EV N8000 DSP Analog Output Module Control:

This module allows control of: gain and mute functions of the AO-1 Analog Output Module.

The module is only fully operational (accepts mute commands and gain levels) when the level-sensing Enable (digital) input is high (asserted). The Poll command may be sent at any time, and module feedback (rx$) will be received, returning current gain level and mute status.

Gain may be adjusted in one-dB steps between -80 and +18 dB; absolute gain levels are directly set by sending an analog (decimal) number between -80 and 18 to the Gain (analog) input.

Mute may be directly set by the edge-triggered Mute_on or Mute_off (digital) signals.

Position of the AO-1 module in the N8000 chassis is set by E-V's IRISNet software. The software configuration file will indicate the instance of the input module when you double-click on the module icon to set the operating parameters, as designated along the top of the control window by "AnalogIn_x" where x = the instance of that module in the configuration logic.

Instance and Channel parameters are selected from a drop-down list of values. These become part of the command string sent through the EVN8000_CommsMgr (Crestron .umc) module to the DSP.

The string input and output rx$ and tx$ receive and send command strings from and to the EVN8000_CommsMgr (Crestron .umc) module. These strings are sent and are required to be received in the format defined in the EV/Bosch document "ASCII Protocol for N8000" and follow the "ASCII Parser" described therein.

A sample Gain command is shown below:
/PARAM/DSP/ANALOGOUT_\[#Instance\]/GAIN/IDX\[#Channel\] 0\x0D\x0A

A sample Mute command is shown below:
/PARAM/DSP/ANALOGOUT_\[#Instance\]/MUTE/IDX\[#Channel\] 1\x0D\x0A

Pulsing the Poll input sends the following commands in sequence (separated by a delay of approximately 0.1 second):
/PARAM/DSP/ANALOGOUT_\[#Instance\]/GAIN/IDX\[#Channel\] ?\x0D\x0A
/PARAM/DSP/ANALOGOUT_\[#Instance\]/MUTE/IDX\[#Channel\] ?\x0D\x0A

In these and all commands, \[#Instance\] and \[#Channel\] represent the Instance and Channel numbers defined in the drop-down parameter list described above, and are automatically inserted in the command string by this module. The forward slash (/) is a delimiter required by ASCII Parser, and separates command subelements. The command value must be preceded by a space ( ) instead of a slash (/).

ASCII Parser commands are shown below

ASCII Protocol for N8000

RS-232 Settings

The RS-232 interface of the N8000 is permanently configured for full duplex operation. Set values are:

Baud Rate	19200 bits per second
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Xon / Xoff

The command string "*** N8000 command mode entered ***" must be sent via RS-232 to enter Parser mode once the N8000 is powered up and has completed its boot sequence.

Ethernet Settings

Factory set values of the Ethernet port are:

IP address	192.168.1.100
Network mask	255.255.255.0
Standard gateway	192.168.1.1
Telnet port	23
Username	netmax
Password	netmax

A Telnet session can be established with an application such as Windows HyperTerminal. Log in requires the username and password (default values given in above table) after which the parser can be started with the command "parser". If there is already another parser up and running, a new parser session can be forced by using the command "parser -f". The command string "*** N8000 command mode entered ***" will be displayed when the parser has started sucessfully. The N8000 is now ready for ASCII parser communication.

ASCII Parser

A simple ASCII string protocol, which is referred to as ASCII Parser is implemented in the N8000. Commands are organized in a tree structure with up to 5 levels. The slash "/" or a space " " can be used for separation. The question mark "?" can be utilized to query parameter settings or commands of the corresponding level. To step down one level you have to enter "..". Use "/" to get back to level 1.

The following table lists the ASCII Parser commands with brief explanations.

Commands for RS-232 communication

				Read / Write	Values	Description
/COMM	/LINEFEED			R / W	ON, OFF	Linefeed state for RS-232 communication
	/PROMPT			R / W	ON, OFF	Prompt state for RS-232 communication
	/ECHO			R / W	ON, OFF	Echo state for RS-232 communication
	/LOG	/state		R / W	ALL_ON, COMMANDS_ON, OFF	Log state for RS-232 communication
		/CLEAR		execute	none	Deletes the existing log file
		/PRINT		execute	none	Displays the existing log file
		/SAVE		execute	none	Saves the log to a file "parser.log" in directory /flash/log

Commands for CAN-BUS communication

				Read / Write	Values	Description
/PARAM	/CAN	/FUNCTIONS	/CAN_RESET	execute	none	Reset of CAN-BUS
			/CAN_SCAN	execute	none	Scan CAN-BUS for new devices
			/SET_BAUD_ALL	execute	10, 20, 63, 125, 250, 500	Set new Baudrate of N8000 and all devices connected to the CAN-BUS
			/SET_MONITOR	execute	input_a, input_b, output_a, output_b; 1...250	Selects Monitor Bus of a remote amplifier

Commands for system querys

				Read / Write	Values	Description
/PARAM	/LOCAL	/CHASSISTEMP	/VALUE	R		Device temperature in degree celcius
		/FANSPEED	/VALUE	R / W	0, 1, 2, 3	Fan speed (0 = off, 1 = slow, 2 = mid, 3= fast)
		/GPIANALOG	/IDX1...IDX4	R	0, 1	State of GPI using analog circuit
		/GPIDIGITAL	/IDX1...IDX4	R	0, 1	State of GPI using digital circuit
		/GPO	/IDX1...IDX3	R / W	0, 1	State of GPO (0 = open, 1 = closed)
		/REMOTEFAULT	/IDX1...IDX100	R	0, 1	State of remote N8000 (0 = OK, 1 = does not answer)
		/CONDRESULT	/IDX1...IDX100	R	0, 1	State of condition (0 = false, 1 = true)
		/REMOTEMASTERFAULT	/IDX1...IDX100	R	0, 1	State of Masterfault of remote N8000 (0 = not set, 1 = set)

