

27.07.1992

Protocol description

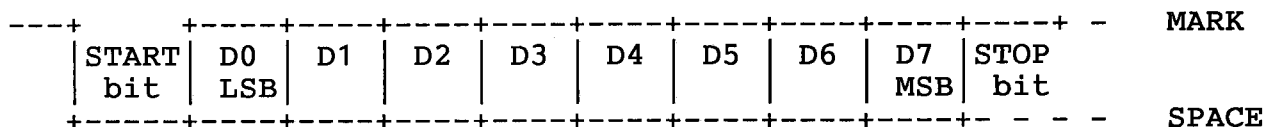
ASCII Protocol Specifications of RS232 Serial Interface
for analog tape recorders STUDER A820-MCH, STUDER A827-MCH

STUDER Norm-Nr. 10.85.1340

1. COMMUNICATION FORMAT

Asynchronous, bit serial signal

- according to RS 232 C specifications;
- full duplex communication channel;
- data transmission rate: 9600 bauds;
- word composition as follow:
1 START bit, 8 data bits, no parity, 1 STOP bit;

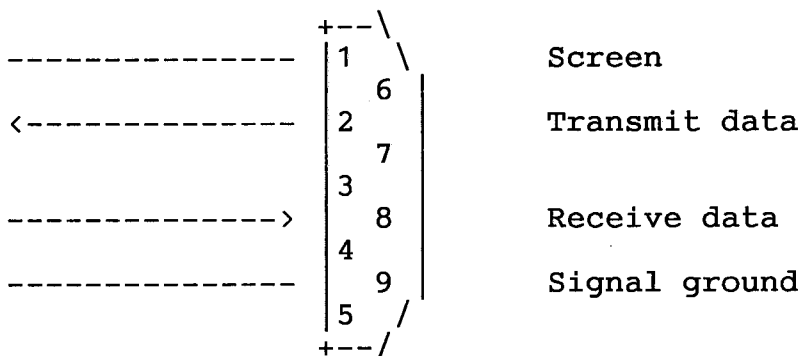


Connector specifications

- 9 pin connector, D type, (SMPTE/BUS / RS232 connector);
- pin out:

controller

machine



2. MESSAGE FORMAT

The communication between the STUDER machine and the controller is implemented through ASCII coded strings of not fixed length.

A message string is composed by ASCII characters:

capital letters, "?", " ", figures and the following control characters

- 'CR' (0Dh)
- 'LF' (0Ah)
- 'CX' (18h)
- 'XOFF' (13h)
- 'XON' (11h)

All commands mnemonics have a length of 3 characters and are usually terminated by a 'CR'. Only commands with parameters vary in length. The additional characters are inserted between the command and 'CR'. The parameters are separated by blanks or colons. There are some exceptions: commands which do not have termination characters. Please refer to the individual command description for the exact syntax of each command.

The STUDER machine uses the sequence 'CR LF' as acknowledge message or to terminate the answer string.

Ex:

"WNF 0400" 'CR' = controlled wind forward at 4 times nominal speed

WNF = command, controlled wind forward
0400 = parameter, 0400h coded as ASCII string

the controller will send to the machine:

character	ASCII code sent
'W'	57h
'N'	4Eh
'F'	46h
' '	20h
'0'	30h
'4'	34h
'0'	30h
'0'	30h
'CR'	0Dh

The machine should answer:

'CR'	0Dh
'LF'	0Ah

The 'CX' control character is used by the controller to reset asynchronously the STUDER machine's communication port.

'XOFF' and 'XON' are used by the machine as handshake characters.

For terminal operation the machine's communication port can operate in 'echo mode'. In this mode, an echo of each character is sent back to the controller, and a prompt ('>') is sent after the answer string. The 'echo mode' may be set via the machine menu. It should not be used for computer remote control.

3. COMMUNICATION PROTOCOL

a) general informations

The communication between the controller and the STUDER machine is a master-slave protocol. The controller is the master and it should take initiative in the communication. The communication has to fulfill the following specifications:

- the machine has to acknowledge a command with a 'CR LF' within 100 msec from the moment that the command's last byte is received;
- the machine's communication port is asynchronously resetted (both receiver and transmitter) by a 'CX' sent by the controller, and it has to acknowledge it with a 'CR LF' in the specified time;
- the machine can interrupt the controller in any moment by sending an 'XOFF' and recover the connection sending an 'XON'. They do not have to be acknowledged by controller;
- for the controller, there is no time specification for the interval between two bytes of a command;
- the controller should not output the next command before receiving the machine's answer (exception: 'CX').

