MICROSCAN

IB-3 PC
Keyboard Wedge
User Manual

i–IB-3 PC Keyboard

Table of Contents

About the IB-3 PC Keyboard Wedge

The IB3-PC Keyboard Wedge is a programmable junction box that can stream data directly from a MS-3 to a host computer program as if the user were typing the data from a computer keyboard. It is frequently used with older communications devices lacking serial ports. It can also act as a passive junction box to distribute power, data, and serial commands.

In the "wedge" mode, it takes 5VDC power from the keyboard PS/2 port of the host computer and supplies it to the MS-3. The computer's keyboard plugs into one end of the wedge and an attached cable with a PS/2 connection completes the connection to the host.

The wedge has its own CPU and an internal EPROM that can be programmed to emulate either an AT or XT keyboard. Certain keystrokes can be mapped to create custom outputs.

There is a 3-position sliding switch on the wedge. **Position 1** is used for the typical wedge operations. You can also use position 1 for bar code configuration of the wedge or the MS-3. **Position 2** allows serial configuration commands (for wedge or MS-3) to be entered directly from the keyboard. **Position 3** allows serial communication to take place between the host and the MS-3.

Host Communications

There are two ways the IB-3 PC can be programmed:

1. Serial keyboard commands.

   Commands such as **<W100?>** can be sent from a terminal program, provided that muting is enabled first by a macro or bar code configuration.

   Note: You can learn the current setting of any parameter by inserting a question mark after the number, as in **<K100?>** To see all "K" commands, send **<K?>**.

2. Bar code configuration.

Chapter

1

Wedge Quick Start

In this Quick Start setup the IB-3 PC is shown in the "wedge" operating position (1) for both the laser and CCD versions of the MS-3.

This is the typical mode in which the IB-3 PC is used to allow serial data to be entered as if it were typed at the keyboard.
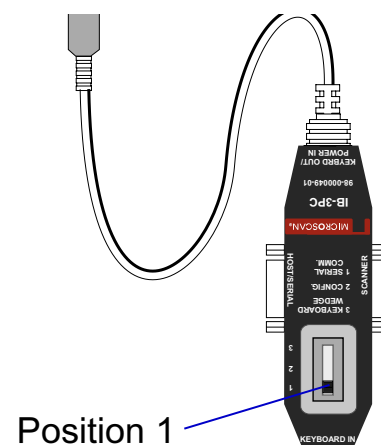
Position 1

Step 1 — Hardware Required

In the operational "wedge" position, the IB-3 PC is inserted (wedged) between the host and the host's keyboard and draws its 5V power from the Keyboard port. Data from the MS-3 is piped directly into any host resident program that accepts ASCII text or keyboard type data.

The following hardware is required:

- (**1**) IB-3 PC, FIS-0001-0030G
- (**2**) Reader
- (**3**) Customer-supplied keyboard
- (**4**) Host computer
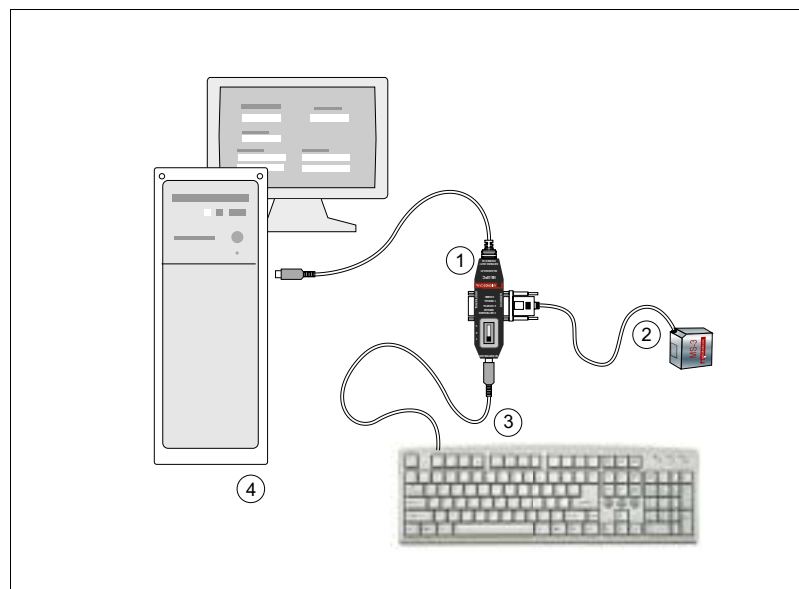
Figure 1-1 Hand Presentation Setup for Keyboard Wedge

