Marantz

RS-232C Control Specification

for

SR6400/SR5400

Category	**:**	***AV. Receiver***
Document Version	**:**	***1.00b***
Date	**:**	**2007/01/19**
Number of Page	**:**	**17**

Table of Contents

1. Introduction

1-1. Purpose

This document was written in order to clarify specification for control this product by the host controller.

1-2. Scope

This document would be using by software or hardware engineers for production of this product.
This product is [marantz SR6400/SR5400]. (It's refered to as "This product" after this.)

1-3. Abbreviations

Abbreviation	Description

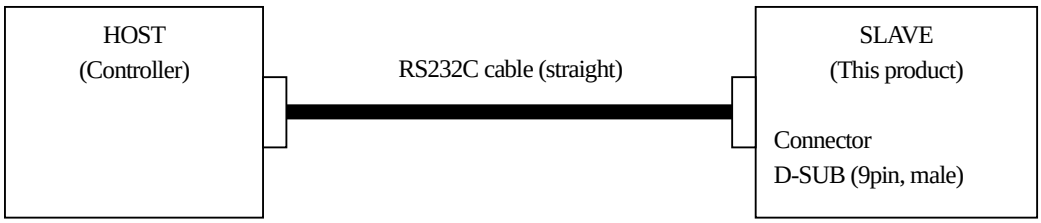
1-4. References

2. Global Description

2-1. Overview

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

2-2. Block Diagram



2-3. Interface connecter specification of This Product

Processor Interface	Signal name	Connection device	D-Sub Pin	Connecter
-	N.C.	-	1	RS232C D-SUB (9pin,male)
UART	TxD (output)	RS232C Level shift driver	2	
	RxD (input)		3	
-	N.C.	-	4	
-	GND		5	
-	N.C.		6	
GENERAL PORT	CTS (input)	RS232C Level shift driver	7	
	RTS (output)		8	
-	N.C.	-	9	

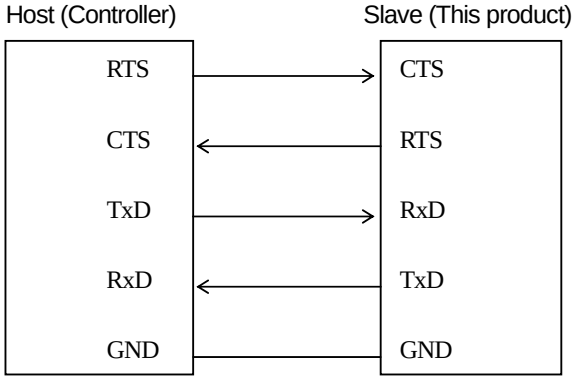
2-4. Assumptions and Dependencies

3. Detailed Description

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

3-1. Connection format

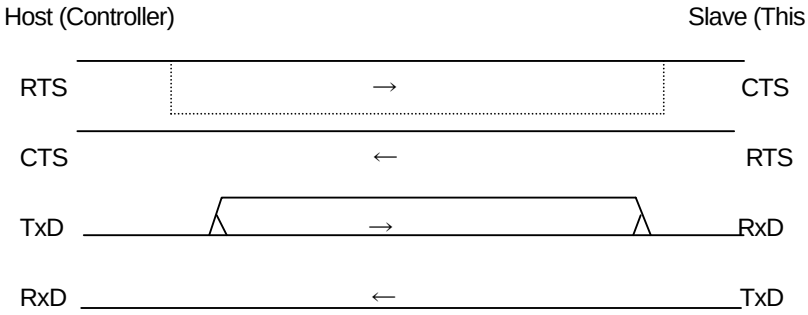
3-1-1. Physical connection



(Serial setting <RS232C basic>)

Baud Rate	: 9600bps
Data Bits	: 8bit
Parity	: None
Stop bit	: 1bit
Handshaking	: (RTS/CTS)

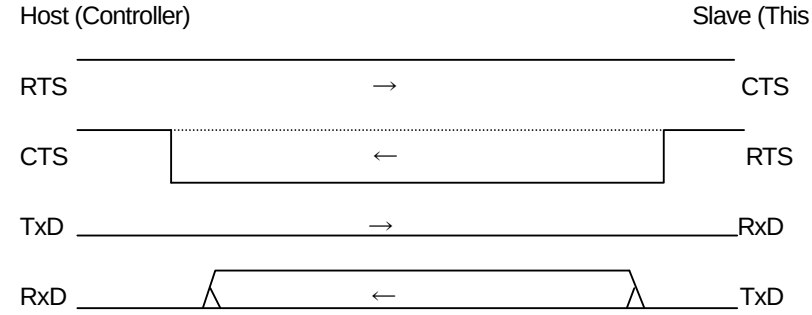
3-1-1-1. Data transmission sequence from Host to Slave



1. The host checks that CTS is High, then starts a data transmission from TxD.
2. The host performs the data transmission of the number of required bytes, and ends a transmission.

