Programmable Bar Code Decode ICs

Technical Data

HBCR-2310
HBCR-2311
HBCR-2312

Features

- **Supports 8 Bar Code Symbologies**
- **Ideal for Hand, CCD, and Laser Scanning Applications**
- **Automatic Code Recognition**
- **Serial or Parallel I/O**
- **Full Duplex ASCII Interface**
- **Extensive Configuration Control**
- **Optical and Escape Sequence Configuration**
- **Input and Output Buffering**
- **CMOS**
- **Thru Hole and Surface Mount Packages**
- **Audio and Visual Feedback Control**
- **EEPROM Support for Nonvolatile Configuration**

Description

Hewlett Packard's Bar Code Decoder ICs offer flexible bar code decoding capability that is designed to give OEMs the ability to address a growing number of industry segments and applications. Flexibility is made possible through firmware which allows the ICs to accept data from a wide variety of scanners and to automatically decode the most popular symbologies. The IC automatically discriminates and decodes the following bar codes:
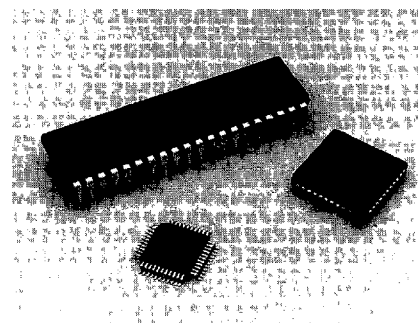
- Code 39 (Standard or Extended)
- Interleaved 2 of 5
- UPC A, E (with or without supplementals)
- EAN/JAN 8, 13 (with or without supplementals)
- Codabar
- Code 128
- Code 11
- MSI Code
- Code 93

All bar codes may be scanned bidirectionally except for UPC/EAN/JAN bar codes with supplemental digits, which must be scanned so that the supplementals are scanned last.

User implementation is easy since only a few supporting components are required and a standard I/O interface is provided.

Scanner Input

The bar code decoder ICs are compatible with most hand held scanners and some medium speed machine mounted laser heads. They are also compatible with fixed beam non-contact scanners, digital wands, slot readers, CCD scanners and hand held moving beam laser scanners.

The scan rate for moving beam scanners and CCDs should be 35 to 45 scans per second.

Data Communications

The serial port supports a wide range of baud rates, parities, and stop bits as shown in the Summary of Features and Configurations. Software control of data transmission is accomplished with the Xon/Xoff (DC1/DC3) handshake. RTS/CTS hardware handshake is also supported.

The parallel port data has configurable parity. The actual port consists of an external '646 family octal bus transceiver and five lines from the Decode IC that are used for handshakes. There are handshakes for both data transmissions and commands.

Feedback Features

Both audible and visual feedback are possible with the HBCR-2310 series. The outputs from the IC should be buffered before driving the transducers. Feedback is controlled directly by the IC, with signals generated by successful decodes, or can be controlled by the host system. The tone of the beeper can be set to one of 16 tones, or can be turned off.

Configuration Control and Nonvolatile Storage

The configuration of the decoder IC is done by any of three methods.

First, a minimal subset of key options can be "hardwired," controlled by electrically strapping specified pins of the decoder IC. Which pins affect configuration depends on the selection of the serial or parallel interface.

Second, ASCII characters in the form of escape sequences can be sent via the serial or parallel port; these commands can be used to control all configurable options.

The third method is optical configuration, which makes use of special bar code menus. Menu labels can be created to modify any configurable option.

A summary of the decoder IC features and configuration methods is shown in the Summary of Features and Configurations on page 4.

Once configuration has been set, it can be stored in an optional

EEPROM. When the EEP pin is high, the decoder IC stores its configuration in a 9346 or 93C46 EEPROM. The configuration is saved during power down of the system and automatically reloaded at power up.

Escape sequence commands are not automatically saved, they must be saved explicitly. When optical configuration is used, storage is automatic.

Power Requirements

The Decoder IC operates from a +5 Volt DC power supply. The maximum current draw is 18 mA. The maximum power supply ripple voltage should be less than 100 mV, peak to peak.

Handling Precautions

The decoder ICs are extremely sensitive to electrostatic discharge (ESD). It is important that proper antistatic procedures be observed when handling the ICs. The package should not be opened except in a static free environment.

Manuals

The decode IC Users Manual and Addendum cover the following topics:

- Data output formats
- I/O interfaces
- Laser input timing diagrams
- Escape sequence syntax and functionality
- Example schematics
- All configurable options
- Bar code menus
- Recommended scanner positioning and tilt

- Sample bar code symbols
- Appendices describing bar code symbologies

Surface Mount Drying

Whenever Vapor Phase or Infrared Reflow technologies are used to mount the PLCC or QFP packages, there is a possibility that previously absorbed moisture, heated very rapidly to the reflow temperatures, may cause the package to crack from internal stresses. There is a liability concern that moisture may then enter the package over a period of time, and metal corrosion may take place, degrading the IC performance.

To reduce the amount of absorbed moisture and prevent cracking, all surface mount ICs should undergo one of the following baking cycles. The parts must then be mounted within 48 hours. If the parts are not mounted within 48 hours they must be re-baked.

The total number of baking cycles must not exceed two. If the ICs are baked more than twice, Hewlett-Packard cannot guarantee the performance or reliability of the part.

Neither bake cycle can be performed in the standard shipping containers. The ICs must be baked in a mechanically stable container, such as an aluminum tube or pan.

Cycle A -125°C for 24 hours
Cycle B -60°C for 96 hours in 5% relative humidity air or dry nitrogen.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Notes
Storage Temperature	T_S	-55	+ 150	°C	
Supply Voltage	V_{CC}	-0.5	+ 7.0	V	1
Pin Voltage	V_{IN}	-0.5	V_{CC} + 0.5	V	1, 2

Notes:
1. T_A = 25°C.
2. Voltage on any pin with respect to ground.

Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Units	Notes
Supply Voltage	V_{CC}	4.0	6.0	V	3
Ambient Temperature	T_A	-40	+85	°C	
Crystal Frequency	XTAL	0	11.059	MHz	4
Element Time Interval (Moving Beam)	ETI_M	13	555	µs	4,5,6
Element Time Interval (Contact Scanner)	ETI_C	50	71000	µs	5,6

Notes:
3. Maximum power supply ripple is 100 mV peak to peak.
4. The IC uses a 11.059 MHz crystal. For different frequencies, multiply the specified baud rate and beeper frequencies by (crystal frequency/11.059 MHz) and multiply the element time interval ranges by (11.059 MHz/crystal frequency).
5. At the specified crystal frequency.
6. Corresponds to a scan rate of 35 to 45 scans per second.

Ordering Information

Part Number	Description
HBCR-2310	40 pin DIP, bulk shipment, no manual
HBCR-2311	44 pin PLCC, bulk shipment, no manual
HBCR-2312	44 pin QFP, bulk shipment, no manual
HBCR-2397	HBCR-2310 series users manual and addendum
Option A01	Individually bagged, no manual
Option B01	Individually boxed with manual, addendum and data sheet.

DC Characteristics (T_A = -40°C to + 85°C, V_{CC} = 4.5 V to 5.5 V, V_{SS} = 0 V)

Symbol	Parameter	2310 Pins	2311 Pins	2312 Pins	Min.	Max.	Units	Test Conditions
V_{IL}	Input Low Voltage	all	all	all	-0.5	0.2 V_{CC} - 0.1	V	
V_{IH}	Input High Voltage	except 9, 18	except 10, 20	except 4, 14	0.2 V_{CC} +0.9	V_{CC} + 0.5	V	
V_{IH1}	Input High Voltage	9, 18	10, 20	4, 14	0.7 V_{CC}	V_{CC} + 0.5	V	
V_{OL}	Output Low Voltage	1-8, 10-17, 21-28	2-9, 11, 13-19, 24-31	1-3, 5, 7-13, 18-25, 40-44	-	0.45	V	I_{OL} = 1.6 mA
V_{OL1}	Output Low Voltage	30, 32-39	33, 36-43	27, 30-37	-	0.45	V	I_{OL} = 3.2 mA

DC Characteristics $(T_A = -40°C$ to $+ 85°C$, $V_{CC} = 4.5$ V to 5.5 V, $V_{SS} = 0$ V) (contd.)

Symbol	Parameter	2310 Pins	2311 Pins	2312 Pins	Min.	Max.	Units	Test Conditions
V_{OH}	Output High Voltage	1-8, 10-17, 21-28	2-9,11, 13-19, 24-31	1-3, 5, 7-13, 18-25, 40-44	2.4	-	V	$I_{OH} = -60$ μA
					0.75 V_{CC}	-	V	$I_{OH} = -30$ μA
					0.9 V_{CC}	-	V	$I_{OH} = -10$ uA
V_{OH}	Output High Voltage	30, 32-39	33, 36-43	27, 30-37	2.4	-	V	$I_{OH} = -400$ μA
					0.75 V_{CC}	-	V	$I_{OH} = -150$ μA
					0.9 V_{CC}	-	V	$I_{OH} = -40$ μA
I_{IL}	Input Low Current	1-8, 10-17, 21-28	2-9, 11, 13-19, 24-31	1-3, 5, 7-13 18-25, 40-44	-10	-200	μA	$V_{IN} = 0.45$ V
I_{IL2}	Input Low Current	18	20	14	-	-3.2	mA	$V_{IN} = 0.45$ V
I_{LI}	Input Leakage Current	32-39	36-43	30-37	-	±10	μA	$0.45 \leq V_{IN} \leq V_{CC}$
R_{RST}	Pulldown Resistor	9	10	4	20	125	kΩ	
I_{CC}	Power Supply Current	-	-	-	-	18	mA	All outputs disconnected
I_{CC}	Idle Mode Power Supply Current	-	-	-	-	9	mA	Note 7.

Note:

7. Wand or Laser Mode with laser idling enabled, with no scanning or I/O in progress.

Summary of Features and Configurations

In the table below, the column titled Selection shows how the IC may be programmed.

Software   Escape Sequence and/or Optical Menu Programmability
Hardwired   Control of a feature by electrically strapping specified pins on the IC
Both   Both Software and Hardwired

Feature	Function or Value	Selection	Default Setting
Code Selection	When selected, bar codes will be decoded assuming other decoding options are satisfied.	Both	All bar codes are enabled
Minimum/Maximum Label Length Selection	Code 39, Codabar, Code 128, Code 93	Software	Min = 1, Max = 32
	Code 11	Software	Min = 2, Max = 32
	MSI Code	Software	Min = 3, Max = 32
	Interleaved 2 of 5	Software	Min = 4, Max = 32
Interleaved 2 of 5 Specific Label Length Selection	Length variable from 4 to 32	Software	Enabled
	Specific even length from 2 to 32	Software	Disabled
	Lengths 6 and 14 only	Software	Disabled
Check Character Verification and Transmission	Code 39, Interleaved 2 of 5, AIM Codabar	Software	Verification Disabled Transmission Disabled
Code 39 Full ASCII Conversion	Extended Code 39 characters will be translated into ASCII Characters	Software	Disabled

Summary of Features and Configurations (contd.)