Commands for CobraNet

				Read / Write	Werte	Beschreibung
/PARAM	/COBRANET	/CONDUCTORSTATUS	/VALUE	R	0, 1	Shows if N8000 is Conductor in CobraNet
		/CONDUCTORPRIORITY	/VALUE	R / W	0...255	Conductor priority in CobraNet
		/RXBUNDLE	/IDX1...IDX4	R / W	0...65535	Number of received Bundle
		/RXBUNDLENAME	/IDX1...IDX4	R / W	max. 16 characters	Name of received Bundle
		/RXCHANNELNAME	/IDX1...IDX32	R / W	max. 16 characters	Name of channels of received Bundles
		/RXCLIP	/IDX1...IDX32	R	0, 1	Clipping LED of channels of received Bundles
		/RXMUTE	/IDX1...IDX32	R / W	0, 1	Mute of channels of received Bundles
		/RXSIGNAL	/IDX1...IDX32	R	0, 1	Signal LED of channels of received Bundles
		/RXSTATUS	/IDX1...IDX4	R	0, 1	Status of received Bundle (0 = NOT RECEIVED, 1 = ACTIVE)
		/SYSNAME	/VALUE	R / W	max. 60 characters	Name of N8000 in CobraNet
		/TXBUNDLE	/IDX1...IDX4	R / W	0...65535	Number of sent Bundle
		/TXBUNDLENAME	/IDX1...IDX4	R / W	max. 16 characters	Name of sent Bundle
		/TXCHANNELNAME	/IDX1...IDX32	R / W	max. 16 characters	Name of channels of sent Bundles
		/TXCLIP	/IDX1...IDX32	R	0, 1	Clipping LED of channels of sent Bundles
		/TXMUTE	/IDX1...IDX32	R / W	0, 1	Mute of channels of sent Bundles
		/TXSIGNAL	/IDX1...IDX32	R	0, 1	Signal LED of channels of sent Bundles

Commands for AI-1 analog input card

				Read / Write	Values	Description
/PARAM	/DSP	/ANALOGIN_x	/CHANNELINFO	/VALUE R / W	0...127	Linking of inputs (Linked-Button). Binary representation of number is equivalent to pressed Linked-Buttons.
			/GAIN	/IDX1...IDX8 R / W	-80...20	Gain of input
			/MUTE	/IDX1...IDX8 R / W	0, 1	0 = not muted, 1 = muted
			/POLARITY	/IDX1...IDX8 R / W	0,1	0 = normal, 1 = inverted
			/NAME	/IDX1...IDX8 R / W	max. 16 characters	Input name
			/RAMPTIME	/IDX1...IDX8 R / W	0.001...20	Ramping Time of input (seconds)
			/PILOTDETECT.FREQ	/IDX1...IDX8 R / W	20...20000	Frequency of pilot tone to detect
			/PILOTDETECT.FLAG	/VALUE R	0x00...0xFF	Status of pilot tone detection of all inputs (1 = pilot tone detected, 0 = pilot tone not detected). The last of the four hexadecimal values corresponds in binary representation to the 8 inputs.
			/PILOTDETECT.ENABLE	/VALUE R	0x00...0xFF	Activation of pilot tone detection of all inputs. The last of the four hexadecimal values corresponds in binary representation to the 8 inputs.

Commands for MI-1 analog microphone input card

				Read / Write	Values	Description
/PARAM	/DSP	ANALOGMICIN_x	/GAIN	/IDX1...IDX8 R / W	-80...18	Gain of input
			/MUTE	/IDX1...IDX8 R / W	0, 1	0 = not muted, 1 = muted
			/POLARITY	/IDX1...IDX8 R / W	0, 1	0 = normal, 1 = inverted
			/CHANNELINFO	/VALUE R / W	0...127	Linking of inputs (Linked-Button). Binary representation of number is equivalent to pressed Linked-Buttons.
			/NAME	/IDX1...IDX8 R / W	max. 16 characters	Input name
			/RAMPTIME	/IDX1...IDX8 R / W	0.001...20	Ramping Time of input (seconds)
			/MIC.LINE	/IDX1...IDX8 R / W	0, 1	Selects input level (0 = Mic level, 1 = Line level)
			/MIC.PHANPOWER	/IDX1...IDX8 R / W	0, 1	Phantom Power (+48 V) of input (0 = off, 1 = on)
			/MIC.GAIN	/IDX1...IDX8 R / W	0...10 [*6dB]	Microphone gain in steps of 6dB.

Commands for AO-1 analog output card

				Read / Write	Values	Description
/PARAM	/DSP	/ANALOGOUT_x	/GAIN	/IDX1...IDX8 R / W	-80...18	Gain of outputs
			/MUTE	/IDX1...IDX8 R / W	0, 1	0 = not muted, 1 = muted
			/POLARITY	/IDX1...IDX8 R / W	0, 1	0 = normal, 1 = inverted
			/NAME	/IDX1...IDX8 R / W	max. 16 characters	Output name

| | | | /RAMPTIME | /IDX1...IDX8 | R / W | 0.001...20 | Ramping Time of output (seconds) |

