APPENDIX—B

Table of Contents

Using RES8F.COM 64
INT 14h 66
Function Calls for INT 14h 67
AH=00h, Initialize the Communications Port. 67
AH=01h, Send Character in AL Over the Comm Line. 68
AH=02h, Receive Character in AL From Comm Line Before Returning to Caller. 68
AH=03h, Return the Comm Port Status in AX. 69
AH=04h, Determine if GTEK RES8F Driver Installed. 70
AH=05h, Set Handshaking and Compatibility Mode. 70
AH=06h, Handshaking Level Control. 73
AH=09h, Transmit BREAK Control. 74
AH=0Bh, Request queue count/size. 74
AH=0Ch, Queue Flush. 74
AH=0Dh, Control DTR line. 75
AH=0Eh, Sample Most Recently Received Character. 75
AH=18h, Redirect Standard COM Port to Intelligent Port. 76
AH=19h, Global Poll. 76
AH=1Ah, Get the CSC # or Board Base Address. 76
AH=1Eh, Memory Block Status. 77
Command 1Eh, Data 00h, Get # of Available Buffer Memory Blocks 77
Command 1Eh, Data 01h, Get Total # Buffer Memory Blocks in System . . 78
Command 1Eh, Data 02h, Get # Blocks Reserved for Code Memory . . . 78
Command 1Eh, Data 03h, Get # TX Blocks in Use on CSC 78
Command 1Eh, Data 04h, Get # RX Blocks in Use on CSC 78
Command 1Eh, Data 05h, Get TX Blocks Limit 79
Command 1Eh, Data 06h, Get RX Blocks Limit 80
Command 1Eh, Data 07h, Get RX Low Water Block Limit 80
Command 1Eh, Data 08h, Get Total # of Blocks Allocated 80
Command 1Eh, Data 09h, Get System Memory Size in 32K Blocks 80
AH=1Fh, Set Transmit Limit on CSC. 80
AH=20h, Set Receive Limit on CSC. 81
AH=21h, Set Receive Low Water Mark. 81
AH=2Ch, Set Extended Baud Rates. 82
AH=2Dh, Unlock Xon/Xoff Condition. 83
AH=2Fh, Event Queue Read. 83
AH=30h, Enable Event Detection. 84
AH=3Bh, Return Number of Events Pending. 85
AH=40h, Get Extended Error Code. 85
AH=41h, Un–install RES8F. 85

Using RES8F.COM

RES8F.COM is a terminate and stay resident program to extend the BIOS INT14 handler. Once installed, any program that uses INT14 for communications will work with the PCSS–8FA/FX. After RES8F has been installed, SSI.com can be run to attach DOS ports COM1: through COM4: to any of the intelligent card ports (or simply use function call 18h). The DOS MODE command will work with a channel attached in this manner except that 19.2k baud is available instead of 150 baud. See function call zero for details.

The driver is installed with the following syntax:

C>**RES8F 2e0 2e4 aaa aaa<enter>**

Where the addresses which follow the command are the hexadecimal board base addresses of all PCSS–8FA/FX's (address=aaa) present in the system that you want to be recognized by RES8F. The intelligent channels are addressed with DL=80h–FFh (indicating channels 0–128) when making the INT14 function call. In the example above, channels 80h–87h would be on the card at address 2E0h (channels 0–7) since it is first in the list. Channels 88h–8Fh would be on the card at address 2E4h (channels 8–15).

If you use multiple cards, you should enter the base addresses in order on the RES8F command line so the channels will be organized neatly on the rear panel of the computer. An "N" on the command line before the addresses would keep RES8F from aborting if it finds a non–working card (or an empty slot). An example is:

RES8F n 2e4 2ec 2e8 2e0

This is the way the hardware is configured for previous example:

board	@2e4	@2ec	@2e8	@2e0	other boards
	0(80h)	8	16	24(98h)	etc.
	1	9	17	25	channel #'s in order
	2	10	18	26	of appearance
	3	11	19	27	
	4	12	20	28	
	5	13	21	29	
	6	14	22	30	
	7(87h)	15	23	31(9fh)	

Channel numbers are in decimal!

The following error level codes are returned when RES8F is executed:

error level=5 if de–installation is successful
error level=4 if de–installation fails
error level=3 if driver already installed
error level=1 if driver installs successfully
(note—if "n" on command line, boards not installed will not cause an error level=0)
error level=0 if driver installation fails.

These error levels can be used by a batch file to recover from errors. An autoexec batch file example might be:

```
PROMPT $P$G
PATH C:\;C:\DOSCOMS;C:\COMM;
RES8F 2C0 2E0 2D0 2F0
IF ERRORLEVEL=3 GOTO PDONE
IF ERRORLEVEL=1 GOTO PASS
IF ERRORLEVEL=0 GOTO FAIL
GOTO FINISH
:PDONE
ECHO DRIVER WAS ALREADY INSTALLED.
GOTO FINISH
:PASS
ECHO DRIVER WAS SUCCESSFULLY INSTALLED
GOTO FINISH
```

```
:FAIL
ECHO DRIVER COULD NOT BE INSTALLED
:FINISH
ECHO DONE
```

To remove RES8F from memory simply enter:
C>**RES8F u<enter>**
This will free the memory occupied by RES8F and also allow you to enter RES8F again with different parameters. If this is done from a "shell" or when you have loaded other TSRs "on top of" RES8F, the memory is freed up, but can't be used by the computer.