Feature	Function or Value	Selection	Default Setting
Code 39 Label Framing	If the length of a label is known, then the margins around the label may be reduced below the minimum specifications	Software	Disabled
UPC/EAN/JAN Decoding Options	UPC/EAN/JAN vs. UPC only	Software	UPC/EAN/JAN
	UPC E0 or UPC E1	Software	UPC E0
	Enable 2 or 5 digit supplementals	Software	Disabled
	Autodiscriminate tags with supplementals	Software	Disabled
	Suppress UPC/EAN ID characters	Software	Suppressed
	Suppress UPC/EAN Check Digit	Software	Transmitted
Codabar Start/Stop Character Transmission	Transmit or suppress Codabar start/stop characters	Software	Transmit characters
Code 11 Check Digit Selection	Selection of 1 or 2 digits	Software	1 check digit
Message Append Mode	When enabled, Code 39 and Code 93 messages that begin with a space suppress the trailer in the decoded message transmission	Software	Disabled
	If a FNC 2 character is in a Code 128 label, then the trailer is suppressed when transmitting data	Software	Disabled
Baud Rates	150, 300, 600, 1200, 2400, 4800, 9600, 19200	Both	Depends on pins BR0, BR1, and SMD
Parity	0's, 1's, odd, even	Both	Depends on pins PT0, PT1, and EEP
Stop Bits	1 or 2	Both	Depends on pins SMD and STB
RTS/CTS Pacing	Hardware pacing of serial port data	Software	Enabled
Xon/Xoff Pacing	Software pacing or serial or parallel port data	Software	Disabled
Transmitted Character Delay	Specifies a delay between characters on the serial port	Software	Disabled
	Time delay can be between 1 and 250 ms	Software	20 ms
Header Selection	Up to 10 characters prepended to decoded data	Software	none
Trailer Selection	Up to 10 characters appended to decoded data	Software	$^C_R{}^L_F$
Reader Address Selection	The Reader Address is transmitted before decoded data and No-read Messages for polling purposes	Software	none
Message Ready/Not Ready Response Selection	The Message Ready/No Ready response is sent in response to a status request type 3 and is used with Single Read Mode 2	Software	Message Ready = ACK Message Not Ready = NAK
No Read Message	Up to 10 characters transmitted after an unsuccessful read	Software	none
No Read Recognition	Controls whether the IC detects unsuccessful reads.	Software	Disabled
No Read Feedback Suppression	Suppresses the LED and beeper feedback when a no read is recognized. The No read message is still transmitted	Software	Disabled
Single Read Mode 1	Controls reading and automatic transmission of decoded messages	Software	Disabled
Single Read Mode 2	Controls reading of bar code data and triggering of decoded message transmission	Software	Disabled

■ 4447584 0013508 248 ■

Summary of Features and Configurations (contd.)

Feature	Function or Value	Selection	Default Setting
Output Buffering	Data is entered into a 256 character queue for use with pacing for transmission	Software	Disabled
Scanner Type Detection	Determines whether a wand or a laser is to be used	Both	Depends upon pin SCT
Laser Shutoff Delay	Defines laser on time prior to automatic shutoff, variable from 0 to 10 seconds in 100 ms steps	Software	3 seconds
Laser Redundancy Check	Enables the requirement the two consecutive, identical decodes for a good read	Software	Disabled
Continuous Laser Read Mode	When enabled the laser is turned on permanently instead of waiting for the trigger to be pulled	Software	Disabled
Laser Connection Detection	When enabled the SCT pin is ignored at power up. The IC tests for a laser scanner to determine the scanner type	Software	Disabled
Laser Trigger Latch Mode	When enabled, the laser scanner continues to scan after the trigger is released until either it times out or decodes a bar code	Software	Disabled
Laser Idling	When enabled, the IC idles while waiting for a Trigger Pull	Software	Enabled
Code ID Character Selection	Code ID character identifies the bar code scanned.	Software	Code 39 = a
			Interleaved 2 of 5 = b
			UPC/EAN = c
			Codabar = d
			Code 128 = e
			Code 11 = f
			MSI Code = g
			Code 93 = h
Code ID Character Transmission	Code ID characters may be added before each data transmission	Software	Disabled
Bar Code Menu Scan Response	Verification of individual configuration menu scans via transmission of a response message	Software	Disabled
Hard Reset Message Enable	"Ready 12.5 ^C_R ^L_F" will be transmitted after a Hard Reset	Software	Disabled
ROM/RAM Self Test	When enabled ROM and RAM are tested after a Hard Reset	Software	Enabled
Good Read Beep Tone	Selects good read beep tone (1 to 16)	Software	Tone 12
LED Control	Automatic Flash Mode	Software	Enabled
	Automatic Feedback Mode	Software	Disabled
	On/Off Mode	Software	Off
LED Active Level	Defines logic level of LED ON state	Software	Active High
LED, Beeper Feedback Suppression	Suppresses LED and Beeper operation for systems without these annunciators	Software	Not Suppressed
Wand Input Buffering	Data from wand scans is collected continuously in an input buffer to increase throughput	Software	Disabled
Quiescent State of the Address Lines	The quiescent state of processor memory bus address lines A8, A9, and A10 can be defined for additional I/O interfacing	Software	High

Summary of Features and Configurations (contd.)

