SW-4268 Instruction manual

QAM Modulator – 8 Controller

Software

SW-4268

Instruction manual



Contents

1. Introduction	3
2. The first step: querying the settings	5
3. Modifying the channel settings	
4. Setting the transport stream input.	9
5. Explanation of the Error Code	11
6. Changing the device IP address	12
7. Using the web interface	13
8. Using SNMP control	14
9. Saving and loading possibilities	
10. User support	16
11. Frequently Asked Questions	17
12. Supplements, developments.	



1. Introduction

The CW-4268 QAM modulator-8 of CableWorld is a common product with our Dutch partner STN B.V., so its control system differs from the system used in our former products. The controlling and programming possibilities of the CW-4268 QAM Modulator-8 are as follows:

- Extensive setting and controlling possibilities of the parameters with the SW-4268 software of CableWorld. This software operates with SNMP messages, covers 90% of the parameter settings and provides a "user friendly" interface.
- 100% of the device parameters can be controlled at the device IP address (factory setting 10.123.13.103) with a popular web browser (Internet Explorer V7.0 or later version).
- Controlling with SNMP messages, by MIB browser, even by building it in device control systems of other manufacturers.

Installing the SW-4268, gives way for using all the three versions. The SW-4268 software can be installed by running the exe file downloaded from the <u>www.cableworld.eu</u> web site. Unless the user specifies otherwise, the software installs in the directory

C:\Program Files\CableWorld\SW_4268

The development has happened in Windows XP environment, performing the tasks puts no special requirements on the computer.

After installing the software can be started by clicking the icon appearing on the desktop. The software starts with the introductory screen as shown in Figure 1.1. If the settings are saved on exit, the next running starts with the settings saved in the \Settings\SW4268a.ini file. The software can be removed easily, so it can be installed for learning and testing, too.



Figure 1.1 SW-4268 QAM Modulator-8 Controller introductory screen



SW-4268

Instruction manual

For using the software interconnect the CW-4268 device and the PC by a UTP crossover cable or via switch by straight cable. On starting the SW-4268 software, and setting the device IP address in the software, the parameters can be queried and modified.

Important note: The CW-4268 QAM Modulator-8 sends no replies to the query commands of the CW-Net system, it will not appear in the user interface of the SW-4800 CW-Net Principal system software.

We appreciate receiving all remarks and comments with our products and software at the cableworld@cableworld.hu e-mail address; we pay respect to your suggestions and ideas at our further developments. Further information on applying the devices can be asked for at the same address.



SW-4268 Instruction manual

2. The first step: querying the settings

On starting the SW-4268 software the most important step is checking the connection between the device and the computer. For performing the task click the 'Read Settings' tab and set the IP address of the device.

In the first step at setting the IP address, the user should decide whether he/she wants to work in the CableWorld 10.123.13.xx range CW-Net system, or other. According to this, check the 'Use CW-Net' box. The IP address can be set by clicking the item in the pull-down address list or stepping up-down to the required address. Unlike the CW-Net system, it is practical to use text editor for writing the IP addresses into the SW4268a.ini file. In a user defined system the software always starts with the address of the first item in the list. The format of the pull-down list in the ini file is as follows:

[IP Address List] Number of Items=10 IP Address 1=192.168.200.20 IP Address 2=10.123.13.105 IP Address 3=10.123.13.101 IP Address 4=10.123.13.101 IP Address 5=10.123.13.200 IP Address 6=192.168.1.101 IP Address 7=192.168.1.101 IP Address 8=192.168.1.200 IP Address 9=172.29.1.103 IP Address 10=255.255.255.255

The GUI for setting the IP address is shown in Figure 2.1, with the ten items of the pull-down list loaded from the ini file. When the value of the IP address is not sure (e.g. after manual modification), step the IP address up and down. In this case the software corrects the incidental typing errors and writes the correct values in the box.



Figure 2.1 GUI for setting the IP address

When the device IP address is not known, interconnect the PC and the device directly and use the query command of the IP address modifying software. Important: In this procedure only one device will get the query command at a time!



