CC4003

RS-232C Control Specification

Category	:	***CD Changer***
Document Version	:	***1.00***
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Date	:	**Oct/8/2009**
Number of Page	:	**9**

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1. Introduction

1-1. Purpose

This document was written as a reference specification of products that are controled by the host controller.

1-2. Scope

This document would be using by software or hardware engineers for production of the product.

1-3. Abbreviations

Abbreviation	Description

1-4. References

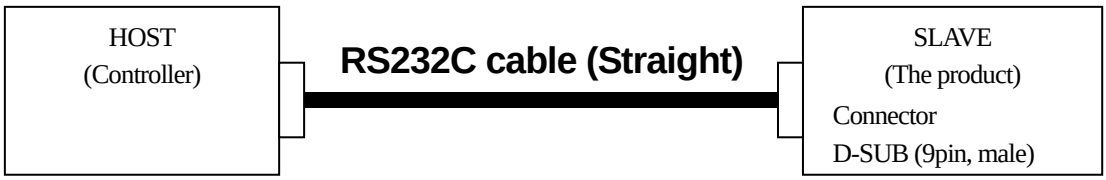
- Host I/F Command DefinitionHost Controller Interface Specification ver. 0.3

Global Description

1-5. Overview

A Host controller can control or watch out the product as a Slave very easily via the communication cable.

1-6. Block Diagram

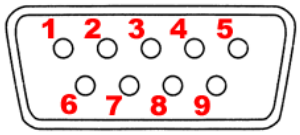


*** The product connector is using D-SUB 9pin male.**

*** RS232C cable must use D-SUB 9pin female to connect the products.**

1-7. Interface connection specification of the product

uP Interface	Signal name	Connection device	D-Sub Pin	Connecter
-	N.C.	-	1	<The product connector> RS232C D-SUB (9pin,**Male)**
UART	**TxD (output)**	**RS232C Level shift driver**	**2**	
	RxD (input)		**3**	
-	N.C.	-	4	
-	**GND**	**GND**	**5**	
-	N.C.	-	6	
-	N.C.	-	7	
-	N.C.	-	8	
-	N.C.	-	9	



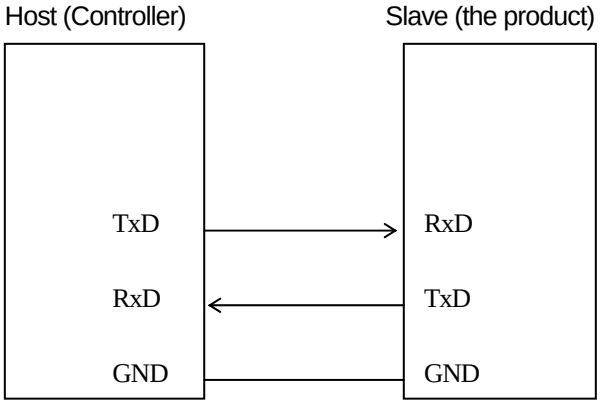
1-8. Assumptions and Dependencies

2. Detailed Description

The interface specification between the product and a Host controller is described below.

2-1. Connection format

2-1-1. Physical connection

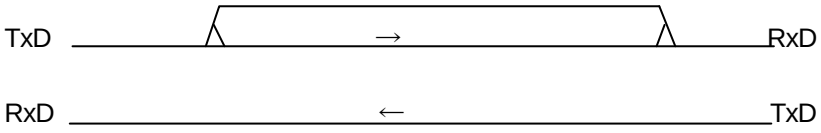


(Serial setting <RS232C basic>)

Baud Rate	: 9600bps
Data Bits	: 8bit
Parity	: None
Stop bit	: 1bit
Handshaking	: None

2-1-1-1. Data transmission sequence from Host to Slave

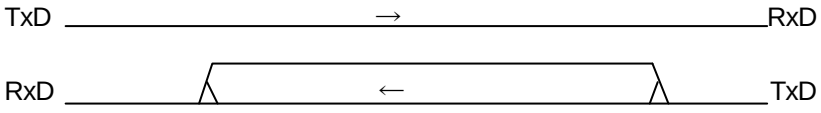
Host (Controller) Slave (The product)



1. Host starts a data transmission from TxD.
2. Host performs the data transmission of the number of required bytes, and ends a transmission.

2-1-1-2. Data transmission sequence from Slave to Host

Host (Controller) Slave (The product)



1. Slave starts a data transmission from TxD.
2. Slave performs the data transmission of the number of required bytes, and ends a transmission.

2-2. Transmission data format

2-2-1. Transmission data format from Host to Slave

There are two kinds of transmission data form from Host shown below.

2-2-1-1. Form1: Command

Command is a data that requests some status change.

