# V-EIGHT RS422 IMPLEMENTATION

Introduction

This document contains information outlining the implementation of the Sony 9-pin protocol in the Studer V-Eight. This is not an official Sony 9-pin protocol document and should not be viewed as such. It is for reference purposes only. To obtain official Sony 9-pin protocol documents, please contact Sony directly.

Interface system overview

- Conforming to EIA RS422A
- Four-wire communications channel is utilized
- Data is transmitted asynchronously, bit serial, word serial with data transmissions between devices being digital
- Standard transmission rate on the interface bus is 38.4 kilobits per second (kb/s)
- The data utilized by the interface system shall be as follows:

Start bit	D0 (LSB)	D1	D2	D3	D4	D5	D6	D7 (MSB)	Parity (odd)	Stop bit	Mark Space
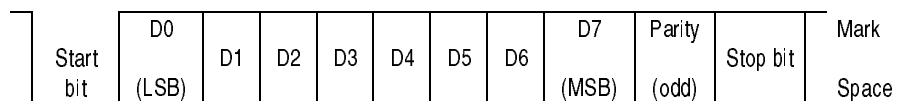
Odd Parity means that the sum of D0 + D1 + … + D7 + PARITY equals an odd number.

Command block format

The definition of CONTROLLER and DEVICE throughout this document shall be as follows:

"CONTROLLER" refers to the unit which controls the VTR.
"DEVICE" refers to the unit (VTR) which is controlled.

The communication between the CONTROLLER and DEVICE is composed of the following:

MSD   LSD

Cmd 1	Data count	Cmd 2	Data-1		Data-n (n=max. 15)	Checksum
1 Byte		1 Byte	1 Byte		1 Byte	1 Byte

When the *Data Count* is zero, the *Data* is not transmitted. When it is not zero, the *Data* corresponding to the value is inserted between *Cmd 2* and *Checksum*.

Cmd 1 classifies the COMMAND into main groups which indicate the Function and Direction of the data to follow.

Cmd 1	Function	Direction Controller Device
0	System control	→
1	System control return	←
2	Transport control	→
4	Preset & select control	→
6	Sense request	→
7	Sense return	←

Data Count Data Count indicates the number of data bytes added following Cmd 2. It ranges from 0 to F.

Cmd 2 Cmd 2 is the designated COMMAND sent to the DEVICE or returned from the DEVICE.

Data The number of data bytes and the content is defined by the specific Cmd 2.

Checksum The Checksum is the sum of all bytes in the message, from Cmd 1/Data Count to the last byte before the Checksum. The Checksum is used to verify data accuracy and reject communication sequences that contain bit errors.

Connector pin assignment

The interface connector is a 9-pin D-type female connector. The pin assignment for the CONTROLLER and DEVICE is as shown in the following table:

PIN	CONTROLLER	DEVICE
1	Ground	Ground
2	Receive A	Transmit A
3	Transmit B	Receive B
4	Transmit Common	Receive Common
5	Spare	Spare
6	Receive Common	Transmit Common
7	Receive B	Transmit B
8	Transmit A	Receive A
9	Ground	Ground

Communication protocol

All communication between CONTROLLER and DEVICE are under the direct supervision of the CONTROLLER.

The CONTROLLER shall not transmit additional Command Blocks to the DEVICE prior to receiving an appropriate response to the previous Command Block.

The CONTROLLER shall not interrupt transmission of a byte in a Command Block for more than 10 milliseconds. A DEVICE detecting the interruption of a byte in a Command Block that exceeds 10 ms shall execute a Time-Out error sequence. A DEVICE shall void the receiving Command Block and transmit a NAK (Time-Out).

The DEVICE, following the receipt of a Command Block from the CONTROLLER shall transmit a response within 9 milliseconds.

The DEVICE, upon detection of an error, shall immediately transmit a NAK to the CONTROLLER, with the appropriate error code. The CONTROLLER, upon receipt of the NAK, shall immediately stop transmission of the Command Block

The V-Eight is a DEVICE (i.e. it only responds to and does not generate Sony 9-pin commands). In general, the V-Eight responds to commands in the following manner:

1) Recognized/supported command:
- Return an ACK as response to command not requiring data.
- Return appropriate data requested.

