Commands for Stereo/RDS Coder R&S SML-B5

Contents:

General Information

This document contains a list of commands for the optional Stereo/RDS Coder R&S SML-B5 for the Signal Generator R&S SML01.

➢ Commands are sent to the Stereo/RDS Coder
 with **STEReo:DIRect: ["command string"]**.

➢ Information is queried with **STEReo:DIRect? ["command string"]**

➢ All commands are to be terminated with CR.

➢ **Uppercase/lowercase:** Uppercase and lowercase letters are used to identify the long form and short form of the keywords of the commands given in the manual. The instrument itself does not distinguish between the two types of characters.

Commands

1A=, 3A=, 5A=, 6A=, 7A=, 8A=, 9A=, 10A=, 11A=, 12A=, 13A=

Description:	Transmits data via free format groups (FFGs). A free format group can be filled with any desired data (5 bits in block B and 16 bits each in blocks C and D of the group).
Command:	1A=WW,xxxxxxxxxx,yyyyyyyyyy,... or 1A=00: erases the data
Query:	1A?
Response:	xxxxxxxxxx,yyyyyyyyyy,...
Value range:	WW = number of retransmissions x, y = 0000000000 to 1FFFFFFFFF (10 ASCII coded hexadecimal characters each) Max. 20 different data sequences can be defined.

Example: *Command:*
          STEReo:DIRect **"1A=01,0123456789,1FFFFFFFFF"**
          Fills a queue with the data "0123456789,1FFFFFFFFF".
          The data is sent in consecutive order in group 1A after group 1A is added to the group sequence (see "GS" command below).

          Query:
          STEReo:DIRect? **"1A"**
          Reads the data of group 1A.

          Response:
          "01,0123456789,1FFFFFFFFF"

Important: ***10 characters must be specified each for x and y. Leading zeros, if any, must also be specified. The command described here only causes a queue to be filled with data for a specific group. The data will only be sent when the group in question is added to the group sequence with the "GS" command.***

AF

Description:	Defines alternative frequencies for the frequency currently transmitted.

Command:	AF=A,xxx.x,xxx.x,...
Query:	AFz?
Response:	xxx.x,xxx.x,...
	or () if list "z" is not available
Value range:	xxx.x = 87.6 to 107.9 (ASCII coded decimal numbers)
	A = "N" (new AF list) or "+" (AF list to be added)
	z = 1 to 5 (AF list to be read)

Example: *Command:*
         STEReo:DIRect **"AF=N,97.4,98.3"**
         Creates a new alternative frequency list with the frequencies 97.4 MHz and 98.3 MHz.

         Query:
         STEReo:DIRect? **"AF1"**
         Reads the first alternative frequency list.

         Response:
         "97.4,98.3"

         Delete lists with:
         STEReo:DIRect **"AF=N"**
         Deletes all frequency lists.

Important: ***A maximum of five AF lists with max. 25 frequencies per list can be created.***

ARI

Description:	Activates ARI signal transmission.

Command:	ARI=x
Query:	ARI?
Response:	x
Value range:	0|1

Example: *Command:*
         STEReo:DIRect **"ARI=0"**
         Deactivates ARI signal transmission.

         Query:
         STEReo:DIRect? **"ARI"**

         Response:
         "0"

ARI-DEV

Description:	Sets the frequency deviation of the ARI signal (max. deviation).
Command:	ARI-DEV=xxxx
Query:	ARI-DEV?
Response:	xxxx
Value range:	0000 to 1000 (ASCII coded decimal numbers), corresponding to 0 Hz to 10 kHz

Example: *Command:*
STEReo:DIRect **"ARI-DEV=1000"**
Sets the ARI frequency deviation to 10 kHz.

Query:
STEReo:DIRect? **"ARI-DEV"**

Response:
"1000"

Important: ***A four-digit value must always be set.***
Leading zeros, if any, must also be specified.

ARI-ID

Description:	Selects the ARI identification.
Command:	ARI-ID=x
Query:	ARI-ID?
Response:	x
Value range:	0|1|2|3
	0 = OFF
	1 = DK (traffic announcement identification)
	2 = BK (area identification)
	3 = DK and BK (traffic announcement identification and area identification)

Example: *Command:*
STEReo:DIRect **"ARI-ID=0"**
Deactivates the ARI identification.

