

PCL-858

8-Port RS-232
Interface Card

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CHAPTER

1

Introduction

Description

The PCL-858 series are eight ports serial communication interface card. The PCL-858A/858B serial ports are implemented using 16C554 UARTs which makes serial I/O more reliable.

The PCL-858 series support all eight ports can be set the address automatically. All channels share the same interrupt (IRQ), and interrupt status register is available for determining the interrupt source. When an on-board interrupt occurs the interrupt status register (vector address) indicates which port has generated it. The shared interrupt can be set to most common (extended) AT interrupts. This simplifies programming, speeds up interrupt processing and frees up interrupts for other devices.

The PCL-858 series developed by Advantech Co., Ltd has passed the CE test for environmental specifications.

Features

- ❖ Eight independent RS-232 serial ports
- ❖ Transmission speed up to 921.6Kbps
- ❖ Independent I/O address, Share IRQ setting for each of 8 serial ports
- ❖ Wide IRQ selection: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15
- ❖ Supports DOS/Windows 3.1 (PC-ComLib), Windows 95/98, Windows NT
- ❖ Supports surge protection : 3000 VDC (PCL-858B)
- ❖ PC-ComLib, Icom Utility software included

Specifications

- Bus interface: ISA
- Number of ports: 8
- I/O address: 0x0000 ~ 0x03F8
- IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15
- Data bits: 5, 6, 7, 8
- Stop bits: 1, 1.5, 2
- Parity: none, even, odd
- UART:
 - 2 x 16C554 (PCL-858A/858B)
- Speed (bps): 50 ~ 921.6K
- Data signals: TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND
- Surge protection: 3000V_{DC} (PCL-858B)

- Power requirement: 450mA typical 950 A max. (+5V),
140mA typical. 240mA max.((12V),
- Dimensions: 18.5cm x 10.0cm
- Operating Temperature.: 0 ~ 60°C (refer to IEC-68-1.2.3 item)
- Storage Temperature: -25 ~ 80°C
- MTBF:
over 99,100 hrs (PCL-858A) at 25°C, Ground, fixed, environment
over 92,363 hrs (PCL-858B) at 25°C, Ground, fixed environment
- For technical support and service please visit our support website at:
<http://support.advantech.com>
and visit the “Industrial Automation Support” and “FAQ” sections

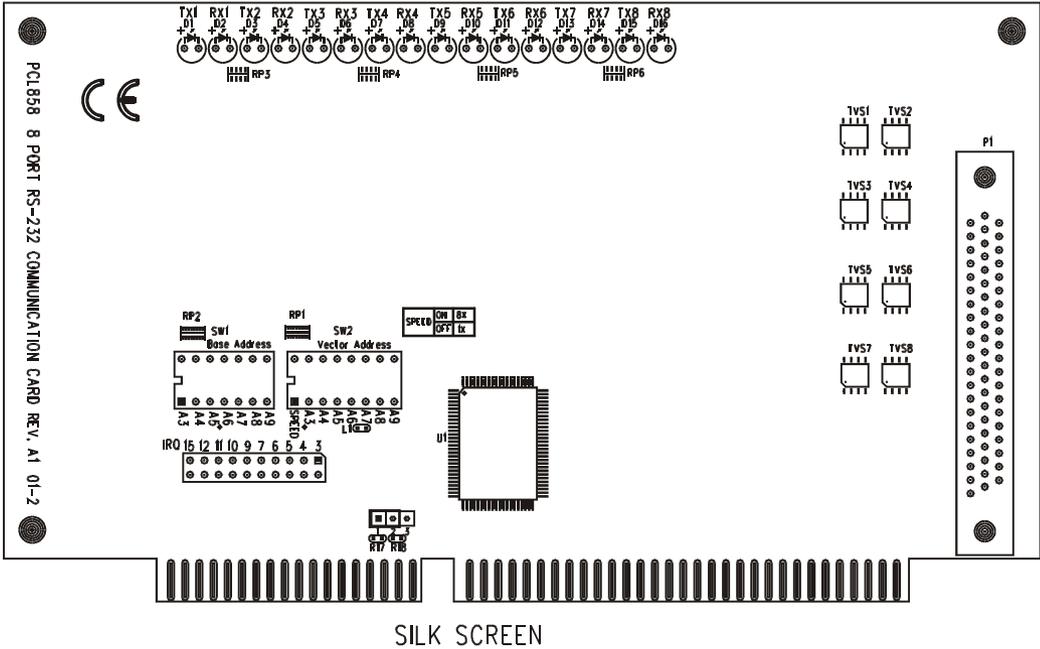


Figure 1-1: Switch and jumper layout

CHAPTER
2

**Hardware
Installation**

Initial Inspection

Depending on the option you ordered, in addition to this manual, you should find the following items inside the shipping container:

- PCL-858(A/B) 8-port RS-232 Card
- One diskette with Icom Utility software
- One PCL-858 manual

We have carefully inspected the PCL-858 mechanically and electrically before shipping. It should be free of marks and scratches and in perfect working order on receipt.

