

**Section 5  
Supplement  
to the  
AST-SNA  
User's Manual**

User's Manual  
000176-001 A  
January, 1985

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## SECTION 5

# COMMUNICATION CLUSTER OPTION

This section applies to AST-SNA used in conjunction with the Four-Port Async communications board to create the AST-SNA Communication Cluster option.

### 5.1 Features

The AST-SNA Communication Cluster option allows the user to attach as many as four additional VT100 compatible ASCII terminals (or IBM PCs with AST Research's Terminal Emulation program "EMULATE.EXE"). This allows the user to tailor the operation of the package to individual requirements. The ASCII terminals or PCs used with this option can emulate the capabilities of an IBM 3278 or 3279 Model 2 Display Station with a 75- or 87-key EBCDIC (typewriter) keyboard.

#### **NOTE**

Certain non-VT100 compatible terminals may be used by configuring the escape sequences on the fourth menu page of the configuration program.

The AST-SNA Communication Cluster option includes software and Four-Port Async communication board and supports as many as four of the above-mentioned terminals emulating an IBM 3278 with the following features:

- 1920-character display screen (24 lines x 80 columns).
- Status indicators.
- Audible alarm.
- Basic 3270 attribute support.
- Printer support including upper- and lowercase characters and local printer capability.

The additional communication capabilities of this option include:

- Transfer rates of 110 to 9600 bits per second (bps)
- Full duplex asynchronous protocols

**NOTE**

For ASCII terminals, line 24 is used for data and status display; it defaults to status display but can be toggled by key sequence SWSTAT defined on the fifth menu page (see Section 5.8.5).

## 5.2 Diskette Contents

The Communication Cluster Option diskette contains the following files:

1. README.DOC This file should be read before using the rest of the diskette.
2. CONFIG.EXE A Configuration program to be used by SNA.COM, CLUSTER.EXE, EMULATE.EXE and ASTSNA.EXE.
3. CONFIG.DAT A sample configuration data file.
4. CLUSTER.EXE The Communication Cluster program.
5. EMULATE.EXE The terminal emulation program running on the PC to work with the Communication Cluster program.

## 5.3 Additional Publications

In addition to the AST Research *Four-Port Async User's Manual*, you will need the appropriate manual for your specific terminal.

## 5.4 Hardware Requirements

In addition to the hardware listed in Subsection 1.3.1, the AST-SNA Communication Cluster option requires an AST Research Four-Port Async board with cable plus at least one and as many as four "smart" ASCII terminals or PCs with RS232 cables. These terminals should have cursor positioning, display attributes such as intensity and reverse video, and editing attributes such as erase-to-end-of-line and erase-to-end-of-screen command sequences.

### 5.4.1 Configuring I/O Addresses on the Four Port Async Board

There are two configurations of the Four Port Async board used for the AST-SNA Communication Cluster option. One is to support the PC-1 and PC-2 family and the other is to support the PC-XT.

Both configurations are for use in noncompatible mode and map the I/O addresses of the Four Port Async board so they do not conflict with COM1 and COM2. Table 5-1 shows the I/O addresses, vector address and switch settings for the PC-1 and PC-2. Table 5-2 shows the same information for the PC-XT.

**Table 5-1. I/O Address Selection for Noncompatible Mode for the PC-1 and PC-2**

S1-1	S1-8	Channel 1	Channel 2	Channel 3	Channel 4	Vector
OFF	ON	:2A0-:2A7	:2A8-:2AF	:2B0-:2B7	:2B8-:2BE	:2BF

**Table 5-2. I/O Address Selection for Noncompatible Mode for the PC-XT**

S1-1	S1-8	Channel 1	Channel 2	Channel 3	Channel 4	Vector
OFF	OFF	:1A0-:1A7	:1A8-:1AF	:1B0-:1B7	:1B8-:1BE	:1BF

### 5.3.2 IRQ Line Selection

The IRQ line selection is determined by the switch positions 2 through 7 on the Four-Port Async board's switch 1 as shown on Table 5-3 below.

**Table 5-3. Switch Setting for Interrupt Line Selection**

S1 Position	2	3	4	5	6	7
Interrupt Line	IRQ2	IRQ3	IRQ4	IRQ5	IRQ6	IRQ7

ON = Interrupt  
OFF = No Interrupt

#### **NOTE**

Only one switch should be set in the ON position at a time.

