

uVI[™]
User Documentation

Universal Validator Interface
Part Number 990-uVI-UCT-02B

Version 02B
June 21, 2005



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!!!IMPORTANT NOTE!!

This document refers to version 02B of the uVI board. 02B is the combination of PCB version 02 and its build options. Other versions of the PCB may differ from the details presented in this document. Please refer to the correct documentation for your specific hardware (see 'Revision History' on page 8).

Legal Statement

The uVI PCB is copyright © & trademark ™ 2003-05 by UltraCade Technologies, All Rights Reserved. The uVI PCB and algorithms are Patent Pending. uVI is a trademark of UltraCade Technologies.

Package Contents

- User Documentation
- Serial Cable (DB9) 6ft
- Free Gift Offer Card
- uVI PCB
- Bill Validator Cable (2-wire) 4ft
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Overview

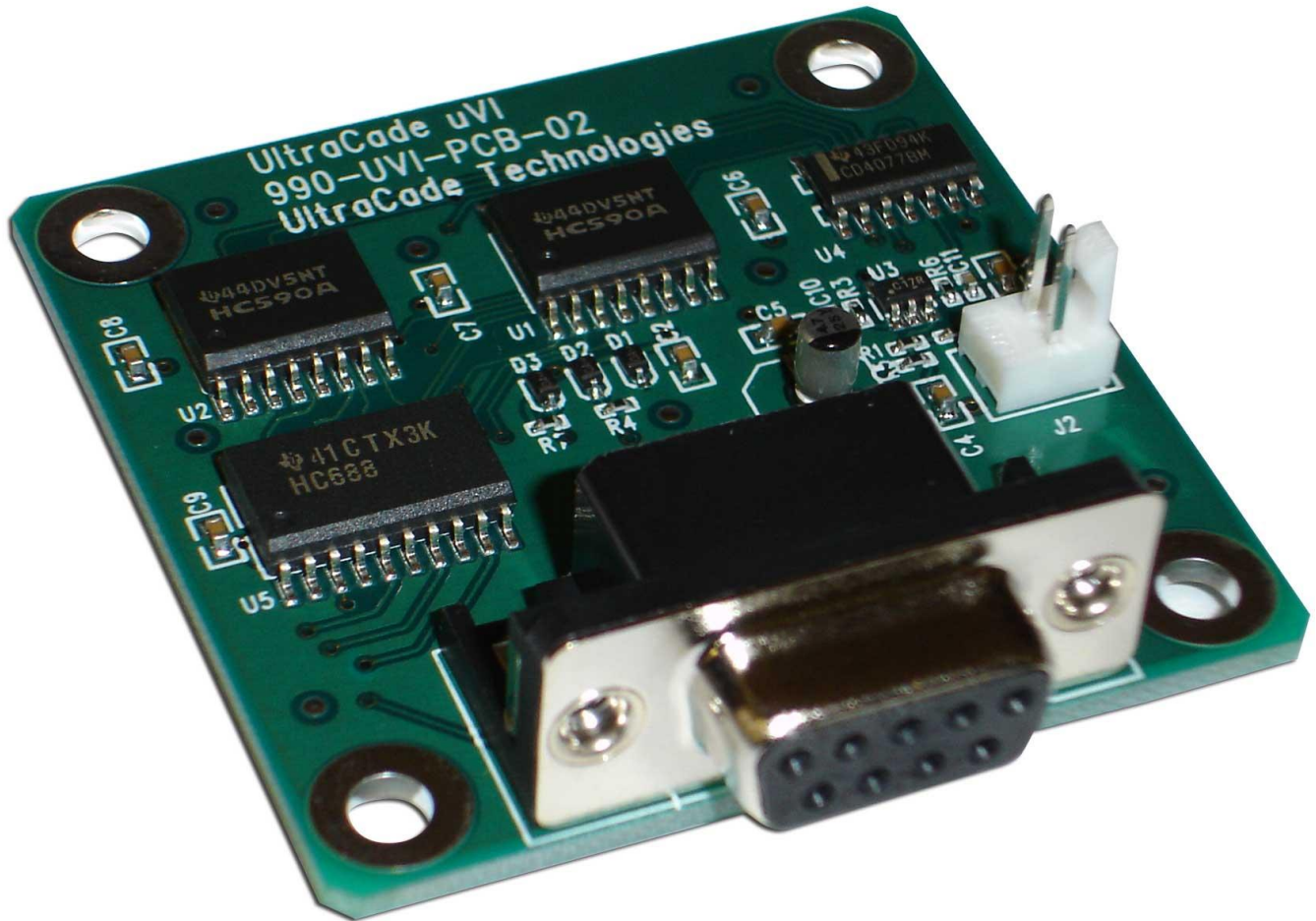
The uVI interface card is part of UltraCade Technologies' series of arcade and vending machine interface cards for PCs. For more information and a full list of current products, please go to www.ultracade.com.