As you unpack the PCL-858, check it for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or it fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection we will make arrangements to repair or replace the unit.

Remove the PCL-858 from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! *Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors.*





Card Configuration

The DIP switch sets the port to the appropriate I/O address and speed mode. The jumpers set the port's IRQ.

Default Settings

The board is shipped with default settings. If you need to change these settings, however, see the following sections. Otherwise, you can simply install the card. Note that you will need to disable your CPU card's on-board COM ports, if any, or set them to alternate addresses / IRQs. (Note: The function of JP2 doesn't offer to user, only for manufacture.)

PCL-858 Default Configuration

Setting	Default function
JPI	IRQ 12
Speed mode	1x
Base address	Address 300H
Vector address	Interrupt 280H

I/O Address and Interrupt Setup

Next, you will need to select an IRQ (interrupt request) number, and an I/O base address for the PCL-858.

Base address setting (SW1)

For base address specify the I/O address of the first port and subsequent ports are set continuous base addresses by the offset of 8 bytes. For instance, if the first port is set for 300H, then the second port is set to 308H sequentially. For PORT number, specify the continuous PORT number of the first port and subsequent ports are mapped to continuous PORT numbers. For example:

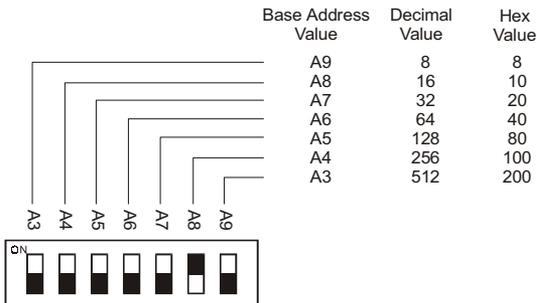
Port 1	Address 300H	Port5	Adress 320H
Port 2	Address 308H	Port 6	Address 328H
Port 3	Address 310H	Port 7	Address 330H
Port 4	Address 318H	Port 8	Address 338H

Select an address which is not already in use by another card in the system. If you are installing more than one PCL-858 card in your system, set the card to different base address. DIP switch(SW1) controls each card's base address, as shown below.

Port base address (SW1)							
Base Address	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉
200-21F	●	●	●	●	●	●	○
208-227	○	●	●	●	●	●	○
.....							
2E8-307	○	●	○	○	○	●	○
.....							
*300-31F	●	●	●	●	●	○	○
.....							
3E0-3FF	●	●	○	○	○	○	○

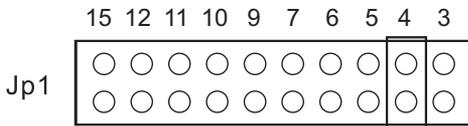
● : on ○ : off * = default

The following example shows how to set the base address to 2F8.
The switch sum is set to 2F8: 200 + 80 + 40 + 20 + 10 + 8 (HEX).



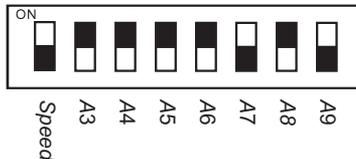
IRQ Setting (JP1)

All channels in PCL-858 series share the same interrupt (IRQ), and interrupt status register is available for determining the interrupt source. Select an IRQ which is not already in use by another card in the system. If you are installing more than one PCL-858, set them to different IRQ number. Jumper Bank JP1 controls the card IRQ. Simply place the jumper on the interrupt level as shown in the following figure.



Interrupt status register setup (SW2, Vector address)

When data arrives at one of the eight ports, it will generate an interrupt in the interrupt register. The software can read this, and identify immediately which port generated the interrupt. This save time, and makes programming easier. In DOS and Windows 3.1 environment, when a data bit of the interrupt status register is set to 0, the corresponding channel is select to generate an interrupt, and vice versa for Windows 95/98/NT system. If the bit is 1, then no interrupt status register, and vice versa for Windows 95/98/NT system, as shown in the following figure and table.