Query:
STEReo:DIRect? **"ARI-ID"**

Response:
"0"

BIN

Description:	Defines and sends, or queries, binary test patterns.
	The BIN command causes the Stereo/RDS Coder to send periodic binary bit patterns instead of RDS data.
Command:	BIN=x
Value range:	0 to 4
	0 = binary mode OFF
	1 = 00000000...
	2 = 11111111...
	3 = 01010101...
	4 = 11001100...

Example: *Command:*
               STEReo:DIRect "**BIN=2**"
               The binary test pattern is set to "2" so that only "1s" are transmitted.

BK

Description: Sets the ARI area identification.

Command: BK=x
Query: BK?
Response: x
Value range: A to F

Example: *Command:*
               STEReo:DIRect **"BK=E"**
               The ARI area identification is set to "E".

               Query:
               STEReo:DIRect? **"BK"**

               Response:
               "E"

CT

Description: Sets and activates transmission of the real-time clock.

Command: CT=XX:YY:ZZ,TT.MM.JJ
               XX = hour, YY = minute, ZZ = second
               TT = day, MM = month, JJ = year
Query: CT?
Response: XX:YY:ZZ,TT.MM.JJ
Value range: 00:00:00,01.01.00 to 23:59:59,31.12.85
               (ASCII coded decimal numbers)

Example: *Command:*
               STEReo:DIRect "**CT=20:30:59,01.08.03**"
               The real-time clock is set to 20:30:59 and 1 August 2003.

               Query:
               STEReo:DIRect? **"CT"**

               Response:
               "20:31:06,01.08.03"

Important: ***The CT data is transmitted in group 4A. Setting the real-time clock
               (CT command) automatically adds group 4A to the group sequence.
               Group 4A must not be manually added to, or removed from, the group
               sequence. To remove group 4A from the group sequence, the "CT=off"
               command must be used.***

CT=off

Description: Deactivates transmission of the real-time clock signal in the RDS signal.

Command: CT=off

Example: *Command:*
             STEReo:DIRect "**CT=off**"
             The real-time clock signal is no longer transmitted in the RDS signal.

Important: ***This command is used to remove group 4A from the group sequence.***
                     Group 4A must not be manually removed from the group sequence.

DI
Description: Sets or reads the decoder information.
                With this command, the current decoder operating mode (mono, stereo, etc) can be detected and, if necessary, changed.

Command: DI=x
Query: DI?
Response: x
Value range: 0 to F (ASCII coded hexadecimal numbers)

Example: *Command:*
             STEReo:DIRect **"DI=4"**
             The decoder information is set to "4".

             Query:
             STEReo:DIRect? **"DI"**

             Response:
             "4"

DS
Description: Selects/activates a storage area in the Stereo/RDS Coder.
                Upon activation, the settings stored in the selected area can be loaded.

Command: DS=x
Query: DS?
Response: x
Value range: 1|2|3|4|5|6|7|8|9

Example: *Command:*
             STEReo:DIRect **"DS=2"**
             Storage area 2 is activated.

             Query:
             STEReo:DIRect? **"DS"**

             Response:
             "2"

EON-AFA
Description: Enhanced Other Networks (EONs):
                defines type A alternative frequencies for the EON with PI=yyyy.

Command: EON-AFA=yyyy,A,xxx.x,xxx.x,...
Query: EON-AFA,yyyy,z?
Response: xxx.x,xxx.x,...
             or () if list "z" is not available
Value range: xxx.x = 87.6 to 107.9 (ASCII coded decimal numbers)
             yyyy = 0000 to FFFF (ASCII coded hexadecimal numbers)

A = "N" (new AF list) or "+" (AF list to be added)
z = 1 to 5 (AF list to be read)

Example: *Command:*
            STEReo:DIRect **"EON-AFA=1000,N,97.4,98.3"**
            Creates a new type A alternative frequency list for the EON with PI=1000.
            The new list contains the alternative frequencies 97.4 MHz and 98.3 MHz.

            Query:
            STEReo:DIRect? **"EON-AFA,1000,1"**
            Reads the first type A alternative frequency list of the EON with PI=1000.