Step 2 — Connect the System

To connect the IB-3 PC system, do the following:

1. Power-off your host computer.

2. Set the IB-3 PC (**1**) switch to position 1.

3. Connect the MS-3 (**2**) and the keyboard (**3**) to the IB-3 PC (**1**) as shown.

4. Plug the IB-3 PC cable directly into the host computer's (**4**) keyboard port.

   Caution: Be sure all cables are connected **BEFORE** applying power. and always power down **BEFORE** disconnecting any cables

5. Power-on host computer.

6. Open a word processor or text editor to see scanned or typed data.

Position 1
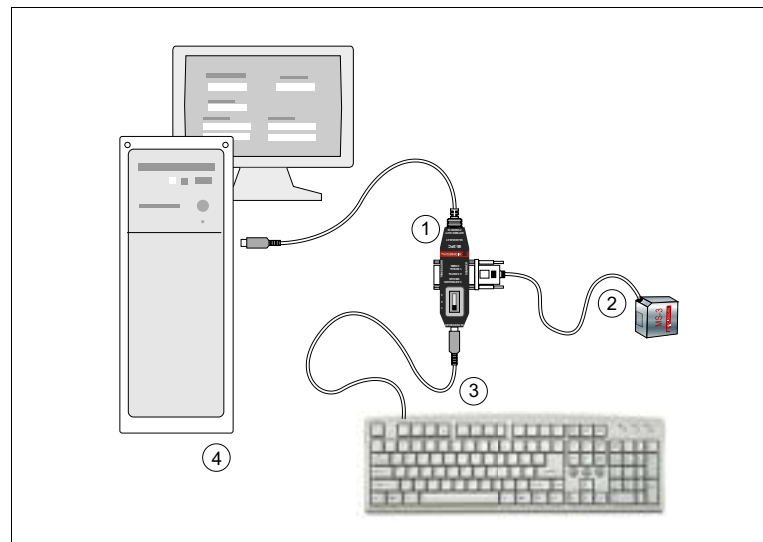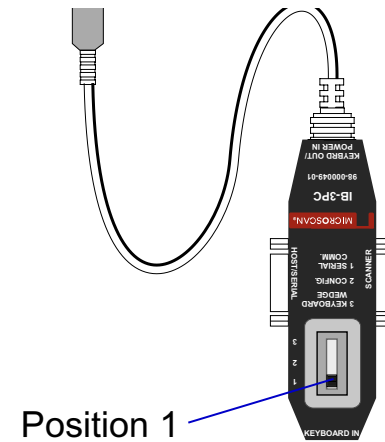
Figure 1-2 Hand Presentation Setup for Keyboard Wedge

1–Wedge Quick

Step 3 — Configure Your MS-3

For the MS-3 Laser Scanner:

Scan the following bar code symbols in the order that they are presented.

1. Enable configuration mode.

2. Enable Continuous Read 1.

3. Set 5 second timeout.

4. Enable all symbologies (no beep on this one).

5. Save for power-on.

You will now be able to scan in data from your bar codes through the wedge from your laser scanner.

IB-3 PC Keyboard Wedge User Manual

1–Wedge Quick

For the MS-2 CCD Reader

The two bar code symbols below will setup the MS-2 CCD for reading with the IB-3 PC.

Enable all Symbologies

Set Read Mode

Note: There is no beeper on the MS-2 CCD but whenever a good read occurs the reader's LED will momentarily turn OFF and then ON and the Good Read lamp will flash ON and OFF.

1–Wedge Quick

Step 4 — Test

The following bar code symbol can be used to test the your setup:

1 2 3 4

Important: You must have your IB-3 PC set to Position 1 and have a text editor open in order to see the results.

Chapter

2

Wedge Configuration

In addition to its primary wedge operations, the IB-3 PC wedge can be programmed from the host by <W...> commands.

