Interfacing to Multiple Vortex® Devices via Multiple RS-232 Devices Simultaneously

Application Note

Polycom Installed
Voice Business
Group

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Video Voice Data

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INTRODUCTION

This application note illustrates the proper procedure for using multiple RS-232 ports simultaneously on multiple EF Bussed Vortex devices. When multiple Vortex devices are linked together via the EFBus, the RS-232 ports on all linked units may be used at the same time. This means that devices such as a Control System, a PC running Vortex Conference Composer™, the Vortex Ethernet Interface, and an infrared remote control device such as the Vortex EF-IR11 may be all be connected to two or more Vortex devices simultaneously. Any command that is received by a Vortex device via RS-232 will be re-sent to other Vortex devices on the EFBus. Likewise, if a Vortex device generates a command acknowledgment, that acknowledgment will be broadcast to all linked Vortex devices. Thus, any devices that will send and/or receive RS-232 commands to Vortex devices can be connected to any type of Vortex device (Vortex EF2280, Vortex EF2241, Vortex EF2201, Vortex EF2210, or Vortex EF2211).

For more detailed information about the operation of RS-232, flow control, and other common RS-232 issues, please see the application note entitled Interfacing to Vortex Devices with RS-232.
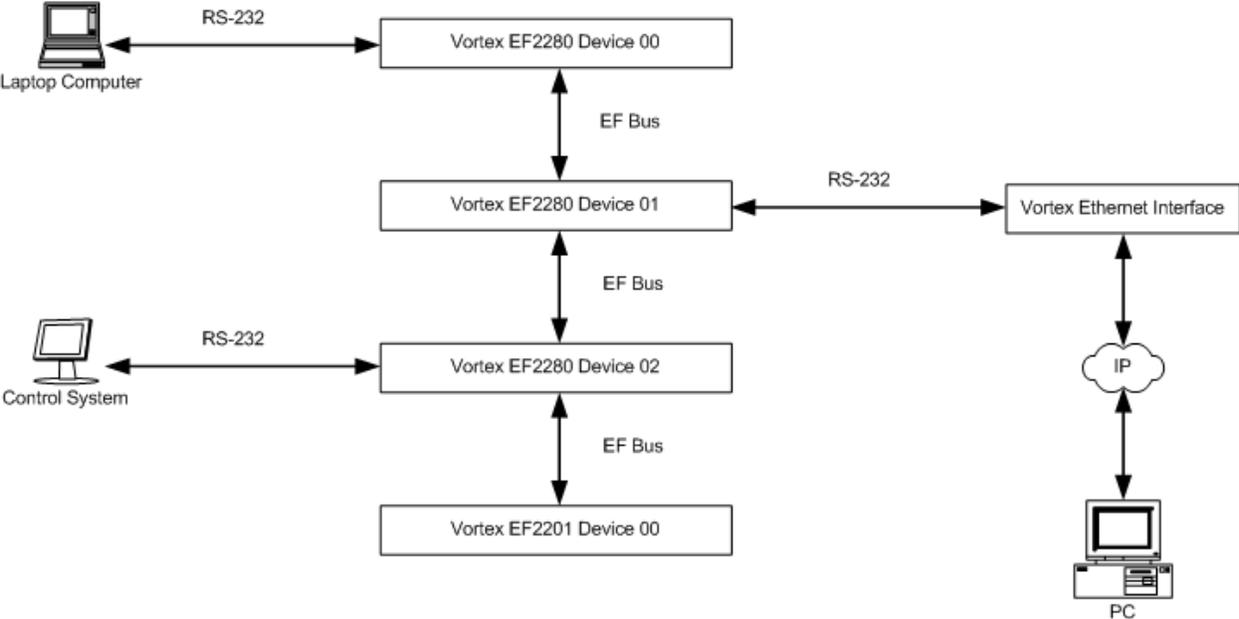
Figure 1: A typical multi-Vortex installation with multiple RS-232 ports used for a control system, a local configuration PC running Conference Composer, and a remote user using Conference Composer over TCP/IP.

RS-232 SPECIFICATIONS

The Vortex is programmed to transmit and receive RS-232 data using the following parameters:

- Baud Rate: 9600, 19200, or 38400
- Data Bits (Word Length): 8 Bits
- Parity: None
- Stop Bits: 1

The number of data, parity, and stop bits is sometimes abbreviated as 8-N-1.