2) Checksum mis-match:
- Return a NAK (with data = checksum error) and take no action.

3) Unrecognized/unsupported command:
- Return a NAK (with data = undefined error) and take no action.

4) Number of data bytes is less than expected
(e.g. Data byte count < # of bytes needed)
- Return a NAK (with data = undefined error) and take no action.

5) If more than 10 milliseconds lapses between bytes in a command block:
- Return a NAK (with data = timeout error) and take no action.

Command/response chart

The marks shown in the tables mean the following:

"O"   indicates that response to this command is supported; returns appropriate response

"✱"   indicates that the appropriate status bits are set, but the V-Eight does nothing; returns an *ACK (10.01)*

"X"   indicates that this command is not supported; returns a *NAK Undefined (11.12.01)*

	Command	V-Eight Response
00.0C	Local Disable	O
00.1D	Local Enable	O
00.11	Device Type Request	O (BVU-950)
01.80	Memory Area Number Preset	X
00.81	Memory Area Number Sense	X
04.82	Memory Area Length Preset	X
00.83	Memory Area Length Sense	X
01.84	Memory Area Select	X
00.85	Memory Area Select Sense	X
01.86	Mem Area Output Select	X
00.87	Mem Area Output Select Sense	X
20.00	Stop	O
20.01	Play	O
20.02	Record	O
20.04	Standby Off	O
20.05	Standby On	O
20.0F	Eject	O
20.10	Fast Forward	O
2X.11	Jog Fwd	O
2X.12	Var Fwd	O
2X.13	Shuttle Fwd	O
20.20	Rewind	O
2X.21	Jog Rev	O
2X.22	Var Rev	O
2X.23	Shuttle Rev	O

	Command	V-Eight Response
20.30	Preroll	O
24.31	Cue With Data	O
2X.37	Chase	O
21.38	Prog Speed +	O
21.39	Prog Speed –	O
20.40	Preview	O
20.41	Review	O
20.42	Auto Edit	O
20.54	Anti-Clog Timer Disable	O
20.55	Anti-Clog Timer Enable	O
20.60	Full EE Off	O
20.61	Full EE On	O
20.63	Select EE On	O
20.64	Edit Off	O
20.65	Edit On	O
20.6A	Freeze Off	*
20.6B	Freeze On	*
20.80	*Memory Stop*	*X*
20.81	*Memory Play*	*X*
20.82	*Memory Write Start*	*X*
20.93	*Memory Read Fwd*	*X*
22.A3	*Memory Red Rev*	*X*
26.B1	*Memory Rd-Pointer Preset*	*X*
44.00	Timer-1 Preset	X
44.04	TimeCode Gen Preset	O
44.05	TimeCode Gen UBit Preset	O
40.08	Timer-1 Reset	O
40.10	In Entry	O
40.11	Out Entry	O
40.12	A In Entry	O
40.13	A Out Entry	O
44.14	In Data Preset	O
44.15	Out Data Preset	O

	Command	V-Eight Response
40.16	A In Entry Preset	O
40.17	A Out Entry Preset	O
40.18	In Shift +	O
40.19	In Shift –	O
40.1A	Out +Shift	O
40.1B	Out –Shift	O
40.1C	A In +Shift	O
40.1D	A In –Shift	O
40.1E	A Out +Shift	O
40.1F	A Out –Shift	O
40.20	In Flag Reset	O
40.21	Out Flag Reset	O
40.22	A In Flag Reset	O
40.23	A Out Flag Reset	O
40.24	In Recall	O
40.25	Out Recall	O
40.26	A In Recall	O
40.27	A Out Recall	O
40.2D	Lost Lock Reset	O
4x.30	Edit Preset	O
44.31	Preroll Duration Preset	O
41.32	Tape/Auto Select	X
41.33	Servo Reference Select	X
4x.34	Head Select	X
41.35	Color Frame Select	X
41.36	Timer Mode Select	O
41.37	Input Check	X
44.3C	Postroll Duration Preset	O
40.40	Auto Mode Off	X
40.41	Auto Mode On	X
40.42	Spot Erase Off	X
40.43	Spot Erase On	X
40.48	Video Reference Disable Off	X
40.49	Video Reference Disable On	X
42.50	DA Input Select	X
42.51	DA Sys Emph Select	X
41.58	DA Sys Fs Select	X
45.78	Chase Offset	O

