

**DataGeneral**

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**SOFTWARE  
ADDENDUM**

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**Addendum to  
NOVA® -LINE  
COMMUNICATIONS  
MULTIPLEXER  
SOFTWARE PACKAGE**

**Application Note**

086-000039-00

This addendum updates manual 017-000014-00.

See UPDATING INSTRUCTIONS on reverse.

Ordering No. 086-000039

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## **UPDATING INSTRUCTIONS**

This addendum (086-000039-00) to the COMMUNICATIONS MULTIPLEXER SOFTWARE PACKAGE (017-000014-00) supplies details about hardware description and package preparation.

To update your copy of 017-000014-00, remove and insert the following pages:

### Remove

Title/Notice  
1-1 through 1-3  
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### Insert

Title/Notice  
1-1 through 1-3  
A-7 through A-9

Insert this sheet immediately behind the new Title/Notice page.

A vertical bar or an asterisk in the margin of a page indicates substantive change or deletion, respectively, from 017-000014-00.

The addendum number appears on the lower inside corner of only those pages changed by this addendum.

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**NOVA® -LINE  
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**Application Note**

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## CHAPTER 1

### HARDWARE DESCRIPTION

#### Introduction

The Communications Multiplexer System (CMS) enables any Data General computer to communicate with and control terminal devices over a variety of communication facilities. The system is composed of one or more Type 4060 and/or Type 4073 multiplexer boards. An appropriate number of Type 5120-5123 modules can optionally be included to provide modem control and auto-answer capabilities.

The 4060/4073 modules can be intermixed to form a combination synchronous/bisynchronous/asynchronous multiplexing system. All circuitry required for the multiplexing function is distributed on interface card subsystems which each handle four lines. There is no common control circuitry; each four-line interface card is self-contained, including all the circuitry necessary to receive, transmit and buffer characters for 4 lines. From 1 to 16 cards serving 4 to 64 lines operate together as a multiplexing system. A number of four-line receiver/transmitter cards appear as if they were a single I/O device connected to the computer under a single device code.

#### Asynchronous Line Control

The Data General 4060 Asynchronous Multiplexer enables a Data General computer to communicate with and control terminal devices over asynchronous communications facilities.

The modularity of the 4060 hardware provides the following features:

- a) Four complete line interfaces on each standard subassembly card.
- b) Easy system expansion from a minimum of four lines to a maximum of 64 lines.
- c) Direct (current loop) connection, modem (data set) interface, or modem control for automatic answer.
- d) Full duplex operation.
- e) Hardware character assembly/disassembly with full character buffering.
- f) Several distinct communications line speeds in a single system (75, 110, 134.5, 150, 300, 600, 1200, 2400, 4800, 9600 baud). Custom baud rates available upon request.

### Asynchronous Line Control (Continued)

- g) Several transmission codes in a single system (5, 6, 7, and 8-level with 1 or 2 stop bits). One and one half stop bits are available on 5-level code only.

In communicating with the terminal or data set, the multiplexer hardware performs all character assembly and disassembly into the serial bit streams required. Start and stop bits are inserted on transmission and are stripped out on reception. Character buffering is provided on both reception and transmission so that the program has a full character time to respond without losing input data or reducing transmission rate.

The multiplexer is flexible in line capacity, transmission code, and line speed. It can accommodate from four to 64 full duplex asynchronous lines, in multiples of four, at speeds including 9600 baud. The transmission code structure (character size and number of stop bits) and line speeds are selectable by the user so that an installation can be reconfigured with minimal hardware change.

### Synchronous Line Control

The 4073 Synchronous/Bisynchronous Line Adapter (SLA) provides an interface between a Data General computer and a Synchronous line. Each 4073 contains 4 lines without modem control circuitry. The 5122 and 5123 modules are available for modem control and will interface up to 4 and 8 full/half duplex auto-answer data sets, respectively.

The basic function of the 4073 line adapter is to provide an interface between a processor and a line, performing character assembly and disassembly into a serial bit stream. Assembled characters are passed to the processor on a program interrupt basis. One complete character of buffering is provided on both reception and transmission so that the program has a full character time to respond without losing input data or reducing transmission rate. SYN characters are detected by the hardware on reception and SYN or DLE SYN sequences are inserted as needed on transmission. On reception, an I/O instruction reads a word containing a line number, a character, and control information. On transmission, an I/O instruction reads a line number, indicating that a character has been transmitted. The program must respond by outputting a word containing the line number and the next character. Multiplexing occurs since the I/O instruction to read line number/character/control words always affects only one line on the several cards. The choice of a specific card to be read is made automatically by the hardware in priority order, lower line numbers having the higher priority. Thus, in a system with mixed data rates, the higher speed lines should be assigned to lower line numbers.

### Synchronous Line Control (Continued)

The transmission code structure (character size, SYN, and DLE characters) are selectable by the user under program control so that an installation can be reconfigured with no hardware change. The SLA enforces no control discipline: such discipline is the responsibility of the program.

A clock is provided for systems requiring an external clock for their modems or for systems containing no modem. Square waves are available at 19.2K baud, 9600 baud, 4800 baud, 2400 baud, and 1200 baud. A pair of synchronous line adapters installed in computers up to a few hundred feet apart provide a data path not requiring a modem.

