

RS-232 IMPLEMENTATION OVERVIEW

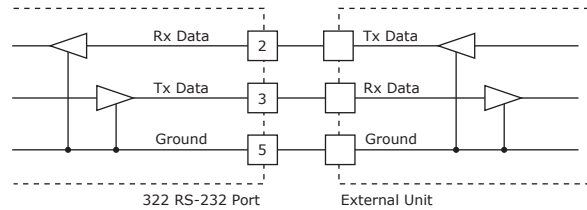
TASCAM's 322 cassette deck has a standard RS-232C port, capable of receiving commands and sending status information. Commands are included for transport functions, including CPS (Compumatic Program Search), Counter Reset, and Sync Reverse settings. Tally information will include deck status, timer information and record prohibit status.



- Individual Control Over Each Deck
- Extensive Transport Control Command Set (Includes CPS, RTZ, Sync Reverse and Dubbing)
- Transport Status Tallies
- Tape Counter Readout Information (MM:SS)
- Tape Counter Reset Command
- Tape Status (Record Prohibit/Enable)
- Empty Deck Indication

RS-232 Pin Assignment & Protocol Specification:

Connector:	DB9	Data Transmission Speed:	9600 bps
Pin 2:	Rx Data	Command Spacing:	>20msec
Pin 3:	Tx Data	Character Length:	8 bit
Pin 5:	Ground	Parity Bit:	None
		Stop Bit:	1 bit



COMMAND STRUCTURE & BEHAVIOR

Basic Transport Commands:

	Preamble		Command		Deck		Direction		Delimiter
LF	0	1	1	0	1	0	1	CR	
0Ah	30h	31h	31h	30h	31h	30h	31h	0Dh	

PLAY, DECK 1, SIDE A

Preamble - All command strings for the 322 begin with an identifying phrase of "Line Feed" (0Ah) and a "0" (30h).

Command - The command follows the preamble directly. (For a complete list of all the commands, see Transport Commands on the next page.)

Deck - This determines whether the command is targeted at Deck 1 (30h 31h) or Deck 2 (30h 32h).

Direction - For commands which have directionality to it, this determines whether the forward or reverse direction is desired. Forward direction (30h 31h) and reverse direction (30h 32h) are used for commands with direction. Transport commands without direction use a "no direction" (30h 30h) place holder.

Delimiter - All command strings for the 322 end with "Carriage Return" (0Dh) as the delimiter.

Status Request Commands:

	Preamble		Command		Deck		Delimiter
LF	0	5	0	0	1	CR	
0Ah	30h	35h	30h	30h	31h	00h	

SENSE MECHANISM STATUS, DECK 1

Status request commands will follow the same structure as basic transport commands, except a direction is not included in the command. (That information will be given in the reply.)

The 322 does not automatically generate status commands when mechanisms change, so the controller will need to scan the 322 at some rate.

When setting a scanning cycle, it is important to recognize that the 322 requires 20 milliseconds between commands. Since there are 3 types of information per deck (time, record prohibit, and mechanism status), it is easily possible to scan each status every half second, and still only be sending messages to the 322 every 83 milliseconds.

TASCAM USA has tested the 322, scanning each status type every half second, and the 322 performed flawlessly.

COMMAND STRUCTURE & BEHAVIOR (CONT)

When the 322 receives commands, the behavior mimics the front panel controls. So, when PLAY DECK 1 SIDE A is issued, the 322 may not be engaged directly into PLAY. (A chart at right explains the actual behavior.)

These behaviors are fairly straight forward, since these commands follow normal cassette logic that most end users are already familiar with. This makes programming a touch panel for standard remote control applications very easy. But for unattended automation systems run completely by computer, it might be wise to create a simple macro which returns the 322 to a known state, like STOP on side A.

- If the 322 was recording on side B, then the machine will flip to side A and continue recording on side A.
- If the 322 was recording on side A, then it will continue recording on side A.
- If the 322 was in record pause on side A, then record is engaged on side A.
- If the 322 was in record pause on side B, then the 322 will flip directions and remain in record pause on side A.
- If the 322 was in pause on side B, then the 322 will flip directions and remain in pause on side A.