After setting the IP address, query the current settings of the device by clicking the '**Read Settings from Device'** button. The GUI (Graphical User Interface) shows the settings in groups of different aspects. The query of the settings starts with SNMP messages, so it takes a few seconds. In default setting after the query command the software waits one second for the reply, and this is not enough for the distant devices in large IP networks. In this case the waiting time can be modified in the SW4268a.ini file. In case of wrong setting or large network the long query process can be broken with the stop button. The GUI appearing after query is shown in figure 2.2.

📲 SW-4268 QAM Mo	dulator - 8 Co	ntroller		Developed b	y Cab	leWorld Ltd. 📃 🗆 🔀
Eile View Load from	<u>S</u> ave as	Tools Hel	p <u>A</u> bout			
Eile yew Load from Channel Sett Channel 1 Frequency 700 QAM Mode 64Q Symbol Rate 5 00 Rif Dutput Ena Rif Level 31 00 Standardption Has Ni raynop 701 Steam File Source IP Address 240 Source IP Addres	Save as ings 000 000 Hz AM 000 000 S/s bled 1.03 30 Annex A bled 1.23 13 100 disabled 00 disabled 123 13 100 disabled 00 disabled ms *s to to to to to to to to to to	Iools Hele	р <u>About</u> Dutput uency - 1 uency - 2 uency - 3 uency - 3 uency - 4 uency - 5 uency - 6 uency - 6 uency - 7 Mode - 2 1 Mode - 7 1 Mode -	Parameters 700 000 000 Hz On 716 000 000 Hz On 716 000 000 Hz On 724 000 000 Hz On 740 000 000 Hz On 740 000 000 Hz On 756 000 000 Hz On 756 000 000 Hz On 754 000 000 Hz On 540AM 540AM 640AM 640AM 640AM		Device Parameters [10.123.13.103] IP Address 10.123.13.103 IP Address 00.15.17.00.0113 Seial Number 00015.59 Hardware Version 03 Firmware Version 03 Followick Version 10 Device Time 000/10.000.000 Device Time 0000/00.000.000 Device Time 0000/00.000.000 Total B FLevel 5.9 dm (Messured) Tot Device Time 5.9 webched On NIT Adaptation Disebid NIT Faite Critter 4.0000000
Settings Error not I Channel 2 Frequency 708 GAM Mode 540 Symbol Re 6 00 Pir Dutput Ena RF Level - 3.0 Standard III NIT Adaptation disa Read Settings Modify Chr.	found 000 000 Hz AM 00 000 S/s bled dBm T J.83 Annex A bled annel Settings Modi ss completed	Sym Sym Sym Sym Sym Sym Sym Sym	bol Rate - 1 bol Rate - 2 bol Rate - 3 bol Rate - 3 bol Rate - 4 bol Rate - 6 bol Rate - 7 bol Rate - 8 bol Rate - 8	6 000 000 5/s 6 000 000 5/s 9 000 000 5/s 9 000 000 5/s 5 000 000 5/s	¥268	Error Code: 0x0000000 - 0x0000000 IP Address Use CW-Net 10.123.13.103 U + Stop Quety - Read Settings from Device

Figure 2.2 GUI for querying the settings

The software shows the channel settings graphically on the display of the 'Modify Channel Settings' page, too. Here the effect of the '**Read Settings**' button is the same as the query button on the previous page. The explanation of data is detailed in the following chapters.



3. Modifying the channel settings

The SW-4268 works with two databases of same size and structure. The first data base (**Read back Database**) comprises the data read back from the device. The second database (**New Database**) comprises the data composed by the user and prepared for loading. The contents of the two databases can be displayed on the screen with the commands of the '**View'** menu item any time.

On starting the software the contents of the two databases are the same; both comprise the data stored in the SW4268a.ini file. After reading back the device settings, the contents of the two databases are the same again, both comprise the read back data. The user's modifications always get into the 'New Database' storage. The content of this can be saved with the 'Save Channel Settings as ...' command to file of optional name, and the content of the file can be loaded with the 'Load Channel Settings from ...' command.