            Response:
            "97.4,98.3"

Important: **For each Enhanced Other Network (EON), a maximum of five type A alternative frequency lists can be created.**

EON-AFB

Description: Enhanced Other Networks (EONs):
             defines type B alternative frequencies for the EON with PI=yyyy.

Command: EON-AFB=yyyy,A,xxx.x,xxx.x,...
             1st frequency = tuned frequency (TF)
             2nd to 5th frequency = mapped frequencies (MFs)
Query: EON-AFB,yyyy,z?
Response: xxx.x,xxx.x,...
             or () list "z" is not available
Value range: xxx.x = 87.6 to 107.9 (ASCII coded decimal numbers)
             yyyy = 0000 to FFFF (ASCII coded hexadecimal numbers)
             A = "N" (new AF list) or "+" (AF list to be added)
             z = 1 to 5 (AF list to be read)

Example: *Command:*
            STEReo:DIRect **"EON-AFB=1000,N,97.4,98.3"**
            Creates a new type B alternative frequency list for the EON with PI=1000.
            The list contains the alternative frequencies 97.4 MHz and 98.3 MHz.

            Query:
            STEReo:DIRect? **"EON-AFB,1000,1"**
            Reads the first type B alternative frequency list of the EON with PI=1000.

            Response:
            "97.4,98.3"

Important: **For each Enhanced Other Network (EON), a maximum of five type B alternative frequency lists can be created, each list containing max. five frequencies. A minimum of two frequencies per EON is required.**

EON-DEL

Description: Enhanced Other Networks (EONs):
             deletes the complete EON with PI=xxxx.

Command: EON-DEL=xxxx
Value range: xxxx = 0000 to FFFF (ASCII coded hexadecimal numbers)

Example: STEReo:DIRect **"EON-DEL=1000"**
                 Deletes the EON with PI=1000.

EON-PI
Description: Enhanced Other Networks (EONs):
                creates a new EON or reads the list of the program identification (PI) codes of
                all EONs created so far.

Command: EON-PI=xxxx
Query: EON-PI?
Response: xxxx,...
Value range: 0000 to FFFF (ASCII coded hexadecimal numbers)

Example: *Command:*
                STEReo:DIRect **"EON-PI=1000"**
                Creates a new EON with PI=1000.

                Query:
                STEReo:DIRect? **"EON-PI"**

                Response:
                "1000"

Important: ***A four-digit value must always be set.***
                 Leading zeros, if any, must also be specified.
                 A maximum of eight EONs can be created.

EON-PS
Description: Enhanced Other Networks (EONs):
                sets the program service (PS) name for the EON with PI=yyyy.

Command: EON-PS=yyyy,xxxxxxxx
Query: EON-PS,yyyy?
Response: xxxxxxxx
Value range: xxxxxxxx = 8 ASCII characters
                yyyy   = 0000 to FFFF (ASCII coded hexadecimal numbers)

Example: *Command:*
                STEReo:DIRect **"EON-PS=1000,Test 123"**
                Sets the program service name for the EON with PI=1000 to "Test 123".

                Query:
                STEReo:DIRect? **"EON-PS,1000"**
                Reads the program service name of the EON with PI=1000.

                Response:
                "Test 123"

Important: ***An eight-digit value must always be set. Blank spaces, if any, must also***
                 be entered, otherwise the value will not be accepted.

EON-PTY
Description: Enhanced Other Networks (EONs):

sets the program type (PTY) for the EON with PI=yyyy.

Command: EON-PTY=yyyy,xx
Query: EON-PTY,yyyy?
Response: xx
Value range: 00 to 31 (ASCII coded decimal numbers)
                yyyy = 0000 to FFFF (ASCII coded hexadecimal numbers)

Example: *Command:*
            STEReo:DIRect **"EON-PTY=1000,10"**
            Sets the program type for the EON with PI=1000 to "10".

            Query:
            STEReo:DIRect? **"EON-PTY,1000"**
            Reads the program type of the EON with PI=1000.

            Response:
            "10"

EON-TA
    Description: Enhanced Other Networks (EONs):
                   sets the TA flag for the EON with PI=yyyy.