The Universal Validator Interface is a board that allows you to connect any bill validator to a PC via the RS-232 serial port. PCs are unreliable in real-time applications. While a PC is usually ready to receive data, it cannot be relied upon. In most applications this is not a critical drawback. However, where money is concerned, there can be no doubt. The uVI provides a real-time interface to standard bill acceptors so that a PC will never miss a single deposit.

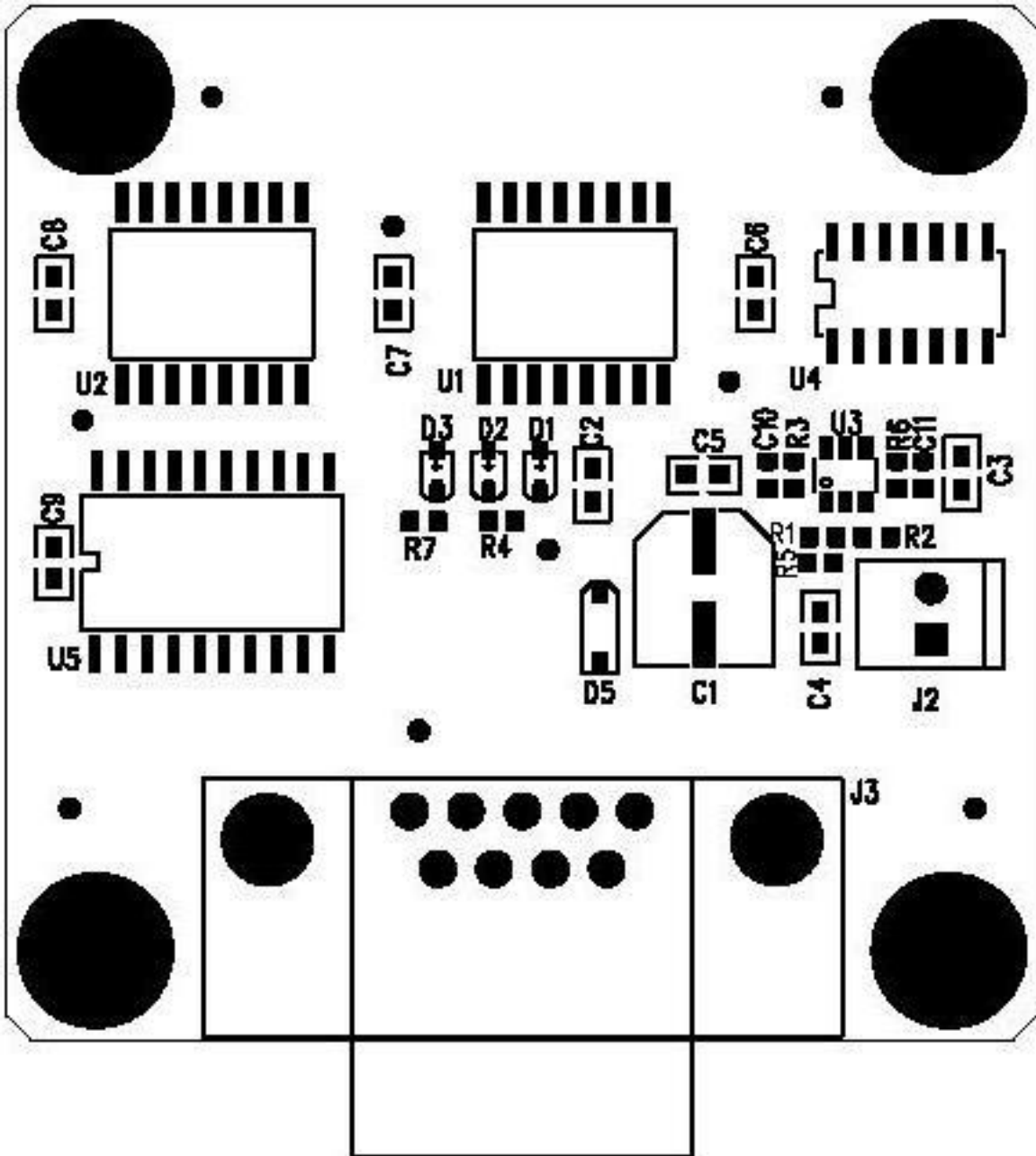
The uVI constantly monitors the bill acceptor and counts up credits when they are registered. The PC can then read in the credits whenever it is ready to do so. The uVI provides a standard serial interface (DB9) for simple integration into any PC system.