On clicking the '**Modify Channel Settings**' tab the channel settings will be displayed with the related spectrum by means of mathematical calculation. The graphical spectrum analyser can represent the whole operational range. The center frequency of the spectrum can be set in 10 MHz steps. The spectrum appearing on the screen is shown in Figure 3.1.



Figure 3.1 Graphic spectrum analyser display

On modifying the channel settings the display shows the results immediately. The channels switched-off are represented with outlines as shown in Figure 3.2.

SW-4268 QAM Modulator - 8 Controller Developed by CableWorld Ltd.	_ □ 🛛		
Eile <u>Vi</u> ew Load from Save as Iools <u>H</u> elp <u>A</u> bout			
10 dB/div	General Parameters Channel 18 Symbol Rate 6875000 Symbol/sec RF Level 14: 105.7 dBuV RF Level 14: -3.0 dBm ◀ ▶		
5 MHz/drv 720 MHz 900 MHz 50 MHz Display Center Frequency 850 MHz	RF Level 58: 105.7 dBuV RF Level 58: -3.0 dBm RF Output Signals		
Common Parameters for Channel 1 4 Common Parameters for Channel 5 8 Switched On: CH 1 🔽 CH 2 🖾 CH 3 🖾 CH 4 🖾 Switched On: CH 5 🖾 CH 6 🖵 CH 7 🗖 CH 8 🖵	Off On On Readed Error Code		
QAM Mode 64 QAM Use Channel Table QAM Mode 64 QAM Use Channel Table Picquency 1 Frequency 1 698000000 Frequency 3 714000000 Frequency 5 738000000 Frequency 7 754000000	Load Ch 14 Settings Load Ch 58 Settings		
Frequency 2 706000000 Frequency 4 722000000 Frequency 6 746000000 Frequency 8 762000000	Stop Read Settings		
Read Settings Modify Channel Settings Modify TS Input Settings Modify General Parameters SW-4268 Project Name: Direct QAM Modulator Test Date of last saving: 2008.09.07. 20.11:44			

Figure 3.2 GUI for setting channel parameters



The feature of the Direct Digital RF Signal Synthesis is, that the produced QAM channels are in connection with each other, so at setting their parameters the following restrictions must be considered:

- The output signals of the CW-4268 QAM Modulator-8 are produced by two 12-bit D/A converters, so both 4-channel groups carry adjacent channels.
- Within the group of four the raster of the channels, the output levels and the QAM modes are equal.
- The Symbol Rates of the 8 channels must be equal.
- The margin between the RF output levels of the two groups of four cannot be set greater than $\pm 3 \text{ dB}$.

The GUI shown in Figure 3.2 allows modifications according to the restrictions listed above. For special settings we suggest using the web interface.

The settings of channel groups Ch1 to Ch4 and Ch5 to Ch8 can be loaded to the device separately by clicking the 'Load Ch1..4 Settings' and 'Load Ch5..8 Settings' buttons. The RF output signal can be switched on/off with a separate command without modifying the channel settings.

Important note: In case of incorrect settings the QAM Modulator-8 will not execute the command, nevertheless the new data can be read back. In case of correct setting combination the value of the read back Error Code is zero. The setting errors are detailed on the 'Modify General Settings' page. After switching off and on the line power, the programming steps having been started will be deleted, and the device will send back the actual working parameters.



4. Setting the transport stream input

The input signals of the eight QAM modulators in the CW-4268 type, can be fed into the device via gigabit IP network. In lack of input signal the device substitutes null packets for the data.

The IP input signal can be unicast and multicast data stream. The UDP packets can comprise 1 to 7 188-byte transport stream packets. For eliminating the irregular transmission of the IP network the input data stream gets into a temporary TS buffer. The delay of the TS buffer, the quantity of the temporarily stored data can be set from 0 to 100 ms, in 10-ms steps. The PCR errors from the IP transmission are diminished by a PCR corrector.

The settings of the IP Receiver modules in the 8 QAM channels are shown on the '**Modify TS Input Settings**' page together. Every IP Receiver can filter the input signal according to the following four parameters:

- Source IP Address
- Source Port Number
- Destination IP Address
- Destination Port Number

The user can enable or disable the operation of every filter. Generally the operation of the Destination Port Number filter and the use of multicast input signals are suggested. The GUI is shown in Figure 4.1.

