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HP 18265A
DDCMP Analysis
for the HP 4952A Protocol Analyzer

User's
Guide

HP 4952A Protocol Analyzer

HP 18265A
DDCMP Analysis

User's Guide

HEWLETT PACKARD

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Conventions

Critical instructions within the text of this publication are preceded by one or more of the following labels

Warning   All operating procedures, practices etc., that must be performed in the specified manner to preclude the possibility of personal injury or loss of life are preceded by a "Warning" label.

Caution   All operating procedures, practices, etc., that must be performed in the specified manner to preclude the possibility of damaging the instrument or destroying programs, or software are preceded by a "Caution" label.

Note   Explanatory comments or supplementary instructions ore preceded by a "Note" label.

Printing History

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the customer. The dates on the title page change only when a new edition or a new update is published. No information is incorporated into a reprinting unless it appears as a prior update; the edition does not change when an update is incorporated.

Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correlation between product updates and manual updates.

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Introduction

The Digital Data Communications Message Protocol (DDCMP) Analysis Application gives the HP 4952A the capability to monitor and simulate DDCMP protocol. It can be used on synchronous, asynchronous, full-duplex, half-duplex, multi-point, or point-to-point lines.

The Digital Communications Message Protocol Analysis package contains three files for your use.

DDCMP4952	is the actual application program.
DDCMP_DATA	is a training file which contains representative menus and data for the DDCMP Analysis Application.
TUTORIAL	is an on-line self-help file that provides an explanation and overview of the DDCMP Analysis Application. To access this application, load the program into the HP 4952A and press the Examine Data softkey.

Setup

The DDCMP Analysis Application provides a new protocol selection and display format selection in the Setup menu. The <DDCMP> softkey appears as a protocol selection when you select <Setup> in the top level menu.

To use the DDCMP display format, move the cursor to the display mode field and press <DDCMP>. As with any protocol, you must make the correct selections in the setup menu before monitoring or simulating.

Monitoring

After selecting the correct setup parameters, you can monitor DDCMP lines from the run menu in the same way as other protocols.

The HP 4952A compares the CRCs on incoming messages with its own calculation, and indicates whether the CRC is good or bad.

Besides the normal display formats, the DDCMP display format decodes the different parts of the DDCMP message.

Auto Configure can be used when DDCMP has been selected as the protocol.

Simulating

After entering the correct setup parameters, DDCMP messages can be transmitted with the Simulate menu. One "send" string is used for each message.

If you set the CRC bytes to 0, the HP 4952A automatically computes and sends the correct CRC values. If you select some non-zero value for the CRC, the HP 4952A sends those non-zero values.

If you set the data count bits to 0, the HP 4952A inserts the proper count length for data and maintenance messages. If you select some non-zero value for the Data jCount, the HP 4952A sends that value for the count, much like the CRC.

Performance Specifications

The following performance specifications apply for the DDCMP Analysis application:

1. Monitor is limited to 56kbps full duplex.

2. Monitor and Simulate exceed 64kbps half duplex.

3. Simulate is limited to 56kbps full duplex when sending on the DTE channel.

4. Simulate is limited to 38.4kbps full duplex when sending on the DCE channel. With the timing turned off by the data filter DCE Simulate will go to 56kbps.

5. In cases where full duplex 56k DCE Simulate with the timing on is required, switch the DTE and DCE channels on the pod and transmit on the DTE channel

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Loading the Application

This chapter tells you how to load the DDCMP Analysis application and data into your HP 4952A Protocol Analyzer. This manual assumes that you are already familiar with the basic use of the protocol analyzer.

Refer to the HP 4952A Protocol Analyzer Operating Manual for detailed information concerning operation, voltage and grounding requirements, and power cords.

Equipment Required

The DDCMP Analysis application supports RS-449, RS-232C/V.24 and V.35 interfaces.

Loading the Program

1. Insert the application disc, and press the <Mass Store> softkey in the Top Level Menu.

2. Move the cursor to the file name - DDCMP4952.

3. Press the <Load> and then the <Execute> softkeys. The disc is read and the application program is loaded into the protocol analyzer memory.

