ 0_2\ 4_6$	G
0	04	0	04	07	TUP		$0_2\ C_3\ A_0\ 0_0\ 0_2\ 1_7$	G
0	04	0	05	3F	SNTMN	I	$5_4\ 4_8\ 4_9\ 5_3\ \ldots\ 2_0\ 4_4\ 4_5\ 4$ D	G
0	00	0	01	07	TUP	I	$8_3\ 8_2\ C_0\ 0_0\ 0_2\ 1_1$	G
0	00	0	02	07	TUP	I	$8_3\ 8_2\ C_0\ 0_0\ 0_2\ 3_2$	G
0	00	0	03	07	TUP	I	$8_3\ 8_2\ C_0\ 0_0\ 0_2\ 3_1$	G
0	00	0	01	07	TUP	I	$8_3\ 8_2\ C_0\ 0_0\ 0_2\ 1_4$	G
0	03	0	02	07	TUP	I	$0_2\ C_3\ A_0\ 0_0\ 0_2\ 1_4$	G
0	03	0	02	00				G
0	03	0	03	07	TUP	I	$0_2\ C_3\ A_0\ 0_0\ 0_2\ 1_6$	G
0	03	0	04	07	TUP	I	$0_2\ C_3\ A_0\ 0_0\ 0_2\ 3_6$	G

Figure 9-3. Interframe Timing Display

Counters			Time Intervals			
1)	=	101	1)	=	125	msec
2)	=	0	2)	=	0	msec
3)	=	0	3)	=	0	msec
4)	=	0	4)	=	0	msec
5)	=	0	5)	=	0	msec

DTE Frames= 0 DCE Frames= 0

DTE FISU= 0 DCE FISU= 0

Counts unmodified except by RUN from line

Return to Data Exit

Figure 9-4. Counting Timers & Counters Display

Example 3 - SLC Triggering

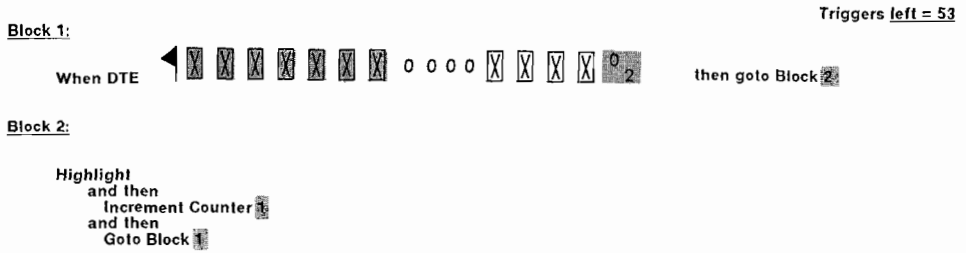
Description

This monitor program counts frames with the SLC trigger set to 20.

Display Set Up

Data Source:	Buffer
Data Displayed from:	Block 4
Display Format:	Level 3

HP 4953A Sample Menu



SI	DPC		OPC		SCL/CIC	HO	H1	DATA	FCS
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	CBK		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0002	0005	020	CCM	RLG		G
SNTMM	0002	0006	0003	0005	00	SLT	SLT	5 4 4 5 2 4 5 2 4 8 9 3 0 9 3 . . . 4 2 5 4 2 4 4 4 5 0 4 F 0 4 5 D	G
TUP	0003	0005	0002	0006	020	FAM	IAM		G
TUP	0003	0005	0002	0006	020	FSM	COT		G
TUP	0003	0005	0002	0006	020	FAM	SAM		G
TUP	0002	0006	0003	0005	020	SBM	ACM		G
TUP	0002	0006	0003	0005	020	CSM	ANC		G
TUP	0002	0006	0003	0005	020	CSM	CBK		G
TUP	0003	0005	0002	0006	020	CSM	CLF		G
TUP	0002	0006	0003	0005	020	CCM	RLG		G

BLOCK NUMBER =4

Figure 9-5. SLC Triggering Display

Counters				Time Intervals		
1)	Frames with SLC = 20	=	44	1)	=	0 msec
2)		=	0	2)	=	0 msec
3)		=	0	3)	=	0 msec
4)		=	0	4)	=	0 msec
5)		=	0	5)	=	0 msec

DTE Frames=	0	DCE Frames=	0
DTE FISU=	0	DCE FISU=	0

Counts unmodified except by RUN from line

Return to Data Exit

Figure 9-6. SLC Triggering Timers & Counters Display

APPENDIX A

MAKE A WORKING COPY OF THE MASTER TAPE

Initialize the Blank Tape

Locate the blank tape and affix a label that is meaningful to you, perhaps CCITT#7 Analysis Copy.