The function calls are executed by loading AH with the number of the call that you want to execute and then executing an INT14. AL and Dh are used to pass information to the function call. DL must contain the channel number (80h–FFh) as outlined above.

INT 14h

This routine provides byte stream i/o to the communications ports according to the following parameters. Note that all registers are preserved, except ax:

On entry, DL must contain the port number as follows: DL=communications channel 80h–FFh (indicating channels 0–127). This is 128 channels, or 16 cards.

On entry, AH contains the function number and AL contains parameters.

On entry, DH may also contain parameters (function call 6) or 0 if you are using a standard communications port or 0–7 if you are using a PCSS–8 card port.

On return, AX contains answers (if applicable):
Generally, if bit 7 of AH is set upon return, an error has occurred. See function 40h

Function Calls for INT 14h

AH=00h
Initialize the Communications Port.

AL has parameters for initialization as follows:

```
7       6       5       4       3       2               1       0
--baud rate--           -parity-        stop            word length
000- 110                x0-none         0-1 stop        10-7 bits
001-19200*              01-odd          1-2 stop        11-8 bits
010-300                 11-even
011-600
100-1200        (*)150 bps in IBM bios. (Who needs that?)
101-2400        you can use the dos MODE command to
110-4800        set 19.2k by using 150 in the command
111-9600        MODE COM1:150 will yield 19.2K baud
```

On return, conditions set as in call to communications status (ah=3). See function 40 for possible error return codes. No error if ah bit 7 is clear. See function 2Ch for setting extended baud rates.

```
Extended Baud rates: See function 2Ch for details:
Bits    765                 43210-the rest are the same as above
        000          880 Baud
        001       19,200
        010       28,800
        011       57,600
        100      115,200
        101       57,600
        110        4,800
        111        9,600
```

AH=01h
Send Character in AL Over the Comm Line.

AL contains the character to be sent and is preserved.

On exit, bit 7 of AH is set if the routine was unable to transmit the byte over the line. If bit 7 is not set, the remainder of AH is set as in a status request, reflecting the current status of the line. (AH=3). Note: The character won't be sent unless the transmit character buffer is empty and CTS is high if in the compatible mode. See function call 5, bit 1.

Also in the "compatability mode" DTR will be asserted the first time this call is made. The transmit time-out is approximately a second. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=02h
Receive Character in AL From Comm Line Before Returning to Caller.

No parameter required for AL on entry. On exit, AH has the current line status, as set by the status routine, except that the only bits left on are the error bits (7,4,3,2,1). If AH has bit 7=1 (time–out), the remaining bits are not predictable. This means AH is non–zero only when an error has occurred.

DTR will be set high the first time you use this function call for IBM bios compatibility, as long as function call 5 has not been called. If function call 5 has been performed with other than 0 as a parameter, this function call will not affect DTR. See function 40 for possible error return codes. No error has ocurred if AH bit 7 is clear.

AH=03h
Return the Comm Port Status in AX.

No parameter required for AL on entry. On exit, AH contains the line control status:
Bit 7 = time out
Bit 6 = transmit shift register empty
Bit 5 = transmit holding register empty
Bit 4 = Break detect
Bit 3 = Framing error
Bit 2 = Parity error
Bit 1 = Overrun error
Bit 0 = Data ready

The information concerning bits 1–4 comes from the receive queue. If bit 0, the RXRDY bit = 1, there is data in the receive queue. AL contains the current (real time) modem status:
Bit 7 = CD. Set if CD=+12V
Bit 6 = (see function 5)
Bit 5 = (see function 5)
Bit 4 = CTS. Set if CTS=+12
Bit 3 = ΔCD. CD changed since last fc 3 if set.
Bit 2 = (see function 5)
Bit 1 = (see function 5)
Bit 0 = ΔCTS. CTS changed since last fc 3 if set.

See function 40 for possible error return codes. No error if ah bit 7 is clear.

The following functions are enhancements to the standard INT 14h functions.

AH=04h
Determine if GTEK RES8F Driver Installed.

On entry, AI=00h. On exit, AI is the high byte of RES8F version number with bit 7 forced to 1. If the version number =1.00A, then this byte would be 90h. AH is the low byte of the RES8F driver version. In the example above, AH would equal 0Ah. AL will be equal to 0 if the RES8F driver is not present.

AH=05h
Set Handshaking and Compatibility Mode.

This function call enables or disables the handshake and 8250 compatibility features. On entry, AL is set as in the following table:

```
Bit  Clear(0)   Set(1)
7    disable    enable    CTS (rx) flow control
6    disable    enable    Xon/Xoff (tx) control
5    disable    enable    DTR (tx) flow control
4    disable    enable    Xon/Xoff (rx) control
3    disable    enable    Set handshake as above
2    disable    enable    Extended Status in AL
1    disable    enable    Tx Queue status meaning
0    Reserved
```

Bit 0=Reserved, used internally.