4. The following message appears, along with the top level softkeys.

```
                    Hewlett  -  Packard

                         DDCMP
                        Rev  XXXX
                   Copyright  ©  hp,  1987




                         HP  4952
                    Protocol  Analyzer


                    Rev  X.X  ©  hp  1986

   Auto        Set       Mon            Sim        Run        Exam
   Config      Up        Menu           Menu       Menu       Data
```
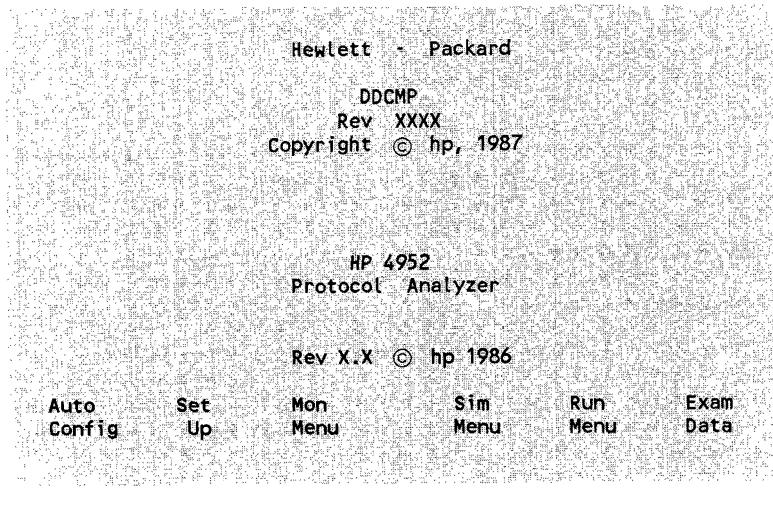
Figure 2-1. DDCMP Top Level Menu

Copying the Application

When you get your DDCMP Application disc, you should make a backup copy. See Appendix
A for copying instructions.

Saving Application Data

You need to reload the application program whenever you turn off the HP 4952A's power. If you have an HP 4952A opt. 002, the application program can be stored into the external memory, which is non-volatile.

Buffer data resides in the 32K byte nonvolatile memory, so captured DDCMP buffer data will remain after power down.

Transferring Menus and Data

You can transfer DDCMP menus and data between the HP 4952A, the HP 4951A, the HP 4951B, the HP 4951C, and the HP 4955A via remote. The only difference is that you should set the protocol to Char Async/Sync in the setup menus of both analyzers and all message statements must be removed. Except for this difference, use the respective operating manuals for the correct procedure.

Loading
the Application

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Setup

After loading the DDCMP application, press <Setup> in the top level menu. A display similar to the one shown below will appear. Some fields may have a different choice entered. What is in each field depends on how the HP 4952A was configured the last time the DDCMP Analysis application was run.

```
          Monitor/Simulate    Parameter Setup

   Protocol   DDCMP              Display    DDCMP
   Code       ASCII 8            Q bit      Off
   Bits/sec   56K                Err chk    CRC16


                                 DTE clock  DCE
   Mode       Sync
                                 Bit sense  Norm


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   HDLC     SDLC     X.25        BSC     Char     DDCMP
```
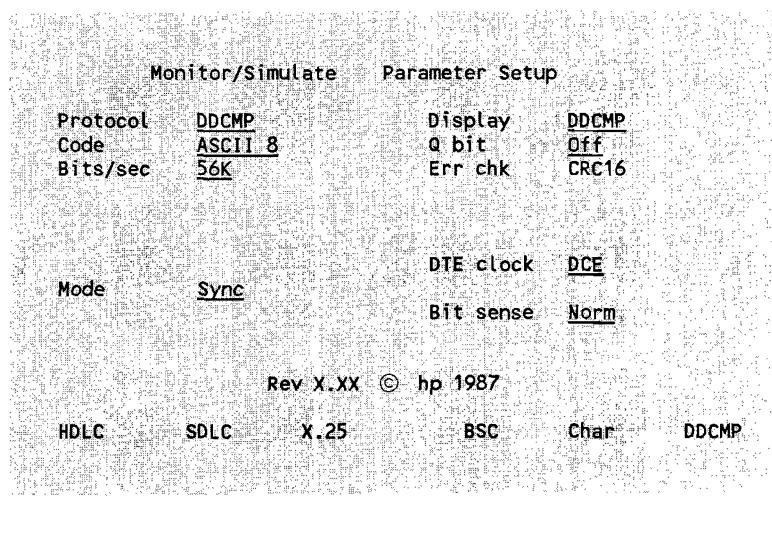
Figure 3-1. DDCMP Setup Menu