New Database (of Transport Stream Re	ceivers	TS Receiver Database Processor
Channel - 1			Channel Calaster
Destination IP Address:	239.123.13.100 dis	Port 58100 en	Channel Selectul
Source IP Address: Channel - 2	240.123.13.100 dis	Port: 59100 dis	Channel - 5
Destination IP Address:	239.123.13.110 dis	Port: 58110 en	
Source IP Address:	240.123.13.110 dis	Port: 59110 dis	INEW Destination IP Address
Channel - 3			239.123.13.140
Destination IP Address:	239.123.13.120 dis	Port: 58120 en	
Source IP Address:	240.123.13.120 dis	Port: 59120 dis	Destination IP Filter Enabled
Channel - 4			
Destination IP Address:	239.123.13.130 dis	Port: 58130 en	New Destination Port Number
Source IP Address:	240.123.13.130 dis	Port: 59130 dis	58140
Channel 5			Destination Port Filter Enabled
Destination IP Address:	220 122 12 1 <i>4</i> 0 Jia	Port 50140 on	
Course ID Address:	233.123.13.140 dis 240.122.12.140 dis	Port 59140 dia	Mau Source IR Address
Channel E	240.123.13.140 dis	1 OIC 33140 UIS	New Jource IT Address
Destination IP Address:	220 122 12 150 Jia	Port 50150 on	240.123.13.140
Course ID Address:	233.123.13.130 dis 240.122.12.150 dis	Port 59150 dis	
Channel 7	240.123.13.130 dis	TOIC JOTJO UIS	Source IP Filter Enabled
Destination IP Address:	220 122 12 100 Jia	Port 50160 on	New Source Port Number
Course ID Address:	233.123.13.100 dis 240.122.12.12.100 dis	Port 59160 dia	Thew source Fort Humber
Channel 9	240.123.13.100 UIS	Fore 33100 UIS	59140
Destination IP Address	220 122 12 170 Ju	Port 59170 on	Course Dest Elles Exciling
Course ID Address:	233.123.13.170 dis 240.122.12.170 dis	Port 59170 dia	j Source Fort Filter Enabled
Jource II Address.	240.123.13.170 dis	TOIC JOTTO UIS	
Comment:	en - Filter Enabled	dis - Filter Disabled	Apply new IP and Port Data

Figure 4.1 GUI of the input transport stream parameters

For modifying the data, first set the number of the channel to be modified with the **Channel Selector**, and then execute the modifications. The modifications get into the database by clicking the '**Apply new IP and Port Data**' button. The data of the 8 channels can be loaded to the device together, by clicking the '**Load TS Receiver 1 .. 8 Database**' button.

The delay of the temporary buffer used for eliminating the IP jitter, can be set independently of the input parameters. The preset value is the same for the eight channels.



The CW-4268 QAM Modulator-8 has a built-in NIT inserter, that allows of changing the NIT table in transmodulation applications. In this case the NIT table must be fed from PC or CW-4881 TS Generator to the device like the input transport streams.

The internal NIT Receiver can receive one NIT data stream, and this can be built in each of the eight QAM channels. The NIT data stream can arrive at the device with the user defined PID value. After removing the old NIT, the device inserts the new NIT data stream, with automatic Continuity Counter at PID 16.

The NIT Inserter can be configured with web interface. The SW-4268 software V1.0 version has not yet the platform for configuring the NIT Inserter.

Configuring the source side of the input TS and determining the symbol rate

The unit expects the input transport stream in UDP packets, that comprise 1 to 7 188-byte TS packets. For general use we suggest UDP packets with $7 \times 188=1316$ byte data content.

The error correcting capability of the PCR corrector is limited, so the transport stream must be fed in the device with null packets, according to the required QAM output packet sequence (transparent transfer). Important note: The null packets must no be removed. In this case the input and the QAM output packet sequence are nearly the same, to avoid overflows, set the output data rate a little bit (1 to 10 kbit/s) higher than the input data rate. From time to time the QAM modulator equalises the difference of the two by inserting a null packet. The PCR corrector corrects this error.

