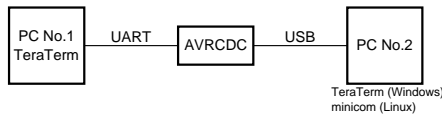


The AVR-CDC Evaluation Report (ATmega48)

1. Test Scheme 1.1 Connection



8N1, FlowControl: none
No other USB devices connected to the target Host Controller on PC No.2.

- ### 1.2 Procedure
- (1) Transmit text data (670kB) from PC1 to PC2.
 - (2) Transmit the received text on PC2 back to PC1.
 - (3) Compare the returned text.
 - (4) Repeat (1)-(3) 3 times.

2. Result - Rx Interrupt

PC No.1: NT-5000 (EPSON DIRECT) Mobile Pentium4 2GHz, RAM512MB, Windows2000 SP4

Model (PC No.2)	Vendor	PC Spec.	OS / Driver (Version)	USB Host Controller Driver	USB Interface		USB Host Controller	Result	Max. Baudrate (Half duplex)	Max. Baudrate (Full duplex)	Cause			
MX4GER	AOpen	Pentium4 2.4GHz RAM 512MB	KNOPPIX 3.7 Kernel 2.4.27 acm.c : v0.21	usb-uhci.c Rev 1.275	on-board	SouthBridge	Intel 845G(ICH4)	OK	38.4kbps	*5				
				usb-ohci.c v5.3	RATOC REX-PCIU3	PCI	NEC uPD720101	OK	57.6kbps	*5				
				usb-uhci.c Rev 1.275	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202	OK	38.4kbps	*5				
				usb-uhci.c Rev 1.275	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L	OK	38.4kbps	*5				
				usb-ohci.c v5.3	ALI USB2ALI1-B01	PCI	ALI M5273	OK	57.6kbps	*5				
				uhci.c v1.1	IODATA CBUS2L	CardBus	VIA VT6212L	OK	38.4kbps	*5				
				usb-ohci.c v5.3	UnionBros UBH004	CardBus	OPTI 82C861	OK	57.6kbps	*5				
				usb-ohci.c v5.3	RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	57.6kbps	*5				
				usb-ohci.c v5.3	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	57.6kbps	*5				
				KNOPPIX 5.0.1 Kernel 2.6.17	uhci_hcd.c v3.0	on-board	SouthBridge	Intel 845G(ICH4)	NG *1	-	-	Low speed bulk transfer prohibited in uhci_hcd.c.		
					ohci_hcd.c 2005 April 22	RATOC REX-PCIU3	PCI	NEC uPD720101	OK	19.2kbps	*5			
					uhci_hcd.c v3.0	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202	NG *1	-	-	Low speed bulk transfer prohibited in uhci_hcd.c.		
					uhci_hcd.c v3.0	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L	NG *1	-	-	Low speed bulk transfer prohibited in uhci_hcd.c.		
					ohci_hcd.c 2005 April 22	ALI USB2ALI1-B01	PCI	ALI M5273	OK	19.2kbps	*5			
					uhci_hcd.c v3.0	IODATA CBUS2L	CardBus	VIA VT6212L	NG *1	-	-	Low speed bulk transfer prohibited in uhci_hcd.c.		
			ohci_hcd.c 2005 April 22		UnionBros UBH004	CardBus	OPTI 82C861	OK	19.2kbps	*5				
			ohci_hcd.c 2005 April 22		RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	19.2kbps	*5				
			ohci_hcd.c 2005 April 22		BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	19.2kbps	*5				
			Debian 3.1_rc2 Kernel 2.6.8-2-386 usb-acm : v0.23	uhci_hcd.c with Patch	on-board	SouthBridge	Intel 845G(ICH4)	OK *2	38.4kbps	*5				
				ohci_hcd.c 2004 Feq 02	RATOC REX-PCIU3	PCI	NEC uPD720101	OK	19.2kbps	*5				
				uhci_hcd.c with Patch	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202	OK *2	38.4kbps	*5	Transmission may not be begun rarely.			