b) Error messages

If a message is not understood by the machine, it shall be acknowledged by:

"?" 'CR LF'

If the machine is in 'echo mode', or with old versions of machine software, it is also possible to have:

"INPUT FORMAT ERROR !" 'CR LF'

c) Notes:

- After power on, the machine may announce itself with a welcome message of some length;
- After a power on or an error message, it is recommended to initialize the communication by sending 'CX'. The communication is established as soon the machine answers with 'CR LF' within the specified time. Then the communication can be considered restored.
- The machine is capable to handle at least 10 commands per second without XOFF-XON interference.
- After the reception of a command the machine should answer with an updated status. E.g. if the command was a "PLY", the machine must answer with 'play not achieved' or 'play achieved'.
- If a command cannot be executed, the machine may answer with a 'not achieved' status, which will be replaced by the actual machine status. E.g. sending a PLY during tapeout the machine may answer with 'play not achieved' before going back to 'tapeout'.
- A locate command has a particular option. It can be followed by a command 'play' or 'record'. This preselection means that, once the locate is terminated, the machine will go in play or record. Preselection commands (play or record) can be repeated without

cancelling the execution of the locate command.

The status corresponding to a locate command is 'locate wind forward' or 'locate rewind', either 'achieved' or 'not achieved'. In addition, the machine may also answer 'play not achieved' or 'record not achieved', if play or record has been preselected.

A normal locate command is considered completed when the machine sends a stop status. When the execution of 'locate' with a preselection of play or record is completed, the machine sends back a status of 'play achieved' respectively 'record achieved'.

Explanations to the following tables

Syntax of input/output strings

[-,A,B,C] means input/output - or A or B or C is definitively expected
(-,A,B,C) means input/output - or A or B or C is possibly expected

Machine properties

"-" not implemented
"1" implemented at least in one option of the family
"x" optionally implemented in future

TAPE DECK COMMANDS					
mne- mo- nics	machine 820 MCH	827 MCH	input	output	meaning
STP	1	1	STP [,CR]	CR LF	stop
EDI	1	1	EDI [,CR]	CR LF	edit
PLY	1	1	PLY [,CR]	CR LF	play
RPL	1	1	RPL [,CR]	CR LF	reverse play
REC	1	1	REC [,CR]	CR LF	record
FWD	1	1	FWD [,CR]	CR LF	forward
RWD	1	1	RWD [,CR]	CR LF	rewind
WNR <SPD>	1	1	WNR [] <xxxx> (0<= xxxx<=5FFF)	CR LF	controlled wind reverse
WNF <SPD>	1	1	WNF [] <xxxx> (0<= xxxx<=5FFF)	CR LF	controlled wind forward
SSA	1	1	SSA [,CR]	CR LF	set play speed A (3.75 IPS)
SSB	1	1	SSB [,CR]	CR LF	set play speed B (7.5 IPS)
SSC	1	1	SSC [,CR]	CR LF	set play speed C (15 IPS)
SSD	1	1	SSD [,CR]	CR LF	set play speed D (30 IPS)
SVP	1	1	SVP [] xxxxxxx [,CR]	CR LF	set varispeed parameter 00A5FE <=xxxxxx<=018ACE (hex) parameter refers to nominal speed, signless, independent of td status; 010000 = nomin(fixed)speed
NS?	1	1	NS? [,CR]	xx IPS CR LF xx = 3.75..7.5..15..30	nominal speed ?

TAPE DECK COMMANDS

mne- mo- nics	machine 820 MCH	827 MCH	input	output	meaning
VS?	1	1	VS? [,CR]	xxxxxx CR LF	varispeed param ? 00A5FE <= xxxxxx <= 018ACE (hex) param refers to nominal speed, signless, inde- pendent of td status; 010000 = nom(fixed)speed
SVS	1	1	SVS [,CR]	CR LF	varispeed on
CVS	1	1	CVS [,CR]	CR LF	varispeed off
VEN	1	1	VEN [,CR]	CR LF	ext varispeed on
VEF	1	1	VEF [,CR]	CR LF	ext varispeed off
FEN	1	1	FEN [,CR]	CR LF	fader enable on
FEF	1	1	FEF [,CR]	CR LF	fader enable off
EDT	1	1	EDT [,CR]	CR LF	lifter mode on, audio not muted, audio mode over- ride, tape on heads; remark:cor responds lifter B
LFT	1	1	LFT [,CR]	CR LF	lifter mode (de- feat) off (tape not on heads)
LFN	1	1	LFN [,CR]	CR LF	lifter mode on, audio muted, audio mode not switched, tape on heads remark: corres- ponds lifter A
LOC <adr>	1	1	LOC []<(-) hh[,:,/] mm[,:,/] ss[,:,/] x> x=dsec	CR LF	locate to address
LMV <adr>	1	1	LMV [] <xxxxxxxx> 4 Byte(hex)	CR LF	locate move roll < >
ZLO	1	1	ZLO [,CR]	CR LF	locate to zero

