REMOTE CONTROLS COMMANDS FOR HDRANGER&RANGER Neo FAMILY

1 Introduction

The design of this meter is based on a microprocessor which allows data to be exchanged between the equipment and a remote controller (usually a personal computer). By this way, data can be obtained from the equipment and also control it remotely. These data can be stored and subsequently processed for use in maintenance work. Furthermore, the remote control allows tracking and monitoring installations.

2 Protocol for communication with PC

This protocol is controlled by software and is using a virtual serial port over an USB interface or an Ethernet Port (according to meter's family). Data and information are exchanged using messages consisting of ASCII alphanumerical characters. This method ensures easy carrying between different types of personal computers.

For USB communication (HDRANGER family) a special driver must be installed. The driver is included with the purchased instrument. Drivers create a virtual COM port, so the software application can "see" the equipment. These drivers only work for Windows operative systems. You need at least Windows XP.

► Connections

- For HDRANGER family: USB cable connected to USB port.
- For RANGER Neo family & HDRANGER 3: Ethernet cable connected to IPCTRL port.

3 Operation Mode

The meter accepts remote commands at any time, which the instrument is on. That is, it is not necessary to put the instrument in special remote control mode; rather, this mode is selected immediately when it detects a complete command during the time necessary for its execution. The protocol communication is as follows:

1.- The metertransmits a XON code (11H) every second. The aim is to indicate to any possible remote device that the equipment is ready to receive data.

2.- At this moment, data streams can be sent it. Each data stream is composed by:

- **a.** Stream beginning: '*' (code 2AH).
- **b.** Set of characters that describe data message.
- **c.** CR (carriage return, code 0DH).

3.- Once a data stream has been sent, will be received a XOFF (code 13H) indicating that the transmission is stopped.

4.- Next, in case of correct message an ACK (acknowledge, code 06H) is expected or a NAK (not acknowledge, code 15H) in the opposite case.

5.- If the sent message requires answers it will be sent at this moment.

6.- Once completed the data stream transmission, the meter will send a XON (code 11H) indicating that already it is prepared to receive a new data stream.

A typical communication chronogram would be as follows:

	PC (REMOTE CONTROLLER)		HDRANGER &RANGER Neo
1)		<------	XON
2)	*?MODE<CR>	------>	
3)		<------	XOFF
4)		<------	ACK
5)		<------	*MODE SP+MEASURE<CR>
6)	wait…		
7)		<------	XON

(all characters are transmitted in ASCII code).

Commands should always be sent in capital letter and cannot be edited online, i.e., once a character is received it is stored in the meter buffer and cannot be rectified by sending an erase code.

Commands in remote control are divided into two groups, orders and interrogations. Orders modify a variable or the equipment status. Interrogations respond with information concerning equipment status or the value of a variable. For interrogative command, it is necessary to add the character ´?´ after the character '*'.

4 Remote Control Software Settings

- Virtual USB Serial Port settings:

Rate:	115200 bits/s
Data bits:	8 bits
Parity:	No
Stop Bits:	1

- Ethernet settings:

IP:	Meter's IP
Port:	2222
Communication Type:	Telnet

Meter's IP is defined in the same equipment at "Preferences -> Network".

For more details refer to chapter "External devices connection" in the equipment user's manual.