## 5.5 Software Requirements

IBM's Personal Computer Disk Operating System (PC-DOS) Version 2.0 (or later) is required to run AST-SNA. All other software that is required to run the emulation package is supplied on the AST-SNA master diskette and the Communication Cluster Option diskette.

## 5.6 Typical AST-SNA Configuration

Figure 5-1 shows the AST-SNA Communication Cluster option configuration.

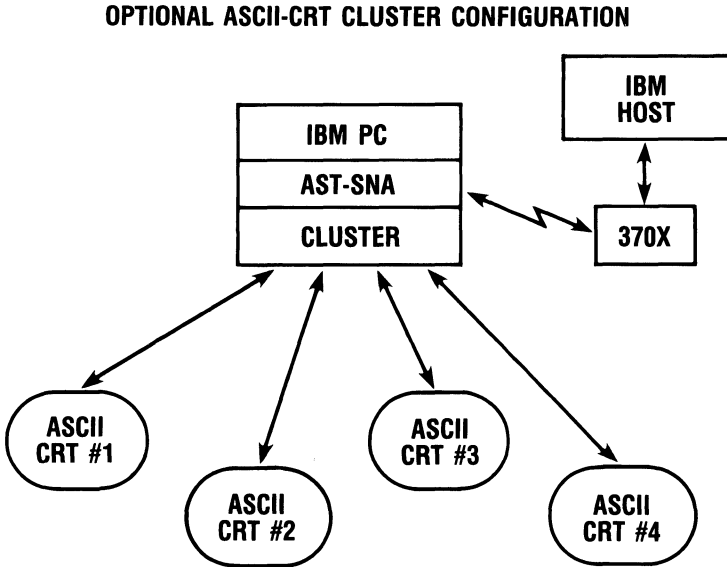


Figure 5-1. AST-SNA with Communication Cluster Option Configuration

## 5.7 Cabling

The connection to the ASCII terminals or PCs is made by using a straight shielded RS232 cable with pins 1, 2, 3, 4, 5, 6, 7, 8 and 20 connected (minimum).

## 5.8 Configuring Your System

When using the Communication Cluster Option, the configuration program allows you to tailor the operation of the package to your individual requirements.

### 5.8.1 Main Menu or First Menu Page

This is exactly as described in Section 3. This menu page is not related to the Communication Cluster Option.

### 5.8.2 Second Menu Page

This is exactly as described in Section 3 with the addition of “PgDn” to access Four-Port Configuration (see Figure 5-3). This menu page is not related to the Communication Cluster Option.

AST-SNA KEYBOARD DEFINITIONS = enter value, cursor keys = cursor movement, space bar = erase cell, PgUp = return to main menu, PgDn = 4port configuration

* (PriSc)	TAB	HOME	BACK TAB	UP	ENTER
LEFT	PRINT	RIGHT	HOME	DOWN	UP
INS	LEFT	DEL	RIGHT	(BS)	DOWN
far rt—	INSERT	far rt +	DELETE		RETURN
alt 1	PA1	alt 5	ERASE INPUT	alt 9	RESET
alt 2	PA2	alt 6	DUP	alt 0	IDENT
alt 3	PA3	alt 7	FIELD MARK	alt—	SYS REQ
alt 4	ERASE EOF	alt 8	DEV CNCL	alt =	CLEAR
F1	PF1	shift F1	PF11	alt F1	PF21
F2	PF2	shift F2	PF12	alt F2	PF22
F3	PF3	shift F3	PF13	alt F3	PF23
F4	PF4	shift F4	PF14	alt F4	PF24
F5	PF5	shift F5	PF15	alt F5	
F6	PF6	shift F6	PF16	alt F6	
F7	PF7	shift F7	PF17	alt F7	
F8	PF8	shift F8	PF18	alt F8	
F9	PF9	shift F9	PF19	alt F9	
F10	PF10	shift F10	PF20	alt F10	

Choices: ATTN | BACK TAB | CLEAR | DELETE | DEV CNCL | DOWN | DUP | ENTER  
 ERASE EOF | ERASE INPUT | FIELD MARK | HOME | IDENT | INSERT | LEFT  
 PA1...PA3 | PF1...PF24 | PRINT | RESET | RETURN | RIGHT | SYS REQ | TAB | UP

Figure 5-3. Second Menu Page



### 5.8.3 Third Menu Page

The third menu page is used entirely for defining each individual parameter on the Async Configuration. The cursor is positioned off to the right on the same line as the currently selected parameter (see Figure 5-4). The following parameters deal with the hardware environment.