Bit 1=1—allows queueing of transmit data.

NOTES: If bit 1 is set to 1, the txrdy status bit of function call 3 will indicate that the transmit queue is not full when it is a 1. That means txrdy=1 (see function call ah=03h) if

tx queue can hold more data. This allows for queuing of transmitted data. This allows you to transmit until the transmit queue is full. You can use the TX empty bit to tell when the transmit queue is empty.

When bit 1 = 0, (which is the default) the txrdy status bit in function call 3 will be set to indicate the transmit queue is empty. This provides compatibility with a standard 8250 type communication channel in that the 8250 does not queue transmitted data. **IMPORTANT**: With this bit 0, which is the default, function call 1 (transmit data) cannot transmit unless the CTS line is high (+12v). This is compatible with the IBM bios. If you set bit 1 to a 1, and don't check CTS yourself or enable one of the auto handshake modes, the transmitter can transmit regardless of the state of CTS. Set bit 1=1 in this function call if you want to use the transmit queue.

Bit 2=1 Enable extended status return in AL when you use function calls 3 and 0 of RES8F. The modem status which is returned in AL in functions 0 and 3 is as follows:

Bit	default AL status	extended AL status
7	as fc 03h	
6	always 0 (RI)	reserved
5	always 1 (DSR)	1 if DTR –12v and auto DTR Rx flow control enabled or if Xoff sent and auto Xon/Xoff Rx flow control enabled.
4	as fc 03h	
3	as fc 03h	
2	always 0 (ΔRI)	1 if Xoff received and Xon/Xoff tx flow control is enabled
1	always 0(Δ DSR)	reserved
0	as fc 03h	

Note that since the PCSS–8FA/FX does not have RI or DSR inputs, the DSR, RI, delta DSR and delta RI are set to 1 for DSR and 0 for the rest in the default mode for maximum compatibility reasons.

Bit 3 =1 to enable handshake mode set via the next 4 bits. The following four bits (4–7)are the handshake control bits. They have no effect unless bit 3 is set when you make this function call. That allows you to make changes to the functions in bits 0–2 without changing the handshake mode. The reason you might wish to do this is that setting the handshake mode on the PCSS–8FA/FX causes the queues to be flushed and the remote transmitter (ie. the remote equipment that is connected to the PCSS–8FA/FX port) to be enabled if it had been disabled by automatic handshaking.

Bit 4 = 1 to enable auto rx xon/xoff flow control. If the receive queue reaches the high water level, an Xoff will be sent (providing one has not already been sent.) When the receive queue reaches the low water level, the PCSS–8FA/FX will automatically transmit an xon in this mode. Bit 5 of AL in function calls 3 and 0 will read a 1 if the PCSS–8FA/FX has transmitted an Xoff and if bit 2 is set in this function call, there by allowing extended status to be read.

Bit 5 = 1 to enable auto rx DTR type flow control. If the receive queue reaches the high water level, dtr will be negated. When the receive queue reaches the low water level, DTR will be re–asserted (+12v). If bit 5 is set in this fc, bit 4 is meaningless as the DTR type handshaking takes

priority over the Xon/Xoff method. Bit 5 of AL in function calls 3 and 0 will read a 1 if DTR is low and bit 2 is set in this function call.

Bit 6 = 1 to enable tx Xon/Xoff flow control. If bit 6=1 and the PCSS–8FA/FX has received an xoff character, then the PCSS–8FA/FX will not transmit anything until an xon is received. This of course, does not prevent you from transmitting as long as there is room in the transmit queue and bit 1 of this function is set so that Txrdy from fc 03h indicates that there is room in the queue. If bit 2=1 of this fc, then bit 2 from fc 03h and 00h returned in AL will indicate xoff received.

Bit 7 = 1 to enable tx CTS handshaking. If the cts input is low (–12v), the PCSS–8FA/FX's transmitter will not be able to transmit. The condition of CTS is returned in bit 4 of AL in functions 00h and 03h. See function 40 for possible error return codes. No error if ah bit 7 is clear.

AH=06h
Handshaking Level Control.

See also function 1Eh in this appendix. This function is used to set the queue levels at which handshaking flow control is activated. On entry, DL=channel number with high bit set (80h–0FFh). On entry, DH=LSB of level and AL=MSB of level.

AL also has bit 7 set to indicate the number in DH and the rest of AL is the Low Water Mark. This is the receive queue level at which DTR goes active (+12) or Xon gets transmitted if one of these auto handshake modes is enabled. The default level is 1344 characters.

If AL has bit 7 set to 0, that means the DH and AL is to set the High Water Mark. This is the receive queue level at which DTR goes inactive (-12) or Xoff gets transmitted if one of these auto handshake modes is enabled. The default level is 1680 characters. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=09h
Transmit BREAK Control.

This function is provided so that the user can send a break on the line if he so desires. Enter with AL=1 to set break. TXD goes to +12v. Enter with AL=0 to clear it -12v. Returns nothing. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=0Bh
Request queue count/size.

