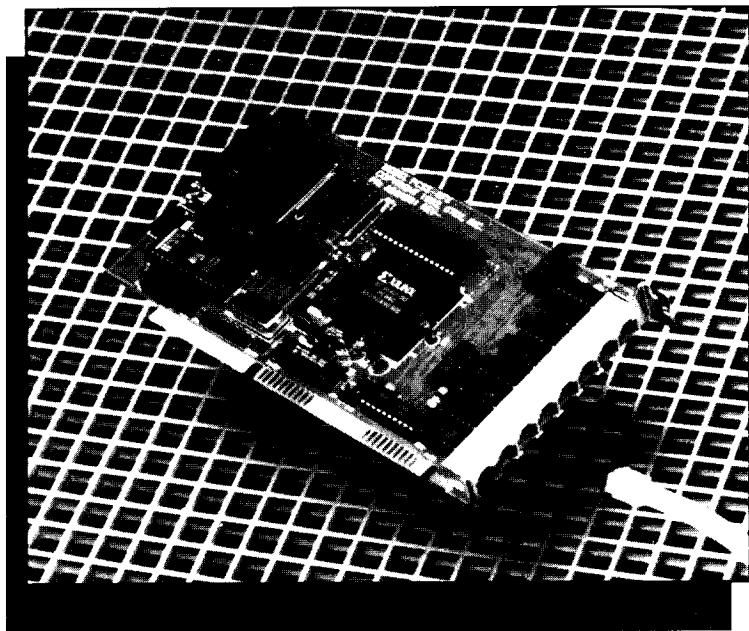


# PCSS-8FA and PCSS-8FX

INTELLIGENT SERIAL COPROCESSORS



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## User Manual

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\$10.00

**GTEK**<sup>®</sup>, INC.

**Operating Manual for the GTEK Model  
PCSS-8FA and Model PCSS-8FX**

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# 1—General Overview

The GTEK PCSS-8FA/FX Super Serial Cards are very powerful serial enhancement products for the IBM Personal Computer (PC, XT, AT, and PS2 Models 30 and 25) family and all compatibles. The PCSS-8FA/FX products provide 8 independent RS-232 asynchronous serial communication channels per board. Baud rates of up to 115.2k baud can be selected. Automatic handshaking of either DTR/CTS or XON/XOFF type is available in both directions. Both transmit and received data is buffered on the board and all of this is done with no overhead on the host computer's processor.

Each board occupies only 4 I/O addresses. Using all of page one and page two of the computers I/O map, it is possible to support 128 cards or 1024 channels of communication. The default address range (no jumpers) is 2E0-2E3h. Jumpering JB1 as the chart in Chapter 3, Step 1 selects the desired base address.

GTEK's operating system for its intelligent serial cards implements DYNAMEMORY™. Dynamemory allocates & deallocates memory to queues that need it or are finished with it, in real time. This gives you a virtual memory space that can be as much as 16 times the size of actual memory. A standard PCSS-8FA/FX with 32K total of Dynamemory can approximate the performance of an operating system with fixed length queues totaling 512K bytes.

The PCSS-8FA/FX GTEK Intelligent Super Serial Cards are supplied with a utility program called RES8F to make it compatible with programs that use BIOS software inter-

rupt 14H. This BIOS Interface utility is a “Terminate and Stay Resident” program that enhances the BIOS INT14 function call. RES8F limits the number of cards that can be installed in one computer to sixteen (or 128 channels), if you can call that a limitation. The PCSS-8FA/FX can take the place of a PCSS-8 or 8X physically, but must use the new BIOS Interface program RES8F in place of RES14. RES14 may also run in conjunction with RES8F. So any of our serial cards can be mixed and matched in the same computer.

SSI is a program supplied on the utilities disk to remap COM1:—COM4: to any of the channels on the intelligent card. Compatibility is so complete you can even use the DOS “Mode” command to set up an intelligent channel that has been remapped to one of the COMx: ports.

GTEK Intelligent Super Serial Cards can also be operated in a command driven mode that bypasses INT14. In this mode you can write programs to do many different types of serial I/O.