Setup Menu Selections

PROTOCOL   This field is always DDCMP after loading the application. With the application loaded, you can still choose one of the other five protocols, or X.21 with one of the other five protocols, but not X.21 with DDCMP. The print setup menu softkey is on the second set of softkeys and can be reached by pressing the 'MORE' softkey.

CODE   The DDCMP setup menu provides three data codes: ASCII 8, Hex 8, and EBCDIC. JIS8 and EBCDIK are also included for the Katakana option.

BITS/SEC   For asynchronous "Mode", you must select the correct clock rate to capture data. For synchronous "Mode", this selection affects only timing measurements. For this application, all the normal clock rates are allowed.

MODE   This field for the DDCMP setup menu can be synchronous, or asynchronous with 1, 1.5, or 2 stop bits.

DISPLAY   Besides the four basic display formats, Two Line, DTE Only, DCE Only, Data & State, the DDCMP application provides a DDCMP format which explicitly decodes message fields.

Q-BIT   This selection in the DDCMP setup menu can be either on or off. The Q-Bit controls whether or not the Quick Sync Flag (Q-Bit) is "obeyed" in the way the HP 4952A brings in line data. When the Q-Bit is turned off, the Quick Sync Flag is ignored and other line information is used to properly frame data (this is the default value). The Q-Bit is used for synchronous setups only.

DTE CLOCK   For synchronous "Mode", you must select the correct clock source for the DTE channel. For asynchronous "Mode" this selection is not available.

BIT SENSE   The DDCMP setup menu provides two choices for the Bit Sense selection - normal or inverted.

4

Monitoring

Monitoring a DDCMP datacomm link is essentially the same as monitoring any other protocol except you cannot trigger on parity errors.

Triggering on Errors

You can trigger on bad CRCs by using the <When Trig> softkey followed by either <BCC DTE> or <BCC DCE>. For triggering purposes, the HP 4952A does not distinguish between header and data CRCs.

You may not, however, trigger on parity errors. Although the <Parity on DTE> and <Parity on DCE> softkeys appear after you press <When Trig> and then <Error>, do not use them. DDCMP has no parity, so a parity error trigger can never be satisfied. The program will not progress past these trigger statements.

WARNING

Do not use parity error triggers in DDCMP.

DDCMP Display Format

Besides the regular display formats in the setup menu, DDCMP provides another format called "DDCMP". When you are in the Run menu, or observing the buffer from the Examine Data menu, DDCMP messages are displayed.

Each DDCMP message is displayed on two lines. The first line contains the decoded header and both CRC checks. The second line contains the first 32 data characters. To see all data characters in a DDCMP message, use a two line display format. The second line is always blank in Control Messages.

If you wish to see data only, use Two Line, DTE Only, or DCE Only. If you wish to

see interface lead changes and data, use Data & State.

Display Definitions

The following describes the display header terms used in DDCMP display format. See Appendix B for more information.

TYPE   Type of Message. The three types, Data, Maintenance, and Control are abbreviated on the display as: DATA, MAIN, CNTL. Control messages are decoded into type and subtype, (e.g., CNTL: ACK).

COUNT   Number of characters in the data field. "Count" is a decimal number in DATA and MAIN messages. "Count" may be a message subtype in CNTL messages. The "Count" is shown in decimal.

QS   Quick sync and Select flags. These flags may be either 1 or 0.

RES   Response field used only in DATA and CNTL:ACK messages. "Res" is a
            decimal number.

SEQ   Sequence field used only in DATA and CNTL:REP messages. "Seq" is a
            decimal number.

ADR   Station address. "Adr" is a decimal number.

HC   Header CRC, displayed as either G (good) or flashing B (bad).

DC   Data CRC, displayed as either G (good) or flashing B (bad).

The following display definitions describe the DDCMP messages decoded and displayed by
the DDCMP application.