Returns the number of characters currently in the queue or the size of the queue in AX. Enter with DL=channel no. and AL=0 for tx queue count, AL=1 for rx queue count, AL=2 for tx queue size, Al=3 for rx queue size. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=0Ch
Queue Flush.

Emptys the specified queue or queues. Returns nothing. On entry if AL=0, flush tx queue, AL=1, flush rx queue. Returns DTR to ready (+12v) if DTR is low and auto DTR mode is enabled. Sends Xon if Xoff was sent and auto

Xon/Xoff mode is enabled. If AL=2, flush both. See DTR, Xon/Xoff side effects above. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=0Dh
Control DTR line.

This function is provided so that the user has control of DTR. Enter with AL=1 to set it (+12v), AL=0 to clear it (–12v). Returns AH bit 7 set if error.

IMPORTANT CONSIDERATIONS:
DTR is NOT set active when the port is initialized by function call 00h. DTR is set active by initializing the channel with DTR handshaking. It also gets set high the first time you call function 01h or 02h (for IBM bios compatibility), as long as you don't use function 05h. If you call function call 05h (with anything other than 0 in AL), you have left the world of compatibility. Then you must use this function call to set it high if you want to. This function should not be used if the auto DTR handshake mode is in use.

See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=0Eh
Sample Most Recently Received Character.

Returns the most recent received status and data in AX. This is non–destructive and the queue pointers are not updated. This function call will return meaningless data if there was no received data in the queue. You should check the status byte to be sure there is some received data before you attempt this function call. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=18h
Redirect Standard COM Port to Intelligent Port.

Enter with AL=0, 1, 2, 3 for COM1, COM2, COM3, or COM4 respectively and DL=80h–0FFh, the intelligent port you wish redirection to. After this function call, INT14 function calls to the standard com channel will be directed to this intelligent port. Redirection may be canceled by calling with AL=80h and DX=0–3, the redirected port. See function call 1ah to get redirection status. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=19h
Global Poll.

Returns the bit pattern of requested status bits for the entire board. Enter with AL=0 for Receive character ready, AL=1 for Transmit ready, AL=2 for Transmit empty, AL=3 for CTS –12v, AL=4 for CD=–12v. DL contains the channel number. On return, AL contains the status bits requested. Bit 0 represents channel 0 on the board, Bit 1 for channel 1 and so on. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=1Ah
Get the CSC # or Board Base Address.

Enter with AL=0 and DX = 0, 1, 2, 3 for com1, com2, com3, or com4. Returns AL = 80h–0FFh, the intelligent port that this DOS com port is attached to. Returns 0 if it's unattached, or if fc 18h has not been used.

Enter with AL=1 and DL=80h–0FFh (any channel on the board in question). This returns the board's base address. The base address is returned in the AX register. Example: AX=02E0h=intelligent board base address. Your program could use this function to find the base address of the board and then operate the board in the command driven mode as explained in Appendix A. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=1Eh
Memory Block Status.

Enter with **DL** equal to the channel on the board you are interested in and **AL** equal to the sub–function number that you wish to call. NOTE: All sub functions of function 1eh return results in **AX**. Bit 7 set in **AH** means that an error occurred. Note this Function Call looks almost the same as COMMAND 1Eh—But it is not accessed the same way!

Command 1Eh Sub Functions:

Command 1Eh, Data 00h
Get # of Available Buffer Memory Blocks

AL=0 returns free buffer memory blocks in system in **AX**. (Those not currently in use but which are available for use as receive or transmit buffers). This is a global value and is board specific, not channel specific.

Command 1Eh, Data 01h
Get Total # Buffer Memory Blocks in System

AL=1 returns total number of buffer memory blocks in system. This is the number of free blocks plus all those in use as buffers. For example, this number is 125 (7dh) on a PCSS–8FA/FX with 32K of Dynamemory. This is a global value and is board specific, not channel specific.

Command 1Eh, Data 02h
Get # Blocks Reserved for Code Memory

AL=2 returns the number of blocks reserved for code memory. This is a global value and is board specific, not channel specific.

Command 1Eh, Data 03h
Get # TX Blocks in Use on CSC

AL=3 returns the number of transmit blocks in use on the CSC (Currently Selected Channel).

Command 1Eh, Data 04h
Get # RX Blocks in Use on CSC

AL=4 returns the number of receive blocks in use on the CSC.

NOTE: the following limits can always be reached if the sum of all the limits which you set do not exceed that returned in sub function 1 above. If the sum of your limits exceeds the number of buffer memory blocks in the system, then the system is operating in the DYNAMIC allocation mode. Memory is allocated to the buffers as needed. They are returned to the free memory pool as characters are removed. So you might not be able to get to the limit

you assigned. The nice thing though is that the condition is only temporary. You can always be assured of 1 transmit block and 2 receive blocks.

Example: suppose you set the transmit limit to 25 blocks on channel 2. Assume so far that you have 22 blocks filled. Also the same condition exists on other channels to the extent that all memory has been allocated. You go to transmit on channel 2 and find that the transmitter is not ready, i.e. txrdy is low. As soon as any memory block in the system is returned to the free pool, this condition will clear itself.