Start character : '@'
COMMAND : see "Command list"
End character (CR) : 0Dh

Start	Command	End
@	"xxx:"+"..."	0Dh

2-2-1-2. Form2: Status request

Status request is a data that requests a answer of some status.

Start character : '@'
Request status : see "Status request list"
Request character : '?'
End character (CR) : 0Dh

Start	Command	End
@	"xxx:?"+"..."	0Dh

2-2-2. Transmission data format from Slave to Host

There are two kinds of transmission data form from Slave shown below.

2-2-2-1. Form1: ACK/NAK

ACK is a reply data from Slave when Slave got an acceptable command data from Host.
(ACK is sent to Host when Slave has no related status by the Command.)

Start character : '@', ACK : 06h, End character (CR) : 0Dh

Start	ACK	End
@	06h	0Dh

NAK is a reply data from Slave when Slave got an incorrect Command data, Status request data or some other data from Host.

Start character : '@', NAK : 15h, End character (CR) : 0Dh

Start	NAK	End
@	15h	0Dh

2-2-2-2. Form2: Status answer and Auto status feedback

Status answers are reply data when Slave got an acceptable Request status or Command data from Host. Auto status feedbacks are send to Host data when a Slave's status is changed.

Start character : '@'
Answer character : see "Status list"
End character (CR) : 0Dh

Start	Status	End
@	"xxx:"+"..."	0Dh

2-3. The transaction sequences and the regulations

2-3-1. The transaction sequences

The transactions have three kinds of sequence.

*A transaction is a Command from Host then Slave will be an answer by Status answer, ACK or NAK.

*A transaction is a Status request from Host then Slave will be an answer by Status answer or NAK.

*A transaction is Auto status feedback from Slave when a Slave's status changed. (If the auto status feedback is enabled.)

2-3-2. The transaction regulations

The transactions have some kinds of regulation.

* An answer (ACK, NAK or Status answer) transmittion by Slave has to finish within 500ms when got a Command or a Status request from Host.

* Host must not transmit an another Command or Status request until "it receives a answer by a previous Command or Status request" or "it passes a term of waitinng time from a finishing of previous transmission of a Command or a Status request ".

* Slave has to finish a transaction under 500ms when it sends Auto status feedback data.

2-3-3. Specification of Auto status feedback

There are some specific regulations about Auto status feedback.

* The product status has segmented into **four layers of 1, 2, 3 and 4**.

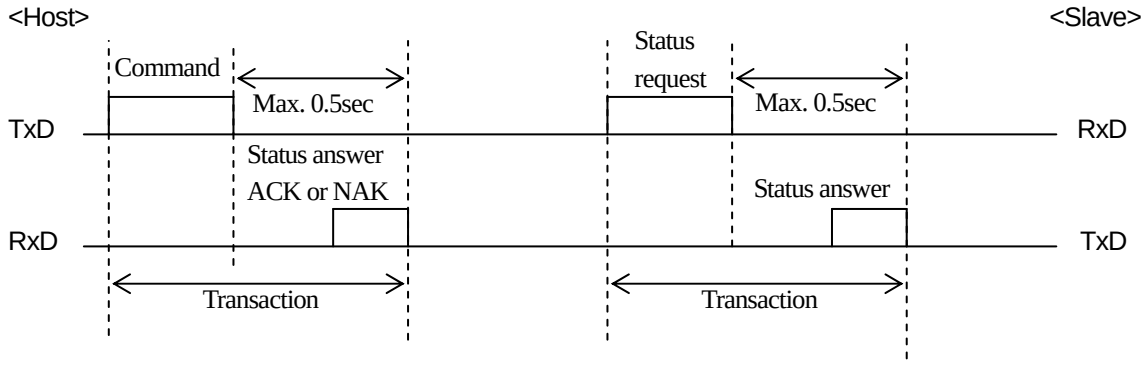
* The status of layer 1 are assigned most kindly status to Host. (The statuses of layer 2 are assigned kindly status, the statuses of layer 3 are not so need status to Host and the statuses of layer 4 are probably no wished statuses.)

* Each layer status can control transmit enable or disable by Host command. (The product default would be all disables.)

* Slave sends auto status feedback by itself when the status is changed and if the status feedback is enabled.

* The product defined and segmentationed layers are takeing in status list.