At transmodulation applications the input data stream cannot be affected, so overflows can be avoided by a slight enhancement of the output data rate. Remember, the symbol rate range of the QAM demodulators (set-top box) is very small, 10-20 kS/s.

At remultiplexer applications in the QAM modulator, setting the nominal value (e.g. 6.875 MS/s) is practical, by a slight reduction of the remultiplexer output data rate.



5. Explanation of the Error Code

The DDS (Direct Digital Synthesis) technology requires the strong control of the parameters to be set. The device controller informs the user about the results by the values of the variables 'Error Code' and 'Extended Error Code'. In case of correct settings the values of these variables are zero.

The read back value of the Error Code and the Extended Error Code is shown on several GUIs. Detailed information can be obtained about the data interpretation on the **Modify General Parameters** page. The Error Code Platform in Figure 5.1, beyond explaining the present codes gives a detailed information about every code and allows the separate read back of these two codes, too.

		Error Code Platform	
	Error Code: h000	00040	^
	h 00 00 00 40	No MPEG2-TS packets received in active channels within 60 seconds ! Active channel will send null packets.	Ш
	Extended Error C	ode: h000000FF	
	$\begin{array}{c} h \ 00 \ 00 \ 00 \ 01 \\ h \ 00 \ 00 \ 00 \ 02 \\ h \ 00 \ 00 \ 04 \\ h \ 00 \ 00 \ 04 \\ h \ 00 \ 00 \ 00 \ 00 \ 10 \\ h \ 00 \ 00 \ 20 \\ \end{array}$	Chi error (no video received in 60 sec) Chi error (no video received in 60 sec)	
	Error Code Table:		~
		Read Error Code from Device)
l			

Figure 5.1 GUI of the Error Code Platform

In the course of configuring the device, after setting the correct channel data, probably most of the error messages will show the lack of the transport stream.



6. Changing the device IP address

The CW-4268 QAM Modulator-8 devices are delivered with factory setting 10.123.13.103 IP address. In the IP network every device must have a separate IP address, so in case of several devices different IP addresses must be set.

The course of changing the IP address:

- Interconnect the QAM modulator and the PC, so that other QAM modulators could not get the message.
- Start the SW-4268 software and use the Tools\Change Device IP Address menu item.
- The software queries the present IP address of the device by sending an UDP packet to the 239.255.255.250 (Port=3702) IP address, and then modifies it according to the user's demand.

The GUI of the software for modifying the IP address is shown in Figure 6.1. (For configuration the DQAMIPconfig.exe file is available in the Tools directory and it can run independently, too.)

击 DQAM IpConfig				
Device:	00:1e:17:00:01:13	Refresh		
IP Address:	10 . 123 . 13 . 103			
Subnet Mask:	255 . 0 . 0 . 0			
Gateway:	10 . 123 . 13 . 1			
Update				

Figure 6.1 GUI for modifying the device IP address



SW-4268

Instruction manual

7. Using the web interface

The CW-4286 QAM Modulator-8 allows a number of possibilities for the user at setting the device parameters and monitoring the operation. For new and not practised users first we offer using the SW-4268 software, which simplifies the programming of the device by applying a number of automatic functions.

On clicking the **Tools/Web browser Platform** menu item, the PC default web browser starts searching the device at the IP address preset in the SW-4268 software. For using the web browser the Microsoft Internet Explorer 7 or later version must be installed. Other software can be used as well.

The web browser allows of setting and querying every parameter, but its use requires thorough technical knowledge. We suggest using it for setting the NIT replacement and the special parameters not managed by the SW-4268. Some part of the web interface is shown in Figure 7.1.