DATA	Data Message.
CNTL: ACK	Control message, positive acknowledgement.
CNTL: NAK1	Control message, neg ack / CRC1 error.
CNTL: NAK2	Control message, neg ack / CRC2 error.
CNTL: NAK3	Control message, neg ack / reply response.
CNTL: NAK8	Control message, neg ack / buffer unavailable.
CNTL: NAK9	Control message, neg ack / receiver overrun.
CNTL: NAK16	Control message, neg ack / message too long.
CNTL: NAK17	Control message, neg ack / header format error.
CNTL: REPLY	Control message, reply.
CNTL: STACK	Control message, start acknowledgement.
CNTL: START	Control message, start.
CNTL: UNDEF	Control message, undefined subtype.

MAIN	Maintenance message.
UNDEF	Undefined message.

The Run-Time Display

"Run-Time" displays occur when monitoring or simulating. When monitoring or simulating, the display shows the count field in hexadecimal.

The Examine Data Display

The Examine Data menu displays the data captured in the buffer. The Examine Data display looks the same as the Run-Time display. The same five display formats available during Run-Time are also available in the Examine Data menu).

In the Examine Data display, the count field is shown in decimal. The Examine Data display shows all the captured data, except idles.

TYPE	COUNT	Q S	RES	SEQ	ADR	H C	D C
DATA	00005	1 1	005	005	084	G	G
HELLO							
CNTL : REPLY		0 0		000	000	G	
MAIN	00148	1 1			001	G	G
T H I S I S A V E R Y L O N G M E S S A G E . T H							
CNTL : START		0 1			011	B	
CNTL : STACK		0 0			101	G	

Hex	Roll Up	Roll Down	Next Page	Prev Page	Timer & Cntr

Figure 4-1. Examine Data Menu with DDCMP Display Format

Monitoring

Differences and Similarities between Run-Time and Examine Data

There are two main differences between the Run-Time and Examine Data displays.

Undefined Messages

UNDEF messages are captured during Run-Time, and are decoded in the Examine Data display. UNDEF messages are caused by loss of sync or the corruption of a normal message. For example, the analyzer cannot identify data following a loss of sync; so it calls this unknown data UNDEF.

"False" messages are also identified as UNDEF. False messages occur when a spurious start of message character (SOH, ENQ, DLE) occurs after loss of sync. A bad header CRC in DATA or MAIN messages can cause false messages: the analyzer starts searching for the next start of message character.

Incomplete transmitted messages may not be displayed. To be displayed, a complete header must be sent.

Order of Messages

During Run-Time, messages are displayed in the order in which the final CRC character is received. The message that ends first is displayed first.

In Examine Data, messages are displayed in the order in which the start-of-message character is received. The message that starts first is displayed first.

For example, assume a DTE message starts before a DCE message, but ends afterwards. The DTE message is displayed first in Examine Data, but last in Run-Time.

Count Field

During Run-Time and Examine Data, the count fields of DATA and MAIN messages are displayed in decimal.

Monitoring to Disc

As in normal HP 4952A operation data can be stored directly to disc during monitoring. After storing to a disc, the data can be loaded back into the buffer. However, when data is loaded back into the buffer, the Setup menu may be reset to Char Async/Sync protocol if DDCMP is not set at the time the data is loaded.. After changing the setup menu back to DDCMP protocol, the disc data can be examined as usual in the Examine Data menu.

To monitor directly to disc:

     1.   Insert the storage disc into the disc drive.

     2.   In the Monitor menu, press <Start>, and then <Disc>.

     3.   Press EXIT and go to the Run menu.

     4.   In the Run menu, press the <Monitor Line> softkey.d

     5.   The HP 4952A asks for the filename in which to store the data. Type in a filename from the keyboard.

     6.   Press the <Execute> softkey. Data is now stored directly to disc as it is brought into the analyzer.

Simulating

As in other protocols, you can send DDCMP messages via the simulate menu. To determine how to format "send" and "when" strings, see Appendix B.

NOTE

Header and CRC bytes should be entered in hex. Data bytes can be entered in hex or text.