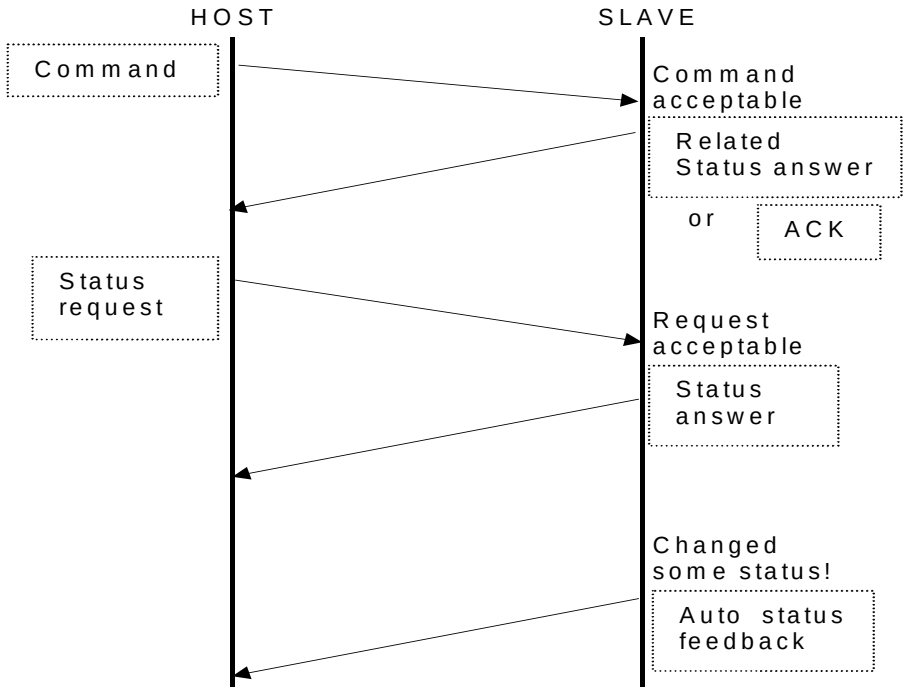
2-3-4. Example of the transactions



Example of the transactions

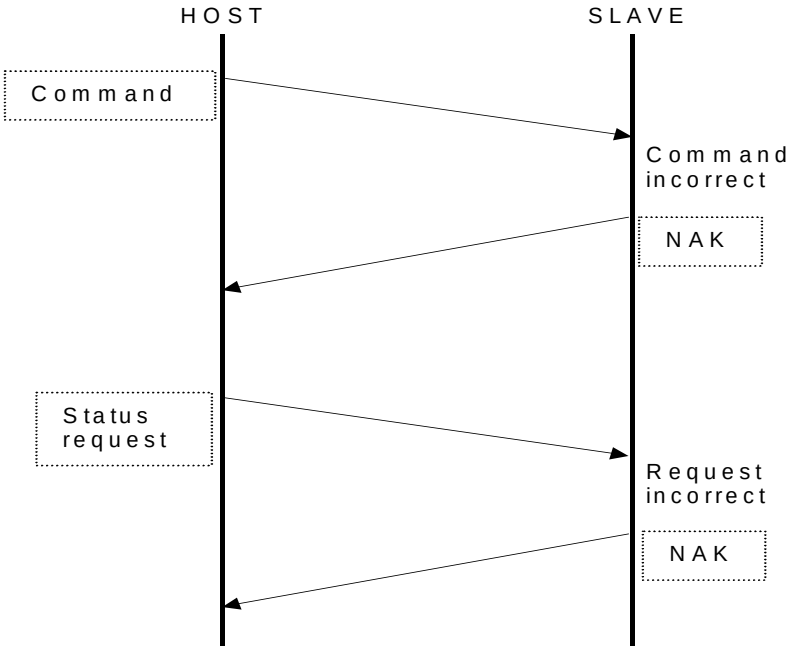
2-3-5. Examples of the handshaking flowchart

2-3-5-1. Example of successful handshaking



The product can reply ACK instead of related status, if the product can not send the related status immediatly.

2-3-5-2. Examples of handshaking error



3. Recommendations of Command, Status and Layer definition

- All Commands, Statuses and Layers will be defined other specific document.
- **[MANDATORY]** The product **MUST** have Commands and the Statuses same as a remote controller buttons (IR controller) of the product.
- All Commands are required working by discreate as ON/OFF commands. (It means that do not support TOGGLE command only.)
- All Commands and Statuses are defined same chharacter size except ACK/NAK on the product. (Recommended character length : 3~6 characters)
- It permits attaching 0x0A character to a reply characters from the product. In this case, must suppose that the object is followed altogether.
- Recommend to supports numbers or values direct setting command, if it has variable numbers or values.

4. Definitions of Command, Status and Layer

This section is told how to define “Command”, “Status” and “Layer” of this product.

4-1. Commands

Please refer to Marantz_RS232C_Command_List_CC_All.xls.

4-2. Status request and Status answer list

Please refer to Marantz_RS232C_Command_List_CC_All.xls.

5. Revision history

Rev.	Date	Owner	Change description
1.0	10/8/2009	Marantz America, Inc.	First release