COMMAND LIST

STOP, DECK 1 - CMND "10"	LF 0 1 0 0 1 0 0 CR 0Ah 30h 31h 30h 30h 31h 30h 30h 0Dh
STOP, DECK 2	LF 0 1 0 0 2 0 0 CR 0Ah 30h 31h 30h 30h 32h 30h 30h 0Dh
PLAY, DECK 1, SIDE A - CMND "11"	LF 0 1 1 0 1 0 1 CR 0Ah 30h 31h 31h 30h 31h 30h 31h 0Dh
PLAY, DECK 1, SIDE B	LF 0 1 1 0 1 0 2 CR 0Ah 30h 31h 31h 30h 31h 30h 32h 0Dh
PLAY, DECK 2, SIDE A	LF 0 1 1 0 2 0 1 CR 0Ah 30h 31h 31h 30h 32h 30h 31h 0Dh
PLAY, DECK 2, SIDE B	LF 0 1 1 0 2 0 2 CR 0Ah 30h 31h 31h 30h 32h 30h 32h 0Dh
PAUSE, DECK 1 - CMND "1C"	LF 0 1 C 0 1 0 0 CR 0Ah 30h 31h 43h 30h 31h 30h 30h 0Dh
PAUSE, DECK 2	LF 0 1 C 0 2 0 0 CR 0Ah 30h 31h 43h 30h 32h 30h 30h 0Dh
REC PAUSE, DECK 1 - CMND "14"	LF 0 1 4 0 1 0 0 CR 0Ah 30h 31h 34h 30h 31h 30h 30h 0Dh
REC PAUSE, DECK 2	LF 0 1 4 0 2 0 0 CR 0Ah 30h 31h 34h 30h 32h 30h 30h 0Dh
REC MUTE, DECK 1 - CMND "1B"	LF 0 1 B 0 1 0 0 CR 0Ah 30h 31h 42h 30h 31h 30h 30h 0Dh
REC MUTE, DECK 2	LF 0 1 B 0 2 0 0 CR 0Ah 30h 31h 42h 30h 32h 30h 30h 0Dh
FFWD, DECK 1 - CMND "1A"	LF 0 1 A 0 1 0 1 CR 0Ah 30h 31h 41h 30h 31h 30h 31h 0Dh
REW, DECK 1	LF 0 1 A 0 1 0 2 CR 0Ah 30h 31h 41h 30h 31h 30h 32h 0Dh
FFWD, DECK 2	LF 0 1 A 0 2 0 1 CR 0Ah 30h 31h 41h 30h 32h 30h 31h 0Dh
REW, DECK 2	LF 0 1 A 0 2 0 2 CR 0Ah 30h 31h 41h 30h 32h 30h 32h 0Dh
RESET COUNTER, DECK 1 - CMND "65"	LF 0 6 5 0 1 0 0 CR 0Ah 30h 36h 35h 30h 31h 30h 30h 0Dh
RESET COUNTER, DECK 2	LF 0 6 5 0 2 0 0 CR 0Ah 30h 36h 35h 30h 32h 30h 30h 0Dh

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COMMAND LIST (CONT)