5 Remote commands table

Remote Commands	Short Description
BATTERY	It provides information about the battery actual status
CAPTURE	It makes and read screen captures
CAPTURE READ	It reads a file with the current screen capture
DISEQC	It gets a list of available diseqc programs and can send a specific one
EQUIPMENT POWER OFF	It shutdowns the equipment
EQUIPMENT SN	It provides the serial number of the equipment
FSM	It provides / configures the field strength meter status
INPUT IMPEDANCE	It provides /configures the input impedance (75/50)
INSTALLATION	It provides information about all the installations
INSTALLATION CURRENT	It provides information about the current installation
INSTALLATION CURRENT CLEAR	It removes all files of the current installation. The installation itself is not remove, only its contents
INSTALLATION CURRENT REMOVE	It removes the files of the same type in the current installation
INSTALLATION FILE	It reads an "xml" file of the current installation and sends it to a PC
INSTALLATION FILE ZIP	It reads an "xml" file of the current installation and sends all the installation files zipped to a PC
INSTALLATION PC FILE	It sends a file of the current installation to the PC
INSTALLATION PC ZIP	It sends a file from a PC to the equipment zipped with all files of the installation
INSTALLATION REMOVE	It removes an installation
IP CONFIG	It sets IPTV parameters
LNB	It provides / configures the LNB output
LTE	It provides / configures the LTE filter status
MEASURE	It provides information of all active measurements
MODE	It provides / sets the operation mode of the equipment
NAM	It provides the program name
POWER OFF	Switches/asks the PowerOff mode (time of inactivity before Power Off)
PRINT SCREEN	It makes a screenshot in PNG format
PSI	It provides / configures services
PSI SERVICE	It provides / configures services
REFLEVEL	It configures the reference level mode
RTC	It provides / sets date and time
SIGNAL	It provides / configures the signal type
SPECTRUM	It configures the span and/or the reference level
SPECTRUM AVERAGE	It provides / configures the spectrum average filter
SPECTRUM DETECTOR	It provides /configures the detector used to measure the spectrum
TFT	It sets brightness on screen or switch to AUTO mode
TS MUX CONTROL	It selects the input and output transport stream
TUNE	It provides / configures the frequency
TUNE CH	It provides / configures the channel
TUNE MODE	It provides / configures the mode
TUNE PLAN	It configures a channel plan
UNITS	It provides / configures the measurement units
VER	It provides the version of the main software

	application
VIDEO	It configures the video source

Name	**BATTERY**		
Description:	It provides information about the battery current status.		
Question:	*?BATTERY*parameter*		
Response:	*BATTERY*parameter_resp*		
	parameter	*parameter_resp*	Description*parameter_resp*
	<empty>	LEVEL, PERCENT, TIME, SMART BATTERY, CHARGER	It provides a complete set of information about the battery current status (see the following parameters for an explanation).
	LEVEL	XXXXmV	It provides the voltage level in mV.
	PERCENT	XX	It provides the charge remaining as a percentage.
	TIME	XXmin	Provides an estimation of the remaining time of functioning. The time is given in minutes. Message CHARGER_CONNECTED will be the answer if the charger is connected.
	SMART_BATTERY	XXX	It answers YES or NO depending if there is a smart battery or not.
	CHARGER	XXX	It answers ON or OFF depending if charger is connected or not.

Name	**CAPTURE**	
Description	It builds a file with the current screen data in xml or png format.	
Configuration	*CAPTURE FORMAT=format	
	format	Description *format*
	PNG	It makes a screen capture in PNG format.
	XML	It makes a screen capture in xml format.
Note:	Before saving the file, this command deletes the previous made capture.	

Name	**CAPTURE READ**	
Description:	It reads a file with the current screen capture (see command CAPTURE)	
Question:	*?CAPTURE BLOCK=*bbbb<CR>*	
Response:	*CAPTURE SIZE= *size*	
	bbbb	Description*bbbb*
	nnn	bbbb is the number of bytes sent in each data block. The file data is sent in blocks, every block is confirmed with an ACK. The value 'bbbb' can be a decimal one (if starts by 0 to 9, like 1234) or in hex format, if started by "0x" followed by hex characters (like in 0x3FF).
	size	Description *size*
	nnn	Size in bytes (nnn) of file. Decimal value.
Protocol:	PC→*?CAPTURE BLOCK=bbbb<cr> RANGER→Xoff It checks if file exists then it sends ACK, otherwise it sends NACK + Xon and aborts the command. RANGER→*CAPTURE SIZE=size. RANGER→Xon. PC→ ACK. RANGER→Xoff. RANGER→block1 + crc (1 byte) + Xon. PC→ It Calculates the block crc if correct send ACK. RANGER→ If detect ACK then send Xoff. RANGER→block2 + crc2 (1 byte) + Xon. PC→It Calculates the block crc if correct send ACK. .... Until last block.	