Commands for Ambient Noise Control

					Read / Write	Values	Description
/PARAM	/DSP	/ANC_x	/AMBABOVETHRESH	/VALUE	R	0, 1	0 = Ambient level below Threshold, 1 = Ambient level above Threshold
			/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/DECREASETIME	/VALUE	R / W	10...3000	Time for GAIN DECREASE in ms
			/FREEZEGAIN	/VALUE	R / W	0, 1	Freeze current gain values (0 = variable, 1 = freeze)
			/GAIN	/IDX1...IDXn /VALUE	R / W	-60...0	Gain of inputs
			/GAINMAX	/VALUE	R / W	-29.9...30	Maximum gain of output signals
			/GAINMIN	/VALUE	R / W	-10...29.9	Minimum gain of output signals
			/GAINVU	/IDX1...IDXn /VALUE	R		Input level Transform given value into dB by: 20 log (256 * value / 0x7FFFFF) + 10 log (2)
			/HOLD	/VALUE	R / W	10...1000	Hold time in ms
			/INCREASETIME	/VALUE	R / W	10...3000	Time for GAIN INCREASE in ms
			/LINK	/VALUE	R / W	0...7	Linking of inputs (Linked-Button). Binary representation of number is equivalent to pressed Linked-Buttons.
			/MUTE	/IDX1...IDXn	R / W	0, 1	0 = not muted, 1 = muted
			/RATIO	/VALUE	R / W	0.3...4	Ratio of program level change to ambient level change
			/RELEASE	/VALUE	R / W	10...3000	Release time in ms
			/THRESHOLD	/VALUE	R / W	-35...21	Threshold in dB
			/VU	/IDX1...IDXn /VALUE	R / W		Gain reduction as fullscale value (32 bit) Transform given value into dB by: 20 log (0x7FFFFF/ value)

Commands for Automixer

					Read / Write	Values	Description
/PARAM	/DSP	/AUTOMIXER_x	/AUTO	/IDX1...IDXn	R / W	0, 1	Automatic mixing of inputs
			/CLIP	/IDX1...IDXn	R	0, 1	Clipping LED of inputs and outputs
			/FREEZEGAIN	/VALUE	R / W	0, 1	Freeze gain of automixer
			/GAININ	/IDX1...IDXn	R / W	-80...0	Gain of inputs
			/GAINOUT	/VALUE	R / W	-80...18	Gain of output
			/POLARITYIN	/IDX1...IDXn	R / W	0, 1	Polarity of inputs (0 = normal, 1 = inverted)
			/POLARITYOUT	/VALUE	R / W	0, 1	Polarity of output (0 = normal, 1 = inverted)
			/MUTEIN	/IDX1...IDXn	R / W	0, 1	Mute of inputs (0 = not muted, 1 = muted)
			/MUTEOUT	/VALUE	R / W	0, 1	Mute of output (0 = not muted, 1 = muted)
			/PRIO	/VALUE	R / W	0, 1	Number of input with high priority
			/RAMPTIME	/VALUE	R / W	1...20000	Time constant (in ms) of faders
			/SIGNAL	/IDX1...IDXn	R / W	0, 1	Signal LED of inputs and outputs
			/SOLO	/IDX1...IDXn	R / W	0, 1	Solo of inputs
			/TAUDIVDUGAN	/VALUE	R / W	1...2000	Time constant (in ms) for weighting rate of input signal level, based on total level.
			/TAUDIVFINAL	/VALUE	R / W	1...2000	Time constant (in ms) for rate of level change.
			/TAURMSDUGAN	/VALUE	R / W	1...2000	Time constant (in ms) of RMS measurement of dugan-gain weighted input signals.
			/TAURMSIN	/VALUE	R / W	1...2000	Time constant (in ms) of RMS measurement of input signals.
			/VUIN	/IDX1...IDXn	R		Input level Transform given value into dB by: 20 log (256 * value / 0x7FFFFF) + 10 log (2)
			/VUOUT	/VALUE	R	value1 value2	Output level Transform given values into dB by: 20 log (value1 / 0x7FFFFF) + value2

Commands for Compressor

					Read / Write	Values	Description
/PARAM	/DSP	/COMPRESSOR_x	/ATTACK	/VALUE	R / W	5...150	Attack time in ms
			/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/GAINREDUCTION	/VALUE	R		Gain reduction as fullscale value (32 bit) Transform given value into dB by: 20 log (0x7FFFFF/ value)
			/MAKE_UP_GAIN	/VALUE	R / W	-18...6	Gain of compressor output in dB, not available for RCM24 compressor
			/RATIO	/VALUE	R / W	1...100	Compressor ratio
			/RELEASE	/VALUE	R / W	10...1000	Release time in ms
			/SOFTKNEE	/VALUE	R / W	0...20	Softknee in dB, not available for RCM24 compressor
			/THRESHOLD	/VALUE	R / W	-9...21	Threshold in dB

Commands for Delay

					Read / Write	Values	Description
/PARAM	/DSP	/DELAY_x	/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/TEMPERATURE	/VALUE	R / W	-20...60	Temperature in degree celcius
			/VALUE	/VALUE	R / W	depends on unit	Delay time including unit. The maximum delay time depends on the used DSP block. Available units are ms (millisecond), smp (samples), ft (Foot), inch, m (meter), cm (centimeter), us (microsecond) and s (seconds). Example: 588.235 ms