### Modem Control

The 5120-5123 modules are available for providing modem control as follows:

- 5120 for up to four asynchronous lines (type 4063)
- 5121 for up to eight asynchronous lines (type 4063)
- 5122 for up to four synchronous lines (type 4073)
- 5123 for up to eight synchronous lines (type 4073)

END OF CHAPTER

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

```

10003 QMIO
01
02
04          .TITL   QMIO      ;CMS I/O MODULE
05          .ENT    QM1,QM3,QHLIS,QMLNM
06          .ENT    QSKD1,QOB01,QIA01,QOA01
07          .ENT    QMDCT,QMT1,MTMSK
08          .EXTN   QISR
09          .NREL
10
11          000024 MDC      =24          ;MODEM DEVICE CODE(4026/4027)
12          000001 QHLIS    =NUML-1      ;HIGHEST LINE NO. IN SYSTEM
13          000077 QMLNM    =77          ;LINE NUMBER MASK(4060/4073)
14          125300 MTMSK    =125300      ;MOVS 1,1 -A SWAP TO MASK FOR CD/RTS
15
16
17          ;          DEVICE CODES
18          000030 QM1      =PRIDC        ;PRIMARY DEVICE CODE
19          000000 QM3      =MODEM        ;MODEM DEVICE CODE FLAG
20
21          ;          DEVICE CONTROL TABLE
22          000000'000010 XISVA: .BLK     10      ;STATE SAVE AREA(0 FOR RDOS)
23
24          00010'000000'QMDCT: XISVA     ;STATE SAVE AREA POINTER
25          00011'000077      DTMSK      ;INTERRUPT SERVICE MASK
26          00012'077777      QISR       ;INTERRUPT SERVICE POINTER
27          00013'000001      QHLIS      ;HIGHEST LINE NO.
28          00014'000030      QM1        ;PRIMARY DEVICE CODE
29          GMT1:             ;START OF MODEM TABLE
30
31          ;          I/O COMMANDS(4060/4073)
32          063730 QSKD1     =SKPDZ      QM1
33          062030 QOB01     =DOB        0,QM1
34          060630 QIA01     =DIAC       0,QM1
35          061030 QOA01     =DOA        0,QM1
36

```

Figure A-2 CMS Software Configuration Parameters (QMIO) (Continued)



LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

```

10004 QMIO
01      ;      CREATE MODEM I/O AND MODEM TABLE
02      000000      N2=0
03      000000      N3=0
04      000000      .IFE      MODEM=2 ;TEST FOR 2 MODEMS
05      N2=1
06      .ENDC
07
08      000000      .IFE      MODEM=3 ;TEST FOR 3 MODEMS
09      N2=1
10      N3=1
11      .ENDC
12
13
14      000000      .IFN      MODEM      ;SKIP REST IF NO MODEM
15      DIA      0,MDC      ;RI INS
16      DIB      0,MDC      ;DSR/CD INS
17      DOA      0,MDC      ;DTR/RTS INS
18      0      ;DTR/RTS VALUE
19      .ENDC
20
21      000000      .IFN      N2      ;SKIP REST IF ONE MODEM
22      .ENT      GMT2
23      GMT2:      DIA      0,MDC+1 ;RI INS
24      DIB      0,MDC+1 ;DSR/CD INS
25      DOA      0,MDC+1 ;DTR/RTS INS
26      0      ;DTR/RTS VALUE
27      .ENDC
28
29      000000      .IFN      N3      ;SKIP REST IF TWO MODEMS
30      .ENT      GMT3
31      GMT3:      DIA      0,MDC+2 ;RI INS
32      DIB      0,MDC+2 ;DSR/CD INS
33      DOA      0,MDC+2 ;DTR/RTS INS
34      0      ;DTR/RTS VALUE
35      .ENDC
36
37      000000      .IFE      MODEM=4 ;SKIP REST IF THREE MODEMS
38      .ENT      GMT4
39      GMT4:      DIA      0,MDC+3 ;RI INS
40      DIB      0,MDC+3 ;DSR/CD INS
41      DOA      0,MDC+3 ;DTR/RTS INS
42      0      ;DTR/RTS VALUE
43      .ENDC
44      00015'17777      -1      ;MARKS END OF MODEM TABLE
45
46      .END

```

\*\*00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

Figure A-2 CMS Software Configuration Parameters (QMIO) (Continued)

0005 QMIO

DTMSK	000077		2/27	3/25					
MDC	000024		3/11	4/15	4/16	4/17	4/23	4/24	4/25
			4/31	4/32	4/33	4/39	4/40	4/41	
MODEM	000000		2/16	3/19	4/04	4/08	4/14	4/37	
MTMSK	125300	EN	3/07	3/14					
N2	000000		4/02	4/05	4/09	4/21			
N3	000000		4/03	4/10	4/29				
NUML	000002		2/20	3/12					
PRIDC	000030		2/12	3/18					
QHLIS	000001	EN	3/05	3/12	3/27				
QIA01	060630	EN	3/06	3/34					
QISR	000012	XN	3/08	3/26					
QM1	000030	EN	3/05	3/18	3/28	3/32	3/33	3/34	3/35
QM3	000000	EN	3/05	3/19					
QMDCT	000010	EN	3/07	3/24					
QMLNM	000077	EN	3/05	3/13					
QMT1	000015	EN	3/07	3/29					
QOA01	061030	EN	3/06	3/35					
QOB01	062030	EN	3/06	3/33					
QSKD1	063730	EN	3/06	3/32					
XISVA	000000		3/22	3/24					

Figure A-2 CMS Software Configuration Parameters (QMIO) (Continued)