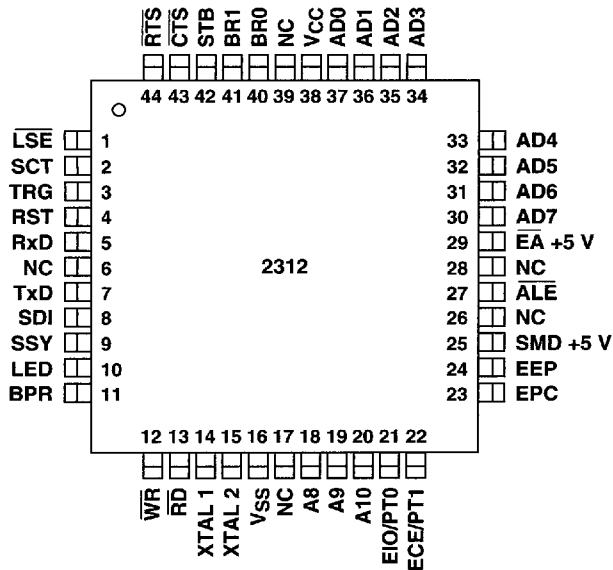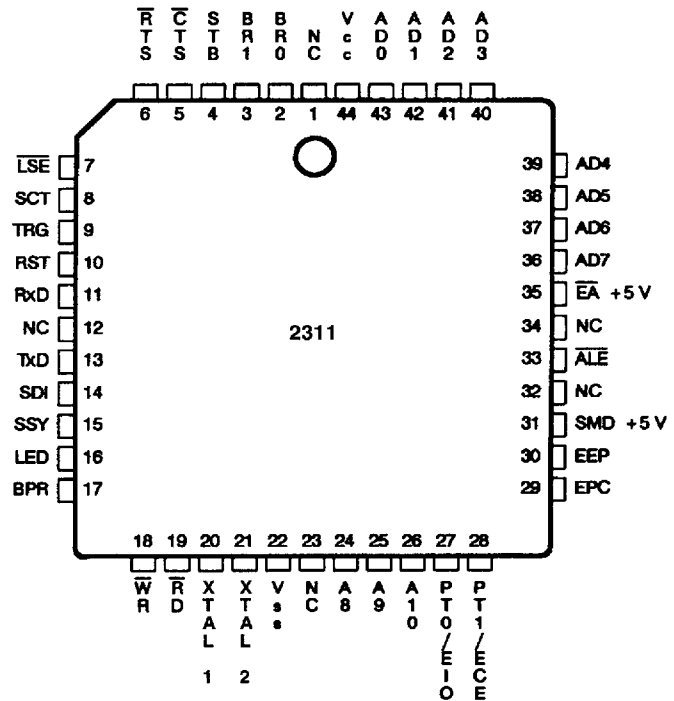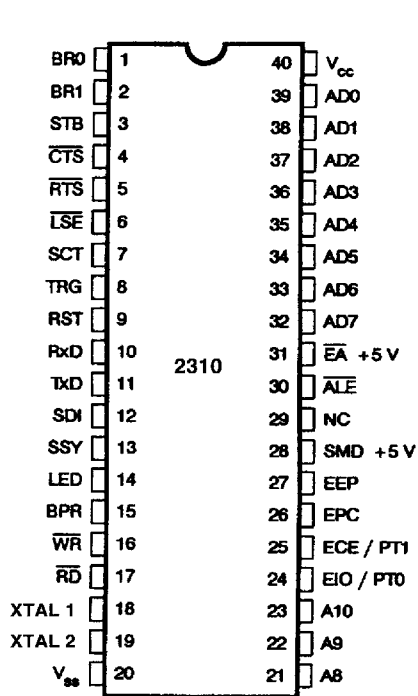| Feature	Function or Value	Selection	Default Setting
Message Editing	Allows reformatting of data before transmission to the host. There are 4 different editing commands: • Insert a specified character • Delete a character and save it • Insert the last saved character • Repeat an instruction.	Software	Disabled
Local Lockout	Disables the ability to program using bar code menus	Software	Disabled
CCD Flash Mode	Allows a CCD attached to the IC to reduce power by flashing the LEDs until a label is in the field of view.	Software	Disabled

Summary of Commands

Features	Description
Scanner Enable	When enabled the data from the wand or laser are decoded; otherwise, they are ignored.
Hard Reset	Resets the IC as though it were just powered up.
Firm Reset	Same as a hard reset, except that no self test are done.
Soft Reset	Clears pacing conditions, errors.
Status Requests	Causes the IC to transmit one of several status requests. See manual for details.
Sound Tone	The IC sounds a tone at the selected pitch for about 100 milliseconds.
Configuration Control	There are three operations that manipulate the IC configuration • Set Default Configuration • Save configuration in non-volatile memory • Recall non-volatile configuration
Execute Pending Command	For use in Laser Mode, this command causes the immediate execution of previous commands that would otherwise be postponed until a laser scan finishes.

Summary of Other Features

Feature	Description
Power Idle Mode	Reduces the current draw of the IC from 18 mA to 4 mA in wand mode, or in laser mode when laser idling is enabled.
Laser Failure Timeout	Turns the laser off if the Scan Sync signal is missing after approximately 1 second, sets the laser failure status bit.
Self Test Failure Message	An appropriate message is transmitted at power up if a self test fails • ROM SELF TEST FAILED • RAM SELF TEST FAILED • EEPROM SELF TEST FAILED
EEPROM Fault Recognition	An appropriate message is transmitted at power up if the EEPROM checksum is incorrect • EEPROM FAULT

Serial Pinout

2310

Pin		Pin	
BR0	1	40	Vcc
BR1	2	39	AD0
STB	3	38	AD1
$\overline{\text{CTS}}$	4	37	AD2
$\overline{\text{RTS}}$	5	36	AD3
$\overline{\text{LSE}}$	6	35	AD4
SCT	7	34	AD5
TRG	8	33	AD6
RST	9	32	AD7
RxD	10	31	$\overline{\text{EA}}$ +5 V
TxD	11	30	$\overline{\text{ALE}}$
SDI	12	29	NC
SSY	13	28	SMD +5 V
LED	14	27	EEP
BPR	15	26	EPC
$\overline{\text{WR}}$	16	25	ECE / PT1
$\overline{\text{RD}}$	17	24	EIO / PT0
XTAL 1	18	23	A10
XTAL 2	19	22	A9
Vss	20	21	A8