In this mode, you can select the IB-3 PC's keyboard emulation (AT or XT), map keyboard characters to ASCII characters, set capitalization option, setup flow control, and save and default the wedge.

2
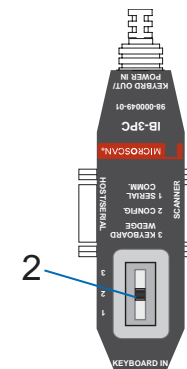
Required Hardware

- (**1**) An IB-3 PC, FIS-0001-0030G.
- (**2**) A Microscan reader.
- (**3**) A customer supplied keyboard with a PS/2 plug.
- (**4**) A DB-9 serial communications cable, P/N 61-000010-01
- (**5**) Host computer.
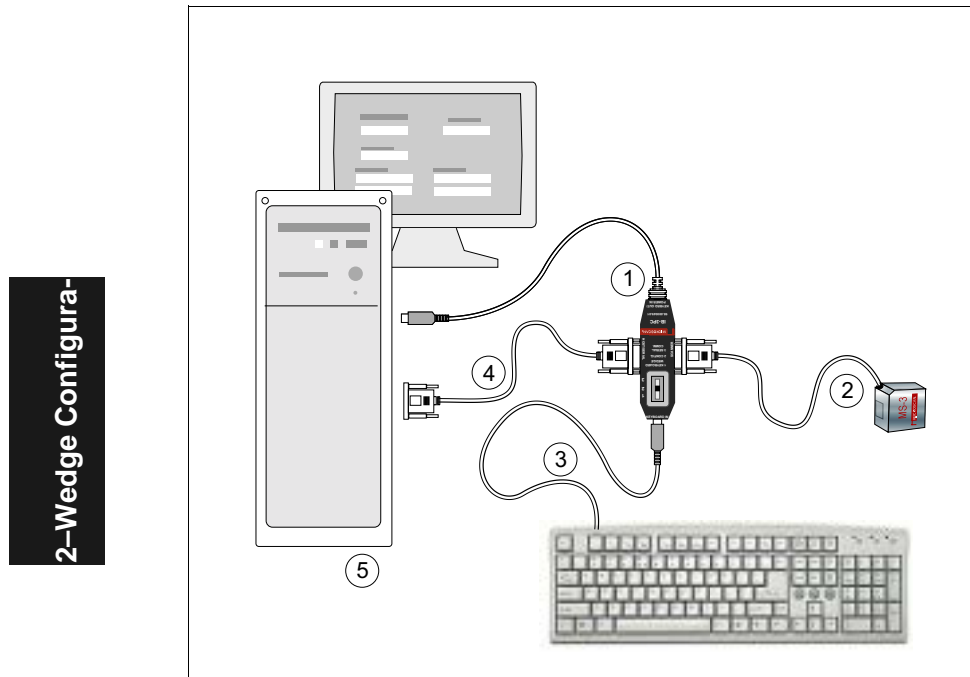
Figure 2-3 Configuration Setup

Connect the System

1. Power off your host computer.

2. Set the IB-3 PC switch to **position 2**.

3. Connect the IB-3 PC (**1**) to the MS-3 (**2**) at the 15-pin "SCAN-NER" connector.

4. Connect the keyboard (**3**) to the IB-3 PC with the PS/2 plug.

5. Connect the IB-3 PC's cable (**1**) (extending from the "KEY-BRD OUT/ POWER IN" end) into the host's keyboard port.[1]

6. Connect the DB-9 serial communications cable (**4**) to the host's RS-232 serial port (**figure 2-4**) or to an alternative configuration computer as shown in **figure 2-5**.