    Command: EON-TA=yyyy,x
    Query: EON-TA,yyyy?
    Response: x
    Value range: x   = 0|1
                   yyyy = 0000 to FFFF (ASCII coded hexadecimal numbers)

    Example: *Command:*
                STEReo:DIRect **"EON-TA=1000,1"**
                Sets the TA flag for the EON with PI=1000 to "1".

                Query:
                STEReo:DIRect? **"EON-TA,1000"**
                Reads the TA flag of the EON with PI=1000.

                Response:
                "1"

EON-TP
    Description: Enhanced Other Networks (EONs):
                   sets the TP flag for the EON with PI=yyyy.

    Command: EON-TP=yyyy,x
    Query: EON-TP,yyyy?
    Response: x
    Value range: x   = 0|1
                   yyyy = 0000 to FFFF (ASCII coded hexadecimal numbers)

    Example: *Command:*
                STEReo:DIRect **"EON-TP=1000,1"**
                Sets the TP flag for the EON with PI=1000 to "1".

                Query:
                STEReo:DIRect? **"EON-TP,1000"**

Reads the TP flag of the EON with PI=1000.

Response:
"1"

GS

Description: Sets or reads the group sequence.

Command: GS=xx,xx,...,xx (1 to 36 groups)
Query: GS?
Response: xx,xx,...,xx
Value range: xx = 2 or 3 characters: 0A,1A,2A, … to 15B

Example: *Command:*
                STEReo:DIRect **"GS=0A,1B,10A,15A"**
                The groups 0A,1B,10A,15A are transmitted.

                Query:
                STEReo:DIRect? **"GS"**

                Response:
                "0A,1B,10A,15A"

Important: **Only group A or group B data may be sent at a time.**
                Only groups that contain data are transmitted.
                The groups 4A, 14B and 15B are automatically added to the group
                sequence and must not be added or removed manually.

IMP

Description: Sets external L, R impedances.

Command: IMP=x
Query: IMP?
Response: x
Value range: 1|2
                $1 = 600 \, \Omega$
                $2 = 100 \, k\Omega$

Example: *Command:*
                STEReo:DIRect **"IMP=1"**
                The external impedance is set to $600 \, \Omega$.

                Query:
                STEReo:DIRect? **"IMP"**

                Response:
                "1"

MASK

    Description: Sets a bit mask to generate defined bit errors in the RDS data stream.

    Command: MASK=xx,yy,aaaaaaa,bbbbbbb,ccccccc,ddddddddd
    Query: MASK?
    Response: xx,yy,aaaaaaa,bbbbbbb,ccccccc,ddddddddd
    Value range: xx = 00 to FF (hexadecimal values), corresponding to number of groups to be masked.
                If xx is set to zero, the RDS groups are continuously linked to the error mask.
                If xx is set to a value other than zero, this value is decremented after each errored group transmitted. When zero count is reached, no further errored groups are transmitted, and MASK_STATE is set to "0".

                yy = 00 to FF (hexadecimal values)
                Number of error-free groups to be inserted after each errored group

                a, b, c, d = 0000000 to 3FFFFFF
                Hexadecimal bit mask for blocks A, B, C and D of the RDS groups.
                For each block, 26 bits (16 data bits and 10 CRC bits) have to be entered in hexadecimal code.

    Example: *Command:*
                STEReo:DIRect **"MASK=09,01,0000001,0000000,0000000,0000000"**
                In nine RDS groups, the least significant bit of the CRC code of block A is inverted, i.e. an errored bit is sent. After each errored group, one error-free group is inserted. After transmission of the complete sequence, MASK_STATE is set to "0".
                With the command MASK_STATE=1, the above sequence (9 errored groups with one error-free group inserted after each errored group) is retransmitted once.
                Then, MASK_STATE is again set to "0".

            Query:
                STEReo:DIRect? **"MASK"**

            Response:
               "**09,01,0000001,0000000,0000000,0000000**"

MASK_STATE

    Description: Switches on or off the transmission of defined bit errors in the RDS data stream.