2311

Top pins (6,5,4,3,2,1,44,43,42,41,40): $\overline{\text{RTS}}$, $\overline{\text{CTS}}$, STB, BR1, BR0, NC, Vcc, AD0, AD1, AD2, AD3

Left pins:
$\overline{\text{LSE}}$	7	39	AD4
SCT	8	38	AD5
TRG	9	37	AD6
RST	10	36	AD7
RxD	11	35	$\overline{\text{EA}}$ +5 V
NC	12	34	NC
TxD	13	33	$\overline{\text{ALE}}$
SDI	14	32	NC
SSY	15	31	SMD +5 V
LED	16	30	EEP
BPR	17	29	EPC

Bottom pins (18,19,20,21,22,23,24,25,26,27,28): $\overline{\text{WR}}$, $\overline{\text{RD}}$, XTAL 1, XTAL 2, Vss, NC, A8, A9, A10, PT0/EIO, PT1/ECE

2312

Top pins (44,43,42,41,40,39,38,37,36,35,34): $\overline{\text{RTS}}$, $\overline{\text{CTS}}$, STB, BR1, BR0, NC, Vcc, AD0, AD1, AD2, AD3

Left/right:
$\overline{\text{LSE}}$	1	33	AD4
SCT	2	32	AD5
TRG	3	31	AD6
RST	4	30	AD7
RxD	5	29	$\overline{\text{EA}}$ +5 V
NC	6	28	NC
TxD	7	27	$\overline{\text{ALE}}$
SDI	8	26	NC
SSY	9	25	SMD +5 V
LED	10	24	EEP
BPR	11	23	EPC

Bottom pins (12,13,14,15,16,17,18,19,20,21,22): $\overline{\text{WR}}$, $\overline{\text{RD}}$, XTAL 1, XTAL 2, Vss, NC, A8, A9, A10, EIO/PT0, ECE/PT1

PIN MNEMONICS	
AD0-AD7	ADDRESS / DATA BUS
RxD	RECEIVED DATA
TxD	TRANSMITTED DATA
BR0-BR1	BAUD RATE
PT0-PT1	PARITY
STB	STOP BITS
$\overline{\text{LSE}}$	LASER SCAN ENABLE
SCT	SCANNER TYPE
SDI	SCANNER DIGITAL INPUT
LED	LED CONTROL LINE
BPR	BEEPER CONTROL LINE
$\overline{\text{WR}}$	DATA MEMORY WRITE
$\overline{\text{RD}}$	DATA MEMORY READ
XTAL 1	CRYSTAL INPUT
XTAL 2	CRYSTAL INPUT
SMD	SERIAL MODE SELECT
$\overline{\text{RTS}}$	REQUEST TO SEND
$\overline{\text{CTS}}$	CLEAR TO SEND
RST	IC RESET
EEP	EEPROM SELECT
EPC	EEPROM CLOCK
ECE	EEPROM CHIP ENABLE
EIO	EEPROM I/O
TRG	LASER TRIGGER LINE
SSY	SCANNER SYNCHRONIZATION
A8	ADDRESS LINE 8
A9	ADDRESS LINE 9
A10	ADDRESS LINE 10
$\overline{\text{EA}}$	EXTERNAL PROGRAM ENABLE
$\overline{\text{ALE}}$	ADDRESS LATCH ENABLE
Vcc	POWER
Vss	GROUND

4447584 0013511 832

Parallel Pinout

2310 (DIP package)

Pin	Name		Pin	Name
1	CRD		40	Vcc
2	CDY		39	AD0
3	DWR		38	AD1
4	DDY		37	AD2
5	RTS		36	AD3
6	LSE		35	AD4
7	SCT		34	AD5
8	TRG		33	AD6
9	RST		32	AD7
10	PGB		31	EA +5 V
11	PDR		30	ALE
12	SDI		29	NC
13	SSY		28	SMD 0 V
14	LED		27	EEP
15	BPR		26	EPC
16	WR		25	ECE / PT1
17	RD		24	EIO / PT0
18	XTAL 1		23	A10
19	XTAL 2		22	A9
20	Vss		21	A8

2311 (PLCC package)

Top pins (left to right): RTS, DDY, DWR, CDY, CRD, NC, Vcc, AD0, AD1, AD2, AD3
Top pin numbers: 6 5 4 3 2 1 44 43 42 41 40

Pin	Name		Pin	Name
7	LSE		39	AD4
8	SCT		38	AD5
9	TRG		37	AD6
10	RST		36	AD7
11	PGB		35	EA +5 V
12	NC		34	NC
13	PRD		33	ALE
14	SDI		32	NC
15	SSY		31	SMD 0 V
16	LED		30	EEP
17	BPR		29	EPC

Bottom pin numbers: 18 19 20 21 22 23 24 25 26 27 28
Bottom pins: WR, RD, XTAL 1, XTAL 2, Vss, NC, A8, A9, A10, PT0/EIO, PT1/ECE

2312 (PLCC package)

Top pins (left to right): RTS, DDY, DWR, CDY, CRD, NC, Vcc, AD0, AD1, AD2, AD3
Top pin numbers: 44 43 42 41 40 39 38 37 36 35 34

Pin	Name		Pin	Name
1	LSE		33	AD4
2	SCT		32	AD5
3	TRG		31	AD6
4	RST		30	AD7
5	PGB		29	EA +5 V
6	NC		28	NC
7	PRD		27	ALE
8	SDI		26	NC
9	SSY		25	SMD 0 V
10	LED		24	EEP
11	BPR		23	EPC

Bottom pin numbers: 12 13 14 15 16 17 18 19 20 21 22
Bottom pins: WR, RD, XTAL 1, XTAL 2, Vss, NC, A8, A9, A10, EIO/PT0, ECE/PT1