Name	**DISEQC**	
Description:	It gets a list of available diseqc programs and can send a specific one.	
Question:	*?DISEQC PROGRAMS<CR>	
Response:	*DISEQC PROGRAMS= PROGRAMS=nn*program_name*	
	Response	**Description** *lnb_resp*
	PROGRAMS=nn *program_name*	nn is the number of available programs the name description of the available programs
Configuration:	*DISEQC PROGRAM=program_name	
	Program_name	**Description *program_name***
	POS_AB_A POS_AB_B etc…	It sends the diseqc program name. This program must exist in the current installation. Check the available programs with *?DISEQC PROGRAMS

Name	**EQUIPMENT POWER OFF**
Description	It shutdowns the equipment
Order	*EQUIPMENT POWEROFF

Name	**EQUIPMENT SN**	
Description	It provides the serial number of the equipment	
Question	*?EQUIPMENT SN	
Response	*EQUIPMENT SN = *equipment_resp*	
	equipment_resp	Description *equipment_resp*
	nnn	Unique numeric code that identifies the equipment

Name	**FIELD STRENGTH METER**	
Description:	It provides / configures the field strength meter status	
Question:	*?FSM	
Response:	*FSM ENABLE=*mode_resp*	
	mode_resp	Description *mode_resp*
	ON OFF	Field Strength meter status is ON Field Strength meter status is OFF
Configuration:	*FSM ENABLE= *mode_conf*	
	mode_conf	Description *mode_conf*
	ON OFF	It enables Field Strength meter tool It disables Field Strength meter tool

Name	**INPUT IMPEDANCE**	
Description:	It provides / configures input impedance	
Question:	*?INPUTIMPEDANCE	
Response:	*INPUTIMPEDANCE IMP=*imp_resp*	
	imp_resp	Description *imp_resp*
	50 75	Current impedance input is 50 Ω Current impedance input is 75 Ω
Configuration:	*INPUTIMPEDANCE IMP=*imp_conf*	
	imp_conf	Description *imp_conf*
	50 75	It sets input impedance to 50 Ω It sets input impedance to 75 Ω

Name	**INSTALLATION**		
Description	It provides information about all the installations		
Question	*?INSTALLATION*install*		
Response	*INSTALLATION *install_resp*		
	install	*install_resp*	Description*install_resp*
	<empty>	NUMBER=nn	Number (nn) of installations
	CURRENT	NAME=name	Name (name) of current installation
		TER-CH=nn	Number (nn) of terrestrial channel plans in the current installation
		SAT-CH=nn	Number (nn) of satellite channel plans in the current installation
		DISEQC=nn	Number (nn) of DISEQC programs in the current installation
		SCREEN=nn	Number (nn) of print screens in the current installation
		DATALOGGER=nn	Number (nn) of dataloggers in the current installation
		SP=nn	Number (nn) of spectrum captures in the current installation
		MER=nn	Number (nn) of captures MERxcarrier in the current installation
		ECHOES=nn	Number (nn) of echo captures in the current installation
		CONSTELLATION=nn	Number (nn) of constellation captures in the current installation
	NUMBER=nn	NAME=name	Name of the installation with index "nn"

Name	**INSTALLATION CURRENT**		
Description	It provides information about the current installation		
Question	*?INSTALLATION CURRENT *current=nn*		
Response	*INSTALLATION NAME=*current_resp*		
	current	Description*nn*(decimal value)	Description*current_resp*
	<empty>	<empty>	Available data from the current installation
	TER-CH	Terrest. channel plan index	Terrestrial channel plan name with "nn" index
	SAT-CH	Sat. channel plan index	Satellite channel plan name with "nn" index
	DISEQC_PROGRAM	DISEQC program index	DISEQC program name with "nn" index
	PNG	Print screen file index	Print screen file name with "nn" index
	DATALOGGER	Datalogger index	Datalogger name with "nn" index
	SPECTRUM	Capture index	Spectrum capture name with "nn" index
	CONSTELLATION	Constellation index	Constellation capture name with "nn" index
	ECHOES	Capture index	Echo capture name with "nn" index
	MER	Capture index	MER capture name with "nn" index
	NUMBER	Installation index	Installation name with "nn" index

Name	**INSTALLATION CURRENT CLEAR**
Description	It removes all files of the current installation. The installation itself is not remove, only its contents
Order	*INSTALLATION CURRENT CLEAR

Name	**INSTALLATION CURRENT REMOVE**	
Description	It removes the files of the same type in the current installation	
Order	*INSTALLATION CURRENTREMOVE *tag=name*	
	tag	Description *tag*
	SPECTRUM	Spectrum capture file
	TER-CH	Terrestrial channel plan file
	SAT-CH	Satellite channel plan file
	DISEQC_PROGRAM	DISEQC program file
	PNG	Print screens file
	CONSTELLATION	Constellation capture file
	ECHOES	Echo capture file
	MER	MER x carrier capture file
	DATALOGGER	Datalogger file
	SPECTROGRAM	Spectrogram file
	MEROGRAM	Merogram file
	TS	Transport stream file
	name	Description *name*
	<empty>	It removes all files belonging to the same type, which is determined by the *tag*
	abcd	It removes the file with name (“abcd”) of the type indicated by the *tag*