RTZ, DECK 1 - CMND "2D"	LF	0	2	D	0	1	0	0	0	CR
	0Ah	30h	32h	44h	30h	31h	30h	30h	0Dh	
RTZ, DECK 2	LF	0	2	D	0	2	0	0	0	CR
	0Ah	30h	32h	44h	30h	32h	30h	30h	0Dh	
CPS FFWD, DECK 1 - CMND "1D"	LF	0	1	D	0	1	0	1	1	CR
	0Ah	30h	31h	44h	30h	31h	30h	31h	0Dh	
CPS REW, DECK 1	LF	0	1	D	0	1	0	2	2	CR
	0Ah	30h	31h	44h	30h	31h	30h	32h	0Dh	
CPS FFWD, DECK 2	LF	0	1	D	0	2	0	1	1	CR
	0Ah	30h	31h	44h	30h	32h	30h	31h	0Dh	
CPS REW, DECK 2	LF	0	1	D	0	2	0	2	2	CR
	0Ah	30h	31h	44h	30h	32h	30h	32h	0Dh	
SENSE MECH STATUS, DECK 1 - CMND "50"	LF	0	5	0	0	1				CR
	0Ah	30h	35h	30h	30h	31h				0Dh
SENSE MECH STATUS, DECK 2	LF	0	5	0	0	2				CR
	0Ah	30h	35h	30h	30h	32h				0Dh
SENSE TAPE STATUS, DECK 1 - CMND "56"	LF	0	5	6	0	1				CR
	0Ah	30h	35h	36h	30h	31h				0Dh
SENSE TAPE STATUS, DECK 2	LF	0	5	6	0	2				CR
	0Ah	30h	35h	36h	30h	32h				0Dh
SENSE TAPE COUNTER, DECK 1 - CMND "5A"	LF	0	5	A	0	1				CR
	0Ah	30h	35h	41h	30h	31h				0Dh
SENSE TAPE COUNTER, DECK 2	LF	0	5	A	0	2				CR
	0Ah	30h	35h	41h	30h	32h				0Dh

TALLY STRUCTURE & BEHAVIOR

Return Tallies:

The first section following the preamble will define whether the tally is giving information about Mechanism Status (D0h), Tape Status (D6h), or Tape Counter (DAh) tally.

For Mechanism Status tallies, following bits will represent the current function of a deck, which mechanism is being described, and the direction the system is defaulted to. (Side A or Side B)

For Tape Counter tallies, the data blocks will represent the Mechanism first, then the minutes and seconds. If the 322 is in CPS mode, the minutes display will transmit "CP" and the seconds will show the number of breaks the CPS mechanism is going to pass. (This is exactly mimicking the timer display on the 322.)

It should be noted that the 322 will not transmit positive or negative time information from the deck, though the display can indicate negative time.

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	Preamble		Mechanism Information			Status		Mechanism		Direction		Delimiter
LF	0	D	0	1	0	0	1	0	1	0	1	CR
0Ah	30h	44h	30h	31h	30h	30h	31h	30h	31h	30h	31h	0Dh

IN STOP, DECK 1, SIDE A

As with the FFWD and REW transport commands, FFWD and REW tallies do not reverse for side B. They are always shuttling tape in the same direction. So, on side B, REW will shuttle ahead, and FFWD will shuttle back. This is consistent with having a dedicated PLAY B button, keeping the relational arrows for commands.

	Preamble		Tape Counter Information			Mechanism		10's Minutes		1's Minutes		10's Seconds		1's Seconds		Delimiter
LF	0	D	A	0	2	2	6	4	7							CR
0Ah	30h	44h	41h	30h	32h	32h	36h	34h	37h							0Dh

TAPE COUNTER 2 SHOWS 26:47

TALLY STRUCTURE & BEHAVIOR (CONT.)

For Tape Status tallies, the data blocks will represent mechanism and Deck 1 and Deck 2 Record Prohibit status will be displayed. (This is determined by the punch blocks on the top of the cassette itself.)

A chart for all Mechanism Tallies and Tape Status Information combinations are shown on the next page in the Tally List & Behavior chart on the next two pages.

	Preamble		Tape Status Information		Mechanism		Place Holder		Deck 2 Deck 1		Delimiter
LF	0	D	6	0	1	0	1	0	1	CR	
0Ah	30h	44h	36h	30h	31h	30h	31h	30h	31h	0Dh	