Entering the CRC

To send any CRC value, type in non-zero bytes. When non-zero CRC bytes are entered, the HP 4952A sends the CRC as you have entered it. To have the HP 4952A compute and send the correct CRC values in a DDCMP "send" string message, do the following:

1. Set the four CRC bytes of each message to zero (two for control and undefined types).

After the initial transmission, the "send" strings in the simulate menu will continue to show the value entered whether it is zero or non-zero. For example, if you were to send a DATA message, you might enter the following "send" string.

Send $\quad {}^{8\ 0}_{1\ 5}{}^{8\ 0}_{0\ 1}{}^{0\ 0}_{2\ 1}{}^{0\ 0}_{0\ 0}$HELLO${}^{0\ 0}_{0\ 0}$

As long as the CRC bytes are non-zero, the HP 4952A does not re-calculate the CRC values.

Entering the Count Field

To send a value for the count, enter any value as long as it is not zero. To have the count calculated automatically, do the following:

1. Only use one "Send" for each message.
2. Use only one message for each "Send".
3. The type of message must be DATA ($^8_1$) or MAINT ($^9_0$).
4. The 14 count bits must be zero.
5. There must be at least 2 bytes after the header.

For example:

```
                              ┌─CRC's are automatically generated
                          ┌──┴──┐
Send    9 9 8 0 C 0 0 0 0‾0      0‾0
        6 6 1 0 0 1 1 1 0 0 DATA 0 0
            0 C
            4 0
              ├──────────── ⎰This count is transmitted
                            ⎱The zeros are left in the Count field
```

Simulating **5-2**
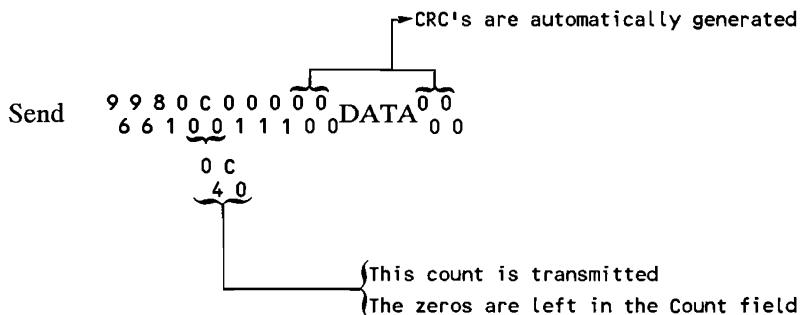
A

Appendix A
Copying the DDCMP Application

Your application disc contains three programs or files: DDCMP4952, TUTORIAL, and DDCMP_DATA. DDCMP is the DDCMP application program. DDCMP_DATA is a training file which contains representative menus and data. The TUTORIAL file is a self-help file that explains the DDCMP application.

It is recommended that you copy all of the programs so your master disc is not used as a training disc or as a normal working disc which might allow an application to be inadvertently deleted or copied over.

Copying the DDCMP Files

To copy any DDCMP file which is on the master disc do the following:

1. Insert the master disc into the HP 4952A.

2. From the top level menu, press the <Mass Store> softkey.

3. Type in the name of the application you want to load or move the cursor to the appropriate name and press <Load>, and then <execute>.

4. Remove the master disc and insert a formatted working disc into the disc drive.

5. Press <Store>. Type in the name of the application you have just loaded or assign a new name to this file. Move the cursor to the comment line and enter a comment which is descriptive of the application you are copying.

6. Press <Execute>. When the disc activity stops, press <Exit> to return to the top level menu.

Repeat these steps for any other applications you want to copy.

B

Appendix B
DDCMP Message Format

DDCMP (Digital Data Communications Message Protocol) is a general purpose protocol: it can be used on synchronous, asynchronous, full-duplex, half-duplex, multi-point, or point-to-point lines.

DDCMP is byte-count oriented: each field is a multiple of eight bits. Messages consist of two parts: header and data. The header contains a COUNT field indicating the number of bytes in the data portion of the message. By indicating the byte-count of the data field, DDCMP avoids the transparency problems associated with character oriented protocols.

DDCMP consists of three message types: data, control, and maintenance. The message type is defined in the field following the sync field.