				uhci_hcd.c with Patch	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L	OK *2	38.4kbps	*5	Transmission may not be begun rarely.			
				ohci_hcd.c 2004 Feq 02	ALI USB2ALI1-B01	PCI	ALI M5273	OK	19.2kbps	*5	Out-data (USB->RS232C) corrupts very rarely.			
				uhci_hcd.c with Patch	IODATA CBUS2L	CardBus	VIA VT6212L	OK *2	38.4kbps	*5				
				ohci_hcd.c 2004 Feq 02	UnionBros UBH004	CardBus	OPTI 82C861	OK	19.2kbps	*5				
				ohci_hcd.c 2004 Feq 02	RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	19.2kbps	*5				
				ohci_hcd.c 2004 Feq 02	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	19.2kbps	*5				
			Windows 2000 SP4	[UHCI]	on-board	SouthBridge	Intel 845G(ICH4)	OK	38.4kbps	*3				
				[OHCI]	RATOC REX-PCIU3	PCI	NEC uPD720101	OK	57.6kbps	*3				
				[UHCI]	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202	OK	38.4kbps	*3				
				[UHCI]	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L	OK	38.4kbps	*3				
				[OHCI]	ALI USB2ALI1-B01	PCI	ALI M5273	OK	57.6kbps	*3				
				[UHCI]	IODATA CBUS2L	CardBus	VIA VT6212L	OK	38.4kbps	*3				
				[OHCI]	UnionBros UBH004	CardBus	OPTI 82C861	OK	57.6kbps	*3				
				[OHCI]	RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	57.6kbps	*3				
				[OHCI]	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	57.6kbps	*3				
			Windows XP SP2	[UHCI]	on-board	SouthBridge	Intel 845G(ICH4)	OK	57.6kbps	57.6kbps				
				[OHCI]	RATOC REX-PCIU3	PCI	NEC uPD720101	OK	115.2kbps	57.6kbps				
				[UHCI]	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202	OK	57.6kbps	57.6kbps				
				[UHCI]	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L	(OK)	57.6kbps	57.6kpbs *4				
				[OHCI]	ALI USB2ALI1-B01	PCI	ALI M5273	OK	57.6kbps	57.6kbps				
				[UHCI]	IODATA CBUS2L	CardBus	VIA VT6212L	(OK)	57.6kbps	57.6kpbs *4				
				[OHCI]	UnionBros UBH004	CardBus	OPTI 82C861	OK	115.2kbps	38.4kbps	Teraterm hangs at a high-speed full duplex transfer.			
				[OHCI]	RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	115.2kbps	115.2kbps				
				[OHCI]	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	115.2kbps	115.2kbps				
			WL2120	SOTEC	Mobile Celeron 1.2GHz RAM:384MB	Windows XP SP2	[OHCI]	on-board		SIS7001	OK	57.6kbps	57.6kbps	
							[UHCI]	IODATA CBUS2L	CardBus	VIA VT6212L	(OK)	19.2kbps	9600bps *4	
							[OHCI]	UnionBros UBH004	CardBus	OPTI 82C861	OK	57.6kbps	9600bps	Teraterm hangs at a high-speed (>57.6kbps) full duplex transfer.
							[OHCI]	RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	57.6kbps	57.6kbps	
							[OHCI]	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	57.6kbps	57.6kbps	
Thinkpad X20	IBM	Pentium3 700MHz RAM:384MB	Windows 2000 SP4	[UHCI]	on-board	SouthBridge	Intel 440ZXM	NG	-	*3	IN response stops because of rx interrupt.			