Name	**INSTALLATION FILE**	
Description	It reads an "xml" file of the current installation and sends it to a PC	
Question	*?INSTALLATION CURRENT *tag*=*name* BLOCK=*bbbb*	
Response	*INSTALLATION SIZE=*size*	
	tag	Description *tag*
	SPECTRUM	It reads spectrum captures in the current installation
	TER-CH	It reads terrestrial channel plans in the current install
	SAT-CH	It reads satellite channel plans in the current install
	DISEQC_PROGRAM	It reads DISEQC programs in the current installation
	PNG	It reads print screens in the current installation
	CONSTELLATION	It reads constellation captures in the current install
	ECHOES	It reads echo captures in the current installation
	MER	It reads MER x carrier captures in the current install
	DATALOGGER	It reads datalogger in the current installation
	SPECTROGRAM	It reads spectrograms in the current installation
	MEROGRAM	It reads merograms in the current installation
	TS	It reads transport stream in the current installation
	name	Description *name*
	abcd	Name ("abcd") of the capture.
	bbbb	Description *bb*
	nnn	Byte (nnn decimal) size to which the file will be divided to be send
	size	Description *size*
	nnn	File byte (nnn decimal) size when send

Name	**INSTALLATION FILE ZIP**	
Description	It reads an "xml" file of the current installation and sends all the installation files zipped to a PC	
Question	*?INSTALLATION CURRENT ZIP BLOCK=*bbbb*	
Response	*INSTALLATION SIZE=*size*	
	bbbb	Description *bb*
	nnn	Byte (nnn decimal) size to which the file will be divided to be send
	size	Description *size*
	nnn	File byte (nnn decimal) size when send

Name	**INSTALLATION PC FILE**	
Description	It sends a file of the current installation to the PC.	
Order	*INSTALLATION CURRENT tag=*name* SIZE=*size* BLOCK=*bbbb*	
	tag	Description *tag*
	SPECTRUM	Spectrum captures files to the current installation
	TER-CH	Terrestrial channel plans files to the current install
	SAT-CH	Satellite channel plans files to the current instal.
	DISEQC_PROGRAM	DISEQC programs files to the current installation
	PNG	Print screens files to the current installation
	CONSTELLATION	Constellation captures files to the current install
	ECHOES	Echo captures files to the current installation
	MER	MER x carrier captures files to the current install
	DATALOGGER	Datalogger files to the current installation
	SPECTROGRAM	Spectrograms files to the current installation
	MEROGRAM	Merograms files to the current installation
	TS	Transport stream files to the current installation
	name	Description *name*
	abcd	Capture name ("abcd").
	size	Description *size*
	nnn	File byte (nnn decimal) size when send
	bbbb	Description *bbbb*
	nnn	Byte (nnn decimal) size to which the file will be divided to be send

Name	**INSTALLATION PC ZIP**	
Description	It sends a file from a PC to the equipment zipped with all files of the installation	
Order	*INSTALLATION ZIP NAME=*name* SIZE=*size* BLOCK=*bbbb*	
	name	Description *name*
	abcd	Name ("abcd") of the installation
	size	Description *size*
	nnn	Byte (nnn decimal) size of the file when send
	bbbb	Description*bbbb*
	nnn	Byte size (nnn decimal) of blocks that will be send from the ZIP file

Name	**INSTALLATION REMOVE**	
Description	It removes a installation	
Order	*INSTALLATION NAME= *name* REMOVE	
	name	Description *name*
	abcd	Installation name ("abcd")

Name	**IP CONFIG**		
Description:	It provides / configures the IP parameters such as: DHCP option, MAC address, IP address and subnet MASK.		
Question:	*?IP*ip_option*		
Response:	*IP *ip_option=ip_resp*		
	ip_option	*ip_response*	
	<empty> MAC DHCP ADDRESS MASK	MAC, DHCP, IP and MASK MAC address DHCP protocol enabled / disabled IP address Subnet MASK	
Configuration:	*IP *ip_option=ip_config*		
	ip_option	*ip_config*	Description *lte_conf*
	DHCP ADDRESS MASK	ON OFF www.xxx.yyy.zzz www.xxx.yyy.zzz	It enables DHCP protocol It disables DHCP protocol It sets IP address It sets Subnet mask