PIN MNEMONICS	
AD0-AD7	ADDRESS / DATA BUS
DWR	DATA WRITE HANDSHAKE
DDY	READY FOR DATA HANDSHAKE
CRD	COMMAND READ HANDSHAKE
CDY	COMMAND READY HANDSHAKE
PT0-PT1	PARITY
LSE	LASER SCAN ENABLE
SCT	SCANNER TYPE
SDI	SCANNER DIGITAL INPUT
LED	LED CONTROL LINE
BPR	BEEPER CONTROL LINE
WR	DATA MEMORY WRITE
RD	DATA MEMORY READ
XTAL 1	CRYSTAL INPUT
XTAL 2	CRYSTAL INPUT
SMD	SERIAL MODE SELECT
RTS	REQUEST TO SEND
PGB	TRANSCEIVER DRIVE ENABLE
PDR	TRANSCEIVER DIRECTION CONTRL
RST	IC RESET
EEP	EEPROM SELECT
EPC	EEPROM CLOCK
ECE	EEPROM CHIP ENABLE
EIO	EEPROM I/O
TRG	LASER TRIGGER LINE
SSY	SCANNER SYNCHRONIZATION
A8	ADDRESS LINE 8
A9	ADDRESS LINE 9
A10	ADDRESS LINE 10
EA	EXTERNAL PROGRAM ENABLE
ALE	ADDRESS LATCH ENABLE
Vcc	POWER
Vss	GROUND