	Command	V-Eight Response
4X.A0	Audio Input Level	X
4X.A1	Audio Output Level	X
61.0A	TC Gen Data Sense	O
61.0C	Current Time Sense	O
60.10	In Data Sense	O
60.11	Out Data Sense	O
60.12	A In Data Sense	O
60.13	A Out Data Sense	O
61.20	Status Sense	O
62.23	Signal Cont Data Sense	X
61.2A	HM Data Sense	X
61.30	Edit Preset Sense	O
60.31	Preroll Duration Sense	O
60.33	Servo Reference Select Sense	X
60.36	Timer Mode Sense	O
60.3C	Postroll Duration Sense	O
60.50	DA Input Sense	X
60.51	DA Sys Emph Sense	X
60.52	DA Input Emph Sense	X
60.53	DA PB Emph Sense	X
60.58	DA Sys Fs Sense	O
61.78	Chase Offset Sense	O

V-Eight command response detail

V-Eight Responses

10.01   **ACK**
– Sent in response to receiving a valid command that does not require data.

12.11   **Device Type Return**
– Sent as response to Device Type Request command.
– The V-Eight responds as a Sony BVU-950: 1x 1C
where x is TC frame rate: 0 = 29.97 or 30, 1 = 25, 2 = 24

11.12   **NAK**
– Sent when detecting communication errors or as response to receiving an undefined command.
– Data Format:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Time out	Framing error	Overrun error	Parity error	-----	Checksum error	-----	Undefined command

System control

00.0C   **Local Disable**
Action: Put V-Eight into Remote Only Mode *(ONLINE CTRL: Remote)*

00.1D   **Local Enable**
Action: Put V-Eight into Local/Remote Mode *(ONLINE CTRL: Local/Rem)*

00.11   **Device Type Request**
Action: None
Response: Device Type = 12.11   Data = 1 x 1C (BVU-950 device)
x is the TC frame rate: 0 = 30 frm, 1 = 25 frm, 2 = 24 frm

Transport control

- Chase mode is automatically cancelled by all "2x" commands, except 2x.37, 20.60, 20.61, 20.63, 20.64, and 20.65.

20.00	**Stop**
Action:	Stop the tape

20.01	**Play**
Action:	Play the tape

20.02	**Record**
Action:	Record (Punch-In Only) from any state. Any other transport command, except Eject and Standby Off, will cause a record exit.

20.03	**Standby Off**
Action:	If already in standby, then unthread the tape (stop in mode1)
	If not in standby, then do nothing (just send ACK)

20.04	**Standby On**
Action:	Pause the tape (stop in mode2)

Standby = *Stopped with the tape threaded.*

20.0F	**Eject**
Action:	Eject the tape.
	If recording, do nothing (just send NAK data = undefined)

20.10	**Fast Forward**
Action:	Forward the tape

2X.11	**Jog Forward**
2X.12	**Var Forward**
2X.13	**Shuttle Forward**
Data:	DATA-1 = N = Coarse speed variable (required)
	DATA-2 = N' = Fine speed variable (optional)
Action:	Estimate speed closest to V-Eight capabilities.

20.20	**Rewind**
Action:	Rewind the tape (threaded or unthreaded)

2X.21	**Jog Rewind**
2X.22	**Var Rewind**
2X.23	**Shuttle Rewind**
Data:	DATA-1 = N = Coarse speed variable (required)
	DATA-2 = N' = Fine speed variable (optional)
Action:	Estimate speed closest to V-Eight capabilities.

- *When only DATA-1 (N) is given:*
  Tape Speed = $10^{(N/32 - 2)}$
- *When both DATA-1 (N) and DATA-2 (N') are given,*
  Tape Speed = $10^{(N/32 - 2)} + (N'/256)(10^{(N - 1/32 - 2)} - 10^{(N/32 - 2)})$

20.30	**Preroll**	
	Action:	Set the Preroll bit (Status4, bit0) and locate to the (PunchIn Point) – (Preroll time).