😉 DQ800AC - Chai	🖻 DQ800AC - Channel Settings - Mozilla Firefox 📃 🗖 🔀					
<u>E</u> ájl S <u>z</u> erkesztés <u>N</u>	jáj Szerkesztés Nézet Előzmények Könyvjelzők Eszközök Súgó					
🧼 • 🔶 • 🥑	🛞 🏠 🗋 http://10.123.13.103/index.htm?Page=ChSettings	🔹 🕨 💽 Google				
🌮 Bevezetés 👧 Fris	ss hírek					
	Device Properties Device Settings Device St	tatus NIT Channel Settings Channel Status				
	Logging Unla	Upgrade				
	Channe	el Settings				
	ChannelNo	2 💌				
	Enabled					
	Active	Yes				
	Compliance	ITU-T J.83 Annex A				
	QamMode	QAM64				
	RfLevel	-3.0 dBm				
	JitterTolerance	20 ms				
	SymbolRate	6000000 sps				
	Center Frequency	708000000 Hz				
	Source IP Address	240.123.13.110				
	Destination IP Address	239.123.13.110				
	Source Port	59110				
	Destination Port	58110				
	Source IP Filter Enable					
	Destination IP Filter Enable					
	Source Port Filter Enable					
	Destination Port Filter Enable					
	Nit Adaptation Enable					
	Settings Error	0				
	(see Capabilities List - Device Status)					
	Apply Settings					

Figure 7.1 Part of the web interface



8. Using SNMP control

First, install a MIB Browser software in your PC for using conventional SNMP control. Add the **SW_4268\Tools\DQAMMIB.MIB** file for the software. Then the parameters can be queried and set one by one.

Note: The SW-4268 software queries and modifies the parameters with SNMP messages but without using the MIB browser. At SNMP control may occur, that the answers return after several seconds (in large IP networks), so the ensured SNMP waiting time for the answer return is very important. At the SW-4268, the SNMP waiting time is set to 1200 ms, where the device uses up 600 to 700 ms during setting the IP addresses, so 500 to 600 ms remain for the delay of the IP network. In large systems when the answers arrive late, the value of the SNMP Waiting Time must be set higher in the SW4268a.ini file. The usual value is 5000 ms.



SW-4268

Instruction manual

9. Saving and loading possibilities

The SW-4268 software starts with the settings stored in the SW4268a.ini file. The file comprises the software and channel settings as well. Save settings when exit so the software and the channel settings will be saved.

In large systems, when several QAM modulator-8 are used, it is practical to prepare the channel settings and call them in from file with the installation. The channel settings can be saved with the 'Save Channel Settings as ...' command to the file assigned by the user. The 'Load Channel Settings from ...' command is used for loading.

The commands 'Save Software Settings as...' and 'Load Software Settings from ...' are used for saving and loading the IP address and a few software parameters only, so they are used in special applications.



10. User support

The detailed technical data sheet of the CW-4268 QAM Modulator-8 is contained in the 4268p m.pdf and can be downloaded from the <u>www.cableworld.eu</u> web site.

The instruction manual of the SW-4268 software is contained in the 4268Help_m.pdf file. The installer exe installs the file in the directory SW_4268\Help, but the file can be downloaded independently from the software page of the <u>www.cableworld.eu</u> web site.

For using the SNMP control the DQAMMIB.MIB file can be found in the directory SW_4268Tools.

The technical specification of the 'Eight_Channel DVB-C Direct VHF/UHF QAM Modulator' module used in the CW-4268 device can be found in the directory SW_4268\Help in the Specification_V12.pdf file. The instruction manual for using the web browser can be found in the DQAMmanual_V07.pdf file.



11. Frequently Asked Questions

1. By the measurements the device operates with no fed or read back data. What can be wrong?

Answer: The entry of the parameters was incorrect, the modifications could not be executed, the device is waiting for correction. The Error Code informs about the kind of the error. Restart the device for reading the actual parameters again.

2. The web interface is not working. What can be wrong?

Answer: It really does not work with the Internet Explorer 6.0 or former versions. Install the Internet Explorer 7.0 or Firefox 2.0.0.1 or similar software!

3. How to make special settings and avoid the automatic functions of the SW-4268?

Answer: The software examines the values loaded from the ini file briefly. For making special settings, use data entry through the ini file, or web interface.



12. Supplements, developments