INSTRUCTIONS

Once the multiple units are racked up, follow these instructions to take advantage of multiple RS-232 connections:

1. Power up the units.
2. Set the Device ID on each unit.   Go to VORTEX SYSTEM SETTINGS on the LCD display, select the Enter key, and use the Up or Down buttons to scroll down until you see DEVICE ID. The range of values is 00-07. Device ID's should be unique unless Vortex EF2280 units and Vortex EF2201 units are bussed together. These devices can share the same ID.
3. Connect the units together via the EF Bus port. Connect the EF BUS OUT of a Vortex device to the EF BUS IN of another Vortex device. After all of the units are linked together, one of the EF BUS IN and one of the EF BUS OUT ports will be unused. These ports do not need to be terminated and should not be connected together.
4. If any of the units reports a Device ID Conflict on the front panel LCD screen, repeat Step 1. Make sure that the Device ID's are unique (unless the units are Vortex EF2280's and EF2201's). Once the Device ID's are unique, the front panel error messages will go away.
5. Connect the various sources to the RS-232 ports of the linked Vortex devices. The device type does not matter, i.e. any Vortex unit will "re-broadcast" a command across the EF Bus and any Vortex unit can receive a command acknowledgment from any other unit on the EFBus.
6. Match the baud rate and flow control requirements of the RS-232 device to the baud rate and flow control settings of the Vortex device. (When communicating with a Vortex device at baud rates higher than 9600, we recommend the use of flow control between the RS-232 device and the Vortex device). Go to VORTEX SYSTEM SETTINGS on the LCD display, select the Enter key, and use the Up or Down buttons to scroll down until you see BAUD RATE. Once that parameter is set, use the Up
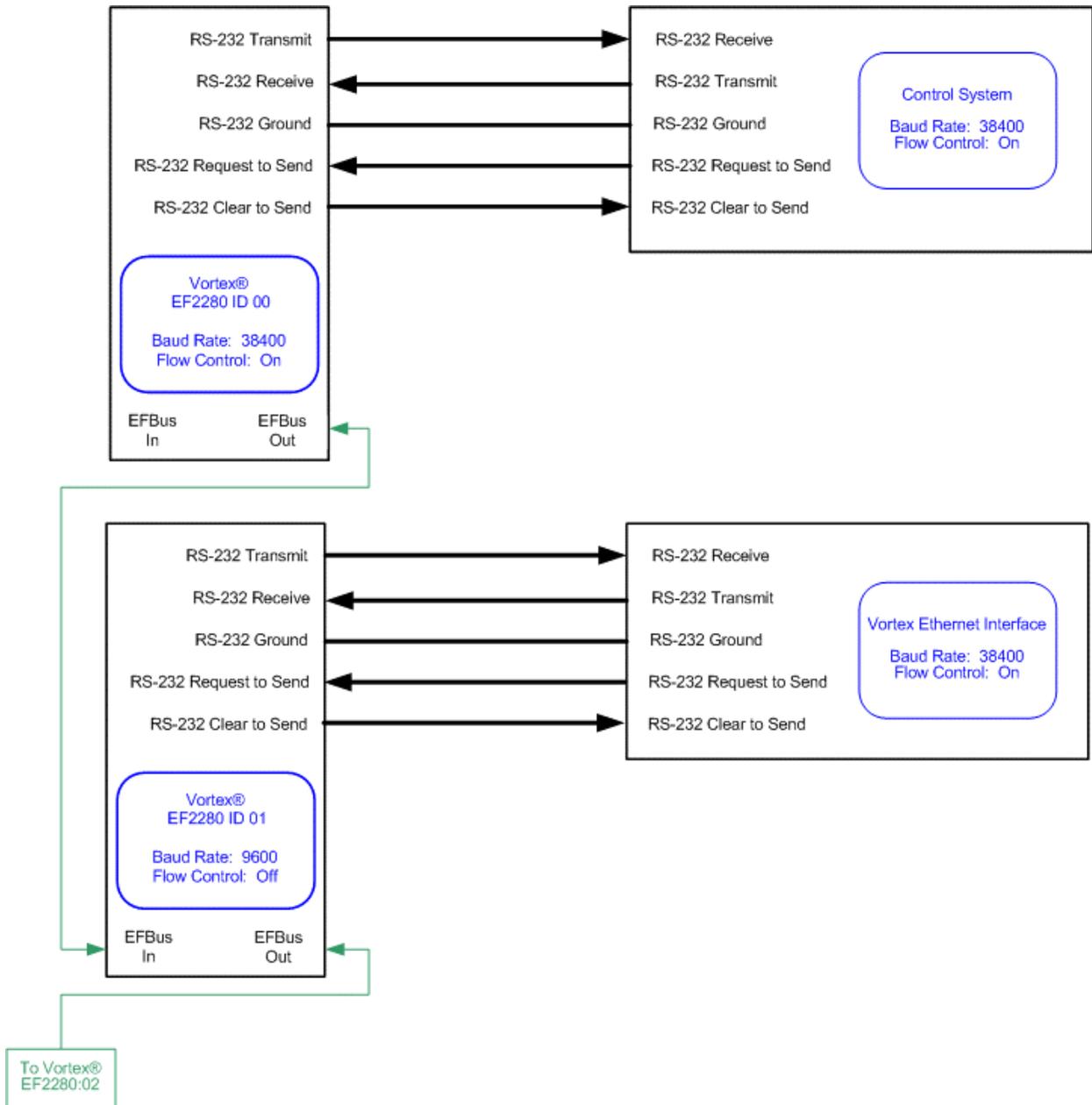
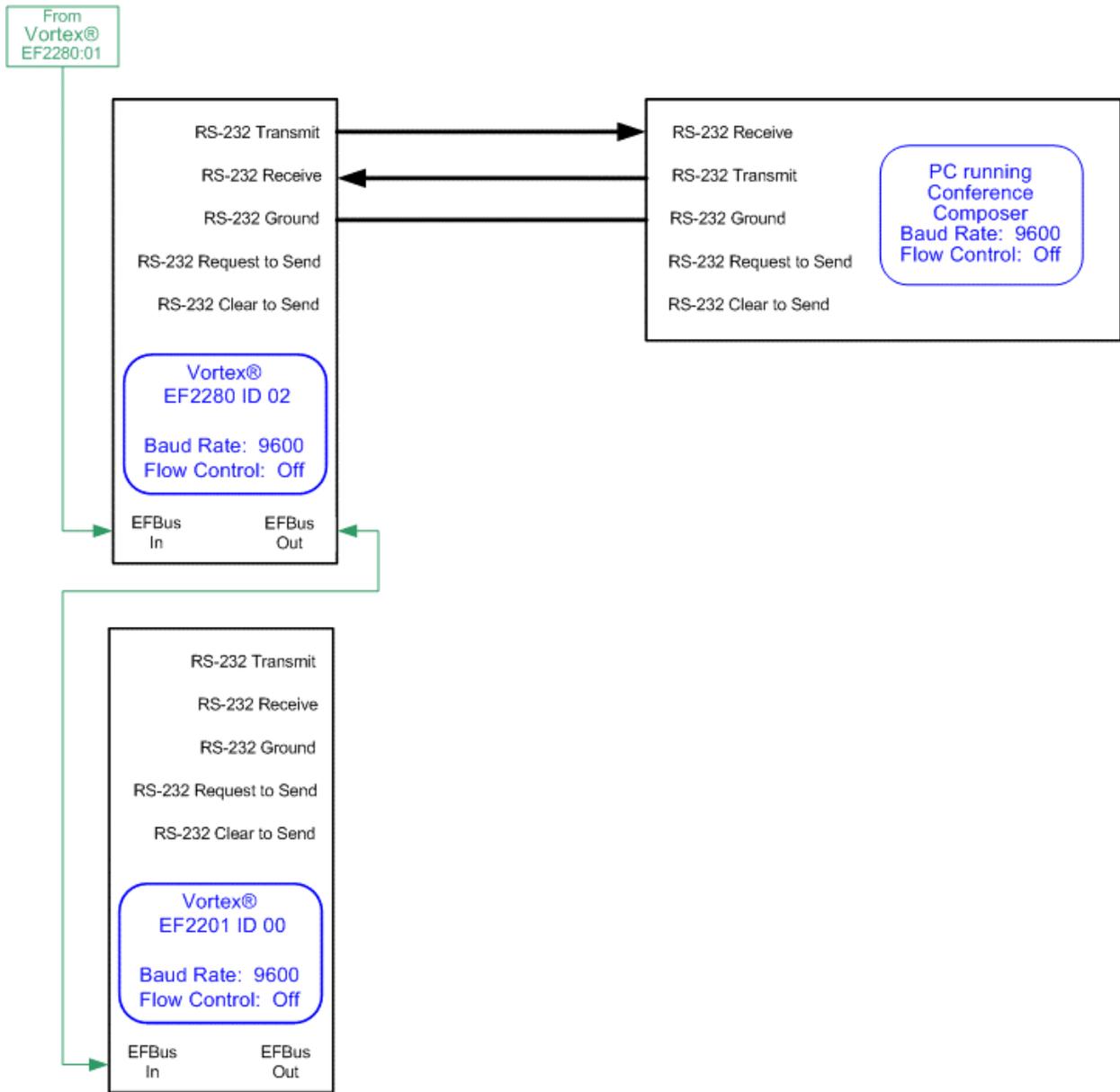or Down buttons to scroll down until you see Flow Control.