Make certain that the RECORD slide is pushed in the direction of the arrow on the slide; otherwise, you will get a write protected error when you attempt to store data.

Insert the blank tape into the tape drive.

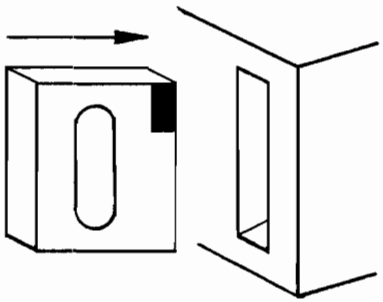


Figure A-1. Inserting a Tape Cartridge

Get the Top Level Menu.

Press <Mass Store>.

Press <Init>.

Press <Execute>.

When the tape is finished copying and winding, remove the initialized tape.

Copying with the Tape Editor

The HP 4953A Protocol Analyzer comes with an accessory tape (PN 04953-16002). You can use the program called tape editor (TEDIT) to copy the master tape.

Locate your HP 4953A accessory tape and insert it into the tape drive.

Get the Top Level Menu

Press <Other Choices>.

Press <Applic Menu>.

Press <Load applic>.

Enter TEDIT in the file name field.

Press <Execute>.

The tape application program will load into the Protocol Analyzer. When the tape activity stops, remove the accessory tape from the drive.

Press <Execute Applc>.

Insert the CCITT#7 Analysis master tape into the tape drive.

Press <Execute>.

Press <Copy>.

All of the files on the master tape are loaded into the Protocol Analyzer memory. When the tape activity stops, remove the CCITT#7 Analysis master tape. Locate your initialized blank tape.

Insert the initialized tape into the tape drive.

Press <copy>.

All of the files are stored to the blank tape.

Press <Exit>.

Copying without the Tape Editor

If you don't use the tape editor program, you can use the file loading and storing features of the Protocol Analyzer to copy each file of the master tape to the blank tape. At a minimum, you should make a working copy of the application program.

The sample data files are used in conjunction with several examples in the CCITT#7 Analysis Users's guide, so, it is wise to copy the sample data files so that the master tape is not used as a training tape.

Get the Top Level Display.

Press <Mass Store>.

Press <Catalog>.

The tape is read and the catalog display appears on the screen.

Press <Load>.

Press <Select file>.

Position the highlight bar over the file named CCITT#7 App.

Press <Execute>.

The tape is read and the analysis program is loaded into the Protocol Analyzer memory. This takes about 15 seconds. When the tape activity stops, remove the CCITT#7 master tape.

Locate your initialized tape and insert it into the tape drive.

Press <Store.

Press <Execute>.

You can load, then store each CCITT#7 file in the same manner.

Press <Exit> to return to the Top Level Menu.

Copying Menus with the Tape Editor

Menus stored to tape while the CCITT#7 Analysis program is active can be copied to another tape with TEDIT Rev 2509 or above. If you have a version of TEDIT with revision below Rev. 2509 you may not be able to reload copied menus. The file TEDIT is located on the HP 4953A Accessory Tape, HP 04953-16002.

Information on receiving new accessory tapes is available from your Hewlett-Packard Sales and Service Office.

ERROR CODES

Introduction

This section contains a list of error codes/messages for the HP 18199A CCITT#7 Analysis Application.

Error Message	Description	Fix

NOTE

All of the error messages used in this application describe the appropriate corrective action on the HP 4953A display.

GLOSSARY

Mnemonic	Phrase	Definition
BIB	Backward Indicator Bit.	Used for error recovery. A bit in a signal unit requesting, by its status change, retransmission at the remote end when a signal unit is received out of sequence.
BSN	Backward Sequence Number.	Used for error recovery. A field in a signal unit sent which contains the forward sequence number of a correctly received signal unit being acknowledged.
CCS7		The North American version of CCITT#7. The primary signaling channel rate will be 56 Kbits/sec. The Signaling Point Codes are 24 bits long instead of 14 bits.
CCITT	International Telegraph and Telephone Consultative Committee	
CIC	Circuit Identification Code	Telephone subscriber circuit
	changeover	The procedure of transferring signaling traffic from one signaling link to one or more different signaling links when the link in use fails or is required to be cleared of traffic.