DECK 1, SIDE A RECORD PROHIBITED

TALLY LIST

STOP, DECK 1, SIDE A - STATUS "10"	LF	0	D	0	1	0	0	1	0	1	CR
	0Ah	30h	44h	30h	31h	30h	30h	31h	30h	31h	0Dh
STOP, DECK 1, SIDE B	LF	0	D	0	1	0	0	1	0	2	CR
	0Ah	30h	44h	30h	31h	30h	30h	31h	30h	32h	0Dh
STOP, DECK 2, SIDE A	LF	0	D	0	1	0	0	2	0	1	CR
	0Ah	30h	44h	30h	31h	30h	30h	32h	30h	31h	0Dh
STOP, DECK 2, SIDE B	LF	0	D	0	1	0	0	2	0	2	CR
	0Ah	30h	44h	30h	31h	30h	30h	32h	30h	32h	0Dh
PLAY, DECK 1, SIDE A - STATUS "11", DIR "01"	LF	0	D	0	1	1	0	1	0	1	CR
	0Ah	30h	44h	30h	31h	31h	30h	31h	30h	31h	0Dh
PLAY, DECK 1, SIDE B	LF	0	D	0	1	1	0	1	0	2	CR
	0Ah	30h	44h	30h	31h	31h	30h	31h	30h	32h	0Dh
PLAY, DECK 2, SIDE A	LF	0	D	0	1	1	0	2	0	1	CR
	0Ah	30h	44h	30h	31h	31h	30h	32h	30h	31h	0Dh
PLAY, DECK 2, SIDE B	LF	0	D	0	1	1	0	2	0	2	CR
	0Ah	30h	44h	30h	31h	31h	30h	32h	30h	32h	0Dh
PAUSE, DECK 1, SIDE A - STATUS "1C"	LF	0	D	0	1	C	0	1	0	1	CR
	0Ah	30h	44h	30h	31h	43h	30h	31h	30h	31h	0Dh
PAUSE, DECK 1, SIDE B	LF	0	D	0	1	C	0	1	0	2	CR
	0Ah	30h	44h	30h	31h	43h	30h	31h	30h	32h	0Dh
PAUSE, DECK 2, SIDE A	LF	0	D	0	1	C	0	2	0	1	CR
	0Ah	30h	44h	30h	31h	43h	30h	32h	30h	31h	0Dh
PAUSE, DECK 2, SIDE B	LF	0	D	0	1	C	0	2	0	2	CR
	0Ah	30h	44h	30h	31h	43h	30h	32h	30h	32h	0Dh
RECORD, DECK 1, SIDE A - STATUS "13"	LF	0	D	0	1	3	0	1	0	1	CR
	0Ah	30h	44h	30h	31h	33h	30h	31h	30h	31h	0Dh
RECORD, DECK 1, SIDE B	LF	0	D	0	1	3	0	1	0	2	CR
	0Ah	30h	44h	30h	31h	33h	30h	31h	30h	32h	0Dh
RECORD, DECK 2, SIDE A	LF	0	D	0	1	3	0	2	0	1	CR
	0Ah	30h	44h	30h	31h	33h	30h	32h	30h	31h	0Dh
RECORD, DECK 2, SIDE B	LF	0	D	0	1	3	0	2	0	2	CR
	0Ah	30h	44h	30h	31h	33h	30h	32h	30h	32h	0Dh

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TALLY LIST & BEHAVIORS (CONT)