    Command: MASK_STATE=x
    Query: MASK_STATE?
    Response: x
    Value range: x = 0 or 1

    Example: *Command:*
                STEReo:DIRect **"MASK_STATE=1"**
                With the command MASK_STATE=1, a sequence of errored groups as defined by the MASK command is retransmitted once if the number of groups to be masked is other than zero. Then, MASK_STATE is automatically set to "0".
                If the number of groups to be masked is equal to zero in the MASK command (which means continuous error transmission), the masking function can be switched off with MASK_STATE=0.

Query:
STEReo:DIRect? **"MASK_STATE"**

Response:
"**1**"
The MASK_STATE query provides information as to whether the RDS data stream is linked to an error mask.

MODE

Description: Sets one of various transmit modes.

Command: MODE=x
Query: MODE?
Response: x
Value range: 1|2|3|4|5
1 = L: signal in left channel only
2 = R: signal in right channel only
3 = signal of equal frequency and phase in left and right channel
4 = signal of equal frequency and opposite phase in left and right channel
5 = different, independent signals in left and right channel
(5 is not possible if the internal LF generator is selected as source
(SRC = LFGen)

Example: *Command:*
STEReo:DIRect **"MODE=1"**
Only the signal of the left channel is transmitted.

Query:
STEReo:DIRect? **"MODE"**

Response:
"1"

MS

Description: Sets or reads the music/speech flag.
The flag signals whether music or speech is being transmitted.

Command: MS=x
Query: MS?
Response: x
Value range: M|S

Example: *Command:*
STEReo:DIRect **"MS=M"**
The music/speech flag is set to "M".
This signals that music is currently transmitted.

Query:
STEReo:DIRect? **"MS"**

Response:
"M"

MPX-DEV

Description:		Sets the MPX frequency deviation (max. deviation).
Command:		MPX-DEV=xxxxx
Query:		MPX-DEV?
Response:		xxxxx
Value range:		00000 to 10000 (ASCII coded decimal numbers), corresponding to 0 Hz to 100 kHz

Example: *Command:*
STEReo:DIRect **"MPX-DEV=00201"**
Sets the MPX frequency deviation to 2.01 kHz.

Query:
STEReo:DIRect? **"MPX-DEV"**

Response:
"00201"

Important: ***A five-digit value must always be set.***
Leading zeros, if any, must also be specified.

PI

Description:		Sets or reads the program identification (PI) code.
Command:		PI=xxxx
Query:		PI?
Response:		xxxx
Value range:		0000 to FFFF (ASCII coded hexadecimal numbers)

Example: *Command:*
STEReo:DIRect **"PI=1234"**
The program identification code to be transmitted is set to "1234".

Query:
STEReo:DIRect? **"PI"**

Response:
"1234"

Important: ***A four-digit value must always be set. Leading zeros, if any, must also be***
specified, otherwise the value will not be accepted.

PIL

Description:		Activates/deactivates the pilot tone.
Command:		PIL=x
Query:		PIL?
Response:		x
Value range:		0|1
		0 = OFF
		1 = ON

Example: *Command:*
                  STEReo:DIRect **"PIL=1"**
                  The pilot tone is activated.

                  Query:
                  STEReo:DIRect? **"PIL"**

                  Response:
                  "1"

PIL-DEV
        Description: Sets the pilot tone frequency deviation (max. deviation).

        Command: PIL-DEV=xxxx
        Query: PIL-DEV?
        Response: xxxx
        Value range: 0000 to 1000 (ASCII coded decimal numbers),
                        corresponding to 0 Hz to 10 kHz

        Example: *Command:*
                        STEReo:DIRect **"PIL-DEV=1000"**
                        Sets the frequency deviation of the pilot tone to 10 kHz.

                        Query:
                        STEReo:DIRect? **"PIL-DEV"**

                        Response:
                        "1000"

        Important: ***A four-digit value must always be set.***
                         Leading zeros, if any, must also be specified.

PIL-PH
        Description: Sets the pilot tone phase.

        Command: PIL-PH=yxx
        Query: PIL-PH?
        Response: yxx
        Value range: -5.0 to .0 to +5.0 (ASCII coded decimal numbers),
                        corresponding to ±5.0 °

        Example: *Command:*
                        STEReo:DIRect **"PIL-PH=-33"**
                        The pilot tone phase is set to -3.3 °.