Interrupt Status Register SW2

Bit	Function
0	Port1
1	Port2
2	Port3
3	Port4
4	Port5
5	Port6
6	Port7
7	Port8

The user may change the interrupt status address via SW2. Please note the address decoder will occupy a continuous, 8-bytes area related to switch setting. For example, if you set the switch to 210H, then the address 210H to 217H will all be decoded. The various DIP switch setting (SW2) for the interrupt status register are shown in the table.

Vector Address (SW2)

	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉
200H	●	●	●	○	○	○	○
210H	●	○	●	●	●	●	○
.....							
250H	●	○	●	○	●	●	○
.....							
300H	●	●	●	●	●	○	○
.....							
3F0H	●	○	○	○	○	○	○

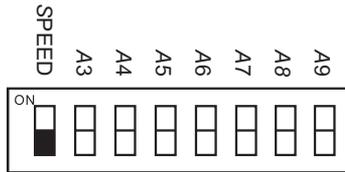
● : on ○ : off

Speed Mode selection

The PCL-858 employs a unique speed option that allows the user to choose either normal speed mode (1x) or high speed mode (8x). This high speed mode is selected at SW2.

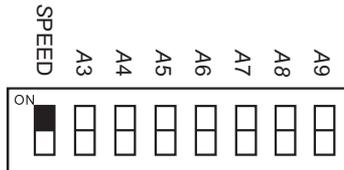
Normal Speed Mode

To select the baud rate commonly associated with COM ports , such as 2400, 4800, 9600. . .115.2 Kbps, place the switch as follows.



High Speed Mode

To increase normal mode rates up to eight times, (e.g. if 115.2 Kbps is selected, the rate can be increased up to 921.6 Kbps), place the switch as follows.

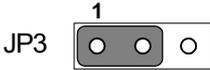


CHAPTER
3

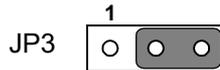
**Software
Installation**

Operating Environment Selection

Set jumper 3 (JP3) to correspond with your desired software operating environment. Connect the left two pins of JP3 to operate in DOS or Windows 3.1 mode, as shown below. Connect the right two pins to operate in Windows 95 or Windows NT mode .



DOS, Windows 3.1



Windows 95, Windows NT

Icom Utility Setup for Windows 95/98/NT environment

In this part, utility installation, configuration and upgrade/ removal procedure are described. IOCM Utility software package is stated for both Windows 95/98 and NT environments.

Utility Installation

The following is the procedure for installing PCL-858 under Windows 95/NT:

1. Run **Setup.exe** in the driver diskette.
2. Select “**Advantech Icom Utility**” to install and configure the boards following the on-line instructions.
3. When Advantech Icom Utility Configuration Panel is popped up, please refer to the software for more detail.
4. After this, user complete the whole installation, and restart Windows 95.

Up to now, users have already completed the whole installation, please restart system as prompted.

Once the board and driver are installed and the system restart successfully, users can execute any ready-made application such as HyperTerminal to transmit/receive data or Remote Access Service to provide dial-up networking capability.

Configuration:

You will enter the configuration program when installing the device driver. Or you can click on the Taskbar [Start] button, then select [Programs] menu, then [Advantech Icom Utility] menu and then [Icom] icon.

When the configuration panel is popped up:

Click [Add Board] button to add a board.

Click [Delete] button to remove a board.

Board Type: PCL-858

Base COM: Specify the COM number of the first port and subsequent ports are mapped to continuous COM numbers. For instance, if the first port is mapped to COM10, then the second port is mapped to COM11 sequentially.

Base Address (200H~3F8H): Specify the base address of the first port and subsequent base address are mapped to continuous COM numbers. For instance, if the first port is mapped to 300H, then the second port is mapped to 308H sequentially.