NOTE

The quick sync flag (Q-Bit) is normally ignored in most applications. If the quick sync flag is needed to control the message framing, the Q-Bit selection must be set to "ON" in the Setup menu.

Data Message

SYNC | SOH | COUNT | FLAGS | RES | SEQ | ADR | HC | DATA | DC

SYNC	Sync field. There may be 0-15 sync characters. The default character is 96(hex). The Sync field is not visible if the Async protocol is being used.
SOH (1 byte)	Start of Header. Message type field.
COUNT (14 bits)	Specifies the number of bytes in the data field.
FLAGS (2 bits)	S and Q flags. The first flag, Select (S), indicates ownership on multi-point and half duplex lines. The Quick Sync (Q) flag notifies the receiver that this message will be followed by sync characters.
RES (1 byte)	Response Number. The number of the last message correctly received from the addressed station. Acknowledges correctly received messages.
SEQ (1 byte)	Transmit Number. Denotes the number of this data message.
ADR (1 byte)	Station Address. Denotes the address of tributary stations on multi-point lines. It is always set to 1 on point-to-point lines.
HC (2 bytes)	CRC-16 checksum computed on the header only.
DATA (count bytes)	Data Field. Must contain the number of bytes specified in the "count" field.
DC (2 bytes)	CRC-16 checksum computed on the data field only.

Appendix B

Control Message

SYNC | ENQ | TYPE | SUBTYPE | RCVR | SNDR | ADR | CRC

SYNC	Same as data message.
ENQ (1 byte)	Control Message Identifier. Always has a value of 05 (hex) to identify a control message.
TYPE (1 byte)	Control Message Type.
ACK	Acknowledges the correct receipt of numbered data messages.
NAK	Notifies the transmitter of an error. Also acknowledges previously received message.
REPLY	Reply to Message Number. Requests received message status from the receiver. The response is ACK or NACK.
START	Start Message. Establishes initial contact and synchronization. Resets message numbering at the transmitter and addressed receiver.
STACK	Start Acknowledge Message. Response to a STRT when the receiver has completed initialization.
SUBTYPE (6 bits)	Type modifier field.
FLAGS (2 bits)	Same as data message.
RCVR (1 byte)	Receiver Field. Used to pass information from the data message receiver to the data message sender.
SNDR (1 byte)	Sender Field. Used to pass information from the data message sender to the data message receiver.
ADR (1 byte)	Same as data message.
CRC	CRC-16 checksum on the control message.

Maintenance Message

SYNC | DLE | COUNT | FLAGS | FILL | FILL | ADR | HC | DATA | DC

DLE (1 byte)	Maintenance Message Identifier. Always has a value of 90 (hex) to identify maintenance messages.
COUNT (14 bits)	Same as data message.
FLAGS (2 bits)	Same as data message.
FILL (1 byte)	Fill byte with a value of 0.
FILL (1 byte)	Fill byte with a value of 0.
ADR (1 byte)	Same as data message.
HC (2 bytes)	CRC-16 checksum on fields DLE through ADR.
DATA (count bytes)	Message data field.
DC (2 bytes)	CRC-16 checksum on the data field.

C

Appendix C
Using the Training File

The DDCMP Analysis application disc contains a training file, DDCMP_DATA, which provides actual data and menus for you to look at. DDCMP_DATA contains the following three types of information:

> 1. Setup Menu.
> 2. Monitor Menu.
> 3. Simulate Menu.
> 4. Buffer data.

Loading the Training File

1.   In the Top Level Menu, press the <Mass Store> softkey.

2.   In the Mass Store Menu, move cursor to the filename "DDCMP_DATA" from the keyboard with the cursor movement arrows, then press <Load>.

3.   Or enter the filename "DDCMP_DATA" from the keyboard, then press <Execute>.

Setup

Press the <Setup> softkey in the top level menu. The setup menu should look like the following figure. Note that we are using Asynchronous Mode with two stop bits. Thus, the "DTE Clock Source" and "Q-Bit" selections are no longer present.