                        Query:
                        STEReo:DIRect? **"PIL-PH"**

                        Response:
                        "-33"

        Important: ***A two-digit value must always be set with a sign ("+" or "-") in front of it.***
                         Leading zeros, if any, must also be specified.

PRE

Description:	Sets one of various preemphasis options.
Command:	PRE=x
Query:	PRE?
Response:	x
Value range:	0|1|2
	0 = OFF
	1 = 50 µs
	2 = 75 µs
Example:	*Command:*
	STEReo:DIRect **"PRE=1"**
	The preemphasis is set to 50 µs.
	Query:
	STEReo:DIRect? **"PRE"**
	Response:
	"1"

PRESET

Description:	Sets the default settings in accordance with specifications.
Command:	PRESET
Example:	STEReo:DIRect **"PRESET"**

PS

Description:	Sets or reads the program service (PS) name.
Command:	PS = xxxxxxxx
Query:	PS?
Response:	xxxxxxxx
Value range:	8 ASCII characters
Example:	*Command:*
	STEReo:DIRect **"PS=RDS Test"**
	Sets the program service name to be transmitted to "RDS Test".
	Query:
	STEReo:DIRect? **"PS"**
	Response:
	"RDS Test"
Important:	*An eight-digit value must always be set. Blank spaces, if any, must also be entered, otherwise the value will not be accepted.*

PTY

Description:	Sets or reads the program type (PTY).
Command:	PTY=xx
Query:	PTY?
Response:	xx
Value range:	00 to 31 (ASCII coded decimal numbers)

Example: *Command:*
STEReo:DIRect **"PTY=08"**
Sets the program type to be transmitted to "08".

Query:
STEReo:DIRect? **"PTY"**

Response:
"08"

Important: ***A two-digit value must always be set. A leading zero, if any, must also be specified.***

PTYN

Description:	Sets or reads the program type (PTY) name.
Command:	PTYN= xxxxxxxx
Query:	PTYN?
Response:	xxxxxxxx
Value range:	8 ASCII characters

Example:

Command:
1.STEReo:DIRect "PTYN=Football"
Sets the program type name to be transmitted to "Football".

2.STEReo:DIRect "GS=0A,10A"
Group 10A is activated in addition to group 0A. The program type name "Football" is now transmitted.

Query:
STEReo:DIRect? **"PTYN"**

Response:
"Football"

Important: ***An eight-digit value must always be set. Blank spaces, if any, must also be entered, otherwise the value will not be accepted.***

RDS

Description:	Switches RDS on or off.
Command:	RDS=x
Query:	RDS?
Response:	x
Value range:	x = 0|1

Example: *Command:*
             STEReo:DIRect **"RDS=1"**
             RDS is switched on.

             Query:
             STEReo:DIRect? **"RDS"**

             Response:
             "1"

RDS-PH

Description:	Sets the RDS phase.
Command:	RDS-PH=xxx
Query:	RDS-PH?
Response:	xxx
Value range:	000 to 359 (ASCII coded decimal numbers)

Example: *Command:*
             STEReo:DIRect **"RDS-PH=100"**
             The RDS phase is set to 100 °.

             Query:
             STEReo:DIRect? **"RDS-PH"**

             Response:
             "100"

RDS-DEV

Description:	Sets the RDS frequency deviation (max. deviation).
Command:	RDS-DEV=xxxx
Query:	RDS-DEV?
Response:	xxxx
Value range:	0000 to 1000 (ASCII coded decimal numbers), corresponding to 0 Hz to 10.00 kHz

Example: *Command:*
             STEReo:DIRect **"RDS-DEV=0201"**
             The RDS frequency deviation is set to 2.01 kHz.

             Query:
             STEReo:DIRect? **"RDS-DEV"**

             Response:
             "0201"

Important: ***A four-digit value must always be set.***
                   Leading zeros, if any, must also be specified.