24.31	**Cue Up With Data**	
	Data:	DATA-1 = Frame,
		DATA-2 = Seconds,
		DATA-3 = Minutes,
		DATA-4 = Hours
	•	All data bytes in BCD format (ms nibble = tens; ls nibble = ones)
	Action:	Set the CueUp bit (Status4,bit0) and locate to specified time. Once the locate has completed, set the CueUpComplete bit (Status2,bit0)

2X.37	**Chase**	
	Data:	DATA-1: Synchronization method
		00 = Lock to ref. when Chase Lock has been completed (Once)
		01 = Always continue the Chase operation (Cont)
	Action:	Synchronize to external timecode, using the Sync Offset

21.38	**Program Speed Play +**	
	Data:	DATA-1 = 8-bit Speed Value that ranges from 0 to 60 (0..3CH)
		Deviation(%) = 0.1 x Speed Value
	Action:	Positive Pitch change

21.39	**Program Speed Play –**	
	Data:	DATA-1 = 8-bit Speed Value that ranges from 0 to 60 (0..3CH)
		Deviation(%) = –0.1 x Speed Value
	Action:	Negative Pitch change

20.40	**Preview**	
	Action:	Locate to (PunchIn) – (Preroll time) and enter record. At PunchIn point, crossfade (at In Point crossfade time preset) with input data. At PunchOut point, crossfade (at Out Point crossfade time preset) with tape playback data. If not chasing, the tape will stop when it reaches the (PunchOut) + (Postroll time). If chasing, the tape will continue to follow the incoming timecode. For the V-Eight, this means the following:

- *Enable Preroll, Postroll, Rehearse and AutoRecord.*
- *Locate to the (AutoPunchInPoint) – (Preroll time)*
- *Initiate a record which puts the V-Eight into auto record rehearse mode (which will crossfade in and out at PunchIn and PunchOut points)*
- *Restore original Preroll, Postroll, AutoPlay, and AutoReturn status at the (PunchOut) + (Postroll time).*

20.41 **Review**

Action: Locate to (PunchIn) – (Preroll time) and enter play. If not chasing, the tape will stop when it reaches the (PunchOut) + (Postroll time). If chasing, the tape will continue to follow the incoming timecode. For the V-Eight, this means the following:

- Enable Preroll and Postroll.
- Locate to the (AutoPunchInPoint) – (Preroll time)
- Initiate a play
- Restore original Preroll, Postroll, AutoPlay, and AutoReturn status at the (PunchOut) + (Postroll time).

20.42 **Auto Edit**

Action: Locate to (PunchIn) – (Preroll time) and enter play. At PunchIn point, crossfade (at In Point crossfade time preset) with input data and enter EDIT REC mode. At PunchOut point, crossfade (at Out Point crossfade time preset) with tape playback data cancel EDIT REC mode and enter REPRO playback. If not chasing, the tape will stop when it reaches the (PunchOut) + (Postroll time). If chasing, the tape will continue to follow the incoming timecode. For the V-Eight, this means the following:

1) Enable Auto Record
2) Locate to (PunchIn) – (Preroll time)
   Initiate a record, which plays the tape until PunchIn point is reached, at which time it will punch-in, punch-out at PunchOut point.
   Restore original Preroll, Postroll, AutoPlay, and AutoReturn status at (PunchOut) + (Postroll time). (If chasing, Auto Record will be disabled at the PunchOut point)

20.54 Anti-Clog Timer Disable

Action: Disable the anti-clog timer, which is responsible for unthreading the tape after the specified time without tape activity. When the timer is disabled, the unthread timeout is infinite (no timeout). The previous timeout is still retained so that enabling the timer will return to the previous timeout.