Name	**LNB**		
Description	It provides / configures the LNB output		
Question	*?LNB*lnb*		
Response	*LNB *lnb = lnb_resp*		
	lnb	**Description** *lnb_resp*	
	OUTPUT ENABLE VOLTAGE CURRENT AVAILABLE UNDERVOLTAGE OVERCURRENT SHORTCIRCUIT DRAINLED	Current selected output LNB enable (ON) or disabled (OFF) Last measurement of the LNB output voltage Last measurement of the LNB output current Available output with the current configuration Under voltage alarm Overvoltage alarm Short circuit alarm LED DRAIN lit (ON) or not (OFF)	
Configuration	*LNB *lnb = lnb_conf*		
	lnb	***lnb_conf***	**Description *lnb_conf***
	ENABLE ENABLE OUTPUT	ON OFF nnn	Enables the LNB. Disables the LNB. LNB output voltage (*nnn* must be one of the available options seen on the command *?LNB AVAILABLE)

Name	**LTE**	
Description	It provides/configures the LTE filter status	
Question	*?LTE	
Response	*LTE *lte_resp*	
	lte_resp	Description *lte_resp*
	ON OFF	LTE filter enabled LTE filter disabled
Configuration	*LTE *lte_conf*	
	lte_conf	Description *lte_conf*
	ON OFF	It enables the LTE filter It disables the LTE filter

Name	**MEASURE**	
Description	It provides information of all active measurements	
Question	*?MEASURE *measure*	
Response	*MEASURE *measure=measure_resp units*	
	measure	Description *measure_resp*
	<empty> POWER LEVEL CN VA MER CBER VBER LBER LM = < >	All the active measures Digital channel power Analogue channel level C/N of the measured channel (dB) Video/Audio carrier ratio MER measurement value CBER measurement value VBER measurement value LBER measurement value Link Margin value Measurement within scale Measurement under the value shown Measurement over the value shown
	units	Description *units*
	dB dBm/dBuV/dBmV	Measurement units for C/N, V/A, MER Measurement units for POWER, LEVEL

Name	**MODE**	
Description	It provides/sets the operation mode of the equipment	
Question	*?MODE	
Response	*MODE *mode_resp*	
	mode_resp	Description *mode_resp*
	TV	TV mode
	TV+SP+MEASURE	TV mode with spectrum and measurements
	TV+PARAMETERS	TV mode with TS parameters
	SP	Spectrum mode
	SP+MEASURE	Spectrum mode with measurement
	SP+MEASURE+TV	Spectrum mode with TV and measurement
	MEASURE	Measurement mode.
	MEASURE+TV+SP	Measurement mode with TV and spectrum
	MEASURE+PARAMETERS	Measurement mode with demodulator parameters
	ECHOES	Echoes tool
	CONSTELLATION	Constellation tool
Configuration	*MODE *mode_conf*	
	mode_conf	Description *mode_conf*
	TV	TV mode
	TV+SP+MEASURE	TV mode with spectrum and measurements
	TV+PARAMETERS	TV mode with TS parameters
	SP	Spectrum mode
	SP+MEASURE	Spectrum mode with measurement
	SP+MEASURE+TV	Spectrum mode with TV and measurement
	MEASURE	Measurement mode
	MEASURE+TV+SP	Measurement mode with TV and spectrum
	MEASURE+PARAMETERS	Meas. mode with demodulator parameters
	ECHOES	Echoes tool
	CONSTELLATION	Constellation tool

Name	**NAM**	
Description	It provides the program name	
Question	*?NAM	
Response	*NAM*nam_resp*	
	nam_resp	Description *nam_resp*
	abc	It provides the program name “abc”

Name	**POWEROFF**	
Description	Switches/asks the PowerOff mode (time of inactivity before Power Off)	
Question	*?POWEROFF *MODE*	
Response	*POWEROFF MODE=*time*	
	time	Time of inactivity before the equipment Powers off. Possible values: OFF, 1, 5, 10, 30.
Configuration	*POWEROFF MODE=*time*	
	time	Sets the time of inactivity before the equipment Powers off. Accepted values: OFF, 1, 5, 10, 30.