The same is true of the Receiving subsystem. When a character comes in, it is put into the queue. If a new block must be allocated and there is no free memory, the Reserve block for this channel is allocated. DTR is negated or xoff sent if the handshaking is enabled. As soon as a block of free memory is available in the system, it will be allocated to the channel and the reserve block restored and handshake enabled.

Receive memory blocks are released to the free pool as you receive characters or do a queue flush. Transmit memory blocks are released to the free pool as the characters in them are transmitted or if you do a queue flush.

Command 1Eh, Data 05h
Get TX Blocks Limit

AL=5 returns the transmit limit on the CSC. The default is 6 on the PCSS–8FA/FX with 32K of Dynamemory.

Command 1Eh, Data 06h
Get RX Blocks Limit

AL=6 returns the receive limit on the CSC. This is also the highwater mark (HWLB). The default is 10 on the PCSS-8FA/FX with 32K of Dynamemory.

Command 1Eh, Data 07h
Get RX Low Water Block Limit

AL=7 returns the receive low water block limit on the CSC. (LWLB). The default limit is 8 on the PCSS-8FA/FX with 32K of Dynamemory.

Command 1Eh, Data 08h
Get Total # of Blocks Allocated

AL=8 returns the global total number of blocks in use. (i.e. the sum of all allocated blocks.)

Command 1Eh, Data 09h
Get System Memory Size in 32K Blocks

AL=9 returns the system memory size in 32k blocks. (i.e. 1=32k)

AH=1Fh
Set Transmit Limit on CSC.

DH=MSB of # of blocks and AL=LSB of # of blocks to set for the transmit limit on the csc. The default level is 10 and the minimum value is one on the PCSS-8FA/FX with 32K of Dynamemory.

AH=20h
Set Receive Limit on CSC.

DH=MSB of # of blocks and AL=LSB of # of blocks to set the receive limit on the csc. The minimum value is 2. This is also the high water limit (HWLB) . If handshaking is enabled, it will be asserted (DTR goes low or XOFF sent) when HWLB is reached. At this point, what is known as the RESERVE block for this channel is allocated. When this happens, 168 more characters can be received before an overflow will occur. This is true whether or not handshaking is enabled. The RESERVE block is allocated to this channel any time there are no free blocks available or the receive limit will be reached as a result of the block allocation.

AH=21h
Set Receive Low Water Mark.

DH=MSB of # of blocks and AL=LSB of # of blocks to set the receive low water mark on the csc (LWLB). There is a minimum value of one. If some form of handshaking is enabled and if HWLB is reached (upon which DTR goes low or XOFF is transmitted), then the re–enabling of the handshake signal (raising DTR or sending XON) will not occur until LWLB is reached.

IF the sum of all the transmit and receive limits exceeds the available system memory then there is the possibility that when a queue attempts to allocate a memory block, there will be none available. If this happens, the handshake flow control will take place (dtr low or xoff sent) and the RESERVE block will be allocated to the channel. Each receive channel keeps a reserved block in case this con-

dition occurs. If this happens, then the flow control will be re-enabled as soon as system memory becomes available. That is the dtr high or XON will occur as soon as the memory shortage clears rather than wait until the low water mark is reached.

AH=2Ch
Set Extended Baud Rates.

This function call allows for more flexibility in selecting baud rates than does function call 0. You must execute function call 00h before function 2ch. Otherwise the function call 00h will change the baud rate to what is specified in it. Bits 7–4 of AL sets receive, bits 3–0 sets transmit baud rates. Enter with AL high and low nibbles with as follows:

Nibble Data (hex)	Baud Rate Standard	Baud Rate Extended	
0	75	7,200	
1	110	880	see #2 below
3	150	14,400	
4	300	28,800	
5	600	57,600	
6	1,200	115,200	
7	2,000	2000	
8	2,400	57,600	
9	4,800	4,800	
A	1,800	14,400	
B	9,600	9,600	
C	19,200	19,200	
2	38,400	38,400	Note order of Nibble...
D	57,600	57,600	
E	reserved	reserved	

Special Case AL=0FFh means to TOGGLE between the Standard and Extended sets...

The PCSS–8FA/FX defaults to the standard baud rate set. Function call 2Ch with AL=0FFh will toggle between the Extended Baud Rate Set and the Standard Baud Rate Set.

AH=2Dh
Unlock Xon/Xoff Condition.

This function may be useful if auto Xon/Xoff mode is being used. On entry, AL=0 to force Xon to be sent, allowing sender to transmit to us. This clears any pending Xon which would be sent when the low water mark is reached if an Xoff had been sent. On entry, with AL=1 clears Xoffed condition. This will allow us to transmit if we have been Xoffed by some remote party. The remote party may not like us however. See function 40 for possible error return codes. No error if AH bit 7 is clear.

AH=2Fh
Event Queue Read.