Commands for DI-1 digital input card

					Read / Write	Values	Description
/PARAM	/DSP	/DIGITALIN_x	/CHANNELINFO	/VALUE	R / W	0...127	Linking of inputs (Linked-Button). Binary representation of number is equivalent to pressed Linked-Buttons.
			/CHANNELMODE	/IDX1...IDX4	R	00...FF	Channel mode of input signal 0 = Not indicated, 1 = 2 channel, 2 = 1 channel, 3 = primary/secondary, 4 = stereo, 5 / 6 = reserved for user applications, 7 = SCDSR, 8 = SCDSR (stereo left), 9 = SCDSR (stereo right), FF =Multichannel
			/CHANNELSTATUSBYTES	/IDX1...IDX4	R		First five bytes of Channel Status Block.
			/CLOCKACCURACY	/IDX1...IDX4	R	0...3	Clock accuracy of input signal (Consumer mode only) 0 = Level 2 (+/- 1000 ppm) 1 = Level 3 (variable pitch) 2 = Level 1(+/- 50 ppm, high accuracy) 3 = reserved
			/COPYRIGHT	/IDX1...IDX4	R		Copyright bit of input signal
			/ERROR	/IDX1...IDX4	R	00...FF	State of signal transmission (Bit[2] = Confidence Error, Bit[3] = Validity, Bit[5] = Channel Status Block CRC)
			/EMPHASIS	/IDX1...IDX4	R	0, 1	Emphasis bit of input signal
			/GAIN	/IDX1...IDX8	R / W	-80...20	Gain of input
			/LOCK	/IDX1...IDX4	R	0, 1	Synchronisation of DI-1 input to input signal (0 = not synchronized, 1 = synchronized)
			/LOWGROUPDELAY	/IDX1...IDX4	R / W		Low group delay option in interpolation filter of sample rate converter
			/MODE	/IDX1...IDX4	R	0, 1	Mode of signal transmission 0 = consumer mode 1 = professional mode
			/MUTE	/IDX1...IDX8	R / W	0, 1	0 = not muted, 1 = muted
			/POLARITY	/IDX1...IDX8	R / W	0, 1	0 = normal, 1 = inverted
			/NAME	/IDX1...IDX8	R / W	max. 16 characters	Input name
			/ORIGINAL	/IDX1...IDX4	R	0, 1	Original bit of input signal
			/RAMPTIME	/IDX1...IDX8	R / W	0.001...20	Ramping Time of faders (in seconds)
			/SAMPLERATE	/IDX1...IDX4	R		Sample rate of input signal
			/SRCBYPASS	/IDX1...IDX4	R / W	0, 1	Sample Rate Converter Bypass (0 = Bypass not activated, 1 = Bypass activated)
			/SRCWORDLENGTH	/IDX1...IDX4	R		Source word length of input signal (professional mode only)
			/SOURCESELECT	/IDX1...IDX4	R / W	1...3	Source selection of input signal 1 = AES/EBU, 2 = S/P DIF, 3 = OPTICAL

Commands for Ducker

					Read / Write	Values	Description
/PARAM	/DSP	/DUCKER_x	/ATTACK	/VALUE	R / W	5...1000	Attack time in ms
			/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/DUCKINGLEVEL	/VALUE	R / W	-100...-6	Ducking level in dB
			/GAINREDUCTION	/VALUE	R		Gain reduction as fullscale value (32 bit) Transform given value into dB by: 20 log (0x7FFFFF/ value)
			/HOLD	/VALUE	R / W	10...2000	Hold time in ms
			/LINEMUTE	/VALUE	R / W	0, 1	Mute of LINE input (0 = not muted, 1 = muted)
			/MICMUTE	/VALUE	R / W	0, 1	Mute of MIC input (0 = not muted, 1 = muted)
			/MIXLINE	/VALUE	R / W	-30...0	Gain of LINE input
			/MIXMIC	/VALUE	R / W	-30...0	Gain of MIC input
			/RELEASE	/VALUE	R / W	5...1000	Release time in ms
			/THRESHOLD	/VALUE	R / W	-15...21	Threshold in dB

Commands for Expander

					Read / Write	Values	Description
/PARAM	/DSP	/EXPANDER_x	/ATTACK	/VALUE	R / W	5...150	Attack time in ms
			/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/GAINREDUCTION	/VALUE	R		Gain reduction as fullscale value (32 bit) Transform given value into dB by: 20 log (0x7FFFFF/ value)
			/MAKE_UP_GAIN	/VALUE	R / W	-18...6	Gain of compressor output in dB, not available for RCM24 compressor

			/RATIO	/VALUE	R / W	1...10	Compressor ratio
			/RELEASE	/VALUE	R / W	10...1000	Release time in ms
			/THRESHOLD	/VALUE	R / W	-84...-25	Threshold in dB

Commands for Filter

					Read / Write	Values	Description
/PARAM	/DSP	/FILTER_x	/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/FREQ	/VALUE	R / W	20...20000	Frequency of filter in Hz
			/GAIN	/VALUE	R / W	-18...12	Gain of filter
			/QUALITY	/VALUE	R / W	0.4...40	Quality of filter
			/SLOPE	/VALUE	R / W	1 = 6dB/Oct, 2 = 12dB/Oct, 3 = 12 dB BS, 4 = 12dB BW, 5 = 12dB LR, 6 = 18dB BS, 7 = 18dB BW, 8 = 24dB BS, 9 = 24dB BW, 10 = 24dB LR	Slope of filter

Commands for FIR Filter

					Read / Write	Values	Description
/PARAM	/DSP	/FIR_x	/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/FS	/VALUE	R	20...20000	Sampling frequency of filter
			/HIPASS.FREQ	/VALUE	R	20...20000	Frequency of high pass
			/LOPASS.FREQ	/VALUE	R	20...20000	Frequency of low pass
			/MAXORDER	/VALUE	R		Maximum order of filter
			/ORDER	/VALUE	R		Order of loaded filter
			/SLOPE	/VALUE	R	21...100	Slope of filter (in dB)
			/TYPE	/VALUE	R	0 = Low pass, 1 = High pass, 2 = Band pass	Type of filter

Commands for DSP presets

				Read / Write	Values	Description
/PARAM	/DSP	/FUNCTIONS	/DELETE_PRESET	exec	1...60	Delete preset
			/LOAD_PRESET	exec	1...60	Load preset
			/PRESET_INFO_READ	exec	1...60	Read description of preset
			/PRESET_SET_DESC	W	1...60 description	Set description of preset (max.32 characters)
			/PRESET_SET_PROP	W	1...60 MUTE/NOMUTE	Set mute/unmute of preset during load
			/SAVE_PRESET		1...60 NOCOMP/WITHCOMP MUTE/NOMUTE	Save preset with selectable compression and mute/unmute during load
			/STARTUP_PRESET	exec	1...60	Set preset as startup preset
		/ACTIVEPRESET	/VALUE	R	1...60	Currently active preset