Appendix C

```
            Monitor/Simulate    Parameter Setup

   Protocol    DDCMP              Display      DDCMP
   Code        ASCII 8
   Bits/sec    9600               Err chk      CRC16




   Mode        Async 2
                                  Bit sense    Norm


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   HDLC      SDLC      X.25         BSC      Char      DDCMP
```
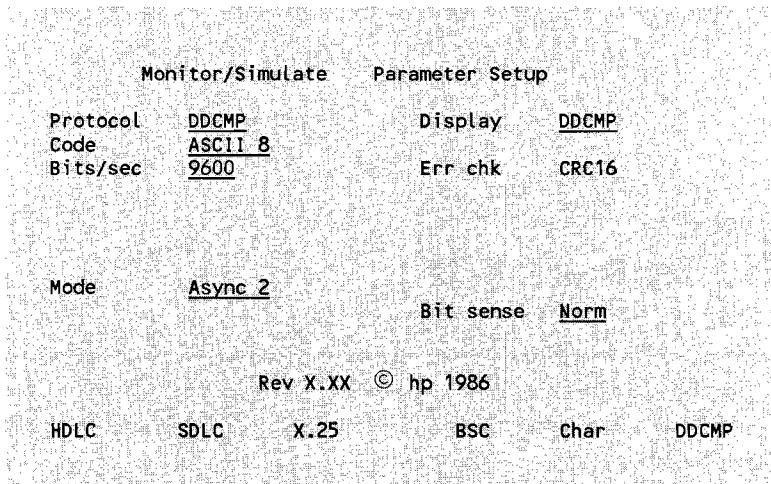
Figure C-1. Training File Setup Menu

Monitoring

Press the <Monitor> softkey in the top level menu. Move the cursor down to see the entire Monitor program. This program highlights any bad CRCs on the DTE channel.

```
Block 1                          The "When" statement tells the
When Error  BCC on DTE           analyzer to trigger on bad CRCs
        then goto Block  2       coming from the DTE.


Block 2
Highlight                        The "Highlight" statement references
        and then                 the preceding trigger statement. The
Goto Block  1                    analyzer will never get past the
                                 "When" unless it finds a bad CRC.
                                 Then it will highlight the bad CRC
                                 and continue looking.
```

To run the above monitor program on the training file buffer data:

1. In the top level menu, press the <Run Menu> softkey.

2. Press <Monitor Buffer>. The HP 4952A monitors its buffer contents just as if it were monitoring an actual line. When the analyzer reaches the end of the buffer data, the "Running" message and Run-Time softkeys are replaced by the top level softkeys.

3. The blank line (denoted by the dotted line in the following figure) in the center of the display indicates the last DDCMP message monitored. Messages above the line were received after messages below the line. Note that the "B" in the DATA message on line 7 is blinking in the display.

```
TYPE            COUNT   Q S   RES     SEQ     ADR     H C    D C


DATA            00026   0 0   005     006     001      G      G
T H - T H - T H - T H A T ' S   A L L       F O L K S   !
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

L A S T   M E S S A G E   W A S   U N D E F I N E D .
MAIN            00026   1 1                   001      G      G
N E X T   M E S S A G E   I S   U N D E F I N E D .
UNDEF           00000   1 1   150     150     150      B

CNTL : NAK 17           1 0   002             001      G

UNDEF           00000   1 1   150     150     150      B

                 Rev X.X  ©  hp 1986

Auto     Set     Mon            Sim      Run      Exam
Config   Up      Menu           Menu     Menu     Data
```

Figure C-2. Training Disc Run-Time Display

Examine Data

Press <Exam Data> in the top level menu to look at buffer data. In the Examine Data display the cursor keys are disabled. Use the <Roll Up>, <Roll Down>, <Next Page>, and <Prev Page> keys to scroll through the buffer. To compare the Run-Time display with the Examine Data display, press <Next Page> until you see the flashing "End of Valid Data". Then press <Prev Page> once.

The display will look like the following two figures. On the Run-Time display, this data message starts the display (which wraps around above the inverse video line). Thus, you can compare the Run-Time display with the Examine Data displays.