Serial Mode Schematic
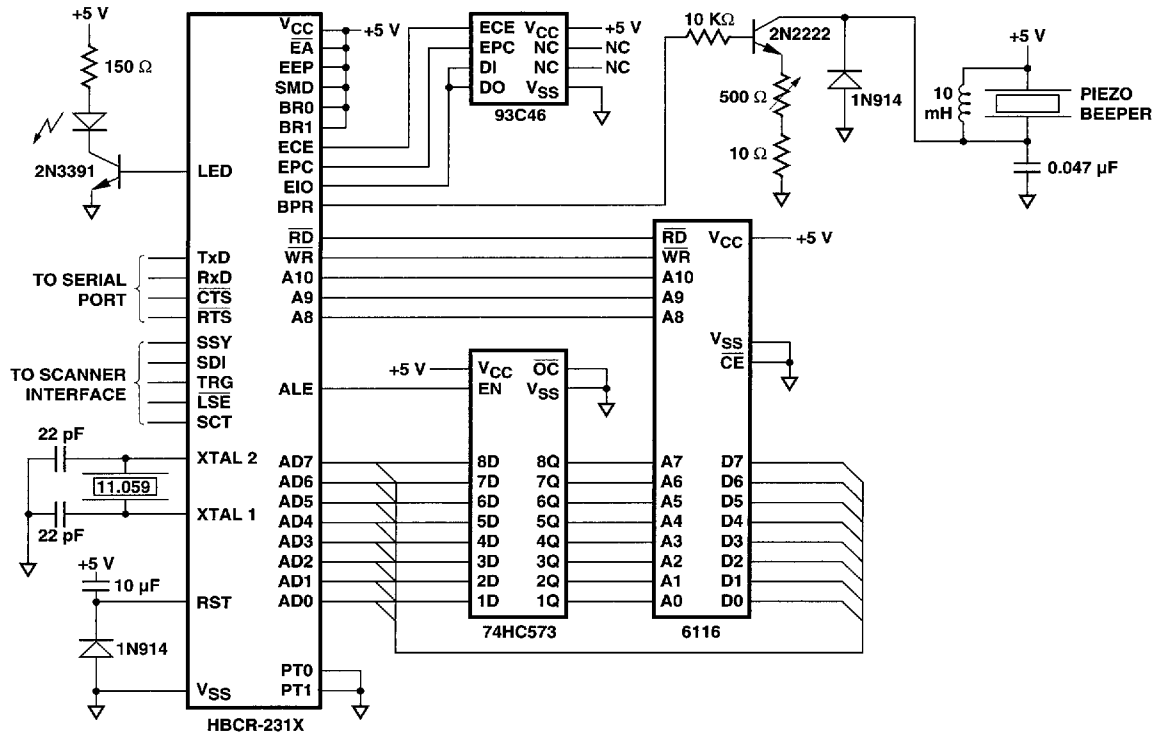


Parallel Mode Schematic

4447584 0013513 605
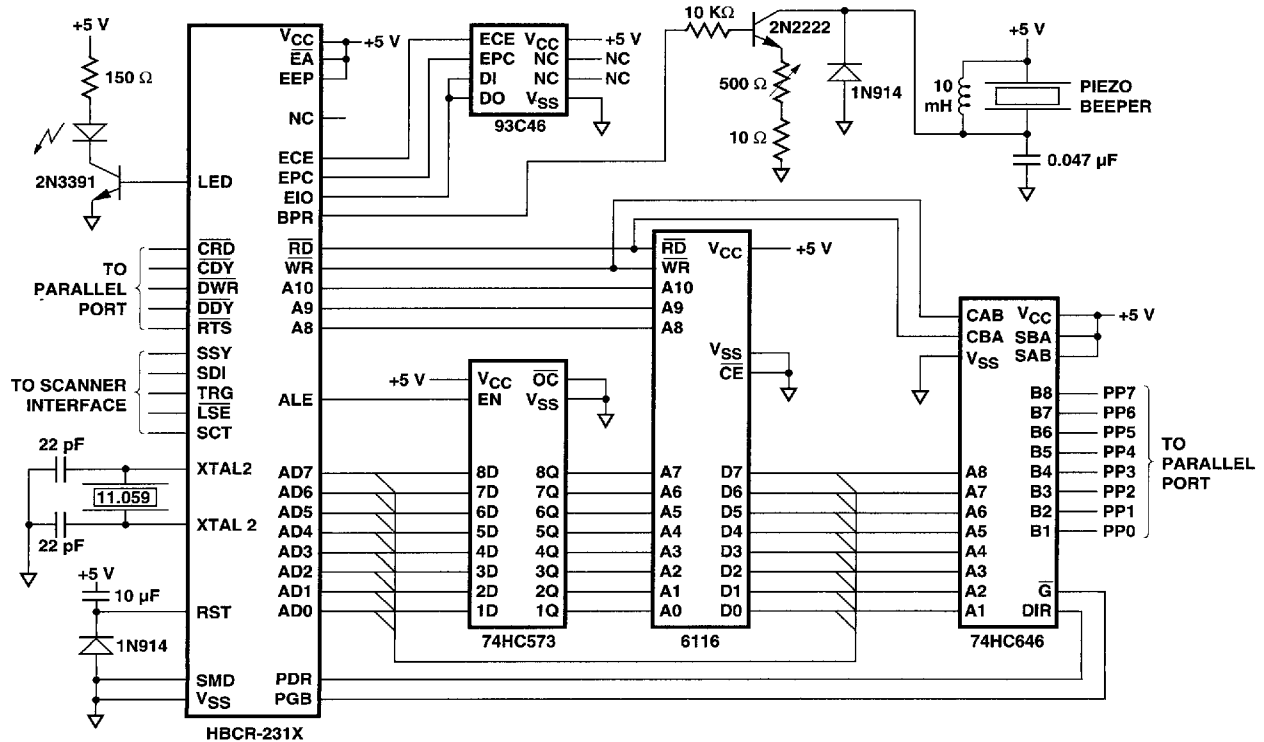
Parallel Mode I/O Handshake
Commands received by the IC
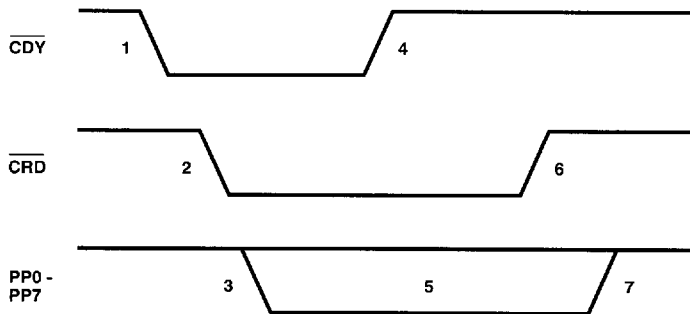
Protocol

1. The host indicates that a command is pending by lowering $\overline{\text{CDY}}$.
2. The IC indicates that it is ready for a command by lowering $\overline{\text{CRD}}$.
3. The host outputs the command onto the data bus.
4. The host indicates that the data is stable by raising $\overline{\text{CDY}}$.
5. The IC reads the command from the bus.
6. The IC indicates that the command was accepted by raising $\overline{\text{CRD}}$.
7. The host removes the command from the data bus.

Data transmitted from the IC
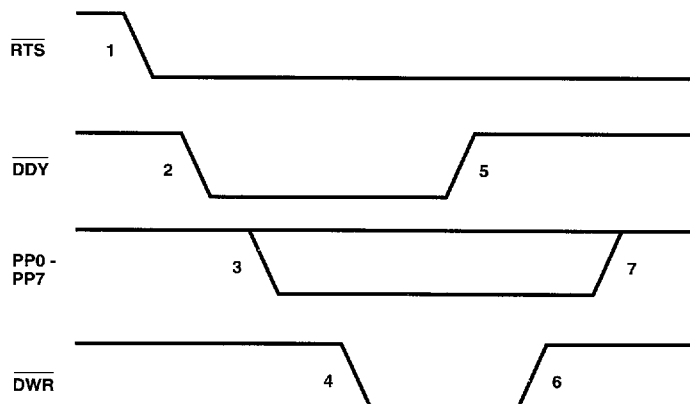
Protocol

1. The IC indicates data is ready to be transmitted by lowering $\overline{\text{RTS}}$; $\overline{\text{RTS}}$ stays low until the last byte has been transmitted.
2. The host signals the IC that it is ready for data by lowering $\overline{\text{DDY}}$.
3. The IC outputs data onto the bus.
4. The IC indicates that the data is stable by lowering $\overline{\text{DWR}}$.
5. The host acknowledges that the data is received by raising $\overline{\text{DDY}}$.
6. The IC indicates the end of the output cycle by raising $\overline{\text{DWR}}$.
7. The IC removes the data from the bus.

Escape Sequences

The following set of escape sequences can be used to control the IC and change the default configuration. Detailed information on how to formulate and use the escape sequences is given in the Users Manual.

Escape Sequence	Description
E_C -y \<n> A < 1 character>	IC Address Selection
E_C -y \<n> b	Good Read Beep Selection
E_C -y \<n> c	Various Options Selection
E_C -y \<n> d	Transmitted Character Delay
E_C E	Hard Reset
E_C -y \<n>E\<edit commands>	Message Editing
E_C -y \<n> f	Code Type Selection
E_C -y \<n> g	Check Character Selection
E_C -y \<n> h	Decoding Options
E_C -y \<n> I <1 character>	Code ID Character
E_C -y \<n> j	Single Read Mode Selection
E_C -y \<n> k	Single Read Control
E_C -y \<n> l	LED Configuration and Control
E_C -y \<n> m	Int. 2 of 5 Message Length
E_C -y \<n> N \<n characters>	Header Selection
E_C -y \<n> O \<n characters>	Trailer Selection
E_C -y \<n> p	Serial Port Configuration
E_C -y \<n> q	Various Options
E_C -y \<n> r	Laser Scanning Options
E_C -y \<n> s	Status Requests
E_C -y \<n> t	Sound Tone
E_C -y \<n>,\<i>,\<j> U	Message Length Limits
E_C -y \<n> v	Laser Shutoff Delay Selection
E_C -y \<n> w	Scanner Enable
E_C -y \<n> x	XON/XOFF Pacing Enable
E_C -y \<n> Y \<n characters>	No-Read Message Selection
E_C -y \<n> z	Reset and Configuration
E_C + y \<n> c	Transmission and Feedback
E_C + y \<n> e	Wand Emulation Options
E_C + y \<n> h	Code 39 Label Framing
E_C + y \<n> r	CCD Read Modes