Commands for Gate

					Read / Write	Values	Description
/PARAM	/DSP	/GATE_x	/ATTACK	/VALUE	R / W	5...150	Attack time in ms
			/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/GAINREDUCTION	/VALUE	R		Gain reduction as fullscale value (32 bit) Transform value into dB by: 20 log (0x7FFFFF/ value)
			/HOLD	/VALUE	R / W	5...1000	Hold time in ms
			/MAKE_UP_GAIN	/VALUE	R / W	-18...6	Gain of output
			/RELEASE	/VALUE	R / W	10...1000	Release time in ms
			/THRESHOLD	/VALUE	R / W	-84...-25	Threshold in dB

Commands for Graphical Equalizer

					Read / Write	Values	Description
/PARAM	/DSP	/GRAPHICEQ_x	/BYPASS	/IDX1...IDXn	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/FREQ	/IDX1	R / W	20...1000	Frequency of LF FILTER
				/IDX2	R / W	1000...20000	Frequency of HF FILTER
			/GAIN	/IDX1...IDXn	R / W	-12...12	Gain of filter. Index 1 corresponds to the LF FILTER, index n corresponds to the HF FILTER.
			/QUALITY	/IDX1	R / W	0.4...40	Quality of LF FILTER
				/IDX2	R / W	3...10	Quality of filter 1 to n
				/IDX3	R / W	0.4...40	Quality of HF FILTER

			/SLOPE	/IDX1	R / W	1 = 6dB/Oct, 2 = 12dB/Oct	Slope of LF FILTER
				/IDX2	R / W	1 = 6dB/Oct, 2 = 12dB/Oct	Slope of HF FILTER
			/TYPE	/IDX1	R / W	0 = PEQ, 1 = Loshelv, 2 = Hishelv, 3 = Hipass, 4 = Lopass	Type des LF FILTER
				/IDX2	R / W		for future use
				/IDX3	R / W	0 = PEQ, 1 = Loshelv, 2 = Hishelv, 3 = Hipass, 4 = Lopass	Type of HF FILTER

Commands for Limiter

					Read / Write	Values	Description
/PARAM	/DSP	/LIMITER_x	/ATTACK	/VALUE	R / W	0...50	Attack time in ms
			/BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/GAINREDUCTION	/VALUE	R		Gain reduction as fullscale value (32 bit) Transform value into dB by: 20 log (0x7FFFFF/ value)
			/RELEASE	/VALUE	R / W	10...1000	Release time in ms
			/THRESHOLD	/VALUE	R / W	-9...21	Threshold in dB

Commands for Loudspeaker Controller

					Read / Write	Values	Description
/PARAM	/DSP	/LSPKBLOCK_x	/CHn	/COMPRESSOR.ATTACK	/VALUE	R / W	5...50	Attack time in ms.
				/COMPRESSOR.BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
				/COMPRESSOR.GAINREDUCTION	/VALUE	R		Gain reduction as fullscale value (32 bit) Transform value into dB by: 20 log (0x7FFFFF/ value)
				/COMPRESSOR.RATIO	/VALUE	R / W	1...8	Compressor ratio
				/COMPRESSOR.RELEASE	/VALUE	R / W	50...999	Release time in ms
				/COMPRESSOR.THRESHOLD	/VALUE	R / W	-9...21	Threshold in dB
				/DELAY.BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
				/EQ.BYPASS	/IDX1...IDX6	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
				/EQ.FREQ	/IDX1...IDX6	R / W	20...20000	Frequency of equalizer band in Hz.
				/EQ.GAIN	/IDX1...IDX6	R / W	-18...12	Gain of equalizer band in dB
				/EQ.QUALITY	/IDX1...IDX6	R / W	0.4...40	Quality of equalizer band
				/EQ.SLOPE	/IDX1...IDX6	R / W	1, 2	Slope of equalizer band (1 = 6dB/Oct, 2 = 12 dB/Oct)
				/EQ.TYPE	/IDX1...IDX6	R / W	0...5	0 = PEQ, 1 = Loshelv, 2 = Hishelv, 3 = Hipass, 4 = Lopass, 5 = Allpass
				/LIMITER.ATTACK	/VALUE	R / W	0...50	Attack time in ms
				/LIMITER.BYPASS	/VALUE	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
				/LIMITER.GAINREDUCTION	/VALUE	R / W		Gain reduction as fullscale value (32 bit) Transform value into dB by: 20 log (0x7FFFFF/ value)
				/LIMITER.RELEASE	/VALUE	R / W	10...999	Release time in ms
				/LIMITER.THRESHOLD	/VALUE	R / W	-9...21	Threshold in dB
				/XOVER.GAIN	/VALUE	R / W	-30...6	Gain of crossover ways.
				/XOVER.MUTE	/VALUE	R / W	0, 1	0 = not muted, 1 = muted
				/XOVER.POLARITY	/VALUE	R / W	0, 1	0 = normal, 1 = inverted
				/XOVER.LINK	/VALUE	R / W	2, 4, 6, 8, 10, 12, 14, 16	Links the LOPASS and HIPASS of adjacent ways. Link-Numbers are used for linking two ways, for linking more than two ways the sum of the corresponding Link-Numbers is used.
				/XOVER.LOPASS.FREQ	/VALUE	R / W	20...20000	Frequency of lopass.
				/XOVER.LOPASS.TYPE	/VALUE	R / W	0...17	Type of lopass. 0 = Off, 1 = 6dB-Butterworth, 2 = 12dB/Q0.5, 3 = 12dB/Q0.6, 4 = 12dB/Q0.7, 5 = 12dB/Q0.8, 6 = 12dB/Q1.0, 7 = 12dB/Q1.2, 8 = 12dB/Q1.5, 9 = 12dB/Q2.0, 10 = 12dB-Bessel, 11 = 12dB-Butterworth, 12 = 12dB-Linkwitz, 13 = 18dB-Bessel, 14 = 18dB-Butterworth, 15 = 24dB-Bessel, 16 = 24dB-Butterworth, 17 = 24dB-Linkwitz
				/XOVER.HIPASS.FREQ	/VALUE	R / W	20...20000	Frequency of hipass.
				/XOVER.HIPASS.TYPE	/VALUE	R / W	0...17	Type of hipass. 0 = Off, 1 = 6dB-Butterworth, 2 = 12dB/Q0.5, 3 = 12dB/Q0.6, 4 = 12dB/Q0.7, 5 = 12dB/Q0.8, 6 = 12dB/Q1.0, 7 = 12dB/Q1.2, 8 = 12dB/Q1.5, 9 = 12dB/Q2.0, 10 = 12dB-Bessel, 11 = 12dB-Butterworth, 12 = 12dB-Linkwitz, 13 = 18dB-Bessel, 14 = 18dB-Butterworth, 15 = 24dB-Bessel, 16 = 24dB-Butterworth, 17 = 24dB-Linkwitz