- *1 : may work if uhci_q.c is modified (not tested).
*2 : usb_uhci.c (v2.2) has been modified to enable bulk transfer.
*3 : In Windows2000, it seems that IN request is not issued while retrying OUT request.
*4 : Data corrupts at OUT direction (USB->RS232C) in full duplex transfer, not due to baudrate.
*5 : minicom can not receive data during transmission.

3. Result - Rx Polling

PC No.1 : NT-5000 (EPSON DIRECT) Mobile Pentium4 2GHz, RAM512MB, Windows2000 SP4

Model (PC No.2)	Vendor	PC Spec.	OS / Driver (Version)	USB Host Controller Driver	USB Interface	USB Host Controller	Result	Max. Baudrate (Half duplex)	Max. Baudrate (Full duplex)	Cause
MX4GER	AOpen	Pentium4 2.4GHz RAM 512MB acm.c : v0.21	KNOPPIX 3.7 Kernel 2.4.27	usb-uhci.c Rev 1.275	on-board	SouthBridge	Intel 845G(ICH4)			
				usb-ohci.c v5.3	RATOC REX-PCIU3	PCI	NEC uPD720101			
				usb-uhci.c Rev 1.275	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202			
				usb-uhci.c Rev 1.275	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L			
				usb-ohci.c v5.3	ALI USB2ALI1-B01	PCI	ALI M5273			
				uhci.c v1.1	IODATA CBUS2L	CardBus	VIA VT6212L			
				usb-ohci.c v5.3	UnionBros UBH004	CardBus	OPTI 82C861			
				usb-ohci.c v5.3	RATOC REX-CBU2X	CardBus	NEC uPD720101			
				usb-ohci.c v5.3	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A			
			KNOPPIX 5.0.1 Kernel 2.6.17	uhci_hcd.c v3.0	on-board	SouthBridge	Intel 845G(ICH4)			
				ohci_hcd.c 2005 April 22	RATOC REX-PCIU3	PCI	NEC uPD720101			
				uhci_hcd.c v3.0	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202			
				uhci_hcd.c v3.0	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L			
				ohci_hcd.c 2005 April 22	ALI USB2ALI1-B01	PCI	ALI M5273			
				uhci_hcd.c v3.0	IODATA CBUS2L	CardBus	VIA VT6212L			
				ohci_hcd.c 2005 April 22	UnionBros UBH004	CardBus	OPTI 82C861			
				ohci_hcd.c 2005 April 22	RATOC REX-CBU2X	CardBus	NEC uPD720101			
				ohci_hcd.c 2005 April 22	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A			
			Debian 3.1_rc2 Kernel 2.6.8-2-386	uhci_hcd.c with Patch	on-board	SouthBridge	Intel 845G(ICH4)			
				ohci_hcd.c 2004 Feq 02	RATOC REX-PCIU3	PCI	NEC uPD720101			
				uhci_hcd.c with Patch	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202			
				uhci_hcd.c with Patch	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L			
				ohci_hcd.c 2004 Feq 02	ALI USB2ALI1-B01	PCI	ALI M5273			
				uhci_hcd.c with Patch	IODATA CBUS2L	CardBus	VIA VT6212L			
				ohci_hcd.c 2004 Feq 02	UnionBros UBH004	CardBus	OPTI 82C861			
				ohci_hcd.c 2004 Feq 02	RATOC REX-CBU2X	CardBus	NEC uPD720101			
				ohci_hcd.c 2004 Feq 02	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A			
			Windows 2000 SP4	[UHCI]	on-board	SouthBridge	Intel 845G(ICH4)			
				[OHCI]	RATOC REX-PCIU3	PCI	NEC uPD720101			
				[UHCI]	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202			
				[UHCI]	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L			
				[OHCI]	ALI USB2ALI1-B01	PCI	ALI M5273			
				[UHCI]	IODATA CBUS2L	CardBus	VIA VT6212L			
				[OHCI]	UnionBros UBH004	CardBus	OPTI 82C861			
				[OHCI]	RATOC REX-CBU2X	CardBus	NEC uPD720101			
				[OHCI]	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A			
			Windows XP SP2	[UHCI]	on-board	SouthBridge	Intel 845G(ICH4)	OK	38.4kbps	19.2kbps
				[OHCI]	RATOC REX-PCIU3	PCI	NEC uPD720101	OK	38.4kbps	19.2kbps
				[UHCI]	KurotoShiko USB2.0V3-PCI	PCI	VIA VT6202	OK	38.4kbps	19.2kbps
				[UHCI]	KurotoShiko USB2.0V5-PCI	PCI	VIA VT6212L	OK	38.4kbps	19.2kbps
				[OHCI]	ALI USB2ALI1-B01	PCI	ALI M5273	OK	38.4kbps	19.2kbps
				[UHCI]	IODATA CBUS2L	CardBus	VIA VT6212L	OK	38.4kbps	19.2kbps
				[OHCI]	UnionBros UBH004	CardBus	OPTI 82C861	OK	38.4kbps	19.2kbps
				[OHCI]	RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	38.4kbps	19.2kbps
				[OHCI]	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	38.4kbps	19.2kbps
WL2120	SOTEC	Mobile Celeron 1.2GHz RAM:384MB	Windows XP SP2	[OHCI]	on-board		SIS7001	OK	19.2kbps	19.2kbps
				[UHCI]	IODATA CBUS2L	CardBus	VIA VT6212L	(OK)	19.2kbps	*2
				[OHCI]	UnionBros UBH004	CardBus	OPTI 82C861	OK	19.2kbps	19.2kbps
				[OHCI]	RATOC REX-CBU2X	CardBus	NEC uPD720101	OK	19.2kbps	19.2kbps
				[OHCI]	BUFFALO IFC-USB2CB	CardBus	NEC uPD720100A	OK	19.2kbps	19.2kbps
Thinkpad X20	IBM	Pentium3 700MHz	Windows 2000 SP4	[UHCI]	on-board	SouthBridge	Intel 4402XM	OK	19.2kbps	*1

*1 : In Windows2000, it seems that IN request is not issued while retrying OUT request.

*2 : Data corrupts at IN process in full duplex transfer, not due to baudrate.

4. Comment

(1) Windows Driver and its Version

Windows 2000 SP4 [OHCI Host Driver]
openhci.sys 5.00.2195.6675
usbd.sys 5.00.2195.6658
usbhub.sys 5.00.2195.6689
usbui.dll 5.00.2134.1

[UHCI Host Driver]
uhcd.sys 5.00.2195.6655
usbd.sys 5.00.2195.6658
usbhub.sys 5.00.2195.6689
usbui.dll 5.00.2134.1

[Serial Port Driver]
usbser.sys 5.00.2195.6655

Windows XP SP2

[OHCI Host Driver]
usbhub.sys 5.1.2600.2180
usbhci.sys 5.1.2600.2180
usbport.sys 5.1.2600.2180
usbui.dll 5.1.2600.2180

[UHCI Host Driver]
usbhub.sys 5.1.2600.2180
usbport.sys 5.1.2600.2180
usbuhci.sys 5.1.2600.2180
usbui.dll 5.1.2600.2180

[Serial Port Driver]
usbser.sys 5.1.2600.2180

(2) Linux: CDC device is recognized as /dev/ttyACM0