	Common Channel Signaling	The signaling method in which a single channel conveys by the means of labeled messages, signaling information relating to a multiplicity of circuits or calls or other information such as that used for network management.
CRC	Cyclic Redundancy Check Code	Used to detect errors
	Data User Part	The User Part specified for data services
DPC	Destination Point Code	A part of the label in a signaling message which identifies the signaling destination point of the message. It contains the address of the message receivers. The part of the label in a signaling message which uniquely identifies the destination point of the message.
FIB	Forward Indicator Bit	Used for error recovery. A bit in a signal unit which indicates the start of a retransmission cycle.
FISU	Fill in Signal Unit	A signal unit containing only error control and delimitation information, which is transmitted when there are no message signal units or link status signal units to be transmitted.

FSN	Forward Sequence Number	Used for error recovery. A signal unit used to identify the transmitted message signal units.
ISDN	Integrated Service Digital Network	An integrated digital network in which the same digital switches and digital paths are used to establish connections for different services, for example, telephony, data.
	Integrated Digital network	A network in which connections established by digital switching are used for the transmission of digital signals.
	label	Always includes the address. Information within a signaling message used to identify the particular circuit, call or management transaction to which the message is related.
LI	Length Indicator	A six bit field which differentiates between message signal units, link status signal units and fill-in signal units and in the case that its binary value is less than 63, indicates the length of a signal unit.
LSSU	Link Status Signal Unit.	A signal unit which contains status information about the signaling link in which it is transmitted. It is generally used at link establishment or link changeover time.

MSU	Message Signal Unit.	It is the signal (frame) used to send data on the link. A signal unit containing a service information octet and a signaling information field which is retransmitted by the signaling link control if it is received in error.
MTP	Message Transfer Part.	The functional part of a common channel signaling system which transfers signaling messages as required by all of the user and which performs the necessary subsidiary functions, for example error control and signaling security. The MTP accepts packets of data and reliably delivers them to their destination, level 3 data
	national indicator	Information within a signaling message which makes a distinction between national and international messages.
NSP	Network Service Part	Includes the SCCP and MTP.
OPC	Originating Point Code	The part of the label in a signaling message with identifies the originating point of the message. Contains the location of the source User Part functions.

	retransmission buffer	Storage in the signaling link control for signal units transmitted but not yet positively acknowledged.
	routing label	Every message has a routing label. It includes an indication of the origination and destination points of the message and a code used for load sharing.
SCCP	Signaling Connection Control Part	Functional block that provides additional functions to the MTP and addresses operation, maintenance and administrative services.
	service indicator	Information within a signaling message identifying the user to which the message belongs
SF	Status Field	The bits of a link status signal unit which indicate one of the major signaling link states.
SIF	Signaling Information Field	Contains level 3,4, and above information. Can contain up to 272 octets in national networks.
SIO	Service Information Octet.	Used to associate the signaling information with a particular User Part.

	signaling link	A transmission means which consists of a signaling data link and its transfer control functions, used for reliable transfer of a signaling message
SLC	Signaling Link Code	A field of the label in the signaling network management messages, which indicates the particular signaling link to which the message refers among those interconnecting the two involved signaling points.
	signaling point	A node in a telecommunications provided with CCS, it is a physical node that can consist of more than one signaling point. It originates and receives signaling messages, or transfers signaling messages from one signaling link to another, or both.
	signaling relation	2 signaling points have a signaling relation when they can have communication between their corresponding User Part functions.
	signaling route management functions	Functions that transfer information about changes in the availability of signaling routes in the signaling network

	signaling transfer point	A signaling point with the function of transferring signaling messages from one signaling link to another and considered exclusively from the viewpoint of the transfer.
SSF	Sub-service field	Used in LSSU frames.
	Telephone User Part	The User Part specified for telephone services
	User Part	A part of the common channel signaling system which transfers signaling messages via the Message Transfer Part. Different types of User Parts exits (eg. for telephone and data services), each of which is specified to a particular use of the signaling system.

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