AL=don't care (on entry). This function returns to the user the oldest of the events which the board was told to detect with function call 30. The event ID is returned in **AL**. If **AL** is 0FFh upon return, then no events have occurred. If an event has occurred, then it is removed from the event first in first out buffer and returned in **AL**. The events are described previously in command 2Fh. Typical events are the occurrence of TXRDY, RXRDY, TXEMP, RXHSO (receive level reaches high water mark.) If one of the above events was detected, then the bottom three bits of the ID indicate the channel upon this board in which the event occurred.

Using events allows the PCSS–8FA/FX to drive your application software rather than your having to poll for them. For example, if you are receiving on several channels and storing information in different places, you could use the global rxrdy poll or enable the event marker system on all

of the channels upon which you are waiting for data. Using the event queue instead of the global rxrdy poll will allow you to service the ports in the order in which the rxrdys became ready. Also if you went to transmit one of these received characters and found that the transmitter was not ready, you could enable the TXRDY event for that channel, save the character you want to transmit and go back to your receive routines. When that transmitter becomes ready, the event ID will be put into the event queue. This could cause your software to come back and finish the task of transmitting the character.

AH=30h
Enable Event Detection.

AL=event ID, **DL**=channel. Enable Event detection. Enter with **DL** being any one of the channels upon this board and **AL** with the event ID of the event you wish to detect.

Event	ID for channel 0–7
Transmitter Empty	00—07h
Receive Data Available	10—17h
Receive Buffer at Limit	20—27h
Transmitter Ready	30—37h
Received Character Match	40—47h
Receive Queue Reached Set Level	50—57h

Refer to the table above or Command 30h in Appendix A for the event ID to use.

NOTE: Once the event occurs and is detected, it is then disabled, except for types 40–47h. Call this function again to re–enable the event. Types 40–47 need only be enabled once.

AH=3Bh
Return Number of Events Pending.

AL=don't care, **DL**=any channel on a particular board (to select the board in question). Upon return **AL** equals the number of events which are pending. On entry, **DL** must be set to any port upon the PCSS–8FA/FX board being interrogated for this information.

AH=40h
Get Extended Error Code.

If AH bit 7 is set upon the return from any function call, an error has occurred. If you want more information about it, make a function call 40h before any other INT14h function call. DX must be set the same as on the function call where the error occurred. AL will be returned as follows:

Bit 7 = 1 means	time–out error from function call 1 or 2.
Bit 6 = 1 means	illegal, non–existent function call.
Bit 5 = 1 means	port (board) does not exist.
Bit 4 = 1 means	board not ready fault. (Call GTEK)
Bit 3 = 1 means	illegal parameter passed to function call
Bit 2	reserved
Bit 1	reserved
Bit 0	reserved

AH=41h
Un–install RES8F.

If you execute this function call, RES8F is removed from memory. The function call must be made with AL=0abh and DX=0cdefh. This function is used by RES8F with the U option. It is not one that you will normally use.

—NOTES—

Appendix—C

Typical Rs-232 Hook-ups

The PCSS-8FA/FX is a DTE type device. Hook-ups to DCE devices run straight through, name to name: TXD—TXD, RXD—RXD, etc.

Modems like Hayes Stack, Novation, etc.

Wires run straight through (to DCE):
TXD–TXD or 2–2
RXD–RXD or 5–3
CTS–CTS or 1–5
CD–CD or 3–8
DTR–DTR or 6–20
SG–SG or 4–7

Serial Printers like Epson MX 100, NEC 7700, Brother, Okidata, and Anadex.

Wires run crossed (to DTE)
TXD–RXD or 2—3
RXD–TXD or 5—2
DTR–CTS or 6—5
CTS–11 or 1—11 (CTS—19 or 1—19)
CD–DTR or 3—20
SG–SG or 4—7

Serial Printers like Qume:

Wires run crossed (to DTE)
same as above except
CTS and CD–DTR (5 and 3—20)

Slow CRT and printers (old):

Wires run crossed (to DTE)
TXD–RXD or 2—3
RXD–TXD or 5—2
DTR–CTS or 6—5
CTS and CD–DTR or 1 and 3—6
SG–SG or 4—7

Diablo 620 Printer:

Wires run crossed (to DTE):
same as slow printer except
CD–DTR or 3—20
DTR–DSR or 6—6

Diablo 630 printer:

Wires run crossed (to DTE):
same as slow printer except
CTS–11 or 1—11
CD–DTR or 3—20 (CD–RTS or 3—4)

MX-80, IDS:

