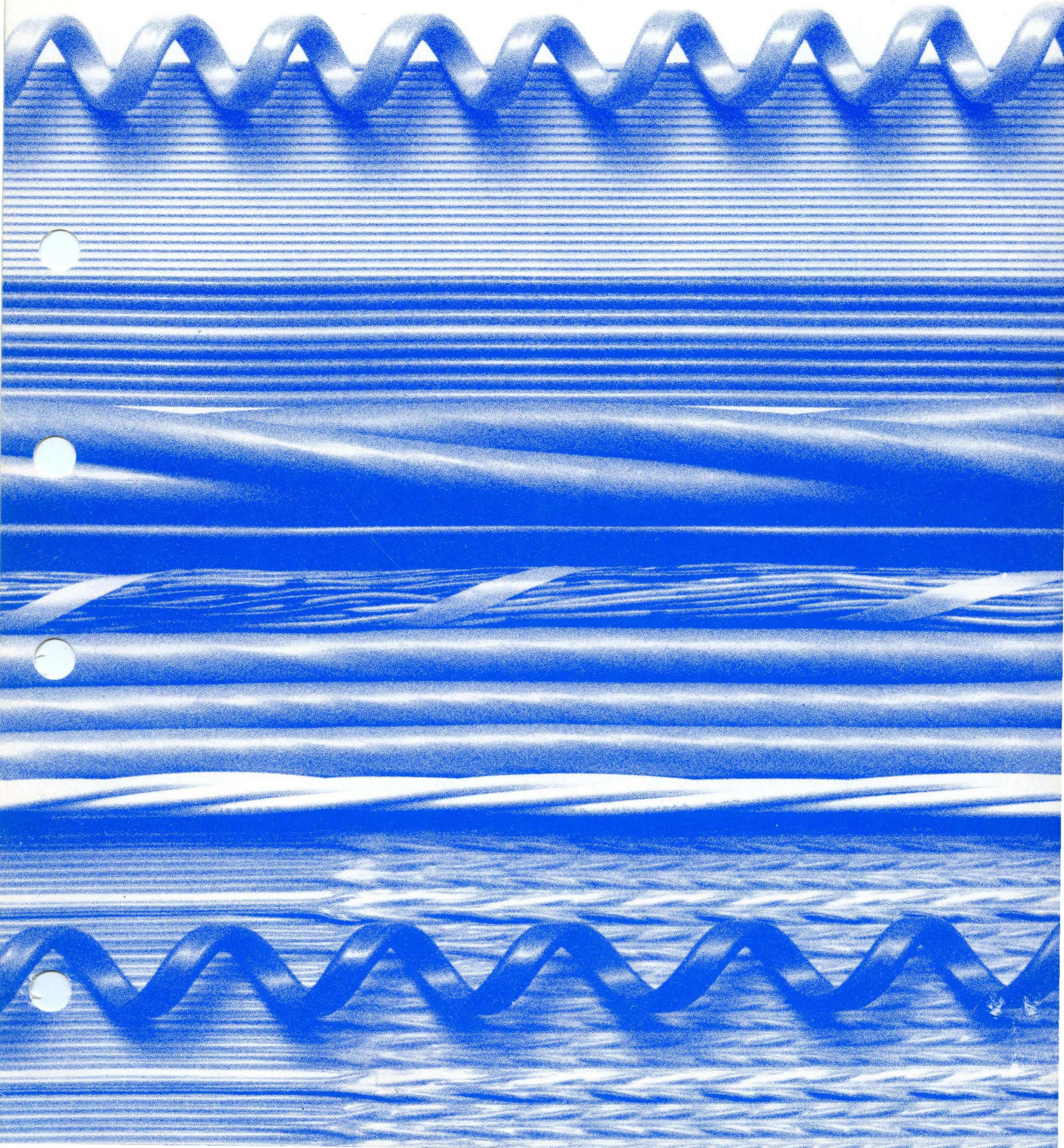
COMPUTERVISION

Communications

CV 3270 Communications User Guide



Appendix D
INITIALIZATION ERROR MESSAGES

Possible error messages during initialization:

1. ***CANNOT LOAD PCU***

   This causes a return to the OS. The loading of code into the PCU has been unsuccessful. Restart the emulator from the beginning. If error persists on retries, report the error to field service.