TYPE	COUNT	Q S	RES	SEQ	ADR	H C	D C
DATA	00005	1 1	005	005	084	G	G
HELLO							
CNTL : REPLY		0 0		000	000	G	
MAIN	00148	1 1			001	G	G
T H I S I S A V E R Y L O N G M E S S A G E .							TH
CNTL : START		0 1			011	B	
CNTL : STACK		0 0			101	G	

Hex	Roll Up	Roll Down	Next Page	Prev Page	Timer & Cntr

Figure C-3. Partial Examine Data Display

```
TYPE            COUNT   Q S   RES    SEQ    ADR     H C   D C

MAIN            00026   1 1   002    004    001      G     G
N E X T   M E S S A G E   I S   U N D E F I N E D .
UNDEF           00000   1 1   150    150    150      B

CNTL: NAK17             1 0   002    005    001      G

UNDEF           00000   1 1   150    150    150      B

DATA            00026   0 0   005    006    001      G     G
T H - T H - T H - T H A T ' S   A L L   F O L K S !


Hex        Roll      Roll             Next     Prev    Timer
           Up        Down             Page     Page    & Cntr
```

Figure C-4. End of Examine Data Display

Highlights in Examine Data

Notice that all the bad CRCs, "B", have been highlighted by the Monitor program in the
Monitor menu. Press <Prev Page> until you see the flashing "Start of Valid Data" at the top
of the display. Now press MORE to access the <Next Hilit> softkey. Press <Next Hilit> to
cause the next highlighted line to be displayed at the top of the display.

Simulating

Press <Simulate> in the top level menu. The simulate program sends four DDCMP messages: DATA, CNTL:ACK, MAIN, and CNTL:UNDEF.

Simulate DTE

<u>Block 1</u>
Send $\begin{smallmatrix}9&9&8&0&C&0&0&5&0&0\\6&6&1&5&0&5&5&4&0&0\end{smallmatrix}$ HELLO $\begin{smallmatrix}0&0\\0&0\end{smallmatrix}$ Send the DATA message.
    and then
Wait <u>100</u>
    and then
Send $\begin{smallmatrix}9&9&0&0&0&0&0&0&0&0\\6&6&5&1&0&1&2&3&0&0\end{smallmatrix}$ Send the CNTL:ACK message.
    and then
Wait <u>100</u>
    and then
Send $\begin{smallmatrix}9&9&9&1&C&0&0&0&0&0\\6&6&0&A&0&4&5&6&0&0\end{smallmatrix}$ TH-TH-TH-T Send the Main message

HAT'S ALL FOLKS ! $\begin{smallmatrix}0&0\\0&0\end{smallmatrix}$
    and then
Wait <u>100</u>
    and then
Send $\begin{smallmatrix}9&9&0&F&F&F&F&F&F&F\\6&6&5&F&F&F&F&F&F&F\end{smallmatrix}$ Send the CNTL:UNDEF message.

The first "send" string can be broken down into five parts:

$\begin{smallmatrix}9&9\\6&6\end{smallmatrix}$ $\begin{smallmatrix}8&0&C&0&0&5\\1&5&0&5&5&4\end{smallmatrix}$ $\begin{smallmatrix}0&0\\0&0\end{smallmatrix}$ HELLO $\begin{smallmatrix}0&0\\0&0\end{smallmatrix}$

  1   2   3   4   5

(1) Sync Field
(2) DDCMP Header
(3) Header CRC
(4) Data
(5) Data CRC

Notice that all of the CRC bytes are set to 0. As explained earlier, when you use "0" for the CRC values, the HP 4952A automatically calculates the correct CRC values and puts them into the "send" string.

Running the Simulate Program

1. Press <Run Menu> in the top level menu.

2. Press <Simulate> in the Run menu.

3. Notice that the first three message have good CRCs, while the CNTL:UNDEF message has a bad CRC.

4. Press EXIT, and re-enter the Simulate menu.

5. Notice that the HP 4952A does not fill the CRC bytes with the correct computation during the run, it leaves them as zeros.

Changing the CRC Bytes

1. In the Simulate menu, move the cursor to the last byte of the first send string. Change the value to 1E (hex).

2. Re-run the Simulate program as before.

3. In the Run-Time display, notice that a bad (B) CRC has appeared on the first message. This is because the HP 4952A sends non-zero CRC bytes as they appear in the send string. If you want the analyzer to compute the CRC, the CRC byte must be set to zero in the Simulate program.

Appendix C

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