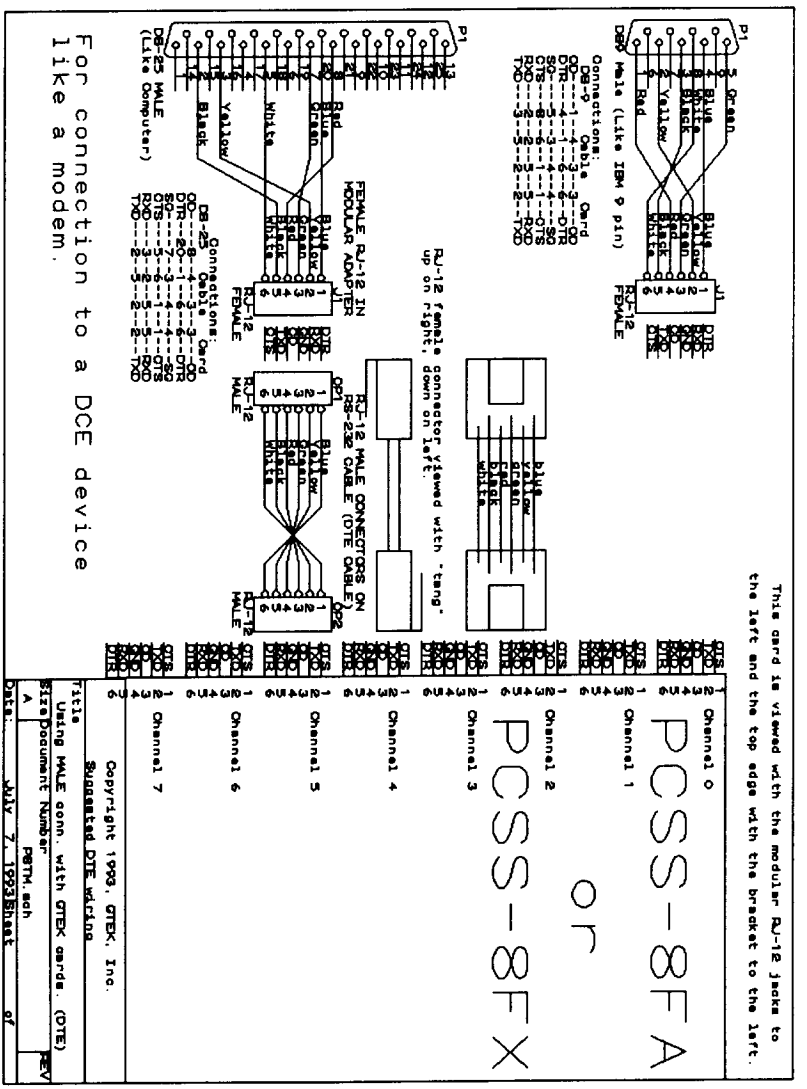
Wires run crossed (to DTE):
same as slow printer

SCTP–1:

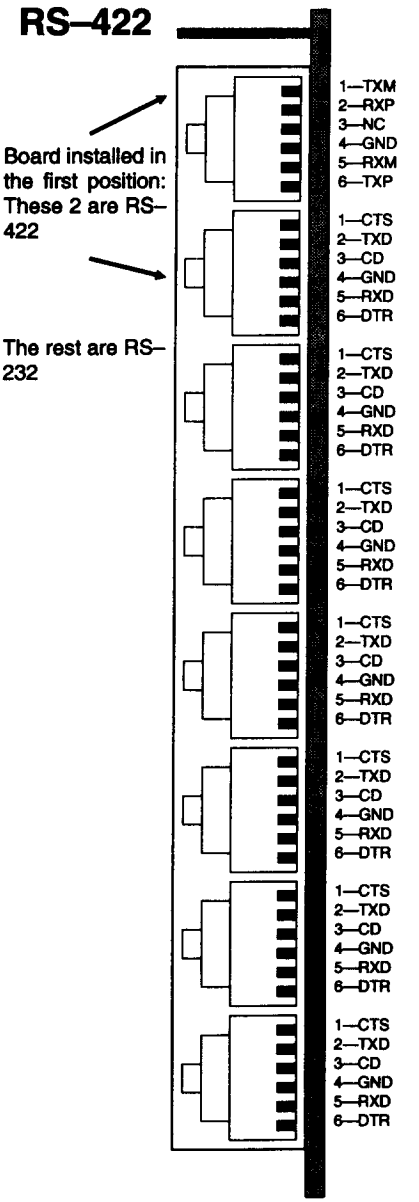
Wires run crossed (to DTE):
same as slow printer except
CTS–RTS or 1—4
CD–DTR or 3—20

Hewlett-Packard, Houston Instruments Plotters:
Wires run same as slow printer (to DTE)

—Notes—



C.1 Wiring of P8TM (male DB-25 at end of wire)