20.55 Anti-Clog Timer Enable

Action: Enable the anti-clog timer. Return the unthread timeout to the last non-infinite value.
The unthread timeout value can be viewed and/or edited in the Utility pages.
(Currently, the user is not able to select the infinite setting from the front panel)

20.60   **Full EE Off**
20.61   **Full EE On**
         Action: Clears/sets all channels to EE (input) mode. (Disables/enables All Input)

20.62   **Select EE On**
         Action: Sets each EDIT PRESET channel assigned by DATA-1 of EDIT PRESET command to the EE mode (disable AutoInput)

20.63   **Edit Off**
         Action: Cancels the EDIT REC mode as well as the SELECT EE mode (enable AutoInput)

20.64   **Edit On**
         Action: Enter EDIT REC PLAY mode (punch-in)

Preset/select control

44.04	**Time Code Generator Preset**	
	Data:	DATA-1 thru DATA-4 same format as in "44.00: Timer-1 Preset"
	Action:	Set (internal) timecode generator to the specified value

44.05	**Time Code Generator User Bit Preset**	
	Data:	DATA-1 = Binary Group 1&2; DATA-2 = Binary Group 3&4; DATA-3 = Binary Group 5&6; DATA-4 = Binary Group 7&8
•		Data Format: ms nibble = Binary Grp N+1; ls nibble = Binary Grp N
	Action:	Set timecode generator user bits to the specified value

40.08	**Timer-1 Reset**	
	Action:	Reset Timer-1 (ABS time) to zero (i.e. make current location the new Relative Zero point)

40.10	**In Entry**	
40.11	**Out Entry**	
40.12	**A In Entry**	
40.13	**A Out Entry**	
	Action:	Transfer the timer or timecode data as In/Out Point data into the In/Out Entry (Transfer timer or timecode data into the PunchIn/Out Point)

44.14	**In Data Preset**	
44.15	**Out Data Preset**	
44.16	**A In Data Preset**	
44.17	**A Out Data Preset**	
	Data:	DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"
	Action:	Place specified data into In/Out Entry (set PunchIn/Out Point)

40.18	**In Shift +**	
40.19	**In Shift –**	
40.1C	**A In Shift +**	
40.1D	**A In Shift –**	
	Action:	Add/subtract 1 frame of timer or timecode value stored in the In Entry as the In Point (Add/Subtract 1 frame from the MarkIn Point)

40.1A	**Out Shift +**	
40.1B	**Out Shift –**	
40.1E	**A Out Shift +**	
40.1F	**A Out Shift –**	
	Action:	Add/subtract 1 frame of timer or timecode value stored in the Out Entry as the Out Point (Add/Subtract 1 frame from the MarkOut Point)

40.20	**In Flag Reset**
40.21	**Out Flag Reset**
40.22	**A In Flag Reset**
40.23	**A Out Flag Reset**

Action: Clear IN flag (STATUS-3, Bit 0) or OUT flag (STATUS-3, Bit 1)

40.24	**In Recall**
40.25	**Out Recall**
40.26	**A In Recall**
40.27	**A Out Recall**

Action: Set the IN flag (STATUS-3, Bit 0) or OUT flag (STATUS-3, Bit 1)

40.2D   Lost Lock Reset

Action: Clear the LOST LOCK flag (STATUS-8, Bit 6)

4X.30   Edit Preset

Data: DATA-1 thru DATA-15

Action: If x = 1, then DATA-1 enables/disables tracks 1, 2, TC
If x = 2..F, then DATA-2 thru DATA-15 = bitmap of cascaded units 1 thru 14

<data-1> = RS422 Edit Preset data-1 format

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Insert	Assem	Video	-----	TC	Trk2	Trk1

<data-2>...<data-15> = track bitmap of unit #1..unit #14
(0 = track disabled, 1 = track enabled)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Trk8	Trk7	Trk6	Trk5	Trk4	Trk3	Trk2	Trk1

44.31   Preroll Duration Preset

Data: DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"

Action: Set Preroll Time (range 0 thru 25 secs)

41.36   Timer Mode Select

Data: DATA-1:   01 = Timecode; 02 = Timer-1 (ABS)

Action: Select timer system to be used as a basis for In Entry, Out Entry, In Preset, Out Preset, Preroll and Cue Up With Data, etc.