* The host can do RTS to Low during the transmission for disable data transmission from a slave.

3-1-1-2. Data transmission sequence from Slave to Host



1. The slave checks that CTS is High, then starts a data transmission from TxD.
2. The slave performs the data transmission of the number of required bytes, and ends a transmission.

* The slave can do RTS to Low during the transmission for disable data transmission from a host.

3-2. Transmission data format

3-2-1. Transmission data format from Host to Slave

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

3-2-1-1. Form1: Command

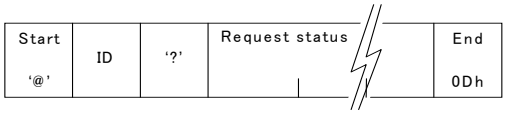
Command is a data that requests some status change.

Start character : '@'
ID : '0' ~ '9' (A Slave has own ID, A Host has to set the ID.)
COMMAND : see "Command list"
End character : 0Dh

3-2-1-2. Form2: Status request

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

Start character : '@'
ID : '0' ~ '9' (A Slave has own ID, A Host has to set the ID.)
Request character : '?'
Request status : see "Status request list"
End character : 0Dh



3-2-2. Transmission data format from Slave to Host

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

3-2-2-1. Form1: ACK/NAK

ACK is a reply data from Slave when Slave got an acceptable command data from Host.

ACK : 06h

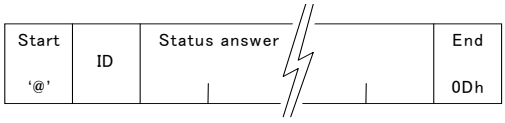
NAK is a reply data from Slave when Slave got an incorrect Command data, Status request data or some other data from Host.

NAK : 15h

3-2-2-2. Form2: Status answer

Status answers are reply data when Slave got an acceptable Request status data from Host.

Start character : '@'
ID : '0' ~ '9' (A Slave will set own ID.)
Answer character : see "Status answer list"
End character : 0Dh



3-3. The transaction sequences and the regulations

3-3-1. The transaction sequences

The transactions have two kinds of sequence.

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

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

3-3-2. The transaction regulations

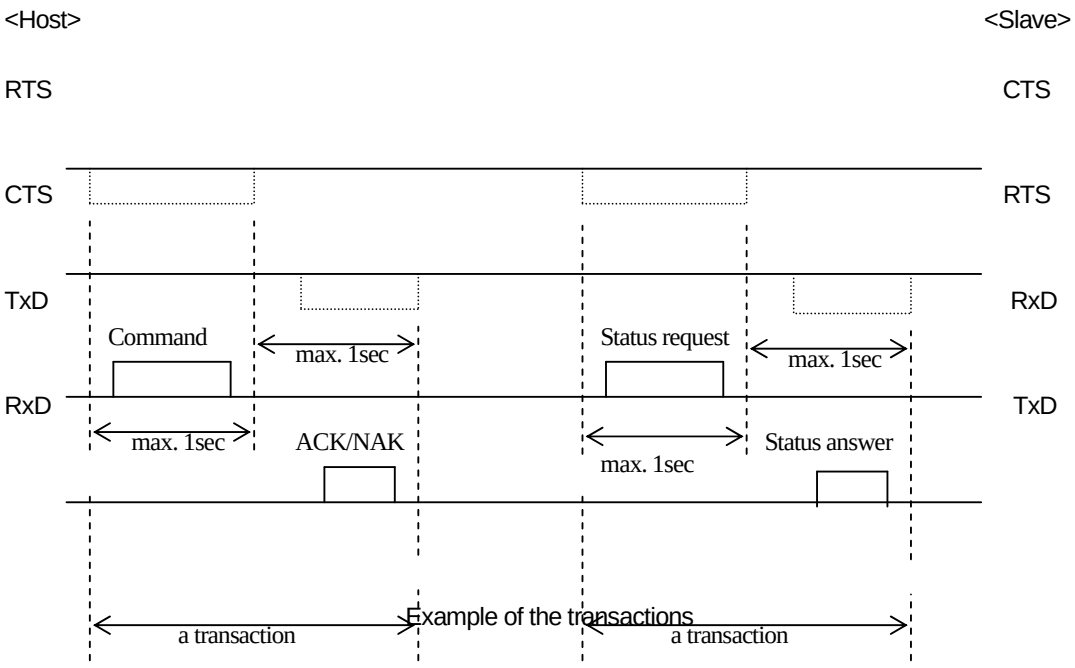
The transactions have some kinds of regulation.