7. For multiple Vortex devices linked together via EF Bus, flow control ***only needs to be enabled on the Vortex device that will be connected to an RS-232 device that supports flow control.*** If flow control is enabled on a Vortex device that does not either have an RS-232 device or RS-232 cable that supports flow control, the transmit buffers of that Vortex device will fill up. Eventually, the device will delay the generation of acknowledgments to incoming commands while it tries to service the transmit buffer. Turning off flow control on that Vortex unit will free the buffer "log jam".

EXAMPLE

Here is a system that contains 3 Vortex EF2280 units s, 1 Vortex EF2201, 1 control system, and 1 PC running Vortex Conference Composer software. All Vortex devices will be linked together via the EF Bus. We will assume that the control system will communicate at 38400 to Vortex EF2280 Device ID 00 and that flow control will be enabled on that device. The Vortex Ethernet Interface will connect to Vortex EF2280 Device ID 01 and flow control will be enabled. The PC will be connected to Vortex EF2280 Device ID 02 but flow control will be disabled on the Vortex device because the cable will not support flow control. The Vortex EF2201 will not have any active connection via RS-232 and thus will have flow control turned off.

Vortex Device	ID	Flow Control	Rate	Connection
EF2280	00	On	38400	Control System
EF2280	01	On	38400	Vortex Ethernet Interface
EF2280	02	Off	9600	PC with Conference Composer
EF2201	00	Off	9600	No Connection

RS-232 Transmit → RS-232 Receive

RS-232 Receive ← RS-232 Transmit

RS-232 Ground — RS-232 Ground

RS-232 Request to Send ← RS-232 Request to Send

RS-232 Clear to Send → RS-232 Clear to Send

Control System

Baud Rate: 38400
Flow Control: On

Vortex®
EF2280 ID 00

Baud Rate: 38400
Flow Control: On

EFBus
In

EFBus
Out

RS-232 Transmit → RS-232 Receive

RS-232 Receive ← RS-232 Transmit

RS-232 Ground — RS-232 Ground

RS-232 Request to Send ← RS-232 Request to Send

RS-232 Clear to Send → RS-232 Clear to Send

Vortex Ethernet Interface

Baud Rate: 38400
Flow Control: On

Vortex®
EF2280 ID 01

Baud Rate: 9600
Flow Control: Off

EFBus
In

EFBus
Out

To Vortex®
EF2280:02

From
Vortex®
EF2280:01

RS-232 Transmit	RS-232 Receive
RS-232 Receive	RS-232 Transmit
RS-232 Ground	RS-232 Ground
RS-232 Request to Send	RS-232 Request to Send
RS-232 Clear to Send	RS-232 Clear to Send

PC running
Conference
Composer
Baud Rate: 9600
Flow Control: Off

Vortex®
EF2280 ID 02

Baud Rate: 9600
Flow Control: Off

EFBus   EFBus
In   Out

RS-232 Transmit

RS-232 Receive

RS-232 Ground

RS-232 Request to Send

RS-232 Clear to Send

Vortex®
EF2201 ID 00

Baud Rate: 9600
Flow Control: Off

EFBus   EFBus
In   Out

FLOW CONTROL PRIMER

This section is included as background info on flow control.