   Caution: Be sure all cables are connected **BEFORE** applying power. and always power down **BEFORE** disconnecting any cables

7. Apply power to the system.
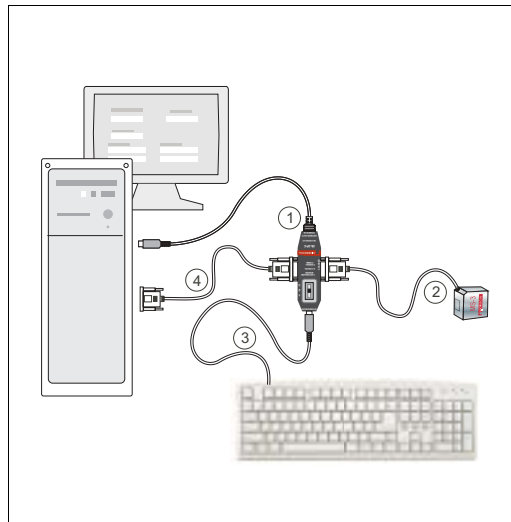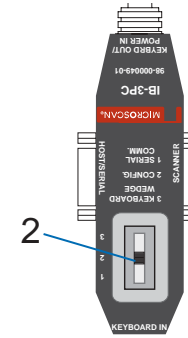
Figure 2-4 Configuration Setup   *Figure 2-5 Alternative Configuration Setup*
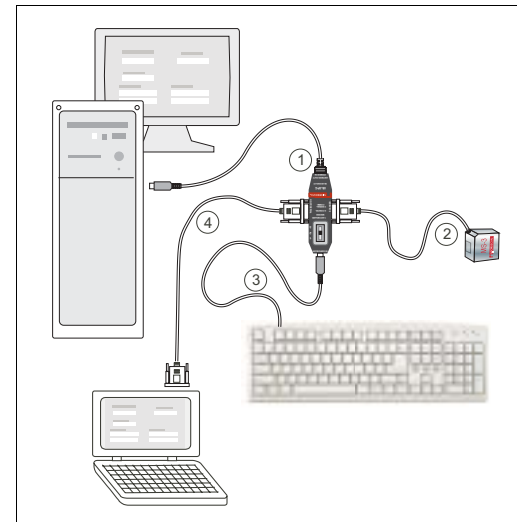
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1. If using your own null modem RS232 host cable, be certain that the host's TxD connects to the scanner's RxD and the scanner's TxD connects to the host's RxD.

IB-3 PC Configuration

Command Format

Commands to the IB-3 PC Keyboard Wedge follow the same numeric format as those applied to our bar code scanners except that the IB-3 PC uses a <W...> as a prefix instead of a <K...>.

Example: <W700,*alphanumeric data,more alphanumeric data*>

Important: If you want to scan in bar code configuration commands to the IB-3 PC, you must switch over to **Position 1**. However, keyboard entry configuration to the IB-3 PC must be done while in **Position 2**. (See **"Serial Operations" on page 3-1**.)

Important: Before you can enter serial keyboard commands from position 2 to the IB-3 PC, you must enable muting with the <W500,1> command. Failure to do this will result in an endless loop following any keystroke.

There are two ways to enable muting:

1. In switch **Position 2**, send the macro **<W500,1>**.

   Note: You must send this command as a macro since keying it in will result in an endless loop that looks like this: <<<<<<<<<<....

2. In switch **Position 1**, scan in the **Enable Muting** symbol:

Once you have enabled muting, you can configure the IB-3 PC in position 2 by typing in commands or sending macros.

Terminal Connection

You can use Microscan's ESP (Easy Setup Program) to see configuration commands that are echoed to your monitor.

To connect with the MS-3 terminal, do the following:

1. Select on **Settings** in the **Connect** pulldown menu list.
2. In the RS-232 tab, select **9600** baud, **Even** parity, **One** stop bit, **Seven** data bits.
3. Check **Force Connect** and click **Connect**.
4. Connect to the MS-3.
5. Click the Terminal button.

Muting

Important: To avoid an endless loop, always send the **Enable Muting** command first.

Usage: Muting should be disabled for normal keyboard operations. Muting should be enabled whenever there's a need to send serial commands to an MS-3.

Definition: When muting is disabled—as it is by default at power-on or upon a reset—all keystrokes are echoed to the host. In this mode a command sent from the host is immediately echoed back to the host and resent in an endless loop. Muting will interrupt the loop and allow the commands to take effect.