RECORD PAUSE, DECK 1, SIDE A - STATUS "14"	LF 0 D 0 1 4 0 1 0 1 CR 0Ah 30h 44h 30h 31h 34h 30h 31h 30h 31h 0Dh
RECORD PAUSE, DECK 1, SIDE B	LF 0 D 0 1 4 0 1 0 2 CR 0Ah 30h 44h 30h 31h 34h 30h 31h 30h 32h 0Dh
RECORD PAUSE, DECK 2, SIDE A	LF 0 D 0 1 4 0 2 0 1 CR 0Ah 30h 44h 30h 31h 34h 30h 32h 30h 31h 0Dh
RECORD PAUSE, DECK 2, SIDE B	LF 0 D 0 1 4 0 2 0 2 CR 0Ah 30h 44h 30h 31h 34h 30h 32h 30h 32h 0Dh
RECORD MUTE, DECK 1, SIDE A - STATUS "1B"	LF 0 D 0 1 B 0 1 0 1 CR 0Ah 30h 44h 30h 31h 42h 30h 31h 30h 31h 0Dh
RECORD MUTE, DECK 1, SIDE B	LF 0 D 0 1 B 0 1 0 2 CR 0Ah 30h 44h 30h 31h 42h 30h 31h 30h 32h 0Dh
RECORD MUTE, DECK 2, SIDE A	LF 0 D 0 1 B 0 2 0 1 CR 0Ah 30h 44h 30h 31h 42h 30h 32h 30h 31h 0Dh
RECORD MUTE, DECK 2, SIDE B	LF 0 D 0 1 B 0 2 0 2 CR 0Ah 30h 44h 30h 31h 42h 30h 32h 30h 32h 0Dh
FFWD, DECK 1, SIDE A - STATUS "19"	LF 0 D 0 1 9 0 1 0 1 CR 0Ah 30h 44h 30h 31h 39h 30h 31h 30h 31h 0Dh
FFWD, DECK 1, SIDE B	LF 0 D 0 1 9 0 1 0 2 CR 0Ah 30h 44h 30h 31h 39h 30h 31h 30h 32h 0Dh
FFWD, DECK 2, SIDE A	LF 0 D 0 1 9 0 2 0 1 CR 0Ah 30h 44h 30h 31h 39h 30h 32h 30h 31h 0Dh
FFWD, DECK 2, SIDE B	LF 0 D 0 1 9 0 2 0 2 CR 0Ah 30h 44h 30h 31h 39h 30h 32h 30h 32h 0Dh
REW, DECK 1, SIDE A - STATUS "1A"	LF 0 D 0 1 A 0 1 0 1 CR 0Ah 30h 44h 30h 31h 41h 30h 31h 30h 31h 0Dh
REW, DECK 1, SIDE B	LF 0 D 0 1 A 0 1 0 2 CR 0Ah 30h 44h 30h 31h 41h 30h 31h 30h 32h 0Dh
REW, DECK 2, SIDE A	LF 0 D 0 1 A 0 2 0 1 CR 0Ah 30h 44h 30h 31h 41h 30h 32h 30h 31h 0Dh
REW, DECK 2, SIDE B	LF 0 D 0 1 A 0 2 0 2 CR 0Ah 30h 44h 30h 31h 41h 30h 32h 30h 32h 0Dh
TAPE STATUS, DECK 1, ALL REC ENABLE	LF 0 D 6 0 1 0 1 0 0 CR 0Ah 30h 44h 36h 30h 31h 30h 31h 30h 30h 0Dh
TAPE STATUS, DECK 1, A: REC PROH, B: REC ENABLE	LF 0 D 6 0 1 0 1 0 1 CR 0Ah 30h 44h 36h 30h 31h 30h 31h 30h 31h 0Dh
TAPE STATUS, DECK 1, A: REC ENABLE, B: REC PROH	LF 0 D 6 0 1 0 1 1 0 CR 0Ah 30h 44h 36h 30h 31h 30h 31h 31h 30h 0Dh
TAPE STATUS, DECK 1, A: REC PROH, B: REC PROH	LF 0 D 6 0 1 0 1 1 1 CR 0Ah 30h 44h 36h 30h 31h 30h 31h 31h 31h 0Dh
TAPE STATUS, DECK 2, ALL REC ENABLE	LF 0 D 6 0 2 0 1 0 0 CR 0Ah 30h 44h 36h 30h 32h 30h 31h 30h 30h 0Dh
TAPE STATUS, DECK 2, A: REC PROH, B: REC ENABLE	LF 0 D 6 0 2 0 1 0 1 CR 0Ah 30h 44h 36h 30h 32h 30h 31h 30h 31h 0Dh
TAPE STATUS, DECK 2, A: REC ENABLE, B: REC PROH	LF 0 D 6 0 2 0 1 1 0 CR 0Ah 30h 44h 36h 30h 32h 30h 31h 31h 30h 0Dh
TAPE STATUS, DECK 2, A: REC PROH, B: REC PROH	LF 0 D 6 0 2 0 1 1 1 CR 0Ah 30h 44h 36h 30h 32h 30h 31h 31h 31h 0Dh