Since you are not operating with the Uart directly, the I/O bus speed is of no immediate concern. The GTEK Intelligent Super Serial Cards can operate with I/O bus speeds of over 60MHz. They can be used in a number of different applications, some of which do not even require it to be in a computer! By supplying power to the board and installing the proper co-processor firmware, the board can be operated stand alone in a data multiplexing mode or as a spooler with multiple inputs or outputs. One such application could be as a print spooler, taking input from a number of computers and outputting to a single device such as a laser printer.

The board can also be operated as a data multiplexer or spooler within a computer, with the application program on the computer controlling the data flow. By using optional I/O addresses, application programs such as bulletin boards with as many as 1024 channels (depending on the number of available slots) can be written. Used with data multiplexing on external GTEK Intelligent Super Serial boards, any number of channels could be available. You could have literally hundreds of addressable RS-232 channels for many applications.

Dynamemory is a trademark of GTEK, Inc.

**—NOTES—**

## 2—Compatibility

GTEK's Intelligent Super Serial Cards are completely compatible with all existing IBM PC/XT/AT models when the application uses the BIOS 14H software interrupt and the GTEK RES8F program has been installed. It is also compatible with Compaq and other IBM compatibles.

The solution for enhancing new and many existing applications is to use GTEK's RES8F program. SSI.com can be used to remap the computer's COM1:–COM4: ports to any of the intelligent board's channels. The selected intelligent channel can then be used as a standard COM port. Programs that are not well behaved (ie. write directly to the computer's uarts instead of using INT14) will require some modifications to work with the GTEK Intelligent Super Serial Cards.

GTEK's Intelligent Super Serial Cards may also be addressed directly by writing and reading registers normally located at 2E0–2E3h. You can write your own application program to use them directly, rather than through RES8F if you have a special need. Multiple boards can be used by selecting another I/O space (normally 2E4–2E7h), or you can request I/O space at any normally unused I/O address space in your computer.

Unlike the GTEK model PCSS-8, the GTEK Intelligent Super Serial Cards have 8 built-in RJ-12 type jacks. This allows the connection of 8 telephone type modular plugs directly to the card in just one slot space, rather than

through an external bracket with DB connectors as on the PCSS-8. Available signals are CTS, DTR, TXD, RXD, CD and Signal/Frame GND.

**—NOTES—**

## 3—Installation

The PCSS-8FA/FX card can be inserted into any available expansion slot in a PC, XT or AT type computer. The PCSS-8FA/FX takes a half size slot.

### CAUTION

Be sure that the power is off and the power cord is removed from the computer before installing or removing any equipment.

### STEP 1—PCSS-8FA/FX I/O and IRQ Configuration

#### Address Selections

Jumper block JB1 selects one of seven base addresses for the PCSS-8FA. In the following chart "on" means a jumper installed between the two pins under the number indicated. "Off" means no jumper installed. All three jumpers installed is not allowed and will not work.

## JB1 (JP5 on an PCSS-8FX)

BASE ADDRESS	ONE	TWO	THREE
2E0h	off	off	off
2E4h	on	off	off
210h	off	on	off
214h	on	on	off
218h	off	off	on
21Ch	on	off	on
220h	off	on	on
illegal	on	on	onbase address

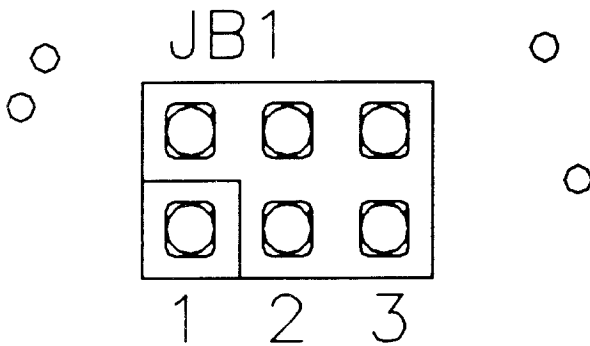


Figure 3.1—Base Address Selections

Simply place a shorting jumper as indicated. NOTE: You need only 2 jumpers to cover all possible selections, and you need NO jumpers to use the default selections.