2. ***CANNOT SEND DEVICE STATUS***

   This causes a return to the OS. The first write to the PCU General Port 0 has failed. Restart emulator from the begining. If error persists on retries, report the fault to field service.

3. ***WARNING: LINE PRINTER DISABLED***

   This is not a fatal error, the emulator will continue. Only two line printers can be used, the emulator will ignore any others which are attached to the task.

CV 3270 Communications User Guide

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PREFACE

Computervision's *CV 3270 Communications User Guide* introduces key aspects of the CV 3270 Communications Package and provides step-by-step procedures for its installation and use.

Prepared as a single source document for the CV 3270 user, this manual highlights procedures required for day-to-day operation. The Table of Contents and Index provide quick reference to material throughout the manual. This publication is divided into five sections and four appendices.

1	Introduction	Introduces CV 3270 Package, PCU, Local, and Remote Host.
2	Hardware Components	Discusses PCU, Interconnecting Cable, and Display.
3	Software Components	Defines Device Handler and Emulator Software.
4	Installation	Provides Pre-installation and Installation techniques for hardware and Host system software.
5	Operation	Describes the Start-up procedure.

Appendices

A	Keyboard Correspondence
B	CGOS PCU Configuration/UNCHWRDS
C	File Transfer Protocol
D	Initialization Error Messages

Because software is updated from time to time, some information herein may be superseded. For possible changes, please consult on-line documentation or contact your Computervision representative.

Notation

Different type sizes and faces are used to distinguish between system and user responses.

	Exact	Variable
User Input	ALL CAPS	Upper and Lowercase
System Output	ALL CAPS, SMALL TYPE FACE	Upper and Lowercase Small Type Face

	Symbol	Meaning
Other Conventions	<CR>	Carriage return.
	↵	Carriage return.
	n>	Operating System (OS) level prompt for input.
	< >	Variable field.
	[ ]	Optional material.
	( )	Choose between two or more items.

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INTRODUCTION

Section 1
INTRODUCTION

The three-fold purpose of this document is to:

- Identify CV 3270 hardware and software components.
- Describe how the package is installed and used.
- Specify the product relative to IBM technology.

CV 3270 COMMUNICATIONS PACKAGE

Computervision's CV 3270 communications package is an integrated hardare and software product that emulates an IBM 3271 control unit (Model 2). The emulator provides an interactive data transmission path between a Computervision CADDS system and an application running on an IBM computer. It is capable of supporting up to four devices at any one time, which may be selected from the following:

- Alphanumeric Displays

  A maximum of four displays (emulating 3277's) can be supported. Only three displays are allowed if file transfer is specified. Must be set for cursor control and clear screen enabled (i.e., the cursor must take the form of a bright oblong). The automatic new line feature should be enabled on Lear Siegler terminals. The keyboard is functionally the same as the basic IBM 78 key EBCDIC keyboard. At least one display must be configured.

- Line Printers

  A maximum of two lineprinters (emulating 3284's or 3286's) can be supported. Print orders may be specified in 64, or 80 character/line formats. If print orders are not specified, NL and EM orders within the data are executed.

The CV 3270 package consists of CGP resident communications software package and a Z80 microprocessor-based communications controller (PCU). The software uses available PCU facilities to emulate the 3270 devices and provide a data path between two foreign systems.

The PCU (programmable communications unit) functions as an *intelligent* communications controller. It relieves Computervision's Graphics Processor (CGP) from low-level functions, such as: responding to physical line protocol, error checking and correction, and self-test hardware diagnostics. Hence, the CGP need only deal with the content and purpose of the communication session.

The CGP communicates with the PCU through its Input/Output (I/O) structure. The PCU is assigned specific CGP I/O device codes for PCU control and data access. The device codes are specified by a series of dip switches on the PCU itself.

