

SW-4841 ASI to IP and IP to ASI Converter Controller 1.04

Network Controller and Supervisor Software

This 1.04 version, which was designed by extending the SW-4800 CW-Net Principal permits querying and setting the common parameters of the connected devices. Note, that this software can be used with all devices of the CW-Net system.

The main changes in the 1.03 and 1.04 version:

- Extension of the IP address range.
- Displaying the name, software version etc. of the device.
- Extended instruction set, more user-friendly user interface.
- Control of the input and output selectors.
- Querying and programming the NCO.
- Control of the Send TS and the IP TV functions.
- Transparent TS transmission over IP network (1.04)

Instruction manual

1. Task of the software

Digital television technology requires a very fast environment for controlling the devices and accessing the data streams. For this purpose, CableWorld Ltd. developed a 100 MBit/s control system referred to as CW-Net. Structure, detailed description and instruction set of the CW-Net are included in the CW-Net.pdf file free accessible at www.cableworld.hu.

The SW-4800 CW-Net Principal software is an easy-to-use handling software for the CW-Net network, which permits checking-up the readiness of the devices connected to the network and querying their type numbers and serial numbers. All control processes in the CW-Net network are made using the Internet Protocol therefore the devices must have different IP addresses. Using the CW-Net Principal, the IP addresses beyond being queried can also be changed.

The software was designed for under the Windows system, and runs under Win 98SE or later versions. However, from 2005 on we will test the new pieces of software in Windows XP Professional environment only and we suggest our customer to use this version.

The CW-Net Principal is a good starting point also for them going to design their own control software for the CableWorld devices. Connecting an analyser to the 100 MBit/s network, the structure of commands and responses can be studied, and the description included in the CW-Net.pdf file becomes lucid.

2. Establishing the CW-Net

The CW-Net can be built of the components of the widely used 100 MBit/s Ethernet networks. The simplest system can be established by connecting the computer's Ethernet socket with that of one of the CableWorld devices' through a category 5 cross-wired cable.

Connecting more than one device can be made through a switch or some other component of similar function, but in this case all devices must have different IP addresses. CableWorld Ltd. delivers its products with the 10.123.13.101 IP address, which must be changed to different addresses each at putting them in operation. For doing this, first connect the computer with a straight (not cross-wired) cable to the switch, and then connect the first device with a straight cable. Set the IP address of the device, and then continue this procedure with all devices.

In the CW-Net network the computer has to be set to a fix IP address (e.g.: 10.123.13.201) and to 100 MBit/s full duplex operation mode. In Windows XP environment, for setting the computer's IP address, select following options: My Computer – Control Panel – Network Connections – Local Area Connection – (mouse right click) Properties – Internet Protocol (TCP/IP). The offered (255.0.0.0) Subnet mask should be accepted. Here, on the upper side of the General page also the setting of the network handling device is offered (Configure > Advanced). After clicking the “Settings” button, click the “Link Speed/Duplex Mode” line in the “Special” page and then in the roll down menu select the “100Mbps/Full Duplex” mode. In most cases auto mode is applicable, too.

When selecting the switch type, consider that for transmitting simple instructions e.g. setting IP addresses any switch type may work, but the fast transport stream can only transmitted by industrial versions.

3. Installing the software

The SW-4800 software is free available for our customers, anyone can download it from our web site. Installing is made in the usual way, with running setup.exe. After installing, the software is started with clicking the icon on the desktop. The IP addresses and the attached remarks are stored in the IPdata.dat and Comment.dat files. For those operating more than one system, it is advisable to operate the software from separate folders.

4. Setting up the CW-Net and the IP addresses

On running the software, the CW-Net Principal user interface panel (GUI) appears on the screen. On clicking the Query button, the software queries the parameters of the device with the preset IP address. The answer of the device is displayed in the message box of the Communication Platform. In lack of received response “Device not found!” is displayed.

CableWorld Ltd. delivers its products set to the 10.123.13.101 IP address. The first step of establishing the CW-Net is setting the IP addresses of the connected devices. The CW-Net Principal permits the fourth part of the IP address to be programmed. Within the 1 ... 254 range the IP addresses can be set arbitrarily. The address 101 is not advisable to be left as finalized, because at enlarging the system the new device enters the network always with this address, which then would cause address conflict.