**BOARD NUMBER** is used as an identifier that allows for multiple terminal emulation devices as well as future expansion, i.e., gateways, etc. The default value is 0, with any value between 0 and FF allowed.

**THE VECTOR ADDRESS** is used by the software to determine which port had an interrupt. This address will determine whether it is a PC-1, PC-2, PC-XT or Portable PC. If this address is not set correctly, the software will not respond. The default value is 2BF (for PC-XT only, the allowable values are 1BF or 2BF).

The **INTERRUPT REQUEST LINE** is used to specify the line used by the Four-Port Async board and cannot conflict with any other interrupt device. The default value is 3 and the range is from 2 through 7.

The **ASYNC PORT SPEED**, **ASYNC PORT PARITY**, **ASYNC PORT DATA BITS** and **ASYNC PORT STOP BITS** all pertain to Async protocol. The default parameters are shown in Figure 5-4.

**DEVICE NUMBER FOR ASYNC PORT 1, 2, 3 or 4** refers to the physical port on the Four-Port Async board used for 3270 emulation. [N] represents a value corresponding to the Terminal Device Number (0 to 31). This number will be assigned to the terminal connected to that individual port. This is the number host used to address the device associated with that port.

DEVICE TYPE FOR ASYNC PORT 1, 2, 3 or 4 refers to the two device types supported by the Cluster Option: "T" for ASCII terminals that can accept the command sequences defined on the fourth menu page or "P" for an IBM-PC running "EMULATE.EXE".

```
CLUSTER CONFIGURATION VERSION x.xx
<-| = [default], PgDn = define async screen, PgUp = define main keyboard

BOARD NUMBER [:00] :
VECTOR ADDRESS [:2BF] :
INTERRUPT REQUEST LINE [3] :
ASYNC PORT SPEED [9600] :
ASYNC PORT PARITY [N] :
ASYNC PORT DATA BITS [8] :
ASYNC PORT STOP BITS [1] :
DEVICE NUMBER FOR ASYNC PORT 1 [N] :
DEVICE NUMBER FOR ASYNC PORT 2 [N] :
DEVICE NUMBER FOR ASYNC PORT 3 [N] :
DEVICE NUMBER FOR ASYNC PORT 4 [N] :
DEVICE TYPE FOR ASYNC PORT 1 [T] :
DEVICE TYPE FOR ASYNC PORT 2 [T] :
DEVICE TYPE FOR ASYNC PORT 3 [T] :
DEVICE TYPE FOR ASYNC PORT 4 [T] :

INFORMATION: 4 port board number
CHOICES: 0 | 1 | ... | FF
```

**Figure 5-4. Third Menu Page: Async Configuration**

### 5.8.4 Fourth Menu Page

The fourth menu page is used for defining the parameters for the Async Screen Configuration. The cursor is positioned off to the right on the same line as the currently selected parameter. The parameters shown in Figure 5-5 deal with the hardware environment for a VT100 keyboard; for other terminals, refer to the appropriate user's manual.

ASYNCR SCREEN CONFIGURATOR VERSION x.xx

<-| = [default], PgDn = define async keyboard, PgUp = define async screen

```
Cursor positioning (begin) :1B[
Cursor positioning (middle) ;
Cursor positioning (end) H
Erase to end of line :1B[OK
Erase to end of page :1B[OJ
Erase entire screen :1B[2J
Erase cursor :1B[1v
Draw cursor :1B[0v
Start of intensity :1B[1m
End of intensity :1B[0m
Cursor positioning (row/col) 0102030405060708091011121314151617181920
Cursor positioning (row/col) 2122232425262728293031323334353637383940
Cursor positioning (row/col) 4142434445464748495051525354555657585960
Cursor positioning (row/col) 6162636465666768697071727374757677787980
Number of characters per cursor positioning (row/col) :02
```

INFORMATION: Cursor positioning (begin)

CHOICES: Hex number = :xx | normal key = keystroke

Figure 5-5. Fourth Menu Page

**NOTE**

In both the fourth and fifth menu pages, the user is required to key in character strings that will be used between the ASCII terminal and Cluster PC to represent specific actions. Non-printable characters may be used and are represented by typing a colon followed by the character's hexadecimal value; e.g., ":1B" for the Escape character.