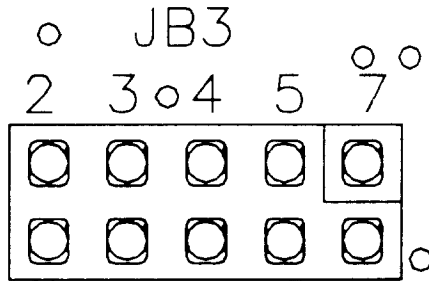


Figure 3.2 Irq Selections for PCSS-8FA

### IRQ Selections

It is not necessary to use any interrupts with the PCSS-8F or 8FX, however, if special interrupting functions are desired, irq selections are made with a SINGLE shorting jumper on jumper block JB3 on a PCSS-8F, or JP6 on a PCSS-8FX. Interrupt numbers 2, 3, 4, 5, and 7 (10-15 on 8FX also) are available. NOTE: It is necessary to give Command 1Eh followed with data 0Dh and then data 02h

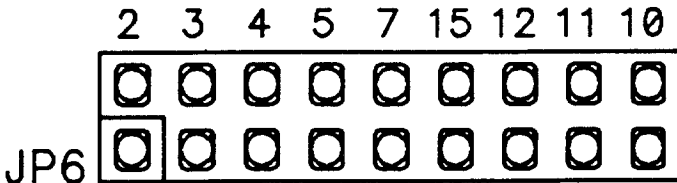


Figure 3.3 Irq Selections for PCSS-8FX

prior to using hardware interrupts. After this is done, an event detected by command 30h will cause a hardware

interrupt. However, it is not necessary to use hardware interrupts to use the event detection provided for by commands 30h, 2Fh and 3Bh.

## **STEP 2—Select Placement**

Select an open expansion slot. Locate the metal bracket that covers the cut-out in the back panel for the slot you've selected. Remove the bracket-retaining screw using a small screw or nut driver. Remove the bracket. Save the screw and store the bracket.

## **STEP 3—Insert Board**

Keeping the top edge of the board level, lower the card until its edge connector is resting on the expansion slot receptacle. The 8 jack telephone connector will fit into the rear panel slot. Using evenly distributed pressure, press the card straight down until it seats in the expansion slot. Install the bracket-retaining screw (that was removed at the beginning of STEP 2) to secure the bracket to the rear of the computer chassis. You should be able to plug the proper connector into any of the open jacks. Channel 0 is at the top and channel 7 is at the bottom.

## **STEP 4—Reinstall Cover**

Replace the system unit cover by carefully sliding the cover over the chassis from the front until it stops securely against the rear panel. Reinstall the screws you removed earlier to secure the system cover.

## **STEP 5—Re-Install Connectors**

Replace the power cord to the system unit and be sure that the keyboard and the monitor connectors are plugged in.

## STEP 6—Initialize

The operating system for the PCSS-8FA/FX initializes all eight channels with the following configuration: 9600 Baud, no parity, 8 data bits, 1 stop bit, DTR low (negated), and no automatic handshaking enabled. If you wish to change any of the settings you can do so by using either RES8F as outlined in Appendix B or by commanding the board directly as outlined in Appendix A. Either method results in the same wide flexibility of configurations for any or all of the channels available to you through the PCSS-8FA/FX.

RES8F.COM is a program to enhance the BIOS of your computer so that it can communicate with the PCSS-8FA/FX in a DOS compatible manner. The syntax to install RES8F is:

```
C>RES8F aaa bbb ... ppp<enter>
```

The operands (aaa bbb etc. to ppp) are simply the base addresses of all the boards that you wish to install. RES8F limits you to 16 boards in a computer. The channel numbers are assigned in the order that the boards appear on the command line. The first board gets channels 0-7, and the second board gets channels 8-16 etc. Please see Appendix B for a more detailed look at the operation of RES8F.

SSI.COM is a program to allow you to attach any of the normal COM ports (ie. COM1:-COM3:) to any of the intelligent channels defined previously with RES8F . The proper syntax is:

```
C>SSI m nnn<enter>
```

The **m** is 1, 2, 3 or 4 representing COM1:, COM2:, COM3: or COM4:. The **nnn** represents the intelligent channel that you wish to attach. After this program is executed, any I/O that is directed to the attached COM port is channeled through the appropriate intelligent channel.