For changing the IP address, set the old and the new IP address, and send out the instruction for change by clicking the Replace IP Address button. In case of a device with unknown IP address (e.g. IP address forgotten), the desired IP address can be set by sending out the instruction for change to the 255.255.255.255 IP address. However this instruction should be sent out with care, because all devices, which receive it, will execute it.

From the software version 1.03 on, both the device and the software can be used also outside the 10.123.13.x range, used by the CW-Net. If the Use CW-Net checkbox is not checked, the “Use:” textbox gets light and the instructions will be sent out in the IP address range written here. The first 3 bytes of the range have to be typed (in decimal format along with the closing decimal point) and the following fourth byte is set with the stepping buttons.

For setting a new IP address, all four bytes of the IP address have to be typed in the New IP Address textbox and entered with the Enter button.

When going to use an individual IP address range, the steps to be made are following:

- Reprogramming the IP addresses of the devices one by one to the new values.
- Reprogramming the IP address of the computer to the new value.
- Setting the new range in the software to be used.

5. Editing the address list

A list of the devices connected to the network can be created in the IP Address List box using the “Add IP Address to List” and the “Remove IP Address from List” buttons. In the list, to each IP address a remark can be attached from the textbox above the IP Address List box. Clicking an item in the IP Address List acts the same as that of the Query button.

6. Querying the whole CW-Net

When forgetting the IP addresses or in case of a CW-Net network with unknown devices, click the “Auto Search” button. On this, the software queries all IP addresses and will display the responses in the message text field of the Communication Platform. The query is always made in the range of the fourth byte of the IP address.

7. Input Selector

Here, the states of the input and output selectors of the different device models can be queried with the Read Settings button. The selectors can be set directly with the Input - Output Selector buttons. When storing the state of the selector, the device goes to the stored state after switch-on.

8. Setting the NCO frequency

From the 1.45 software version on, the frequency of the digital oscillator built in the CW-Net Controller module can be queried with the Read NCO Frequency button. The frequency has already been programmable just from the first version on. At starting to type the data, the colour of the NCO (Clock) Frequency data box changes to yellow. After hitting Enter, the software inspects and if necessary corrects the typed value. This preset value can be entered in the device with the Set NCO Frequency button.

9. PCR Corrector

The PCR corrector of the CW-4842 IP to ASI Converter can be switched on and off with the On and Off buttons. From 2006 on, the number of PCR correctors in this type has been increased from 24 to 64.

10. Transport Stream sending functions

Starting with the 1.45 software version, the CW-Net Controller modules are suitable for receiving and sending data streams beyond the $7 \times 204 + 32$ bytes CW-Net format also with the 7×188 bytes IP TV format, if they are equipped with the No.1 IP TV Option (software). When sending in IP TV format, the module removes the null packets, cuts the bytes above the 188 bytes, and implants the packets in the UDP/IP packets in synchronised way.

Sending transport stream can be requested with different addressing modes using the IP Address Format option buttons. The actual address data and the main features of the actual operation mode are displayed in the message box in the Communication Platform. The data entry boxes not used in the applied mode are dimmed. At starting to type the address data, the colour of the concerned data boxes changes to yellow. The typing has to be closed with Enter, but the data will be built in the UDP/IP packets after sending the Send TS ... command only.

After the Send TS to IP command the device sends ARP messages to the addressed device for deriving the MAC address, and starts sending TS after having received the answer only. After the Send TS through Gateway command the ARP messages are sent to the IP address of the Default GateWay. The GateWay is responsible to send answer to the ARP messages (telling the MAC address) and after that transmit the TS packets to the device with the preset IP address.

Using the Send TS ... command sending TS stops with switching the power off and on. Using the Always Send TS ... command the device stores the settings and after switching the power off and on it goes to the stored operation mode.

11. Transparent TS transmission over IP network

From version 1.51 of the Ethernet Controller module the devices are capable of sending the transport stream in UDP/IP packets of following formats:

Without IP TV option:

- 7×204+32 bytes CW-Net format full transparent transmission without synchronisation

With IP TV option:

- 7×204+32 bytes CW-Net format full transparent transmission without synchronisation
- 7×188 bytes IP TV format synchronised transmission without null packets
- 7×188 bytes transparent transmission in 188 byte synchronised format
- 7×204 bytes transparent transmission in 204 byte synchronised format

Note: The operation mode set in the GUI is only forwarded to the device on sending out the “Send TS” or “Always Send TS” command. Mode change during TS sending is ineffective. The blue colour of the inscription reminds that the mode setting command has not been sent out yet.