TAPE DECK COMMANDS

mne- mo- nics	machine		input	output	meaning
	820 MCH	827 MCH			
	1	1		25 = reverse play	
	1	1		A5 = reverse play ach	
	1	1		26 = rev play varispeed	
	1	1		A6 = rev play vari ach	
	1	1		27 = rev play int ref	
	1	1		A7 = rev ply int rf ach	
	1	1		28 = rev play ext ref	
	1	1		A8 = rev ply ext rf ach	
	1	1		29 = reverse record or rehears revers rec	
	1	1		A9 = revers record ach or reh rev rec ach	
	-	-		2A = reserved for rev record indic B or reh rev rec ind B	
	-	-		AA = reserved for rev rec indic B ach or reh reverse record indic B achieved	
	1	1		40 = shuttle reverse	
	1	1		C0 = shuttle rev ach	
	1	1		41 = shuttle forward	
	1	1		C1 = shuttle forward ac	
	1	1		42 = locate reverse	
	1	1		C2 = locate reverse ach	
	1	1		43 = locate forward	
	1	1		C3 = locate forward ach	
	-	-		44 = locate play revers	
	-	-		C4 = loc play rev ach	
	-	-		45 = locate play forwrđ	
	-	-		C5 = loc play fwd ach	
	1	1		46 = cueing reverse	
	1	1		C6 = cueing reverse ach	
	1	1		47 = cueing forward	
	1	1		C7 = cueing forward ach	
	-	-		48 = position play rev	
	-	-		C8 = pos play rev ach	
	-	-		49 = pos play forward	
	-	-		C9 = pos play forwd ach	
	1	1		4A = rewind controlled	
	1	1		CA = rewind contrl ach	
	1	1		4B = wind forward ctrl	
	1	1		CB = wnd forwd ctrl ach	
	1	1		59 = tape dump	
	1	1		D9 = tape dump ach	
	-	-		5A = cut	
	-	-		DA = cut achieved	
	1	1		DD = burn in ach	

TAPE DECK COMMANDS

mne- mo- nics	machine 820	827 MCH	input	output	meaning
TP?	1	1	TP? [,CR]	aabbccddeeff gghhijj kllmmnnooppqrr CR LF tape width 1": aa: ttension play left bb: ttension play right cc: tape tension wind dd: tape tension edit ee: ttens rev play left ff: ttens rv play right tape width 2": gg: ttension play left hh: ttension play right ii: tape tension wind jj: tape tension edit kk: ttens rev ply left ll: ttens rv ply right tape width Adopted: mm: ttension play left nn: ttension play right oo: tape tension wind pp: tape tension edit qq: ttens rev ply left rr: ttens rev ply right	tape tension parameter ?

AUDIO COMMANDS

all commands are used by master rs232

* exception : EMC & DMC are used by audio rs232

mne- mo- nics	machine 820 MCH	827 MCH	input	output	meaning
EMC	1*	1*	EMC [,CR]	CR LF	set enable memory change
DMC	1*	1*	DMC [,CR]	CR LF	set disable memory change
SNB	1	1	SNB [,CR]	CR LF	set NAB equalization
SCR	1	1	SCR [,CR]	CR LF	set CCIR equalization
EQ?	1	1	EQ? [,CR]	xx CR LF xx=00 for CCIR xx=01 for NAB	equalization norm ?
STA	1	1	STA [,CR]	CR LF	set tape sort A
STB	1	1	STB [,CR]	CR LF	set tape sort B
TS?	1	1	TS? [,CR]	xx CR LF xx=00 for tape A xx=01 for tape B	tape sort ?
MSN	1	1	MSN [,CR]	CR LF	master safe on
MSF	1	1	MSF [,CR]	CR LF	master safe off
SRH	1 1	1 1	SRH [,CR]	CR LF	rehearsal mode on only with dropin/ out delay on
CRH	1	1	CRH [,CR]	CR LF	rehears mode off
DDN	1	1	DDN [,CR]	CR LF	drop in/out delay on
DDF	1	1	DDF [,CR]	CR LF	drop in/out delay off