## —Notes—

## 4—Operating Instructions

### Initialization:

The programs necessary to set up the PCSS-8FA/FX are outlined in the previous chapter. They must be run in the order specified. Set up for the PCSS-8FA/FX can be done from a batch file. You will probably want to include this in your autoexec.bat file so that the board comes up ready to run whenever you turn your computer on.

### Methods of Operation:

The PCSS-8FA/FX will operate in the background queuing any received or transmitted data. Using either the command driven interface or through RES8F the board can be polled for data. The co-processor in either case can return a global poll of all eight channels. The byte of information returned will have a bit set for each channel that has received data. Bit 0 set indicates channel 0 has received data, bit 1 set indicates channel 1 has received data up to bit 7 set indicates channel 7 has received data. See Appendix A command 25h or Appendix B function call 19h for more information about global polling.

Because the PCSS-8FA/FX stores any received data in its on-board buffer, the host computer can poll the board for received data at your leisure. This reduces the load on the computer and allows you to execute task swaps between serial communications and some other task. This method of operation could be used with programs written in high level languages like "C", "PASCAL", "BASIC", etc. For example, in Microsoft QuickBasic:

```
ON TIMER(1) GOSUB POLL 'subroutine poll checks
'the PCSS-8F for received data and processes it
'as necessary
POLL:
ax=&H1900: CALL RES(ax,dx)
al=ax-(ax\256)*256 'get AL bit pattern
IF al=0 THEN RETURN '=0 if no channel with data
FOR I=0 TO 7
    ch=2^I
    aold=al
    IF (ch AND al)>0 THEN 'we found one
        'put characters into indexed variable ch$(I)
    END IF
    al=aold
NEXT I
RETURN
```

Remember the time between polls of the board must not be so large that the received data could overflow the buffer on the board. This maximum time is about 1 second for the 32K PCSS-8FA/FX running at 9600 baud.

## —NOTES—

## 5—PCSS—8FA/FX Specifications

### Board dimensions:

8FA—4.2 x 6.5" or 106.7 x 165.7mm (1/2 size)

8FX—4.2 x 7.4" or 106.7 x 188mm

Weight:           8FA—5.4oz, 154g  
                      8FX—6.7oz, 190g

### Power Requirements:

+5 Volts:       8FA/FX is .7 amp typical  
                  on all models:

+12 volt @ 200ma typical

—12 volt @ 20ma typical

### Operating Environment:

45–95 deg F., 7–35 deg C.

5% to 95% non-condensing relative humidity.

**RJ-12 Telco Connector Pin-out (6 pins).** Pin 1 is the top pin of each jack, or the pin closest to the metal mounting bracket at the top of the card:

PIN	abbrv.	Name	Signal Direction
1	CTS	Clear To Send	(input)
2	TXD	Transmitted Data	(output)
3	CD	Carrier Detect	(input)
4	SFG	Signal and Frame Ground	
5	RXD	Received Data	(input)
6	DTR	Data Term. Ready	(output)

In the tables below, hook only the pins necessary to the operation of your device. Signal names might be changed to accomodate the type of device you are attaching to. This is controlled by your interface software and/or the setup that was used for RES8F .

**Typical hookup with a male DB-25 connector (to a DCE device such as a modem)**

Telco	DB-25P
1-CTS	5-CTS
2-TXD	2-TXD
3-CD	8-CD
4-SFG	7-SG
5-RXD	3-RXD
6-DTR	20-DTR
4-SFG	1-Frame Ground

**Pin 1 is the top pin of each jack.**



Typical hookup with a female DB-25 connector (to a DTE device such as a terminal):

1-CTS	4-RTS
2-TXD	3-RXD
3-CD	20-DTR
4-SFG	7-SG
5-RXD	2-TXD
6-DTR	5-CTS
4-SFG	1-Frame ground

Hookup for the external power connections, when it is used as a stand alone are as follows:

1-Buffered Reset
2-Ground
3-Vcc (+5v)
4-Ground
5--12V
6-+12V

### —Notes—

**—Notes—**

## **6—Software License Agreement**

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### **7.1—Hardware**

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Products requiring Limited Warranty service during the warranty period should be delivered to GTEK with proof of purchase. If the delivery is by mail, you agree to insure the product or assume the risk of loss or damage in transit. You also agree to prepay the shipping charges to GTEK.