There is also no perceptible delay introduced by the uVI, just the peace of mind that no deposits are missed due to the PC's serial port sampling frequency or the task scheduling in today's multi-tasking operating systems.

Board Image



Board Layout





Power

The uVI draws power from the PC serial port, no other power supply is required. Pin 4 (DTS - Data Terminal Ready) is designated as the power line, however, the uVI board only requires one of its inputs to be high to be fully functional.

The uVI requires +5v to function correctly. Unfortunately, serial port voltage levels are not strictly regulated. The uVI therefore performs rudimentary +5v voltage regulation on the three input signals (RTS, DTS and Tx), while also ensuring that there is no reverse current draw on the DTS and Tx signals.

Communication

The uVI utilizes the standard serial signals that are used in traditional modem applications. However, the communication method is far simpler. The uVI stores the credits indicated by the bill acceptor, and sets a flag for the PC showing whether there are any stored credits or not. If there are stored credits, the PC reads them until none remain.

The uVI can store credits up to maximum of 255. When 256 more credits have been received than have been read out, an overflow will occur and the uVI will indicate that no credits remain.

The DB9 signals are shown in the table below, along with their traditional usage in a modem application, and their usage in the uVI.

Pin	Std ID	Standard Usage	PC Dir	uVI Usage	Default Level
1	ID	Data Carrier Detect	In	n/c	n/a
2	Rx	Receive Data	In	n/c	n/a
3	Tx	Transmit Data	Out	Clear	+5v
4	DTR	Data Terminal Ready	Out	Power	+5v
5	Gnd	Ground (signal)	n/a	Ground	0v
6	DSR	Data Set Ready	In	n/c	n/a
7	RTS	Request To Send	Out	Read Credit	+5v
8	CTS	Clear To Send	In	Credit Left	n/a
9	Ring	Ring Indicator	In	n/c	n/a

Depending on the sampling interval of the PC and the scheduling frequency of the multi-tasking operating system, there would normally be no perceptible delay between the bill acceptor transmitting a credit to the uVI and the PC reading that credit from the uVI. The uVI will indicate the presence of a credit to the PC nano-seconds after receiving that data from the bill acceptor.



The data flow of the uVI board is easily shown by an example. The example assumes that all hardware is correctly connected and the bill acceptor is set to one pulse per dollar. A typical series of events in the life of a uVI board are shown below along with the signaling events.

Event	Description	CTS	(Credit)
DTR set	Power applied to uVI	unknown	(unknown)
RTS set	Credit read signal initialized	unknown	(unknown)
Tx clear	uVI credit store cleared	0	(0)
Tx set	INITIALISATION COMPLETE	0	(0)
\$1 deposit	J2 shorted for ~50ms	1	(1)
\$1 deposit - start	J2 shorted for ~10ms	1	(1)
RTS clear	Credit read while J2 shorted	1	(1)
\$1 deposit - end	J2 no longer shorted after ~50ms	1	(2)
RTS set	Credit read finished	1	(1)
RTS clear	Credit read while J2 shorted	1	(1)
RTS set	Credit read finished	0	(0)

As can be seen from the event list above, even when reads and writes overlap, no data corruption occurs. The uVI status indicator is not updated until after the credit read has completed, however, this update is approximately 15 nano-seconds after the end of the read. After a read has fully completed, the PC should pole the uVI status indicator again to see if any additional credits remain.

PCB Connectors

This section provides the part numbers and pin assignments for the mating connectors to all of the connectors on the PCB.

PCB Ref	PCB Connector Description	Required Mate Description	Parts Required	Supplier	Part Number	Inc. in packet
J1	Alt Serial Port	<removed>	n/a	n/a	n/a	no
J2	Bill acceptor	Female, 2-pin 100mil header Pin1 - Credit relay Pin2 - Ground	2-wire, 1 ended 4ft 1 x Female housing 2 x Female terminal	UltraCade Molex Molex	115-2W1CON-CBL 22-01-2027 08-50-0108	yes no no
J3	Serial Port	Male, D-Sub 9-pin Standard serial	Std serial cable 6ft	UltraCade	115-SERIAL-CBL	yes

Revision History

- Version 02A. PCB version 02:
 - 4/26/2004, DRF. Original Version.
 - 6/24/2004, DRF. Update SDK so that power on function is always called during initialization. Removed Power On / Power Off toggle from UI.
 - 3/04/2005, DT. Added C# demo program and source code to SDK.
- Version 02B. PCB version 02:
 - 6/21/2005, DT. Re-formatted whole document to new UltraCade standards. Changed document title from "System Development Kit" to "User Documentation". Removed demo program source code. Complete rewrite of all sections.

Contact Information

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