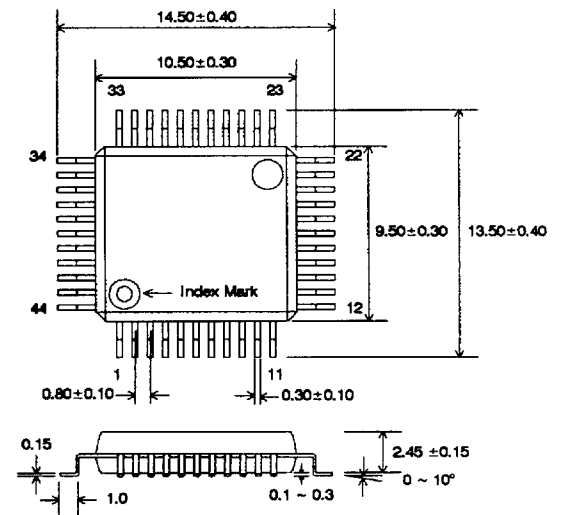## Mechanical Specifications – Units (mm)

HBCR-2310
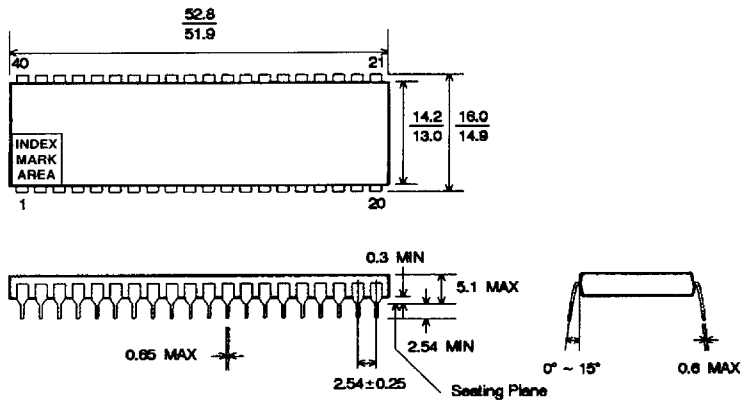
HBCR-2311
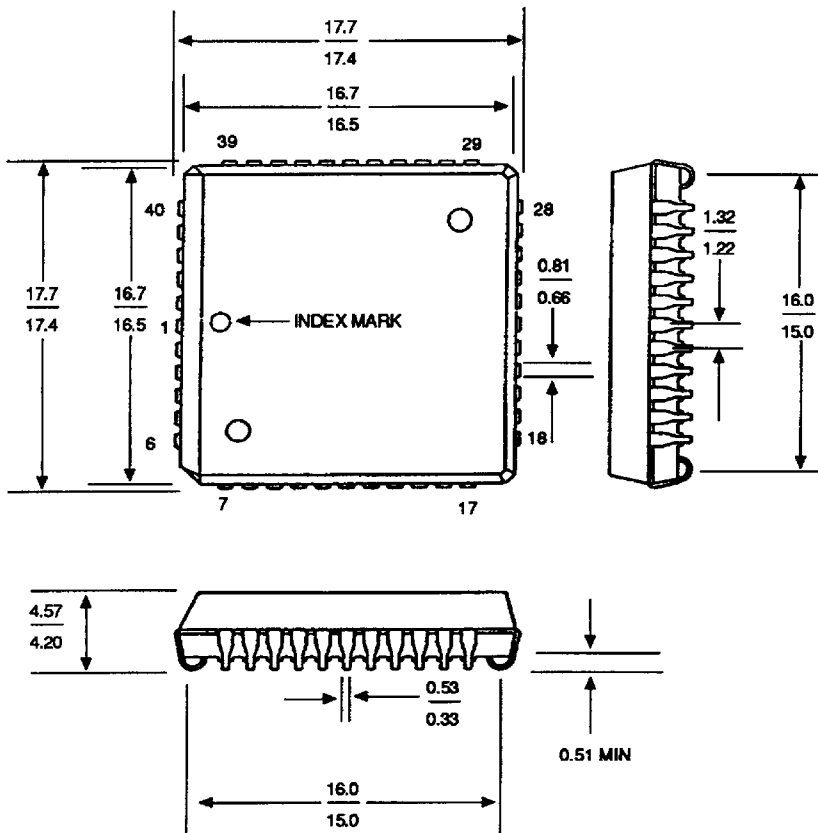
HBCR-2312

Warranty and Service

HP Digitizer ICs are warranted
for a period of one year after
purchase covering defects in
material and workmanship.
Hewlett-Packard will repair or, at
its option, replace products that
prove to be defective in material
or workmanship under proper
use during the warranty period.

NO OTHER WARRANTIES ARE
EXPRESSED OR IMPLIED,
INCLUDING BUT NOT LIMITED
TO THE IMPLIED WARRANTIES
OF MERCHANTABILITY AND
FITNESS FOR A PARTICULAR
PURPOSE. HEWLETT-PACKARD
IS NOT LIABLE FOR
CONSEQUENTIAL DAMAGES.

For additional warranty or service
information, please contact your
local Hewlett-Packard sales
representative or authorized
distributor.

/4

4447584 0013517 250

5C578 Y