The purpose of flow control between two devices is to signal if those devices are ready to receive commands. If the units are not ready to receive commands, the input and/or output data buffers of each device could overflow, causing data loss if the flow of data is not regulated. Flow control is achieved through two separate signal lines called Request to Send and Clear to Send. If one or both devices are not ready to receive commands, then one or both of the signal lines will be de-asserted.

If a Vortex device has flow control enabled but the PC / Control System or the RS-232 cable that connects the PC / Control System does not support flow control, then the RS-232 buffers of the Vortex device will eventually fill up and will **not** be able to send data to the PC / Control System or any other RS-232 connected device. This is because the Vortex device is waiting for signal activity on the Request to Send pin. If the Vortex device receives commands via the EF Bus, then the unit will still generate an acknowledgment, but the response will be slower than normal as the unit tries to add that acknowledgment to the already full RS-232 buffer.

A cable that supports flow control is one that contains at least 5 signal conductors: one each for transmit, receive, ground, request to send, and clear to send.
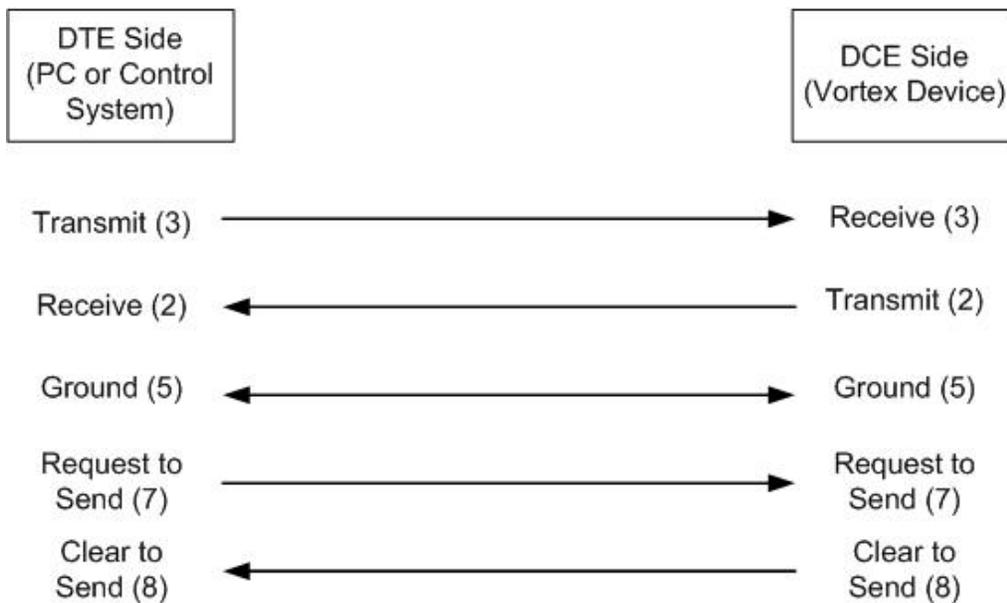
Here are some rules about flow control:

- For data transfers above 9600 baud, we recommend the use of flow control.
- If a linked Vortex device will not be connected to any other device via RS-232, do not enable flow control on that Vortex device.
- If a linked Vortex device will be connected to a device via RS-232 that does not support flow control, do not enable flow control on that Vortex device.
- If a linked Vortex device will be connected to a device via RS-232 and the cable that connects the two devices does not support flow control, do not enable flow control on that Vortex device.
- Only enable flow control if the PC / Control System supports flow control and the cable has support for the Request to Send and Clear to Send signal conductors.

TECHNICAL SUPPORT

For support on the Vortex product line, call toll-free (USA/Canada) 888-248-4143, then select option 1, then option 3.

For exclusive Integrator and Consultant focused support (through our PASS program), dial 1.408.474.2048; this number will get you help on video and Vortex products.

For general technical support, dial 1.800.POLYCOM

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