The PCU interfaces with a data communications link via an EIA RS-232 Standard Interface. The link can be to either a Local or Remote Host:

- Local Host

  When the IBM host can be reached without resorting to telecommunications, connections can be supported by a limited distance line driver. Computervision provides a 50-foot Standard EIA RS-232 *straight-through* cable to connect to the line driver as part of its product. (*CV 3270's current maximum line speed is 4800 bps.*)

- Remote Host

  When the IBM host can be reached via telecommunications common carrier only, a modem must be used. The same EIA RS-232 standard Computervision *straight-through* cable is provided for connecting the PCU to the local modem.

3270 IDS Features

The following features are supplied at this time:

- Protected or unprotected fields
- Alphanumeric or numeric data
- Display or non-display

3270 IDS Features Not Supported

The following features are not supported:

- Intensified display (displays at normal intensity)
- IBM 3288 Printer special features
- Selector pen
- Test Request Key
- Lowercase text
- Typamatic keys
- Key lock
- Operator identification card reader

Program Commands

The listed program commands are supported or not supported as indicated.

Supported (Received)	Not Supported (Rejected)
• WRITE	• COPY commands
• ERASE/WRITE	• IBM READ BUFFER command
• ERASE ALL UNPROTECTED	• IBM READ MODIFY command

Note

Because READ MODIFIED is not supported, the IBM must poll the 3270 emulator for all information it wishes to receive. The ENTER or PROGRAM FUNCTION key causes the Emulator to generate a READ modified sequence. A short READ sequence is generated in response to the CLEAR or PROGRAM ATTENTION keys.

Section 2
HARDWARE COMPONENTS

Section 2
HARDWARE COMPONENTS

Additional hardware components required to use the CV 3270 communications package on the CGP are a PCU, a communications device interconnecting cable, and a Display Terminal.

- PCU

  This general purpose communications controller is Z80 microprocessor based. The Port supports both modem or terminal interconnection through EIA RS-232 and current loop operation.

- Interconnecting Cable

  The basic cable configuration supplied is a *straight-through* cable.

- Display Terminal

  Lear Siegler terminal is required.

Section 3
SOFTWARE COMPONENTS

Section 3
SOFTWARE COMPONENTS

The software components consist of two functionally distinct pieces:

- CGP Resident Device Handler Software

  This software provides device support and converts data between devices and IBM formats.

- PCU Resident 3270 Emulator Software

  This software provides communication functions between the IBM host and the CADDS system. This includes such items as line control, hardware control, protocol, etc.

Protocol used between the communications processor and the IBM host is CV 3270 multipoint BSC (described in IBM manuals):

- *GA27-3004-2 General Information* describes binary synchronous communication.
- *GA27-2749-5 CV3270 Information* describes display system components.

The emulator will run on full or half-duplex, dedicated, or switched (manual call initialization) lines at speeds of 2400 bps or 4800 bps.

Section 4
INSTALLATION

Section 4
INSTALLATION

These paragraphs describe the pre-installation requirements and software installation.

Pre-Installation

Because *Acceptance Tests* would necessitate providing mainframe software, they are not defined for this package. Prior to installation, you will be asked to provide the following material that will enable the emulator to be checked against your system.

- An IBM (or compatible system) with a CV 3270 suitable configuration.
- Device addresses for devices to be emulated by Computervision.
- Control unit address.
- Log-on and operational procedures for mainframe systems.

Software Installation

Software is installed in two stages:

1. Set up CGP configuration to reflect PCU installation and Unit Characteristic Words (see Appendix B).

2. Check these three files to ensure that they are present. If required, these files may be loaded from tape.

   - CMTB.CV3270
   - OVLY.3270.PCU.MAIN
   - OVLY.PCU.3270

   Introduce the command CV3270 to the system by entering:

   ```
   SYSCMTB CMTB.CV3270
   ```

Section 5
OPERATION

Section 5
OPERATION

In order for the CV 3270 package to operate, devices must be renamed. The renamed devices must then be attached to the task.

Device Names

Two-character unit names are derived as follows:

- Character 1

  Type of unit

  D = Display
  P = Printer

- Character 2

  Number of CV 3270 device

  Valid numbers are 1 to 4; each device must have a unique number (e.g., D1,D2,P3,D4).