Name	**PRINT SCREEN**	
Description	It makes a screenshot in PNG format	
Configuration	*PRINT SCREEN=*printscreen_conf*	
	=printscreen_conf	Description *=printscreen_conf*
	<empty> =abc	It gives a name by default It gives the name "abc"

Name	**PSI**	
Description	It provides / sets services	
Question	*?PSI	
Response	*PSI STATUS=status_resp NUMBER= number_resp ONID=onid NID=nid TSID=tsid NETWORK=name	
	status_resp	Description *status_resp*
	ACQUIRED IN_PROGRESS FAIL STOPPED	Acquired services of channel (in this case, service information is not shown). Acquiring services of channel (in progress). Acquisition failed. Acquisition stopped.
	number_resp	Description *number_resp*
	nn	Number of services
	Services information	Description *service information*
	ONID NID TSID NETWORK	Original Network id Network id Transport Stream id Name of service network
Configuration:	*PSI SERVICE= *index_conf* [AUDIO=*index_audio*]	
	index_conf	Description *index_conf*
	nn	Index of service. Selecting service from the index service.
	index_audio	Description *index_audio*
	nn	Index of audio. OPTIONAL: [AUDIO=xx].
Configuration:	*PSI SID= *service_id_conf* [AUDIO=index_audio]	
	service_id_conf	Description*service_id_conf*
	nn	Service id. Selecting service from the service id.
	index_audio	Description*index_audio*
	nn	Index of audio. OPTIONAL: [AUDIO=xx].

Name	**PSI SERVICE**	
Description	It provides / configures services	
Question	*?PSI SERVICE=*service*	
	service	Description *service*
	CURRENT nn	Current service Index of service
Response	*PSI SERVICE=*ss* NAME=*name* PROVIDER=*provider* SID=*sid* TYPE=*type* SCRAMBLED=*lcn*	
	response	Description *response*
	ss *name* *provider* *sid* *type* *scrambled* *LCN*	CURRENT for current service or index of service. Service name Service provider Service id Type of service (radio/tv/data) Service (service scrambled) or No (service free) Logical channel number

Question	*?PSI SERVICE=CURRENT AUDIO	
Response	*PSI NUMBER=*nn* AUDIO=*aa* PID=*pid* BITRATE=*bitrate* TYPE=*type* FORMAT=*format* LANGUAGE=*language*	
	response	Description *response*
	nn *aa* *pid* *bitrate* *type* *format* *language*	Audios number Index of audio PID number Bitrate in kbps Type of audio (MPEG-1, DD, DD+...) Format of audio (Stereo/Mono...) Language of audio
Question	*?PSI SERVICE=*service* AUDIO	
Response	*PSI NUMBER=*nn*	
	response	Description *response*
	nn	Audios number
Question	*?PSI SERVICE=*service* AUDIO=aa	
Response	*PSI NUMBER=*nn* AUDIO=*aa* PID=*pid* TYPE=*type* LANGUAGE=*language*	
	response	Description *response*
	nn *aa* *pid* *type* *language*	Audios number Index of audio PID number Type of audio (MPEG-1, DD, DD+…) Language of audio

Question	*?PSI SERVICE=CURRENT VIDEO	
Response	*PSI PID=*pid* BITRATE=*bitrate* TYPE=*type* RESOLUTION=*resolution* FORMAT=*format* FRAME=*frame* PROFILE=*profile*	
	response	Description *response*
	pid *bitrate* *type* *resolution* *format* *frame* *profile*	PID number Bitrate in kbps Type of video (MPEG-2,H264,...). Resolution of video. Format of video (16:9/4:3...) Freq Profile level
Question	*?PSI SERVICE=xx VIDEO	
Response	*PSI PID=*pid* TYPE=*type*	
	response	Description *response*
	pid *type*	PID number Type of audio (MPEG-2, H264,...)
Question	*?PSI SERVICE=*service* DATA	
Response	*PSI NUMBER=*nn*	
	response	Description *response*
	nn	Number of datas
Question	*?PSI SERVICE=*service* DATA=dd	
Response	*PSI NUMBER=*nn* DATA=*dd* PID=*pid* TYPE=*type*	
	response	Description *response*
	nn *dd* *pid* *type*	Number of datas Index of data PID number Type of data (txt, subtitles, data...)