Commands for Matrix Mixer

					Read / Write	Values	Description

/PARAM	/DSP	/MATRIX_x	/CONNECTCROSSPOINT	/IDX1...IDXc	R / W	0, 1	Connection of crosspoint. Crosspoints are numbered column by column from top left to bottom right. (0 = not connected, 1 = connected)
			/GAINCROSSPOINT	/IDX1...IDXc	R / W	-80...0	Gain of crosspoint. Crosspoints are numbered column by column from top left to bottom right.
			/GAININ	/IDX1...IDXn	R / W	-80...0	Gain of inputs 1 to n of matrix
			/GAINOUT	/IDX1...IDXm	R / W	-80...0	Gain of output 1 to m of matrix
			/MUTEIN	/IDX1...IDXn	R / W	0, 1	Mute of input 1 to n of matrix
			/MUTEOUT	/IDX1...IDXm	R / W	0, 1	Mute of output 1 to m of matrix

Commands for Matrix Router

					Read / Write	Values	Description
/PARAM	/DSP	/MATRIXROUTER_x	/GAININ	/IDX1...IDXn	R / W	-80...0	Gain of inputs 1 to n of matrix router
			/GAINOUT	/IDX1...IDXm	R / W	-80...0	Gain of outputs 1 to m of matrix router
			/MUTEIN	/IDX1...IDXn	R / W	0, 1	Mute of input 1 to n of matrix router
			/MUTEOUT	/IDX1...IDXm	R / W	0, 1	Mute of output 1 to m of matrix router
			/ROUTINGPOINTS	/IDX1...IDXm	R / W	0...n	Connected crosspoint of output 1 to m of matrix router

Commands for Mixer

					Read / Write	Values	Description
/PARAM	/DSP	/MIXER_x	/CLIP	/IDX1...IDXn	R	0, 1	Clipping LED of inputs and outputs
			/GAININ	/IDX1...IDXn	R / W	-80...0	Gain of inputs
			/GAINOUT	/IDX1	R / W	-80...18	Gain of output L (only for stereo mixer)
				/IDX2	R / W	-80...18	Gain of output R
			/LINK	/VALUE	R / W	0x00...0xFF	Linking of inputs (Linked-Button). Binary representation of number is equivalent to pressed Linked-Buttons.
			/MUTEIN	/IDX1...IDXn	R / W	0, 1	Mute of inputs (0 = not muted, 1 = muted)
			/MUTEOUT	/IDX1	R / W	0, 1	Mute of output L (only for stereo mixer)
				/IDX2	R / W	0, 1	Mute of output R
			/PAN	/IDX1...IDXn	R / W	-50...+50	Pan of input (only for stereo mixer, -50 = left, +50 = right)
			/POLARITY	/IDX1...IDXn	R / W	0, 1	0 = normal, 1 = inverted
			/SIGNAL	/IDX1...IDXn	R	0, 1	Signal LED of inputs and outputs
			/SOLO	/IDX1...IDXn	R / W	0, 1	Solo of inputs

Commands for Noise Generator

					Read / Write	Values	Description
/PARAM	/DSP	/NOISEGENERATOR_x	/ENABLE	/VALUE	R / W	0, 1	0 = off, 1 = on
			/GAIN	/VALUE	R / W	-60...0	Gain of noise in dB
			/TYPE	/VALUE	R / W	0, 1	0 = white noise, 1 = pink noise

Commands for Parametric Equalizer

				Read / Write	Values	Description
/PARAM	/DSP	/PEQ_x	/BYPASS	/IDX1...IDXn	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/FREQ	/IDX1...IDXn	R / W	20...20000	Frequency in Hz
			/GAIN	/IDX1...IDXn	R / W	-18...12	Gain of equalizer band
			/QUALITY	/IDX1...IDXn	R / W	0.4...40	Quality of equalizer band
			/SLOPE	/IDX1...IDXn	R / W	1, 2	Slope of equalizer band (1 = 6dB/Oct, 2 = 12dB/Oct)
			/TYPE	/IDX1...IDXn	R / W	0,1,2,3,4,5	0 = PEQ, 1 = Loshelv, 2 = Hishelv, 3 = Hipass, 4 = Lopass, 5 = Allpass

Commands for Priority Matrix

					Read / Write	Values	Description
/PARAM	/DSP	/PRIORITYMATRIX_x	/CONNECTPAGINGLINE	/IDX1...IDXn	R / W	see description	Set the connection of the input to one ore more outputs. 4 Byte (32 Bit) because there is a maximum of 32 outputs. The first byte represents output 1 to 8, the second byte represents outputs 9 to 16 and so on. The byte is displayed in hexadecimal representation. The binary representation of the byte gives from left to right the connected points in the matrix. (0 = not connected, 1 = connected) Example: Using a Priority Matrix with 8 outputs the value "0x12, 0x00, 0x00, 0x00" sets the connection of outputs 4 and 7.
			/GAINCROSSPOINT	/IDX1...IDXn	R / W	-80...0	Gain of crosspoint. Crosspoints are numbered column by column from top left to bottom right.
			/GAINOUT	/IDX1...IDXm	R / W	-80...0	Gain of outputs.
			/MUTEIN	/IDX1...IDXn	R / W	0, 1	Mute of inputs (0 = not muted, 1 = muted)
			/MUTEOUT	/IDX1...IDXm	R / W	0, 1	Mute of outputs (0 = not muted, 1 = muted)
			/PRIORITYPAGINGLINE	/IDX1...IDXn	R / W	0...255	Priority of inputs