* A Command or a Status request transmission by the Host has to finish within one second.

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

* The 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 one second from a finishing of previous transmission of a Command or a Status request ".

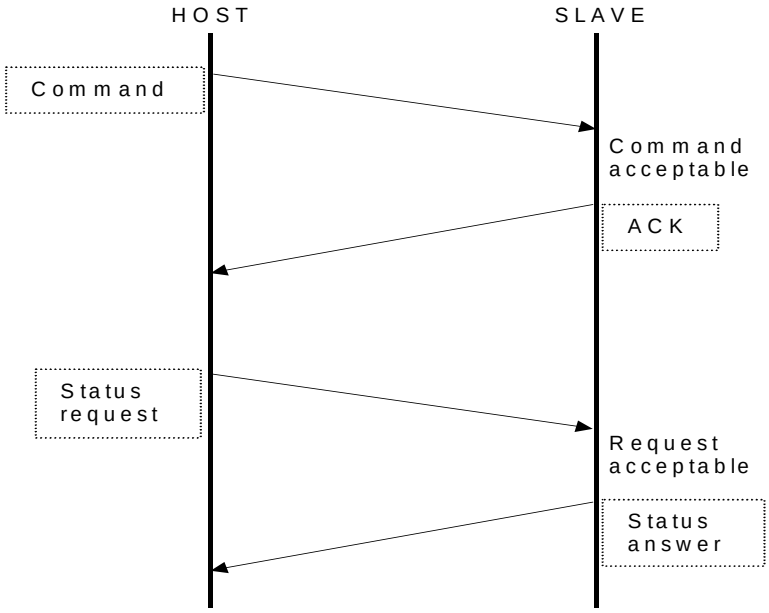
3-3-3. Example of the transactions



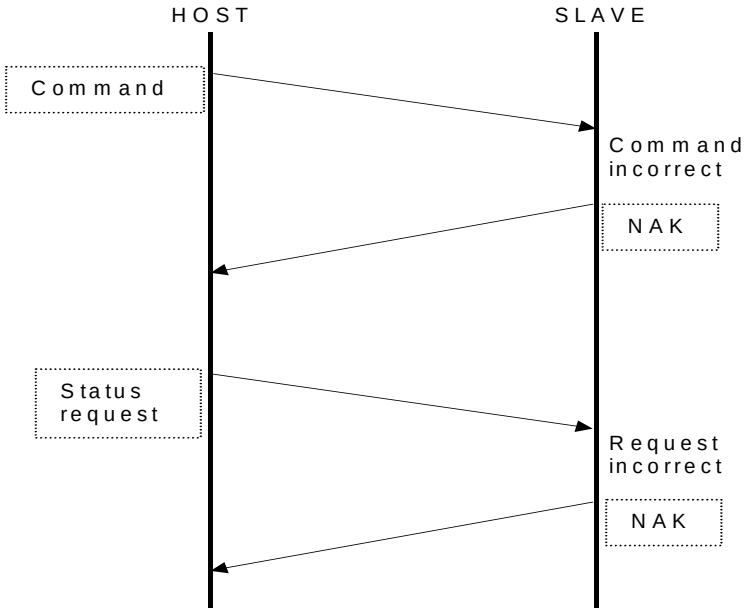
Example of the transactions

3-3-4. Examples of the handshaking flowchart

3-3-4-1. Example of successful handshaking



3-3-4-2. Example of error handshaking



3-4. Command list

3-4-1. Normal Command list

(Samples indicated the ID set to as '1'.)