Name	**REFERENCE LEVEL CONFIGURATION**	
Description	It provides/configures reference level mode	
Question	*?REFLEVEL	
Response	*REFLEVEL MODE= *mode_resp*	
	mode_resp	Description *mode _resp*
	MANUAL AUTO	Reference level set by user Reference level set automatically
Configuration	*REFLEVEL MODE=*mode_conf*	
	mode_conf	Description *mode_conf*
	MANUAL AUTO	Reference level set by user Reference level set automatically

Name	**RTC**		
Description	It provides/sets date and time		
Question	*?RTC*rtc*		
Response	*RTC *rtc=rtc_resp*		
	rtc	*rtc_resp*	Description *rtc_resp*
	TIME DATE FORMAT	DATE=date TIME=time FORMAT=format hh:mm:ss DD/MM/YYYY DD/MM/YY MM/DD/YYYY YYYY/MM/DD	It shows current date, time and date format Hours:minutes:seconds day/month/year day/month/year (last two digits) month/day/year year/month/day Selected format
Configuration	*RTC *rtc=rtc_conf*		
	rtc	*rtc_conf*	Description *rtc_conf*
	TIME DATE FORMAT	hh:mm:ss DD/MM/YYYY DD/MM/YY MM/DD/YYYY YYYY/MM/DD	Hours:minutes:seconds Date according to the selected format day/month/year day/month/year (last two digits) month/day/year year/month/day

Name	**SIGNAL**		
Description	It provides/configures the signal type		
Question	*?SIGNAL*signal*		
Response	*SIGNAL *signal=signal_resp*		
	signal	Description*signal_resp*	
	TYPE	Signal standard type	
	CR	Current code rate	
	BANDWIDTH	Signal bandwidth	
	SR	Signal symbol rate	
	SP	Spectral inversion enabled (ON) or disabled (OFF)	
	MODE	Measurement of the FFT in a COFDM modulation	
	GI	Measurement of the guard interval	
	CONSTELLATION	Constellation type	
	HIERARCHY	DVB-T hierarchy	
	COLOR	Type of colour coding	
	STANDARD	Analogue standard type	
	RATE	Field frequency	
Configuration	*SIGNAL *signal=signal_config*		
	signal	*signal_config*	Description*signal_config*
	TYPE	DVB-T	Terrestrial signal standard
		DVB-C	Cable signal standard
		ANALOG	Analogue signal standard
		DVB-S	Satellite signal standard
		DVB-S2	Satellite signal standard (2d generation)
	COLOR	PAL	PAL coding colour
		NTSC	NTSC coding colour
		SECAM	SECAM coding colour
	STANDARD	BG	Analogue standard type BG
		DK	Analogue standard type DK
		I	Analogue standard type I
		N	Analogue standard type N
		M	Analogue standard type M
		L	Analogue standard type L

Name	**SPECTRUM**		
Description	It configures the *span* and/or the reference level		
Configuration	*SPECTRUM *spectrum=spectrum_config*		
	spectrum	*spectrum_config*	Description*spectrum_config*
	REF SPAN	nn.n nnnF	Value (nn.n) of the reference level in units of the current band nnn= span value number F= Order of magnitude for the span. F values: <empty> = 1 K= 1 x 10 E3 M=1 x 10 E6 G=1 x 10 E9

Name	**SPECTRUM AVERAGE FILTER**	
Description	It provides/configures the spectrum average filter	
Question	*?AVERAGE	
Response	*AVERAGE VALUE= *average_resp*	
	average_resp	Description *average_resp*
	0 - 7	Average filter value
Configuration	*AVERAGE VALUE=*average_conf*	
	average_conf	Description *average_conf*
	0 - 7	Average filter value

Name	**SPECTRUM DETECTOR**	
Description	It provides/configures the detector used to measure the spectrum	
Question	*?DETECTOR	
Response	*DETECTOR TYPE= *detector_resp*	
	detector_resp	Description *detector_resp*
	PEAK RMS	Peak detector type RMS detector type
Configuration	*DETECTOR TYPE=*detector_conf*	
	detector_conf	Description *detector_conf*
	PEAK RMS	Peak detector type RMS detector type

Name	**TFT**	
Description	It sets brightness on screen or switches to AUTO mode	
Question	*?TFT *BRIGHTNESS*	
Response	*TFT BRIGHTNESS= *bright_resp*	
	bright_resp	Description *bright_resp*
	number	If the mode is MANUAL, returns the value of the brightness which is an integer in [0-100].
	Auto	Sets the brightness mode to AUTO in the equipments where it is available.
Configuration	*TFT BRIGHTNESS=*bright_conf*	
	bright_conf	Description *bright_conf*
	number	Sets the brightness in MANUAL mode at the value given by *number* which must be in range [0-100]
	Auto	Sets the brightness in AUTO mode if the equipment supports it.