Refer to the *CGOS 200 GNA Operator Guide* for further information on commands RENAMDEV and ATTACH that may be used for this purpose (e.g., ATTACH D1, INF2; ATTACH D2, INFO; RENAMDEV SD, D3). The IBM device numbers are specified in the unit characteristic words (UNCHWRDs) of the PCUC device (see Appendix B).

The CV 3270 system can now be started.

Starting the CV 3270

The left column defines the system input/output; the right column clarifies the interaction. (*** signifies a system error message.)

n> CV3270	Enter CV3270 command at the system level prompt (n>). You can now type in IBM editing commands.
CANNOT ATTACH PCU	If this error message occurs, check that the system configuration contains proper auxiliary devices (see Appendix B).

n> STATUS DEV	With STATUS DEV, check that PC00 and PC01 devices are not attached to task. If attached, detach and allow 3270 to run. (The program automatically attaches them.)
n> G, S, or F	Restart the emulator. G — (Go) Normal emulator operations begin. S — (Stop) Emulator program terminated. F — (File Transfer) operations will be in file transfer mode.
n> N, or R	N (Normal) — N reloads PCU. System indicates that the PCU is being loaded. R (Restart) — R does not cause PCU to be reloaded. R can be used when the emulator was previously operating with identical configuration to the current one. In above cases, type only one character. Any other reply is ignored.
CANNOT LOAD PCU ***CANNOT SEND DEVICE STATUS*** ***WARNING: LINE PRINTER DISABLED***	Possible error messages output (see Appendix D). Displays clear and cursor is positioned in top lefthand corner. Emulator is fully operational.

Displays can now accept IBM editing commands. Certain IBM functions correspond to two key depressions on Computervision system (see Appendix A).

Emulator Stop

Two key depressions (\ /) immediately terminate the emulator program, even though other devices or file transfers are active. *Exercise CAUTION when several IBM devices are being emulated*. If a transfer is in progress (\ W) may be used to reset and exit the emulator.

Depression of a " \ " key indicates a two-key sequence. The next character selects a particular function; if that character is an invalid function character, the entire sequence is ignored and another \ is required before entering a valid function key.

File Transfer Operation

F, entered in response to the initial prompt (n >), causes only one device to be used for the file transfer operation. Only three normal (real) devices will be supported by the emulator. The fourth device becomes a virtual screen. See Appendix C for virtual screen protocol.

APPENDICES

Appendix A
KEYBOARD CORRESPONDENCE

Figure A-1 shows the layout of the keyboard keys described below.

A to Z and the following keys have the same IBM function:

(,)#,@,<,>,comma,/,:,=,',%,-,*,&,$,?,;,+,",-,].

The following Computervision keys have the corresponding IBM function:

Computervision Key(s)	IBM Function	Computervision Key(s)	IBM Function
CTRL - H	Cursor Left	\ Y	PA1
CTRL - J	Cursor Down	\ H	PA2 (CNCL)
CTRL - K	Cursor Up	\ J	PA3
CTRL - L	Cursor Right	\ 1	PF1
\ I	Tab	\ 2	PF2
\ RETURN	New Line	\ 3	PF3
\ U	Back Tab	\ 4	PF4
\ A	Clear	\ 5	PF5
\ Q	Enter	\ 6	PF6
\ G	Erase EoF	\ 7	PF7
\ T	Erase Input	\ 8	PF8
\ D	Insert Mode	\ 9	PF9
\ F	Del	\ 0	PF10
\ W	Reset	\ :	PF11
\ E	Dup	\ -	PF12
\ R	Field Mark		