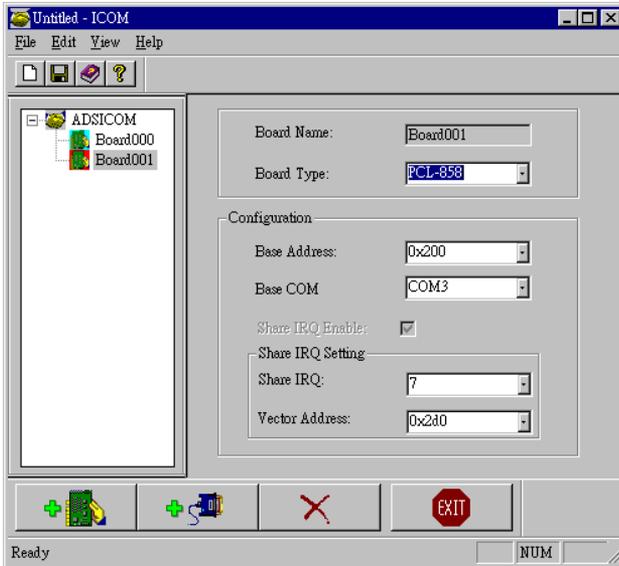
At PCL-858 series can be installed together as long as the memory resources are sufficient and available in a system. The board can share only one same IRQ, and different board will set different IRQ.

Click [**Share IRQ Enable**] button to set the share IRQ function.

Share IRQ: 3,4,5,6,7,9,10,11,12,15

Vector Address: 200H ~ 3F8H

After you finish the installing, you could click [Exit] and restart your system. Unless the system restarted, the latest configuration will not take effect.



CHAPTER

4

Wiring

Connector Pin Assignments

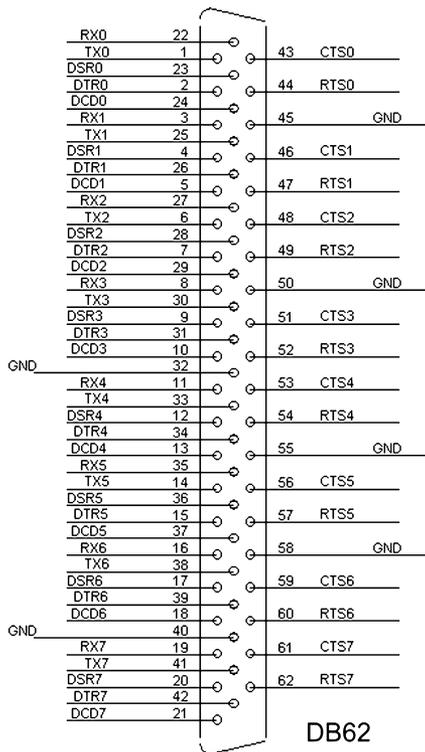
RS-232 8-port connection boxes/octopus cable designed for PCL-858 are:

- Opt8A: 8-port DB25 female connection box
- Opt8B: 8-port DB25 male connection box
- Opt8C: Octopus cable with 8 male RS-232 DB25 ports

The following lists the pin assignments of the DB62 connector on the bracket. You may fabricate octopus cable for DB25 to 8 x DB25 with these pinouts.

Pin no.	Signal	Pin no.	Signal	Pin no.	Signal
1	TxD1	22	RxD1	43	CTS1
2	DTR1	23	DSR1	44	RTS1
		24	DCD1	45	GND
3	RxD2	25	TxD2	46	CTS2
4	DSR2	26	DTR2	47	RTS2
5	DCD2				
6	TxD3	27	RxD3	48	CTS3
7	DTR3	28	DSR3	49	RTS3
		29	DCD3	50	GND
8	RxD4	30	TxD4	51	CTS4
9	DSR4	31	DTR4	52	RTS4
10	DCD4	32	GND		
11	RxD5	33	TxD5	53	CTS5
12	DSR5	34	DTR5	54	RTS5
13	DCD5	55	GND		
14	TxD6	35	RxD6	56	CTS6
15	DTR6	36	DSR6	57	RTS6
		37	DCD6	58	GND
16	RxD7	38	TxD7	59	CTS7
17	DSR7	39	DTR7	60	RTS7
18	DCD7	40	GND		
19	RxD8	41	TxD8	61	CTS8
20	DSR8	42	DTR8	62	RTS8
21	DCD8				

Signal	Name	Pin #	Mode
GND	Ground	7	
TD	Transmit Data	2	Output
RTS	Request To Send	4	Output
DTR	Data Terminal Ready	20	Output
RD	Receive Data	3	Input
CTS	Clear To Send	5	Input
DSR	Data Set Ready	6	Input
DCD	Data Carrier Detect	8	Input
RI	Ring Indicator	22	Input



Wiring

RS-232 signal wiring

Since the RS-232 interface is not strictly defined, many devices have their own connection methods which may ignore some signal lines or define reserved lines for other functions. It is best to refer to the user's manual for your device for installation instructions. You may find the following helpful.