CURSOR POSITIONING (BEGIN, MIDDLE or END) is used to position the cursor at a given position on the CRT.

The next three lines allow you to erase information from the screen. ERASE TO END OF LINE and ERASE TO END OF PAGE will remove everything from the cursor forward to the defined point. ERASE ENTIRE SCREEN removes everything shown on the screen at that time.

START OF INTENSITY defines the character sequence needed to display in a high intensity field while END OF INTENSITY is used to return to normal intensity.

### **NOTE**

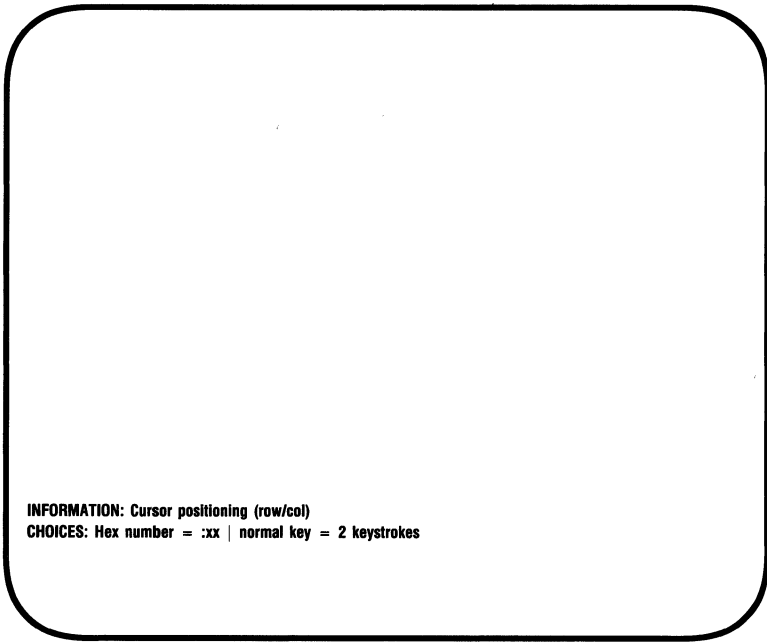
The Start of Intensity, End of Intensity and Erase/Draw Cursor command sequences are required to run the Cluster Option. If your terminals do not support these sequences, enter “:00” to suppress them.

The four lines of CURSOR POSITIONING (ROW/COL) are also used to position the cursor at a given position on the CRT as specified by the particular make of terminal. Figure 5-6 shows the two lines that appear on the bottom of the screen. The parameters are entered with two keystrokes, one of which will be a space if the terminal uses one character to specify a row/column. The values for each row/col are as follows: first line is from 1 through 20, second line from 21 through 40, third line from 41 through 60, fourth line from 61 through 80. For example, the following ASCII string is sent to position the cursor at row 9, column 11:

```
<ESC>[09;11H
```

### **NOTE**

<ESC> represents a single ASCII character ESC which has a hex value of 1B.



**Figure 5-6. Information and Choice Lines.**

### **5.8.5 Fifth Menu Page**

The fifth menu page is used entirely for defining the mapping of keys on the keyboard. Refer to Figure 5-7 for the mapping used with a VT100 keyboard or refer to the user's manual for your specific terminal.

The fifth menu page is divided into three vertical sections, each consisting of two columns. The right-hand column is configurable and represents the key stroke sequence used to generate the 3270 key codes indicated by the left hand column. For example, “<ESC>A1” will be the keystroke sequence used to generate <PA1> code (note that <ESC> has a hex value of 1B). When running the Communication Cluster program, the user will enter this sequence on the ASCII terminal to generate the 3270 command. The PC running EMULATE.EXE will use the function key defined in the second menu page instead of the fifth menu page. These multiple key stroke sequences are configurable with the restriction that they should all begin with “:1B” and are always three characters long. REDRAW and RSTPRT are debugging keys and are not normally used.