Notes

1. The special EBCDIC characters ¬ | ¢ are also displayed and printed with the equivalent ASCII characters ↑ [].

2. Test Req is not supported.

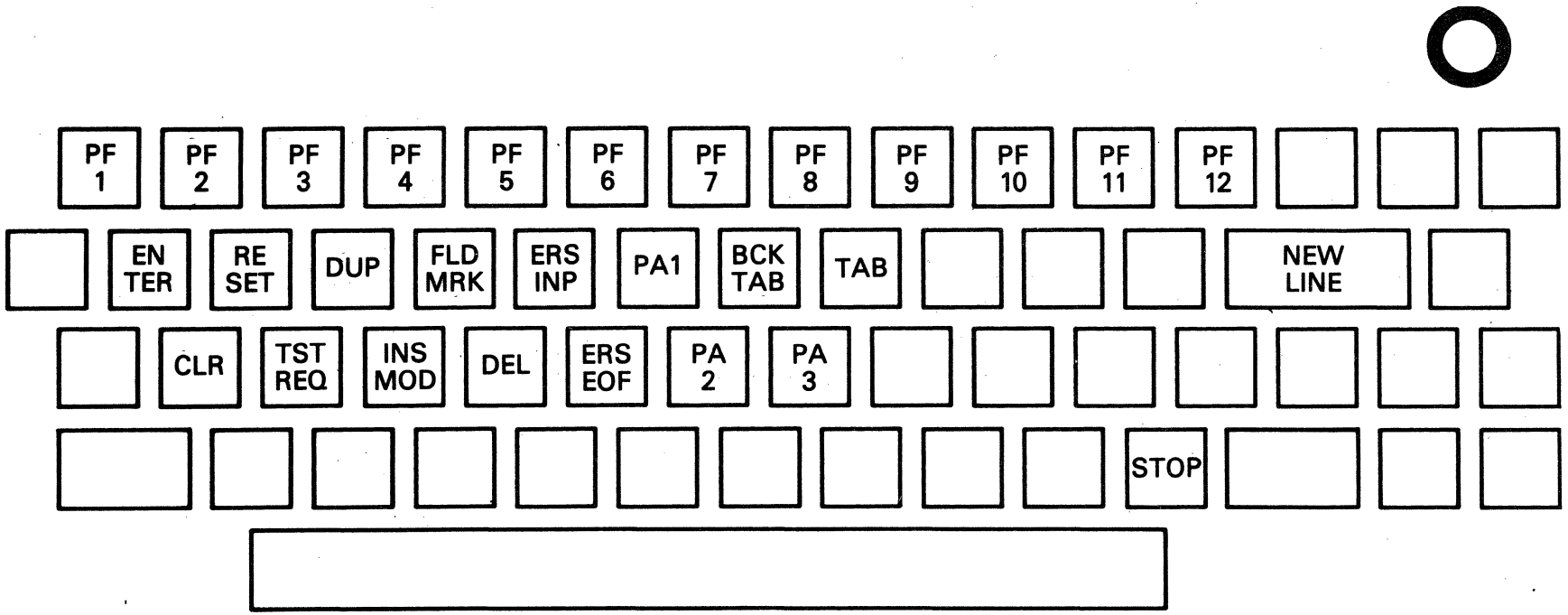

Figure A-1. Layout of IBM Function Keys on CV (Lear Siegler) Keyboard

Appendix B
CGOS PCU CONFIGURATION/UNCHWRDS

Auxiliary Unit type numbers are:

- PCUC = 19
- PCUG = 20

Four device codes are required for one PCU. These codes should not be previously used in the configuration or set up on other, possibly unused, boards in the system (i.e., unused MDB board device codes must not conflict with PCU device codes). The following configuration is appropriate for a PCU with a Z80 device code of 2C, a (data channel) port 0 device code of 2E.

AUX Unit 6 (PCUC) Parameters

1. NAME1 (BCD) = PC
2. NAME2 (BCD) = 00
3. DEVNO in (hex) = 002C
4. DEVNO out (hex) = 002D
5. UNCHWRD1 (hex) = xxxx
6. UNCHWRD2 (hex) = xxxx
7. UNCHWRD3 (hex) = xxxx

Defined below.

AUX Unit 7 (PCUG) Parameters

1. NAME1 (BCD) = PC
2. NAME2 (BCD) = 01
3. DEVNO in (hex) = 002E
4. DEVNO out (hex) = 002F
5. UNCHWRD1 (hex) = xxxx
6. UNCHWRD2 (hex) = xxxx
7. UNCHWRD3 (hex) = xxxx

Defined below.

Unit Characteristics are used to determine the control unit numbers and device addresses of the 3270 Display system. They also define the Line Printer buffer capabilities. With Unit Characteristic Words (UNCHWRDs), one may specify unit numbers on the line for the Control Unit (3271), Displays (3276), Line Printers (3284 or 3286) and the Virtual Terminal. The numbers are in the range 0-31.