RT

Description: Radio text

Command: RT= xx,y,ccccc…,ccccc…
Query: RT?
Response: xx,y,ccccc…,ccccc…
Value range: xx = 00 to 15 (ASCII coded decimal numbers),
                 number of retransmissions of radio text message
                 y = 0|1 (A/B flag: If the A/B flag is set, the A/B bit in group 2A is toggled
                 to signal that a new radio text message will be transmitted.)
                 c = max. 64 characters, i.e. two texts of 64 characters each can be transmitted
                 in a radio text message

Example: *Command:*
                 STEReo:DIRect **"RT=02,1,Test message 123"**
                 The radio text message "Test message 123" is transmitted.

                 Query:
                 STEReo:DIRect? **"RT"**
                 Reads the current radio text message.

                 Response:
                 "02,1,Test message 123"

SPS

Description: Scrolling program service (SPS) name
                 The program service name automatically changes at the specified time interval.
Command: SPS=tt,xxxxxxxx,yyyyyyyy,...
Value range: x,y = 8 ASCII characters
                 tt = 01 to 59 (time interval in seconds)
                 Max. 20 program service names of eight characters each can be entered.
Example: *Command:*
                 STEReo:DIRect **"SPS=05,TEST0123,TEST4567"**
                 The program service names "TEST0123" and "TEST4567" are alternately
                 transmitted at an interval of 5 seconds.

Important: ***An eight-digit value must be set for each program service name.***
                 Blank spaces, if any, must also be entered, otherwise the value will not be
                 accepted.

SRC

Description: Selects the signal source.

Command: SRC=x
Query: SRC?
Response: x
Value range: 0|1|2|3
                 0 = OFF
                 1 = external analog (via L and R inputs)
                 2 = external digital
                 3 = internal with LF generator

Example: *Command:*
                 STEReo:DIRect **"SRC=1"**
                 The external analog L and R inputs are selected as source.

                 Query:
                 STEReo:DIRect? **"SRC"**

Response:
"1"

STATUS

Description: Status request as to whether the encoder or the update loader program is being executed.

Query: Status?
Response: xxx
Value range: ENC = encoder program is running
       UPL = update loader program is running

Example: *Query:*
       STEReo:DIRect? **"STATUS"**

       Response:
       "ENC"

STORE

Description: Stores data in the flash memory.
       All RDS-specific settings are stored in data set "x" of the flash memory.

Command: STORE=x
Value range: 1 to 5

Example: *Command:*
       STEReo:DIRect **"STORE=1"**
       The current settings are stored in data set 1.

Important: *Any settings not stored will be lost on power-off.*

TA

Description: Sets or reads the traffic announcement flag.
       This flag signals whether traffic information is currently being broadcast.

Command: TA=x
Query: TA?
Response: x
Value range: 0|1

Example: *Command:*
       STEReo:DIRect **"TA=1"**
       The traffic announcement flag is set to "1".

       Query:
       STEReo:DIRect? **"TA"**

       Response:
       "1"

TP

Description:	Sets or reads the traffic program flag.
	This flag signals whether traffic information is generally transmitted.
Command:	TP=x
Query:	TP?
Response:	x
Value range:	0|1

Example: *Command:*
STEReo:DIRect **"TP=1"**
The traffic program flag is set to "1".

Query:
STEReo:DIRect? **"TP"**

Response:
"1"

TRANS

Description:	Transparent mode.
	An RDS data stream of binary data is generated.
	(If transparent data is selected, all other RDS data is ignored.)
Command:	TRANS=xxxxxxxxxxxxxxxx,...
Query:	TRANS?
Response:	xxxxxxxxxxxxxxxx,...
Value range:	x = 16 ASCII coded hexadecimal characters (blocks A to D of the RDS groups)
	TRANS=0: Deletes all transparent data and switches back to normal
	RDS data transmission.
	Max. 20 different data sequences can be defined.

Example: *Command:*
STEReo:DIRect **"TRANS=0123456789ABCDEF"**
The data "0123456789ABCDEF" is sent instead of the RDS data.

Query:
STEReo:DIRect? **"TRANS"**
Reads the transparent data.

Response:
"0123456789ABCDEF"

Important: ***16 characters must be specified for each data sequence. Leading zeros,
if any, must also be specified. The data will be transmitted even if it
constitutes no meaningful RDS data.***

Examples

Alternative Frequency Lists

Alternative frequency lists can be transmitted in two ways:

Method A: The frequencies of an AF list are entered one after the other; the frequency currently transmitted has to be specified as the first frequency.