**ASYNCR KEYBOARD DEFINITIONS** <-| = enter value, cursor keys = cursor movement  
space bar = erase cell, PgUp = define async screen

TAB	:09	BACK TAB	:1BBT	ENTER	:0D
PRINT	:1BPR	HOME	:1BHO	UP	:1B[A
LEFT	:1B[D	RIGHT	:1B[C	DOWN	:1B[B
INS	:1BIN	DELETE	:1BDL	RETURN	:1BLF
PA1	:1BA1	ERASE INPUT	:1BEI	RESET	:1BRS
PA2	:1BA2	DUP	:1BDU	IDENT	:1BID
PA3	:1BA3	FIELD MARK	:1BFM	SYS REQ	:1BSR
ERASE EOF	:1BEE	DEVCONCL	:1BDC	CLEAR	:1BCL
PF1	:1B01	PF09	:1B09	PF17	:1B17
PF2	:1B02	PF10	:1B10	PF18	:1B18
PF3	:1B03	PF11	:1B11	PF19	:1B19
PF4	:1B04	PF12	:1B12	PF20	:1B20
PF5	:1B05	PF13	:1B13	PF21	:1B21
PF6	:1B06	PF14	:1B14	PF22	:1B22
PF7	:1B07	PF17	:1B15	PF23	:1B23
PF8	:1B08	PF16	:1B16	PF24	:1B24
SWSTAT	:1BST	RSTPRT	:1BRP	REDRAW	:1BRD

Hex number = :xx | normal key = keystroke

**Figure 5-7. Async Keyboard Mapping for VT100 Keyboard.**

## 5.9 Executing the EMULATE Program

The EMULATE program allows PCs to emulate VT100 type terminals for use with the Communication Cluster program. It can be executed either before or after the Communication Cluster program is activated. However, it may be necessary to execute a reset (<Alt>-<9>) if it is executed after the Cluster program.

In order to execute the EMULATE program, type the following command in response to the DOS prompt:

```
EMULATE [/n] [filespec] <Enter>
```

The first optional parameter shown on the command line is for specifying the communication port (1 = COM1, 2 = COM2). The second parameter allows a specific configuration file to be entered. The default file is CONFIG.DAT.

### NOTE

The keyboard mapping file MAPDFT.AST must be present on the disk containing EMULATE.EXE.

To end execution of the EMULATE program and return to the DOS prompt, press the <Esc> key. The host connection will be maintained by the cluster PC and you will be able to resume later at the same point.

If you reload your PC-DOS operating system, either by turning the power off and then on again, or by the <Ctrl>-<Alt>-<Del> keystroke combination, the mode command will need to be executed again. It is also possible that some application programs may interfere with the resident portion of the EMULATE program.

## 5.10 Executing the Communication Cluster Program

Before running the Communication Cluster program, the SNA program must first be loaded (see Section 4.3.1). Once the SNA program is loaded, execute the Cluster program by typing the following command in response to the DOS prompt:

```
CLUSTER [file spec] <Enter>
```

The optional file specification shown on this command line is for the configuration file that provides the emulation parameters (see Section 5.8). If the default configuration filename of "CONFIG.DAT" is used, you do not need to include it on the command line.

This command loads the Communication Cluster program into memory. The attached ASCII terminals or VT100-emulating PCs may now be used.

### NOTE

In order for the ASCII terminals to use the printer, the PC with the Communication Cluster program must be running AST-SNA as an application program executed *after* the CLUSTER program.

If you use the EMULATE program (see Section 5.9), you should first invoke the CLUSTER program on the cluster PC and then invoke the EMULATE program on the device PC to insure a proper start-up.



If you reload your PC-DOS operating system, either by turning the power off and then on again, or by the **<Ctrl>-<Alt>-<Del>** keystroke combination, the host connection will be terminated. It is also possible that some application programs may interfere with the resident portion of the Communication Cluster program and cause the host connection to be terminated.