Command		Character	Sample
POWER	POWER	A0	"@1A0",0x0D
	POWER ON	A1	"@1A1",0x0D
	POWER OFF	A2	"@1A2",0x0D
INPUT SELECT	DSS	B0	"@1B0",0x0D
	TV	B1	"@1B1",0x0D
	DVD	B3	"@1B3",0x0D
	VCR1	B4	"@1B4",0x0D
	VCR2	B5	"@1B5",0x0D
	AUX1	B6	"@1B6",0x0D
	CD	B9	"@1B9",0x0D
	TAPE	BA	"@1BA",0x0D
	CD-R	BB	"@1BB",0x0D
	FM	BC	"@1BC",0x0D
	AM	BD	"@1BD",0x0D
MULTI-CHANNEL	MULTI-CHANNEL INPUT ON	BH	"@1BH",0x0D
	MULTI-CHANNEL INPUT OFF	BI	"@1BI",0x0D
INPUT SIGNAL	A/D	BJ	"@1BJ",0x0D

Command		Character	Sample
TUNNER FREQUENCY	AUTO-TUNE	C0	"@1C0",0x0D
	FREQ. UP	C1	"@1C1",0x0D
	FREQ. DOWN	C2	"@1C2",0x0D
TUNNER PRESET	PRESET INFO.	C3	"@1C3",0x0D
	P-SCAN	C4	"@1C4",0x0D
	PRESET UP	C5	"@1C5",0x0D
	PRESET DOWN	C6	"@1C6",0x0D
F-DIRECT	F-DIRECT	C7	"@1C7",0x0D
TUNER MODE	T-MODE	C8	"@1C8",0x0D
AUTO FREQ. TUNING	AUTO UP START/STOP	C9	"@1CA",0x0D
	AUTO DOWN START/STOP	CA	"@1CB",0x0D
MEMO/CLR	CLR	D0	"@1D0",0x0D
	MEMO	D1	"@1D1",0x0D
DIRECT KEY	DIRECT KEY 0	E0	"@1E0",0x0D
	DIRECT KEY 1	E1	"@1E1",0X0D
	DIRECT KEY 2	E2	"@1E2",0x0D
	DIRECT KEY 3	E3	"@1E3",0x0D
	DIRECT KEY 4	E4	"@1E4",0x0D
	DIRECT KEY 5	E5	"@1E5",0x0D
	DIRECT KEY 6	E6	"@1E6",0x0D
	DIRECT KEY 7	E7	"@1E7",0x0D
	DIRECT KEY 8	E8	"@1E8",0x0D
	DIRECT KEY 9	E9	"@1E9",0x0D

Command		Character	Sample
SURROUND MODE	AUTO	F0	"@1F0",0x0D
	THX SURR EX	F2	"@1F2",0x0D
	DTS	F4	"@1F4",0x0D
	DTS ES	F5	"@1F5",0x0D
	DOLBY	F6	"@1F6",0x0D
	DOLBY PROLOGIC	F7	"@1F7",0x0D
	DOLBY PLⅡ MOVIE	F8	"@1F8",0x0D
	DOLBY PLⅡ MUSIC	F9	"@1F9",0x0D
	VIRTUAL	FA	"@1FA",0x0D
	S DIRECT	FB	"@1FB",0x0D
	Mch-STEREO	FF	"@1FF",0x0D
	STEREO	FG	"@1FG",0x0D
	NEO6 CINEMA	FI	"@1FI",0x0D
	NEO6 MUSIC	FJ	"@1FJ",0x0D
	CSⅡ MUSIC	FL	"@1FL",0x0D
	CSⅡ CINEMA	FM	"@1FM",0x0D
	SURR MODE	FN	"@1FN",0x0D
	CSⅡ MONO	FO	"@1FO",0x0D
VOLUME	VOLUME UP	G0	"@1G0",0x0D
	VOLUME DOWN	G1	"@1G1",0x0D
TONE	BASS UP	G4	"@1G4",0x0D
	BASS DOWN	G5	"@1G5",0x0D
	TREBLE UP	G6	"@1G6",0x0D
	TREBLE DOWN	G7	"@1G7",0x0D
SLEEP MODE	SLEEP	H0	"@1H0",0x0D
MUTE	MUTE OFF	H1	"@1H1",0x0D
	MUTE ON	H2	"@1H2",0x0D
VIDEO MUTE	VIDEO MUTE	H3	"@1H3",0x0D
ATT	ATT	H4	"@1H4",0x0D
TEST TONE	TEST TONE	I0	"@1I0",0x0D
SPEAKER A ON	SPEAKER A ON	I1	"@1I1",0x0D
SPEAKER A OFF	SPEAKER A OFF	I2	"@1I2",0x0D
SPEAKER B ON	SPEAKER B ON	I3	"@1I3",0x0D
SPEAKER BOFF	SPEAKER BOFF	I4	"@1I4",0x0D
NIGHT	NIGHT	J0	"@1J0",0x0D