Enable Muting

<W500,1>

Disable Muting

<W500,0>

Serial Cmd: <**W500**,*status*>

Default: **Disabled**

Options: 0 = Disabled   1 = Enabled

2–Wedge Configura-

Flow Control

Disable Xon/Xoff

<W810,0>

Enable Xon/Xoff

<W810,1>

Enable CR

<W700,1,0d,43>

Note: If enabled, Xon/Xoff must also be enabled in the MS-3.

Definition: Data sizes that exceed the input buffer size (200 characters) can use Xon/Xoff to manage the flow by sending packets. When enabled, Xon/Xoff will be sent to manage the serial input.

Serial Cmd: <**W810**,*XonXoff status*>

Default: **Disabled**

Options: 0 = Disabled   1 = Enabled

Wedge Parameter Default

<W900,DEFAULT>

If the IB-3 PC is not in a known state, it may be necessary to default it in order to regain desired functionality. The default communication settings for the wedge are the same as those of a defaulted MS-3. This assures communication between the MS-3 and the wedge.

<W900,DEFAULT>

MS-3 Default

<W999,DEFAULT>

If the MS-3 is not in a known state, it may be necessary to default the MS-3 in order to regain functionality. The default communication settings for the MS-3 are the same as those of the wedge. This assures communication between the MS-3 and the wedge.

<W999,DEFAULT>

This command sends an <A> reset to the MS-3 before executing the hardware default.

Note: To take effect, the MS-3 default must be done within 60 seconds after power-on.

Note: Configuring the MS-3 for **Continuous-1** is recommended after defaulting.

2–Wedge Configura-

Save Wedge Parameters
<W200,1>

Once the desired settings have been sent to the Keyboard Wedge, they need to be saved to the wedge's non-volatile memory for availability on power-on. This command does this and is similar in effect to the MS-3's <Z> command.

<W200,1>

Packet Status

Definition: When set to 0 the wedge will send out keystrokes per each serial charac-ter that is received at the soonest possible time. When set to 1 the wedge will send data that is packetized. That means it will only send out the data in between the start and end packet markers. All other data will be ignored.

Serial Cmd: **<W520,***packet status***>**

Default: **Enabled**

Options: 0 = Disabled 1 = Enabled

Packet Start

<W521,*Packet Start Char***>**

When **Packet Status** is set to 1 the wedge will send data that is prefixed and suffixed by a char. This command will set the start char. That value is entered as a hexadecimal value in ASCII that represents that ASCII char value.

Default = "STX" value of #02

Packet End

<W522,*Packet End Char***>**

When packet mode is set to 1 the wedge will send data that is prefixed and suffixed by a char. This command will set the end char. That value is entered as a hexadecimal value in ASCII that represents that ASCII char value.

Default = "CR" value of #13

Software Version

Application Code: <W100?>

<W100?>

This command will output the application code revision number.

Boot Code: <W101?>

App Code Checksum: <W110?>

Boot Code Checksum: <W111?>

Emulation Mode

AT Emulation

<W800,0>

XT Emulation

<W800,1>

Definition:	This will control the way the overall data is sent and read back from keyboard and PC. If this option is not set correctly the device will not work.
Serial Cmd:	**<W800,***emulation mode***>**
Default:	**AT**
Options:	0 = AT 1 = XT

2–Wedge Configura-

Chapter

3

Serial Operations

In addition to its primary wedge use, the IB-3 PC can be also used as a conventional junction box with serial connectivity to the host and power from a separate power supply.

In this mode, the IB-3 PC is used in place of a junction box such as the IB-131 and communications between the MS-3 and the host are handled in the same manner described in the **MS-3 Laser Scanner User Manual.**