44.3C Postroll Duration Preset

Data: DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"

Action: Set Postroll Time

44.78 **Chase Offset Preset**

        Data: DATA-1 = Frame,
                      DATA-2 = Seconds,
                      DATA-3 = Minutes,
                      DATA-4 = Hours,

- All data bytes are in BCD format (ms nibble = tens; ls nibble = ones)

    Action: Set Chase Offset

SENSE REQUEST

61.0A   **TC Gen Data Sense**   *Data:*   DATA-1 = 01: Request for GEN TC
Response: 74.08: GEN TC DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"

Data: DATA-1 = 10: Request for GEN UB
Response: 74.09: GEN UB DATA
– DATA-1 thru DATA-4 same format as in "44.05: Time Code Generator
User Bit Preset"

Data: DATA-1 = 11: Request for GEN TC and GEN UB
Response: 78.08: GEN TC DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"
– DATA-5 thru DATA-8 same format as in "44.05: Time Code Generator
User Bit Preset"

61.0C   **Current Time Sense**   *Data:*   DATA-1 = 01: Request for LTC TIME
Response: 74.04: LTC TIME DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"
              74.14: LTC INTERPOLATED TIME DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"

Data: DATA-1 = 04: Request for TIMER-1
Response: 74.00: TIMER-1 DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"

Data: DATA-1 = 10: Request for LTC USER BITS
Response: 74.05: LTC UB DATA
– DATA-1 thru DATA-4 same format as in "44.05: Time Code Generator
User Bit Preset"

Data: DATA-1 = 11:Requ. for LTC TIME & USER BIT
DATA
Response: 78.04: LTC TIME & UB DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"
– DATA-5 thru DATA-8 same format as in "44.05: Time Code Generator
User Bit Preset"
              78.14: LTC INTERPOLATED TIME & UB DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"
– DATA-5 thru DATA-8 same format as in "44.05: Time Code Generator
User Bit Preset"

Note: Respond with 70.0D: REQUEST TIME DATA MISSING if requested data
is other than Timer-1 or Timer-2 data, and when following conditions exist:
• Immediately after power-on and until tape starts moving
• Cassette out
• During loading or unloading

60.10	**In Data Sense**	
60.11	**Out Data Sense**	Request In/Out Point data

60.10　　　　**In Data Sense**
60.11　　　　**Out Data Sense**　　Request In/Out Point data
Response: 75.10: IN DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"
　　　　75.11: OUT DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"

61.20　　　　**Status Sense**　　Request for status
Data:　　DATA-1 (MS nibble = initial status byte to be sent back)
　　　　(LS nibble = # of status bytes to be sent back)
Response: 7X.20: STATUS DATA
– DATA-1 thru DATA-x (Status Bytes) *Reference Appendix A*

61.30　　　　**Edit Preset Sense**　　*Data:*　　DATA-1 (MS nibble = initial status byte to be sent back)
　　　　(LS nibble = # of status bytes to be sent back)
Response: 7x.30: EDIT PRESET DATA
– DATA-1 thru DATA-x (Status Bytes)

60.31　**Pre-roll Duration Sense**　Request Pre-roll time data
Response: 74.31: PREROLL TIME DATA
– DATA-1 thru DATA-4 same format as in "24.31: Cue Up With Data"

60.36　　**Timer Mode Sense**　Request for setting of the Timer Mode (Timer-1 or Timecode)
Response: 71.36: TIMER MODE STATUS
– DATA-1 = 00 for Timecode, = 01 for Timer-1 (ABS)

60.58　　　　**DA Sys Fs Sense**　Request digital audio channel sampling frequency
Response: 71.58: DA SAMPLING FREQ DATA
– DATA-1: 01 = 48 kHz; 02 = 44.1 kHz

61.78　　**Chase Offset Sense**　Request Chase Offset value
Response: 76.78: CHASE OFFSET DATA
– DATA-1 = 00
– DATA-2 = Frame, DATA-3 = Seconds, DATA-4 = Minutes

Notes:　In certain instances, the user may want to use ABS + SMPTE Offset instead of the TC track timecode when controlling the V-Eight via RS422.
If the Chase Reference = Tape TC, then the TC track timecode will be used and if the Chase Reference = ABS Time, then the ABS + SMPTE Offset will be used.
For example, when Chase Reference = ABS Time, the V-Eight will respond to the timecode query with the ABS+SMPTE Offset timecode.
Also while Chase Reference = ABS Time, if the reference counter display is in TapeTC mode, the ABS + SMPTE Offset timecode will be displayed instead of the TC track timecode.