Method B: The frequencies of an AF list are entered in pairs, each pair containing the frequency currently transmitted and an alternative frequency. The frequency pairs should normally be entered in ascending order. Descending order should be chosen only if the alternative frequencies belong to different regions or are used to broadcast different programs at different times.

Important: Do not combine methods A and B.

Method A:

   1. Generate a new alternative frequency list with
      STEReo:DIRect **"AF=N,87.6,87.7,87.8"**

   2. Set the group sequence, e.g.:
      STEReo:DIRect **"GS=0A,14A"**
      The group sequence must contain group 0A.
      The alternative frequencies are now transmitted in group 0A.

   3. Add another alternative frequency list with
      STEReo:DIRect **"AF=+,88.6,88.7,88.8"**

Method B:

   1. Generate a new alternative frequency list with
      STEReo:DIRect **"AF=N,87.6,90.2,87.6,90.2"**

   2. Set the group sequence, e.g.:
      STEReo:DIRect **"GS=0A,14A"**
      The group sequence must contain group 0A.
      The alternative frequencies are now transmitted in group 0A.

   3. Add another alternative frequency list with
      STEReo:DIRect **"AF=+,88.6,91.2,88.6,91.2"**

The frequency lists are not checked for correctness. For this reason, make sure that the syntax is correct.

A maximum of five AF lists can be generated. For type A lists, max. 25 frequencies per list can be specified, for type B lists, max. 12 frequencies per list.

Enhanced Other Networks (EONs)

Creating an EON data set:

   1. Read the list of existing EON data sets with
      STEReo:DIRect? **"EON-PI"**
      The list shows the EON PI codes already used and those remaining for new data sets.

   2. Create an EON data set with
      STEReo:DIRect **"EON-PI=1234"**

   3. Set the program service (PS) name for the EON data set with
      STEReo:DIRect **"EON-PS=1234,Test EON"**

4. Set the group sequence, e.g.:
   STEReo:DIRect **"GS=0A,14A"**
   Group 14A with variants 0 to 3 is now transmitted.

5. Create a new AF list for the EON, using method A:
   STEReo:DIRect **"EON-AFA=1234,N,87.6,87.7,87.8"**

6. Create further AF lists for the EON, using method A:
   STEReo:DIRect **"EON-AFA=1234,+,88.6,88.7,88.8"**

7. Read the first AF list of the EON with
   STEReo:DIRect? **"EON-AFA,1234,1"**

Important: Do not combine methods A and B for generating EON alternative frequency lists.

5. Create a new AF list for the EON, using method B:
   STEReo:DIRect **"EON-AFB=1234,N,87.6,87.7,87.6,87.8"**

87.6 = tuned frequency
87.7 = mapped frequency 1 (variant 5)
87.8 = mapped frequency 2 (variant 6)

A maximum of five AF lists can be generated. For type A lists, max. 25 frequencies per list can be specified, for type B lists, max. five frequencies per list.

Free Format Groups (FFGs)

In the user-definable groups 1A, 3A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 12A and 13A, any desired data can be transmitted. Five bits of this data are transmitted in block B and 16 bits each in blocks C and D of the specified group.

1. Define the data to be transmitted in group 1A:
   STEReo:DIRect **"1A=05,0000000000,1FFFFFFFFF"**
   Group 1A is now transmitted first with "0000000000" and then with "1FFFFFFFFF".
   Each of the two data sequences is retransmitted five times, which is indicated by the information "05".
   Max. 20 different data sequences can be defined.

2. Set the group sequence, e.g.:
   STEReo:DIRect **"GS=0A,1A"**
   The defined data is now transmitted in group 1A.

Transparent Mode

The transparent mode allows the user to transmit freely definable binary data instead of the standard RDS data. Blocks A to D of the RDS groups are used. This means that standard RDS data will no longer be transmitted when transparent data is set. The binary data will be sent even if it constitutes no valid or meaningful RDS data. The transmission of standard RDS data will not be resumed until the transparent data is deleted.

Delete the transparent data and switch back to standard RDS data transmission with:
STEReo:DIRect **"TRANS=0"**

Max. 20 different data sequences can be defined.