Required Hardware

- (**1**) An IB-3 PC, FIS-0001-0030G.
- (**2**) Reader.
- (**3**) A customer supplied keyboard with a PS/2 plug.
- (**4**) A DB-9 serial communications cable, P/N 61-000010-01.
- (**5**) A power supply, P/N 97-000002-01.
- (6) Host computer.
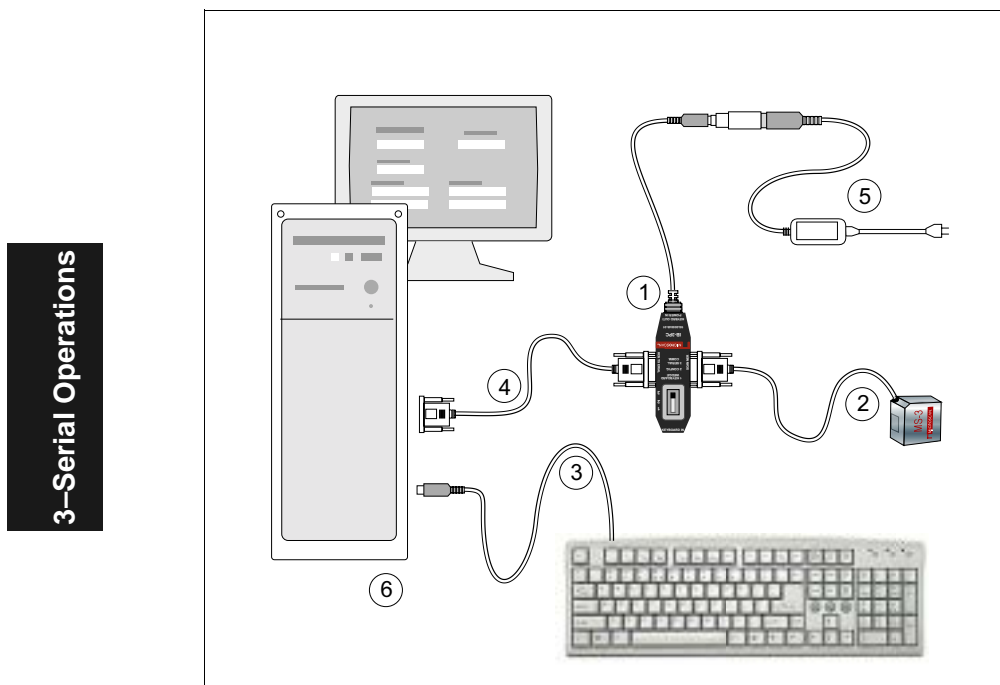
Figure 3-6 Serial Setup

Caution: Be sure all cables are connected **BEFORE** applying power. and always power down **BEFORE** disconnecting any cables

Caution: If using your own power supply, be certain that it is wired correctly and supply voltage is 5VDC. Incorrect wiring or voltage can cause software or equipment failures.

Connect the System

1. Power off your host computer.
2. Set the IB-3 PC switch to **position 3.**
3. Connect the IB-3 PC (**1**) to the MS-3 (**2**) at the 15-pin "SCANNER" connector.
4. Connect the keyboard (**3**) to the computer with the PS/2 plug.
5. Connect the IB-3 PC's cable (**4**) (extending from the "KEYBRD OUT/ POWER IN" end) directly to the host's RS-232 serial port.[1]

   Caution: Be sure all cables are connected **BEFORE** applying power. and always power down **BEFORE** disconnecting any cables

6. Connect power supply (**5**) to the IB-3 PC's "POWER" connector.
7. Apply power to the system.

Position 3
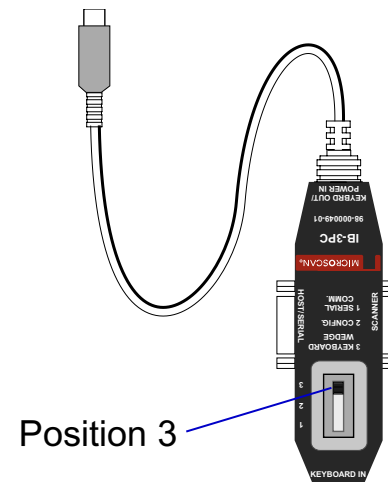
Figure 3-7 Serial Setup

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1. If using your own null modem RS232 host cable, be certain that the host's TxD connects to the MS-3's RxD and the MS-3's TxD connects to the host's RxD.