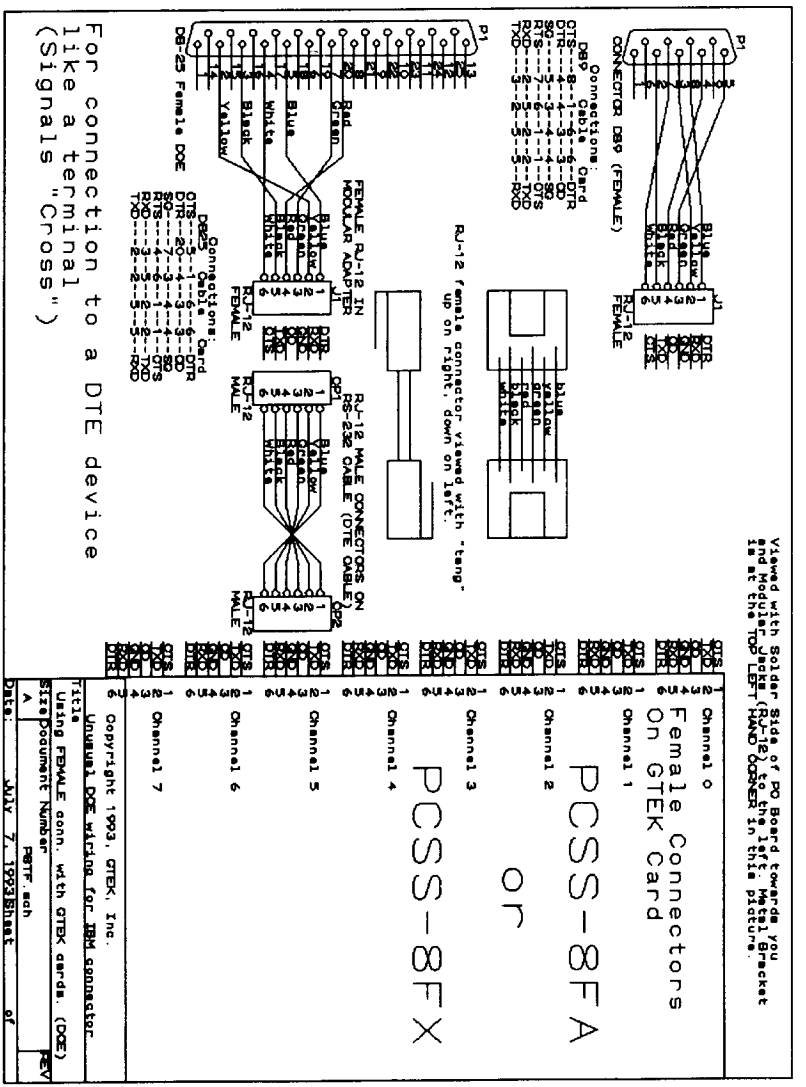
On a PCSS–8FA/FX type card, the chips from top to bottom are 1488, 1489, 1488. To install a RS–422–2 card, remove a pair (1488/89) **BEGINNING AT THE TOP** and insert the RS–422 card where the **1488/1489** (not 1489/88) was. This converts 2 channels at a time to RS–422.

There is only one possible way to insert the RS–422 card due to the way it's manufactured. Just make sure that the correct "pair" of 1488/89 is selected. The 1488/89 pair controls 2 channels at a time, so if you insert the RS–422–2 card in place of the top 2 chips, this converts channel 0 and 1 to RS–422.

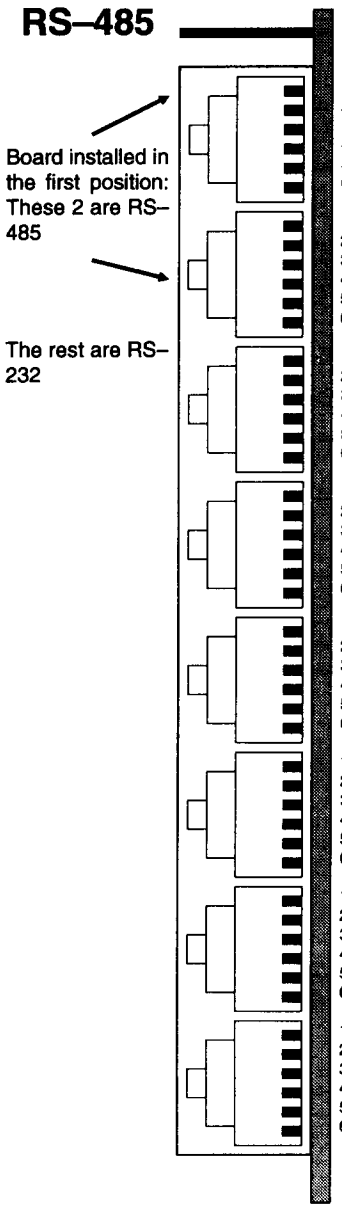
The pin numbers are:

1—Transmit MINUS
2—Receive PLUS
3—No Connection
4—Ground
5—Receive MINUS
6—Transmit PLUS

Figure C.2 Installation of RS–422–2 board.



C.3 Wiring of P8TF (female connector at end)



On a PCSS–8FA/FX type card, the chips from top to bottom are 1488, 1489, 1488. To install a RS–485 card, remove a pair (1488/89) **BEGINNING AT THE TOP** and insert the RS–485 card where the **1488/1489** (not 1489/88) was. This converts 2 channels at a time to RS–485.

There is only one possible way to insert the RS–485 card due to the way it's manufactured. Just make sure that the correct "pair" of 1488/89 is selected. The 1488/89 pair controls 2 channels at a time, so if you insert the RS–485 card in place of the top 2 chips, this converts channel 0 and 1 to RS–485.

The pin numbers are:

1—No connection
2—Transmit/Receive PLUS
3—No Connection
4—Ground
5—Transmit/Receive MINUS
6—Transmit PLUS

On the PCSS–8FA/FX, automatic DTR control is enabled with command 19h followed by data 20h.

Figure C.4 Installation of RS–485 adapter

—NOTES—