Command		Character	Sample
DISP	DISP	J1	"@1J1",0x0D
OSD	OSD	J2	"@1J2",0x0D
MENU	MENU (OK)	J3	"@1J3",0x0D
	MENU OFF	J4	"@1J4",0x0D
CURSOL	CURSOL UP	J5	"@1J5",0x0D
	CURSOL DOWN	J6	"@1J6",0x0D
	CURSOL LEFT	J7	"@1J7",0x0D
	CURSOL RIGHT	J8	"@1J8",0x0D
RDS	RDS DISP MODE	J9	"@1J9",0x0D
	RDS PTY	JA	"@1JA",0x0D
VOLUME RESET	VOL. RESET	JB	"@1JB",0x0D
RE-EQ	RE-EQ	JC	"@1JC",0x0D
CHANNEL SELECT	CH. SEL.	JD	"@1JD",0x0D
CHANNEL LEVEL	CH. LEVEL UP	JE	"@1JE",0x0D
	CH. LEVEL DOWN	JF	"@1JF",0x0D
SELECT	SELECT	JG	"@1JG",0x0D
ENTER	ENTER	JH	"@1JH",0x0D
UP/DOWN	UP>>	JI	"@1JI",0x0D
	DOWN<<	JK	"@1JK”,0x0D
FACTORY MODE	into FACTORY MODE	K1	"@1K1",0x0D
SERVICE MODE	into SERVICE MODE	K2	"@1K2”,0x0D

3-5. Status request and Status answer list

3-5-1. Normal Status request and Status answer list

(Samples indicated the ID set to as '1'.)

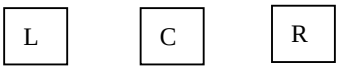
Request Status	Char. & Sample	Status answer	Char. & Sample
POWER Status	'A' ("@1?A",0x0D)	POWER ON	A0 ("@1A0",0x0D)
		POWER OFF	A1
VIDEO INPUT	'B' ("@1?B",0x0D)	DSS	B0
		TV	B1
		DVD	B3
		VCR-1	B4
		VCR-2	B5
		AUX1	B6
AUDIO INPUT	'C' ("@1?C",0x0D)	DSS	C0
		TV	C1
		LD	C2
		DVD	C3
		VCR-1	C4
		VCR-2	C5
		AUX1	C6
		CD	C9
		TAPE	CA
		CD-R	CB
		FM (/TUNER)	CC
		AM	CD
		MULTI-CHANNEL INPUT	CG
INPUT MODE	'D' ("@1?D",0x0D)	DIGIAL	D0
		ANALOGUE	D1
TUNER FFREQUENCY	'E' ("@1?E",0x0D) FM:076.0-108.0 AM,MW:520-1710 LW:152-282	TUNER FREQUENCY E0xxxx:(Not tuned+Freq.) E1xxxx:(Tuned+Freq.)	(FM: 87.55 = "8755") (FM:108.00 = "0800") (MW: 520="0520") (LW:282="0282")
		Frequency Scaning	E2 ("@1E2"!,0x0D)
		Not available	E- ("@1E-",0x0D)
TUNER PRESET	'F' ("@1?F",0x0D)	Preset No (XX=01～50) Not Preset mode (XX=00)	F0XX
		Not available	F- ("@1F-",0x0D)
TUNER MODE	'G' ("@1?G",0x0D)	AUTO STEREO	G1
		MONO	G0
		Not available	G-
VOLUME Status	'H' ("@1?H",0x0D)	VOL.= XXXdB (XXX = -90～+99)	H0XXX ("@1H0-15",0x0D)
		max	H1
		min (-∞)	H2
BASS Status	'I' ("@1?I",0x0D)	BASS:xxdB(xx=-9～+9)	I0xx
TREBLE Status	'J' ("@1?J",0x0D)	TREBLE:xxdB(xx=-9～+9)	J0xx
ATT Status	'K' ("@1?K",0x0D)	ATT ON	K1
		ATT OFF	K0