Connect the System

3—Serial Operations

Appendix

Electrical Specifications

Table A-1 Scanner 15-pin Connector

Pin	Host RS-232	I/O
1	Power +5VDC	
2	Transmit data (RS-232)	In
3	Receive data (RS-232)	Out
4	Power/Signal Ground	
5	NC	
6	RTS	
7	NC	
8	Default configuration	In
9	NC	
10	CTS	
11	NC	
13	NC	
14	NC	
15	NC	

Table A-2 Serial Communications

Pin	Signal
1	NC
2	Receive data (RS-232)
3	Transmit data (RS-232)
4	NC
5	Ground
6	NC
7	RTS
8	CTS
9	NC

Table A-3 PS/2 Keyboard Socket and Plug Connectors

Pin	Signal
1	Data
2	NC
3	Ground
4	+5
5	Clock
6	NC
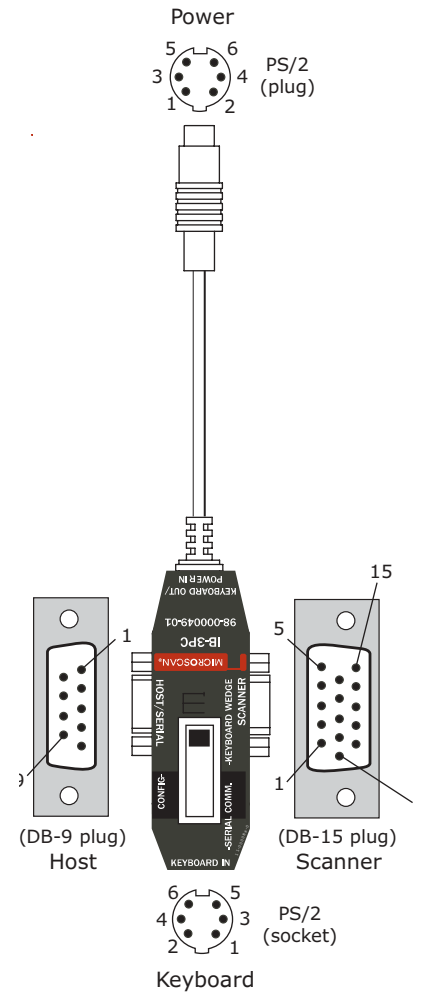
Wedge Limitations and Risks

PC's Keyboard Buffer

The PC itself can only handle so many keystrokes in a given period of time. If the internal workings of the PC do not allow for all the keystrokes to be processed, then they will begin to pile up within the PC. Eventually the PC will no longer accept keyboard data and will reject it.

Wedge's Scanner Character Buffer

The Keyboard Wedge has only a finite amount of memory to save incoming serial data. If the rate of incoming data is greater than the keyboard data leaving the wedge, then the characters will begin to pile up within the wedge. Either the remaining data is ignored or a Xon/Xoff protocol will need to be implemented between scanner and wedge to handle the potential data overflow. The input character buffer size is 200 characters. If the data that is being sent is larger than 200 characters, it will not be possible to enable packet mode. Packet mode requires that all data be sent in completion before the conversion process starts.

Keyboard Activity with Pending Wedge Data

The Keyboard Wedge will buffer data until there are a few milliseconds of quiet time. Then the Wedge will take over the line and output all the scanner data that is pending. That means that holding down shift will not work unless the there is enough time between the keyboard character outputs to allow for the Wedge to splice into the line. If the wedge does splice into the line, it will ignore any further keyboard activity. There is a method of accessing the characters that require a shift held to access without the user actually holding down the shift. See **“Momentary Key Bindings” on page A-4**.

Held Key Memory Limit

The Keyboard Wedge has a limit of 10 held keys. That means that if there were 11 bound keys (not possible), the last one would be forgotten or ignored.

PC State Changes and Responses

During the Keyboard Wedge data transmission it may be necessary for the PC to change the capslock LED state. The Keyboard Wedge is responsible for buffering any commands that the PC sends to the keyboard. There is a limit to the amount of data the Wedge can buffer up from the PC. Typically the amount of data the PC sends is usually very small. There is also a need to assure that the PC, Keyboard and Wedge do not get out of sync. This would result in flipping the capslock state.

Continuous 1

For most applications where a symbol only needs to be read once, it is recommended that the scanner by set to **Continuous 1**.

Appendix

Key Mapping Commands

See **"Keyboard Layout" on page A-6** and **"ASCII Table with Control Charac-
ters" on page A-8**.