PCUC Word	Left Byte	Right Byte
1	Display 1 Number	Display 2 Number
2	Display 3 Number	Display 4 Number
3	Printer 1 Number	Printer 2 Number

PCUG Word	
1	Virtual Screen Number Control Unit Number.
2	Whole Word = Block Size for transmission on the line.
3	Undefined.

The most significant bit in each printer byte indicates the buffering capabilities of that printer (i.e., 0 = Printer, buffered; 1 = Printer, unbuffered).

Note

The unit characteristic word or the PCUG device (Transmission Block Size) must be set to X'FE' when system is configured.

Example

If the control unit is Number 0 (Address 40), the screens are 0, 1, 2, 3 (Addresses 40, C1, C2, C3), the Virtual Screen is 4 (Address C4) the Line Printers are 5 and 6 (Addresses C5 and C6; both buffered) and the block size is 100, then:

```
PCUC = 0001 0203 0506
PCUG = 0400 0100 0000
```

Note that the lowest numbered display (e.g., D1, or D2 if there is no D1) is associated with the IBM device number in the left byte of the first UNCHWRD of the PCUC device. Further displays are associated with subsequent bytes in the PCUC UNCHWRDs. The lower numbered printer is associated with the IBM device number in the left byte of the third UNCHWRD of the PCUC device.

Appendix C
FILE TRANSFER PROTOCOL

Note

This information applies only to those customers who possess IBM software that is specifically written to provide this capability.

The following specification describes an extension of the Computervision emulator for the IBM 3270 Information Display System. The extension allows source files to be transferred from the IBM system to the file structure (disc) of the Computervision system and vice-versa.

A file transfer is accomplished by creating a virtual screen that looks to the IBM system like a 3277 display on the 3270 control unit. However, instead of displaying IBM information on an alphanumeric screen, the Computervision system places the information in a file manager file. Similarly, when the IBM system reads information from this virtual device, the data is not received from a keyboard operator. The Computervision system reads from a file manager file and automatically transmits this data to the IBM system. See Figure C-1.

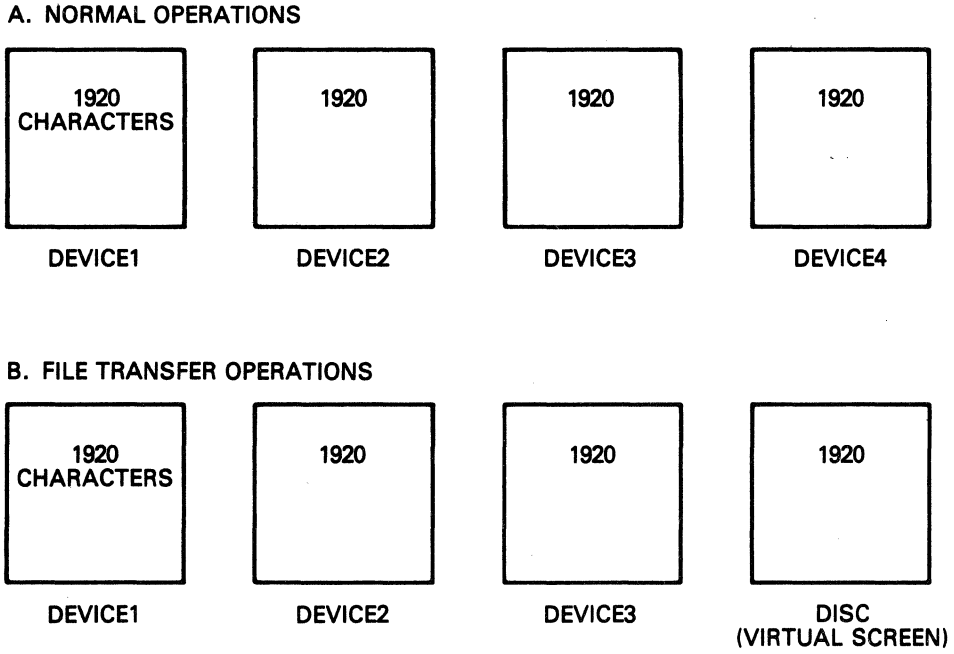

Figure C-1. System Representation

OPERATION

Although the system can also be used for normal operations, only three normal IBM devices may be used. It is not possible to swap between normal mode and virtual mode. Once the emulator is entered in a given mode, the mode may only be changed by stopping and restarting the Computervision 3270 program.