Request Status	Char. & Sample	Status answer	Char. & Sample
SURROUND MODE	'L' ("@1?L",0x0D)	AUTO	L0 ("@1L0",0x0D)
		THX SURR EX	L2
		DTS MUSIC	L5
		DTS CINEMA	L6
		DTS ES	L7
		NEO 6 CINEMA	L8
		NEO 6 MUSIC	L9
		D DIGITAL	LA
		DD PROLOGIC	LB
		DD PL Ⅱ MOVIE	LC
		DD PL Ⅱ MUSIC	LD
		CS Ⅱ CINEMA	LE
		CS Ⅱ MUSIC	LF
		VIRTUAL	LG
		S DIRECT	LH
		Mch-STEREO	LL
		STEREO	LM
		MONO	LN
		CS Ⅱ MONO	LP
SLEEP TIMER Status	'M' ("@1?M",0x0D)	SLEEP OFF	M0
		SLEEP XXX(001～120)	M1XXX
DISPLAY Status	'N' ("@1?N",0x0D)	DISPLAY ON	N0
		DISPLAY OFF	N1
OSD Status	'O' ("@1?O",0x0D)	OSD ON	O0
		OSD OFF	O1
TEST TONE Status	'P' ("@1?P",0x0D)	TEST TONE OFF	P0
		TEST TONE L	P1
		TEST TONE C	P2
		TEST TONE R	P3
		TEST TONE SR	P4
		TEST TONE SBR	P5
		TEST TONE SBL	P6
		TEST TONE SL	P7
		TEST TONE SW	P8
TEST TONE MODE	'Q' ("@1?Q",0x0D)	TEST TONE AUTO	Q0
		TEST TONE MANUAL	Q1
NIGHT MODE	'R' ("@1?R",0x0D)	NIGHT MODE ON	R0
		NIGHT MODE OFF	R1
MENU	'S' ("@1?S",0x0D)	MENU ON	S0
		MENU OFF	S1

Request Status	Char. & Sample	Status answer	Char. & Sample
F-DIRECT	'T' ("@1?T",0x0D)	F-DIRECT ON	T1 ("@1T1",0x0D)
		F-DIRECT OFF	T0
		Not available	T-
SIGNAL FORMAT	'U' ("@1?U",0x0D)	D DIGITAL(AC-3)	U0
		DD SURROUND	U1
		DD SURR EX	U2
		DTS	U3
		DTS ES	U4
		AAC	U5
		PCM	U8
		OTHER	UB
		NONE_DETECTION	UC
		DTS ES DISCRATE	UE
		DTS ES MATRIX	UF
SAMPLING FREQ.	'V' ("@1?V",0x0D)	32K	V0
		44.1K	V1
		48K	V2
		88.2K	V3
		96K	V4
		OUT OF RANGE	V7
		Not available	V-
CHANNEL STATUS	'W' ("@1?W",0x0D)	See below	W1$%
		Not available	W-

* Description of CHANNEL STATUS answer character. (about : $%)
(Character $ and % would be '0' to '9' or 'A' to 'F',it uses to as hex. bit data.)

	$ bit				% bit			
Bit	3	2	1	0	3	2	1	0
	1	LFE	SL	SR	S	L	R	C



When a bit of channel status is effective, it sets to 1.
And when it is opposite condition, it sets to 0.

ex.)
* If front L and R channel status are only effective, it will send "@1W146",0Dh.
* If front and surr. L/R channel status are effective, it will send "@1W1B6",0Dh.
* If all channel status are effective, it will send "@1W1FF",0Dh.
* If all channel status are not effective, it will send "@1W180",0Dh.