Momentary Key Bindings

(pushed once and released)

<**W700**,*ASCII_DATABASE_#,ASCII_HEX,KEY#_ASCII_DECIMAL*>

ASCII_DATABASE_#	ASCII_HEX	KEY#_ASCII_DECIMAL
The memory slot that data is to be stored	The ASCII value from scanner	The key number based on the keyboard map
Value (1-10)	Value (0x00-0x7F)	Value (00-130)

There are 10 momentary bindings. These commands range from <W700,1,> to
<W700,10,>.

Held Key Bindings

(pushed once and held)

<**W750**, ASCII_DATABASE_#,ASCII_HEX >

ASCII_DATABASE_#	ASCII_HEX
The memory slot that data is to be stored	The ASCII value from scanner
Value (1-10)	Value (0x00-0x7F)

There are 10 held bindings. These commands range from <W750,1,> to <W750,10,>.
There are 2 occurrences of the bound character to form a Key-ON and some time later
the Key-OFF.

Key Assigning

There are several keys for which there are no assigned ASCII characters. To access
these keys there is a need to assign them valid ASCII characters. To achieve this the
user can send commands to the Keyboard Wedge via bar code programming or RS-232
serial commands from a scanner or a terminal.

There are two types of keys that can be mapped.

• Pushed once and released

• Pushed and held.

Held keys such as Shift, Alt, and Control are examples of keys that need to be held so
that another key will be affected by it. When configuring the Keyboard Wedge the user
should know which keys need to be held and which keys are momentary. Standard
ASCII characters are already handled such as "a" vs. "A"

Appendix

Auto Caps Discriminate

Wedge Controls Caps

<W802,0>

Force Caps

<W802,2>

Definition: Sets the option for upper and lower case input/output.

Serial Cmd: <**W802,**auto caps mode>

Default: **0**

Options: 0 = Will manage shift for upper and lower case letters
                  (literal presentation)

                  1 = Will just send the letter key, ignoring shift/capslock status

                  2 = Will force all alpha to caps (sends all caps)

                  3 = Will force all alpha to lower case (sends all lower case)

These 4 options apply only to "a" through "z".

Note: Some symbologies do not allow for upper and lower case letters.

Appendix

Keyboard Layout

XT Keyboard

AT Keyboard

Appendix

ASCII Table with Control Characters

Dec	Hex	Mne	Ctrl	Dec	Hex	Ch	Dec	Hex	Ch	Dec	Hex	Ch
00	00	NUL	^@	32	20	SP	64	40	@	96	60	`
01	01	SOH	^A	33	21	!	65	41	A	97	61	a
02	02	STX	^B	34	22	"	66	42	B	98	62	b
03	03	ETX	^C	35	23	#	67	43	C	99	63	c
04	04	EOT	^D	36	24	$	68	44	D	100	64	d
05	05	ENQ	^E	37	25	%	69	45	E	101	65	e
06	06	ACK	^F	38	26	&	70	46	F	102	66	f
07	07	BEL	^G	39	27	'	71	47	G	103	67	g
08	08	BS	^H	40	28	(	72	48	H	104	68	h
09	09	HT	^I	41	29	)	73	49	I	105	69	i
10	0A	LF	^J	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	^K	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	^L	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	^M	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	^N	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	^O	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	^P	48	30	0	80	50	P	112	70	p
17	11	DC1	^Q	49	31	1	81	51	Q	113	71	q
18	12	DC2	^R	50	32	2	82	52	R	114	72	r
19	13	DC3	^S	51	33	3	83	53	S	115	73	s
20	14	DC4	^T	52	34	4	84	54	T	116	74	t
21	15	NAK	^U	53	35	5	85	55	U	117	75	u
22	16	SYN	^V	54	36	6	86	56	V	118	76	v
23	17	ETB	^W	55	37	7	87	57	W	119	77	w
24	18	CAN	^X	56	38	8	88	58	X	120	78	x
25	19	EM	^Y	57	39	9	89	59	Y	121	79	y
26	1A	SUB	^Z	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	^[	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	^\	60	3C	<	92	5C	\	124	7C	|
29	1D	GS	^]	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	^^	62	3E	>	94	5E	^	126	7E	~
31	1F	US	^_	63	3F	?	95	5F	_	127	7F	D

Appendix