In general, DTE (Data Terminal Equipment) refers to the device that is leading the communication. Examples include PC's, terminals and some printers. DCE refers to the device being communicated with or controlled. Examples include modems, DSU's (digital service units), printers and lab/factory equipment.

In some situations you may be able to get by with just three lines: data on TXD, a signal ground and a handshaking line. Examples are printer or plotter connections, troubleshooting and situations where you require only one-wire communication.

Terminal or PC (DTE) connections

DB-25 Male: PCL-858		DB-25 Male or Female: Terminal	
Pin	Signal	Pin	Signal
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS	5	CTS
5	CTS	4	RTS
6	DSR	20	DTR
7	GND	7	GND
20	DTR	6	DSR
8	DCD	8	DCD

Modem connections

DB-25 Male: PCL-858		Modem (DCE)	
Pin	Signal	Pin	Signal
2	TxD	2	RxD
3	RxD	3	TxD
4	RTS	4	CTS
5	CTS	5	RTS
6	DSR	6	DTR
7	GND	7	GND
20	DTR	20	DSR
8	DCD	8	DCD

For DTE to DCE connection, use straight through cable, i.e. you don't have to reverse lines 2 and 3, lines 4 and 5, and lines 6 and 20.

Because in general the DCE RS-232 interfaces are reversed themselves.

Terminal without handshake

DB-25 Male: PCL-858		Terminal, PC (DTE)	
Pin	Signal	Pin	Signal
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS —		
5	CTS —		
7	GND	7	GND
6	DSR —		
20	DTR —		
8	DCD —		

If not using CTS, RTS, DSR ,DTR signals, please loop back for the PC-ComLIB software to function correctly, because PC-ComLIB will always check for handshake signals.

APPENDIX
A

**PC I/O Address
Reference**

PC I/O Address Usage

The following table indicates the PC I/O address usage assignment. To prevent conflicting settings of the PCL-849 with other devices or I/O cards, you are recommended to refer this table.

I/O Address	Device
000 - 00F	DMA (8237A)
020 - 021	8259A IRQ Controller
040 - 043	8253/8254 Timer/Counter
060 - 063	PPI 8255A
070 - 071	Real-Time Clock
080 - 08F	DMA Page Register
0A0 - 0BF	8259A Interrupt Chip
0C0 - 0DF	Second DMA Controller 8237A
0F0 - 0FF	Math Coprocessor
1F0 - 1F8	AT Fixed Disk
200 - 20F	Game I/O
278 - 27F	Parallel Printer Adaptor #2
2F8 - 2FF	Serial Adaptor (COM 2)
320 - 32F	XT Fixed Disk
378 - 37F	Parallel Printer Adaptor #1
380 - 38F	SDLC Binary Communication Adaptor
3A0 - 3AF	Master Binary Communication Adaptor
3B0 - 3BF	Monochrome/Parallel Adaptor
3D0 - 3DF	Color Graphics Adaptor
3F0 - 3F7	Diskette Controller
3F8 - 3FF	Serial Adaptor (COM 1)

APPENDIX **B**

**Quick
Reference**

➤ **Jumper Setting**

- **IRQ Mode (JP1, IRQ12*)**
- **Operation System Mode (JP3)**

* Connect Left two pins of JP3 is used to DOS, Windows 3.1
Connect Right two pins of JP3 is used to Windows 95, NT

➤ **Speed Mode (SW2)**

DIP1 : **ON** (Upper) position==> **High Speed Mode or x 8 Mode**
(Frequency of Oscillator Crystal = 14.7456 MHz)

* DIP1 : **OFF** (Lower) position==> **Normal Speed Mode**
(Frequency of Oscillator Crystal = 1.8432 MHz)

(*: default)

Base Address MODE (SW1): In this mode, The I/O Addresses and its IRQ Level for each port are set to default as below, (Please make sure that the I/O address on BIOS setting of on-board COM1 ~ COM4 will never conflict with **[Base Address] ~ [Base Address + 3Fh]**)

Port No.	I/O Address	COM Port No.	IRQ Level (JP1)
Port 1	Base Address + 00h	COM1	JP12
Port 2	Base Address + 08h	COM2	JP12
Port 3	Base Address + 10h	COM3	JP12
Port 4	Base Address + 18h	COM4	JP12
Port 5	Base Address + 20h	COM5	JP12
Port 6	Base Address + 28h	COM6	JP12
Port 7	Base Address + 30h	COM7	JP12
Port 8	Base Address + 38h	COM8	JP12