Request Status	Char. & Sample	Status answer	Char. & Sample
CHANNEL LEVEL [XX: (0=”10”) (+01=”11”~+10=”20”) (-01=”09”~ -10=”00”) (-11=”55” ~ -15=”51”)]	“i0” ("@1?i0", 0x0D)	LEFT LEVEL	i0XX (“@1i010”0x0D)
	“i1” ("@1?i1", 0x0D)	RIGHT LEVEL	i1XX
	“i2” ("@1?i2", 0x0D)	CENTER LEVEL	i2XX
	“i3” ("@1?i3", 0x0D)	SUBWF LEVEL	i3XX
	“i4” ("@1?i4", 0x0D)	SURR L LEVEL	i4XX
	“i5” ("@1?i5", 0x0D)	SURR R LEVEL	i5XX
	“i6” ("@1?i6", 0x0D)	BACK L (or 1ch) LEVEL	i6XX
	“i7” ("@1?i7", 0x0D)	BACK R LEVEL	i7XX
SPEAKER DISTANCE [XX: (00～30) (1 foot = “01”) (10 feet=”10”)]	“j0” ("@1?j0", 0x0D)	LEFT DISTANCE	j0XX
	“j1” ("@1?j1”, 0x0D)	RIGHT DISTANCE	j1XX
	“j2” ("@1?j2", 0x0D)	CENTER DISTANCE	j2XX
	“j3” ("@1?j3", 0x0D)	SUBWF DISTANCE	j3XX
	“j4” ("@1?j4", 0x0D)	SURR. L DISTANCE	j4XX
	“j5” ("@1?j5", 0x0D)	SURR. R DISTANCE	j5XX
	“j6” ("@1?j6", 0x0D)	BACK L DISTANCE	j6XX
	“j7” ("@1?j7", 0x0D)	BACK R DISTANCE	j7XX
SPEAKER SIZE	“k0” ("@1?k0", 0x0D)	FRONT LAGE	k00
		FRONT SMALL	k01
	“k1” ("@1?k1", 0x0D)	CENTER LAGE	k10
		CENTER SMALL	k11
		CENTER OFF	k12
	“k2” ("@1?k2", 0x0D)	SUBWF ON	k20
		SUBWF OFF	k22
	“k3” ("@1?k3", 0x0D)	SURR. LAGE	k30
		SURR. SMALL	k31
		SURR. OFF	k32
	“k4” ("@1?k4", 0x0D)	BACK LAGE	k40
		BACK SMALL	k41
		BACK OFF	k42
SPEAKER BACK	‘l’ ("@1?l", 0x0D)	BACK 1ch	l0
		BACK 2ch	l1
		BACK NONE	l2
SPEAKER A	‘o’ (“@1?o”,0x0D)	SPEAKER A OFF	o0
		SPEAKER A ON	o1
SPEAKER B	‘p’ (“@1?p”,0x0D)	SPEAKER B OFF	p0
		SPEAKER B ON	p1
BILINGUAL	‘q’ ("@1?q",0x0D)	MAIN+SUB	q0
		MAIN	q1
		SUB	q2
AUDIO MUTE	‘r’(“@1?r”,0x0D)	AUDIO MUTE OFF	r0
		AUDIO MUTE ON	r1
VIDEO MUTE	‘s’ (“@1?s”,0x0D)	VIDEO MUTE OFF	s0
		VIDEO MUTE ON	s1

3-5-2. Special Status request and Status answer list

Request Status	Char. & Sample	Status answer	Char. & Sample
SERIAL NUMBER	'n' ("@1?n", 0x0D)	SERIAL NUMBER	"n0XXXXXXXXX" ("@1n0123456789",0x0D)
ERROR DETECT	'm' ("@1?m", 0x0D)	see blow	m0#$%& ("@1m0#$%&",0x0D)
		No error	m- ("@1m-",0x0D)

Descriptions of ERROR DETECT status answer character. (about : #$%&)
(Character #, $, % and & would be '0' to '9' or 'A' to 'F', it uses to as hex. bit data.)

* # :

Bit	ErrorName	ERROR	SAFE
3	Reserved	1	1
2	Reserved	0	0
1	Reserved	0	0
0	Reserved	0	0

* $:

Bit	ErrorName	ERROR	SAFE
3	Reserved	0	0
2	Reserved	0	0
1	PROTECT	1	0
0	DSP1 ERROR	1	0

* % :

Bit	ErrorName	ERROR	SAFE
3	Reserved	1	1
2	DSP2 ERROR	1	0
1	ADC ERROR	1	0
0	EEPROM ERROR	1	0

* & :

Bit	ErrorName	ERROR	SAFE
3	EEPROM IF ERROR	1	0
2	DSP CODE ERROR	1	0
1	RS232C ERROR	1	0
0	POWER 5V ERROR	1	0

ex.)
* If the POWER 5V ERROR only occurs that will send ["@1m08081",0x0D].
* If the RS232C ERROR only occurs that will send ["@1m08082",0x0D].
* If the ADC ERROR only occurs that will send ["@1m080A0",0x0D].
* If the DSP1 ERROR only occurs that will send ["@1m09080",0x0D].

4. Revision history

Rev.	Date	Owner	Change description
1.00	10/10/03	MAI	Released
1.00b	01/19/07	MAI	