Commands for Router

					Read / Write	Values	Description
/PARAM	/DSP	/ROUTER_x	/ROUTINGPOINTS	/IDX1...IDXm	R / W	0...n	Connected crosspoint of output 1 to m of matrix router

Commands for Tone Control

					Read / Write	Values	Description
/PARAM	/DSP	/TONECONTROL_x	/GAIN	/IDX1...IDX3	R / W	-18...12	Gain of "band"

Commands for Tone Generator

					Read / Write	Values	Description
/PARAM	/DSP	/TONEGENERATOR_x	/ENABLE	/VALUE	R / W	0, 1	0 = off, 1 = on
			/FREQ	/VALUE	R / W	20...20000	Constant frequency (for SINE mode)
			/GAIN	/VALUE	R / W	-60...0	Gain of generated tone
			/SWEEPREP	/VALUE	R / W	0, 1	Selection of a single or periodic sweep (0 = one time, 1 = periodic)
			/SWEEPSTART	/VALUE	R / W	20...20000	Lower (or upper) frequency of sweep
			/SWEEPSTOP	/VALUE	R / W	20...20000	Upper (or lower) frequency of sweep
			/SWEEPTIME	/VALUE	R / W	5...120	Time of sweep in seconds
			/TYPE	/VALUE	R / W	0, 1	Selection of SINE or SWEEP mode (0 = SINE, 1 = SWEEP)

Commands for Crossover

					Read / Write	Values	Description
/PARAM	/DSP	/XOVER_x	/GAIN	/IDX1...IDXn	R / W	-30...6	Gain of crossover ways. Ways are numbered top-down. (e.g. IDX1 = HIGH, IDX2 = MID, IDX3 = LOW)
			/HIPASS.FREQ	/IDX1...IDXn	R / W	20...20000	Frequency of hipass. Ways are numbered top-down. (e.g. IDX1 = HIGH, IDX2 = MID, IDX3 = LOW)
			/HIPASS.TYPE	/IDX1...IDXn	R / W	0...17	Type of hipass. 0 = Off, 1 = 6dB-Butterworth, 2 = 12dB/Q0.5, 3 = 12dB/Q0.6, 4 = 12dB/Q0.7, 5 = 12dB/Q0.8, 6 = 12dB/Q1.0, 7 = 12dB/Q1.2, 8 = 12dB/Q1.5, 9 = 12dB/Q2.0, 10 = 12dB-Bessel, 11 = 12dB-Butterworth, 12 = 12dB-Linkwitz, 13 = 18dB-Bessel, 14 = 18dB-Butterworth, 15 = 24dB-Bessel, 16 = 24dB-Butterworth, 17 = 24dB-Linkwitz
			/LINK	/VALUE	R / W	2, 4, 6, 8, 10, 12, 14, 16	Links the LOPASS and HIPASS of adjacent ways. Link-Numbers are used for linking two ways, for linking more than two ways the sum of the corresponding Link-Numbers is used.
			/LOPASS.FREQ	/IDX1...IDXn	R / W	20...20000	Frequency of lopass. Ways are numbered top-down. (e.g. IDX1 = HIGH, IDX2 = MID, IDX3 = LOW)
			/LOPASS.TYPE	/IDX1...IDXn	R / W	0...17	Type of lopass. 0 = Off, 1 = 6dB-Butterworth, 2 = 12dB/Q0.5, 3 = 12dB/Q0.6, 4 = 12dB/Q0.7, 5 = 12dB/Q0.8, 6 = 12dB/Q1.0, 7 = 12dB/Q1.2, 8 = 12dB/Q1.5, 9 = 12dB/Q2.0, 10 = 12dB-Bessel, 11 = 12dB-Butterworth, 12 = 12dB-Linkwitz, 13 = 18dB-Bessel, 14 = 18dB-Butterworth, 15 = 24dB-Bessel, 16 = 24dB-Butterworth, 17 = 24dB-Linkwitz
			/MUTE	/IDX1...IDXn	R / W	0, 1	0 = not muted, 1 = muted
			/POLARITY	/IDX1...IDXn	R / W	0, 1	0 = normal, 1 = inverted

Commands for RCM-24

					Read / Write	Values	Description
/PARAM	/RCM24	/COMMON	/CANBAUDRATE	/VALUE	R	10, 20, 63, 125, 250, 500	Baud rate of CAN-BUS
			/AMPNAME	/IDX1...IDX250	R / W	max. 30 character	Amplifier name
			/POWER	/IDX1...IDX250	R / W	0, 1	Switch amp ON / OFF or read out ON / OFF state (0 = off, 1 = on)
			/POWERDELAY	/IDX1...IDX250	R / W	1...127	Power-On-Delay in steps of 20ms. 0 sets the default value, dependent on amp address.
			/THERMO	/IDX1...IDX250	R		Current amplifier temperature in degree celcius
		/FUNCTIONS	/LOADPRESET		exec	1...8 "amps"	Loads a amplifier preset. 1 = U01, 2 = U02, ..., 8 = U08; "amps" is hexadecimal representation of amps.
			/SAVEPRESET		exec	1...8 "amps"	Saves a amplifier preset. 1 = U01, 2 = U02, ..., 8 = U08; "amps" is hexadecimal representation of amps.
		/INPA	/NAME	/IDX1...IDX250	R / W	max. 30 character	Name of input A
			/DELAYBYPASS	/IDX1...IDX250	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
			/DELAYVALUE	/IDX1...IDX250			
			/EQ1BYPASS	/IDX1...IDX250	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated

			/EQ1TYPE	/IDX1...IDX250	R / W	0, 1 ,2, 3, 4	0 = PEQ, 1 = Loshelv, 2 = Hishelv, 3 = Hipass, 4 = Lopass
			/EQ1SLOPE	/IDX1...IDX250	R / W	1, 2	Slope of equalizer 1 (1 = 6dB/Oct, 2 = 12dB/Oct)
			/EQ1FREQ	/IDX1...IDX250	R / W	20...20000	Frequency of equalizer 1 in Hz
			/EQ1GAIN	/IDX1...IDX250	R / W	-18...12	Gain of equalizer 1
			/EQ1QUALITY	/IDX1...IDX250	R / W	0.4...40	Quality of equalizer 1
			/EQ2...				(same as above, but for equalizer 2 to 5)
			...				
			/EQ5...				
	/INPB	...					(same as above, but for input B)
	/OUTPA	/NAME	/IDX1...IDX250	R / W	max. 30 character	Name of output A
		/LEVEL	/IDX1...IDX250	R / W	-128...6	Gain of output A
		/TRIMLEVEL	/IDX1...IDX250	R / W	-30...6	Gain Trim (in dsp block Crossover)
		/DELAYBYPASS	/IDX1...IDX250	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
		/DELAYVALUE	/IDX1...IDX250			
		/MUTE	/IDX1...IDX250	R / W	0, 1	0 = not muted, 1 = muted
		/POLARITY	/IDX1...IDX250	R / W	0, 1	0 = normal, 1 = inverted
		/ROUTE	/IDX1...IDX250	R / W	0, 1, 2	Routing of output A (0 = A, 1 = B, 2 = A+B)
		/COMPBYPASS	/IDX1...IDX250	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
		/COMPTYPE	/IDX1...IDX250	R / W	0, 1, 2, 3, 4	Compressor ratio (0 = 1/1, 1= 1/1.4, 2 = 1/2, 3 = 1/4, 4 = 1/8)
		/COMPTHRESH	/IDX1...IDX250	R / W	-30...0	Threshold of compressor in dB (-30 corresponds to -9 dB, 0 corresponds to +21 dB)
		/COMPATTACK	/IDX1...IDX250	R / W	0...99	Attack time of compressor in ms
		/COMPRELEASE	/IDX1...IDX250	R / W	10...999	Release time of compressor in ms
		/LIMITBYPASS	/IDX1...IDX250	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
		/LIMITTHRES	/IDX1...IDX250	R / W	-30...0	Threshold of limiter in dB (-30 corresponds to -9 dB, 0 corresponds to +21 dB)
		/LIMITRELEASE	/IDX1...IDX250	R / W	10...999	Release time of limiter in ms
		/XOVERHITYPE	/IDX1...IDX250	R / W	0...17	0 = Off, 1 = 6dB-Butterworth, 2 = 12dB/Q0.5, 3 = 12dB/Q0.6, 4 = 12dB/Q0.7, 5 = 12dB/Q0.8, 6 = 12dB/Q1.0, 7 = 12dB/Q1.2, 8 = 12dB/Q1.5, 9 = 12dB/Q2.0, 10 = 12dB-Bessel, 11 = 12dB-Butterworth, 12 = 12dB-Linkwitz, 13 = 18dB-Bessel, 14 = 18dB-Butterworth, 15 = 24dB-Bessel, 16 = 24dB-Butterworth, 17 = 24dB-Linkwitz
		/XOVERHIFREQ	/IDX1...IDX250	R / W	20...20000	Frequency of crossover-hipass of output A
		/XOVERLOTYPE	/IDX1...IDX250	R / W	0...17	0 = Off, 1 = 6dB-Butterworth, 2 = 12dB/Q0.5, 3 = 12dB/Q0.6, 4 = 12dB/Q0.7, 5 = 12dB/Q0.8, 6 = 12dB/Q1.0, 7 = 12dB/Q1.2, 8 = 12dB/Q1.5, 9 = 12dB/Q2.0, 10 = 12dB-Bessel, 11 = 12dB-Butterworth, 12 = 12dB-Linkwitz, 13 = 18dB-Bessel, 14 = 18dB-Butterworth, 15 = 24dB-Bessel, 16 = 24dB-Butterworth, 17 = 24dB-Linkwitz
		/XOVERLOFREQ	/IDX1...IDX250	R / W	20...20000	Frequency of crossover-lopass of output A
		/EQ1BYPASS	/IDX1...IDX250	R / W	0, 1	0 = Bypass not activated, 1 = Bypass activated
		/EQ1TYPE	/IDX1...IDX250	R / W	0, 1, 2, 3, 4, 5	0 = PEQ, 1 = Loshelv, 2 = Hishelv, 3 = Hipass, 4 = Lopass, 5 = Allpass
		/EQ1SLOPE	/IDX1...IDX250	R / W	1, 2	Slope of equalizer 1 (1 = 6dB/Oct, 2 = 12dB/Oct)
		/EQ1FREQ	/IDX1...IDX250	R / W	20...20000	Frequency of equalizer 1 in Hz
		/EQ1GAIN	/IDX1...IDX250	R / W	-18...12	Gain of equalizer 1
		/EQ1QUALITY	/IDX1...IDX250	R / W	0.4...40	Quality of equalizer 1
		/EQ2...	/IDX1...IDX250			(same as above, but for equalizer 2 to 5)
		...				
		/EQ5...				
	/OUTPB	...					(same as above, but for output B)

Link-Numbers for linking adjacent ways of a crossover

Way	5	4	3	2	1
Link-Number		8		2	
	16		4		

Hexadecimal representation of remote amplifiers connected to the N8000

CAN address	1	2	3	4	5	6	7	8	9	...	240	241	242	243	244	245	246	247	248	249	250
Decimal value	8	4	2	1	8	4	2	1	8	...	1	8	4	2	1	8	4	2	1	8	4
Example			X	X	X		X														
				0x3A							0x00										