Name	**TS MUX CONTROL**	
Description:	It selects the input and output transport stream	
Configuration:	*TSMUX, DECODER=*decoder_input*, OUT=*asi_out*	
	decoder_input	Description *decoder_input*
	DEMOD ASI_IN IPTV	Input from demodulators. Input from ASI_IN. Input from IPTV (when equipment is on a IPTV mode I.E. IPTV+TV).
	asi_out	Description *asi_out*
	OFF DEMOD ASI_IN IPTV	No ASI output signal. Output from demodulators. Output from ASI_IN. Output from IPTV (when equipment is on a IPTV mode I.E. IPTV+TV).

Name	**TUNE**	
Description	It provides/configures the frequency	
Question	*?TUNE	
Response	*TUNE BAND=*band_resp* FREQ= *freq_resp*	
	band_resp	Description *band_resp*
	TER SAT	Terrestrial band Satellite band
	freq_resp	Description *freq_resp*
	nnnK	nnn=Number value for the frequency; K= (kHz)
Configuration	*TUNE BAND=*band_conf*FREQ= *freq_conf*	
	band_conf	Description *band_conf*
	TER SAT	Terrestrial band Satellite band
	freq_conf	Description*freq_conf*
	nnnF	nnn= Number value for the frequency F= Order of magnitude for the frequency F values: <empty> = 1 K= 1 x 10 E3 M=1 x 10 E6 G=1 x 10 E9

Name	**TUNE CH**	
Description	It provides/configures the channel	
Question	*?TUNE CH	
Response	*TUNE BAND=*band_resp*PLAN=*plan_ resp* CH= *ch_ resp*	
	band_resp	Description *band_resp*
	TER SAT	It means that channel belongs to the terrestrial band It means that channel belongs to the satellite band
	plan_resp	Description *plan_resp*
	xyz	Alphanumeric code that identifies the channel plan
	ch_resp	Description *ch_resp*
	xyz	Alphanumeric code that identifies the channel
Configuration	*TUNE *ch_conf*	
	ch_conf	Description *ch_conf*
	CH=xyz CH NEXT CH PREV	"xyz" is an alphanumeric code that identifies a channel It increases +one channel It decreases –one channel

Name	**TUNE MODE**	
Description	It provides / configures the mode	
Question	*?TUNE MODE	
Response	*TUNE MODE= *mode_resp*	
	mode_resp	Description *mode_resp*
	FREQ CH	Tuning by frequency. Tuning by channel.
Configuration	*TUNE *MODE=mode_conf*	
	mode_conf	Description *mode_conf*
	MODE=FREQ *MODE*=CH	Tuning by frequency. Tuning by channel.

Name	**TUNE PLAN**	
Description	It configures a channel plan	
Configuration	*TUNE PLAN=*plan_conf*	
	plan_conf	Description *plan_conf*
	xyz	Alphanumeric code that identifies a channel plan

Name	**UNITS**	
Description	It provides/configures measurement units	
Question	*?UNITS	
Response	*UNITS TER= *units_resp SAT=units_resp*	
	units_resp	Description *units_resp*
	TER SAT DBM DBMV DBUB	Terrestrial Satellite Measurement unit dBm Measurement unit dBmV Measurement unit dBµV
Configuration	*UNITS TER=*units_conf* *UNITS SAT= *units_conf*	
	units_conf	Description *units_conf*
	TER SAT DBM DBMV DBUB	Terrestrial Satellite Measurement unit dBm Measurement unit dBmV Measurement unit dBµV

Name	**VER**	
Description	It provides the version of the main software application	
Question	*?VER	
Response	*VER *ver_resp*	
	ver_resp	Description*ver_resp*
	x.yy.zzz	Alphanumeric code that identifies a version

Name	**VIDEO**		
Description	It configures the video source		
Configuration	*VIDEO *video=video_conf*		
	video	*video_conf*	Description*video_conf*
	SOURCE SYSTEM	INTERNAL EXTERNAL PAL_50 Hz PAL_60 Hz NTSC SECAM	It enables internal video source It enables external video source It enables the video system selected It enables the video system selected It enables the video system selected It enables the video system selected