AUDIO COMMANDS

mne- mo- nics	machine 820 MCH	827 MCH	input	output	meaning
AA?	1	1	AA? [,CR]	aabbccdd CR LF aa: 0 = safe 1 = ready/rec bb: 0 = tape 1 = input cc: 0 = rep 1 = sync dd: 0 = demute 1 = mute	channel 1..8 status ? MSB(xx): chnl 8 LSB(xx): chnl 1 xx = aa .. dd
AB?	1	1	AB? [,CR]	aabbccdd CR LF aa: 0 = safe 1 = ready/rec bb: 0 = tape 1 = input cc: 0 = rep 1 = sync dd: 0 = demute 1 = mute	channel 9..16 status ? MSB(xx): chnl 16 LSB(xx): chnl 9 xx = aa .. dd
AC?	1	1	AC? [,CR]	aabbccdd CR LF aa: 0 = safe 1 = ready/rec bb: 0 = tape 1 = input cc: 0 = rep 1 = sync dd: 0 = demute 1 = mute	channel 17..24 status ? MSB(xx): chnl 24 LSB(xx): chnl 17 xx = aa .. dd
REA <i>	1	1	REA[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	set channel i to ready
SAF <i>	1	1	SAF[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	set channel i to safe

AUDIO COMMANDS					
mne- mo- nics	machine 820 MCH	827 MCH	input	output	meaning
INP <i>	1	1	INP[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	set channel i to input
SYN <i>	1	1	SYN[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	set channel i to synch
REP <i>	1	1	REP[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	set channel i to repro
MTN <i>	1	1	MTN[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	mute channel i
MTF <i>	1	1	MTF[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	demute channel i
CHN <i>	1	1	CHN[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	channel i on
CHF <i>	1	1	CHF[]<i> [,CR] i = 1..18H 0FFH for all	CR LF	channel i off

MACHINE COMMANDS						
mne- mo- nics	machine 820 827 MCH MCH		input	output	meaning	
LCD	1	1	LCD [,CR]	CR LF	local keyboard disabled	
LCE	1	1	LCE [,CR]	CR LF	local keyboard enabled	
RMD	1	1	RMD [,CR]	CR LF	remote keyboard disabled	
RME	1	1	RME [,CR]	CR LF	remote keyboard enabled	
SD?	1	1	SD? [,CR]	dd:ww:yy CR LF	software date ?	
MK?	1	1	MK? [,CR]	aa CR LF	mark nr of software version ? aa=mark number: 00,01,'?'=mark I, 02=mark II	
MT?	1	1	MT? [,CR]	aa CR LF	machine type ? aa= mach.type nr 01=820,02=812, 03=820MCH, 04=827MCH,05=807, 06=816,07=810	
SBA <adr>	1 1	1 1	SBA [] <xxxx>	CR LF	set ESbus address (8280-FFFF)	
BA?	1	1	BA? [,CR]	xxxx CR LF	bus address ?	

file rs232_MCH.t

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Last update: see next page

ASCII Protocol of RS232 Serial Interface for STUDER A820-MCH, A827-MCH

Changes

- 21.06.89 : status RPL (reverse play) redefined from 0AH/8AH to 25H/0A5H;
stati RPV (rev play vspd), RPI (rev play vspd int ref)
and RPE (rev play vspd ext ref) new implemented
- 09.08.89 : command RPL implemented for A820MCH and A827MCH
- 27.11.89 : SSA (set speed 3.75 ips) new implemented
- 06.12.89 : SVS, CVS, VS? and SVP new implemented
- 16.02.90 : general remarks to control x, xon, xoff protocol
- 16.08.90 : status record redefined for command DST, but not for command
ST?: from 09H resp 89H to two stati: 09H resp 89H for
record indication A, 0AH resp 8AH for record indication B
(in analogy to audio communication)
- 18.10.90 : 'Locate with record preset' has same philosophy in status
display as 'locate with play preset'
- 12.11.90 : audio channel setting: number range changed from dec to hex
format (before: 01..09H,10H..19H,20H..24H, now: 01..18H)
- 27.07.92 : STM description corrected in this protocol
(dms: from 'xxx' to 'x')
- 28.02.97 : TS? (tape sort A/B) & EQ? (ccir/nab)