BUFFER FORMAT

Information is written to the virtual display in unformatted mode. The format, identical to that used for a line printer, allows a maximum amount of information to be transferred at one time.

- NL (new line) character terminates each line of information.
- EM (end of message) character terminates all valid data.

The first two lines of the buffer have a specific meaning and must be present in the buffer. They may be followed by a variable number of data lines. A line of data is always contained in one device buffer, it is never split between two device buffers.

First Line

This line contains the Computervision filename. It must be given in full form and must be the name of a text file (e.g., A.FILE.&BCD.TEST). The filename is only given in the first device buffer of any file transfer sequence. In the later device buffers, a % character must appear as the first character of the first line. This saves retransmitting the filename and allows easy checking for out-of-sequence data blocks.

Second Line

This line contains a single character to specify the type of data transmitted to the virtual screen. The character may take three values and indicate the following:

D indicates IBM or Computervision is sending a block of data to the other system. Further blocks of data will be sent.

L indicates IBM or Computervision is sending the last block of data in a file transfer sequence.

T indicates IBM is requesting or acknowledging the transfer of Computervision data. There are no data lines in the buffer when T is used.

Finally, the IBM may send a null buffer. This causes the Computervision system to terminate any file transfer sequence and ready itself to start a new file transfer sequence. The Computervision system responds by sending 'CLEAR' back to the IBM system. This function is useful for error recovery after a break in transmission. (Note that a null buffer need not be sent in a normal termination.)

FUNCTION KEYS

The Computervision system inputs data to the IBM system with the following function keys:

- CLEAR

  IBM data was not good or not in the correct sequence. Computervision system terminates any operation currently in progress and will be ready to start a new file transfer sequence.

- PF1

  Sends data blocks to IBM system.

- PF2

  Acknowledges data sent from IBM system. No data will be transferred.

- PF3

  A negative acknowledgement from Computervision system. If given when the IBM is sending data to Computervision, the file already exists on the Computervision system and can not be overwritten. If given when IBM is receiving Computervision data, the file requested does not exist on the Computervision system and no data is transferred.

TYPICAL TRANSFER SEQUENCE

These typical transfer sequences indicate the use of the data formats and function keys. The number before the comma represents the line number.

TYPICAL TRANSFER SEQUENCE (Continued)

1. IBM Sends File to Computervision.

IBM	Computervision	Comments
1,FILE.&BCD.TEST 2,D 3..,data		IBM forms buffer of data.
	'PF2'	Computervision opens a file and starts accepting data.
1,% 2,D 3..,data		IBM sends more data after positive ACK.
	'PF2'	
1,% 2,L 3..,data		IBM sends last block.
	'PF2'	Computervision acknowledges and closes new file. File transfer sequence is completed.

2. IBM Receives Data from Computervision.

IBM	Computervision	Comments
1,FILE.&BCD.TEST2 2,T		IBM requests Computervision for a file.
	'PF3'	Computervision indicates file does not exist.
1,FILE.&BCD.TEST 2,T		IBM requests another file.
	'PF1' 1,% 2,D 3..,data	Computervision forms first data block for file.

****

TRANSMISSION INTERRUPTED

****

IBM	Computervision	Comments
'ERS/WRT'		
NO data		IBM sends null buffer.
	'CLEAR'	
		Computervision terminates previous output, becomes ready to start a new file transfer sequence.
1,FILE.&BCD.TEST		
2,T		
		IBM retries request for file.
	'PF1'	
	1,%	
	2,D	
	3..,data	
		Computervision forms file data.
1,%		
2,T		IBM acknowledges data.
	'PF1'	
	1,%	
	2,L	
	3..,data	Computervision forms last buffer. File transfer sequence terminates.

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