All Express And Implied Warranties For This Product Including, But Not Limited To, The Warranties Of Merchantability And Fitness For A Particular Purpose, Are Limited In Duration To The Above 1 Year Period. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

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or limitation of incidental or consequential damages for consumer products, so the above limitations or exclusion may not apply to you.

**This Warranty Gives You Specific Legal Rights, And You May Also Have Other Rights Which May Vary From State To State.**

The limited warranty applies to hardware products only.

## **7.2—Software**

This Product Is Not A Consumer Product Within The Meaning Of The Uniform Commercial Code And Applicable State Law. The Program Is Provided "AS IS" Without Warranty Of Any Kind, Either Expressed Or Implied, Including, But Not Limited To The Implied Warranties Of Merchantability And Fitness For A Particular Purpose. The Entire Risk As To The Quality And Performance Of The Program Is With You. Should The Program Prove Defective, You (Not GTEK, Inc.) Assume The Entire Cost Of All Necessary Servicing, Repair Or Correction. Some States Do Not Allow The Exclusion Of Implied Warranties, So The Above Exclusion May Not Apply To You. This Warranty Gives You Specific Legal Rights And You May Also Have Other Rights Which Vary From State To State.

GTEK, Inc. does not warrant that the functions contained in the program will meet your requirements or that the operation of the program will be uninterrupted or error free. However, GTEK, Inc. warrants the diskette(s) on which the program is furnished, to be free from defects in materials

and workmanship under normal use for a period of ninety (90) days from date of delivery to you as evidenced by a copy of your receipt.

Licensee herein acknowledges that the software licensed hereunder is of the class which inherently cannot be tested against all contingencies by Licensor. Licensee acknowledges Licensee's obligation to test all programs produced by the licensed software to determine suitability and correctness prior to use.

### **7.3—Limitations Of Remedies**

GTEK, Inc.'s entire liability and your exclusive remedy shall be:

1. the replacement of any diskette(s) not meeting GTEK's "Limited Warranty" and which is returned to GTEK, Inc. with a copy of your receipt, or
2. if GTEK, Inc. or the dealer is unable to deliver a replacement diskette(s) which is free of defects in materials or workmanship, you may terminate this Agreement by returning the program and your money will be refunded.

**In No Event Will GTEK, Inc. Be Liable To You For Any Damages, Including Any Lost Profits, Lost Savings Or Other Incidental Or Consequential Damages Arising Out Of The Use Or Inability To Use Such Program Even If GTEK, Inc. Has Been Advised Of The Possibility Of Such Damages, Or For Any Claim By Any Other Party.**

**Some States Do Not Allow The Limitation Or Exclusion Of Liability For Incidental Or Consequential Damages So The Above Limitation Or Exclusion May Not Apply To You.**

## **7.4—General**

You may not substitute, assign or transfer the license or the program except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign or transfer any of the rights, duties or obligations hereunder is void.

This Agreement will be governed by the laws of the State of Mississippi.

Should you have any questions concerning this Agreement, you may contact GTEK, Inc. by writing to:

**GTEK, Inc. Sales and Service**  
**P. O. Box 2310**  
**Bay St. Louis, MS 39521-2310**



## 8—Service

For **warranty or non warranty service**, contact GTEK, INC. at (601) 467-8048 to obtain an RMA (Return of Material Authorization number). We will need the serial number and date of purchase. Send the board, **freight prepaid** to:

GTEK, INC.  
RMA #####  
399 Highway 90  
Bay St. Louis, MS. 39520

Be sure to include the RMA number on and in the package so we will know what to do with it. Out of warranty service charges are determined on an hourly labor plus materials basis. GTEK will pay the return freight via UPS Surface for “in warranty” service within the continental United States.

**—Notes—**