The IP to ASI conversion has been considerably extended in the 1.51 software version. Reception of the 7×204 bytes format is only possible from this version on. The 1.51 version permits the Null Packet Remover and the Null Packet Inserter to be switched on and off by programming.

Layout of the CW-4842 IP to ASI Converter

The layout of the CW-4842 has not been changed in the course of the modification. The device continuously generates null packets with the frequency of the NCO, and inserts in them the useful packets coming over the IP network. The null packets arriving over the IP network will be removed at all UDP/IP packets. The format of the output signal is identical with that of the input signal (188 or 204 bytes/packets). The PCR error caused by the rearrangement of the packets can be corrected with the 64-member PCR corrector. The block diagram of the CW-4842 is shown in Figure 1.

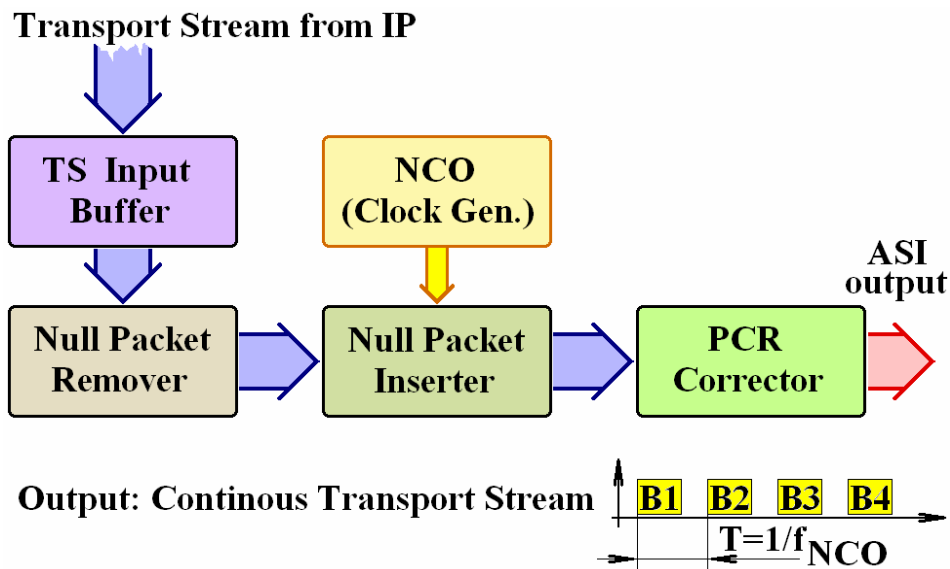


Figure 1
Procedure of the IP to ASI conversion in the CW-4842

Layout of the CW-4843 IP to ASI Converter

The CW-4843 has been designed for transparent transmission; here the Null Packet Remover and the Null Packet Inserter are switched off. The bytes arriving over the IP network will be transmitted to the ASI output without any modification, with the frequency of the NCO. It is the user's task to set the NCO frequency to a proper value at which the data stream can be outputted. By setting the NCO frequency the user can adjust the rate of the output ASI data stream to match the capability of the receiving device. Recommended NCO frequency is 10 MHz, if the receiving device is capable of receiving at this rate.

The CW-4843 is equipped with an ASI Interface module instead of PCR corrector. When selecting Data Burst mode the ASI Interface transmits the data to the ASI output with the pace determined by the NCO. In Packet Burst mode the ASI Interface writes the bytes arriving with the NCO frequency in a temporary storage and then the ASI module transmits the packets after reading out with its 27 MHz clock signal. As a result, at the ASI output the bytes of the packets continuously follow each other and the K28.5 characters will only be sent out between the packets. The NCO frequency is important also in this mode: it must be higher than the byte data rate. Generally, the system will work right with the NCO frequency set to 10 MHz. At overflow the "Overflow" LED lights. Skilled users can control the distance between the packets by adjusting the NCO frequency. The block diagram of the device is shown in Figure 2.

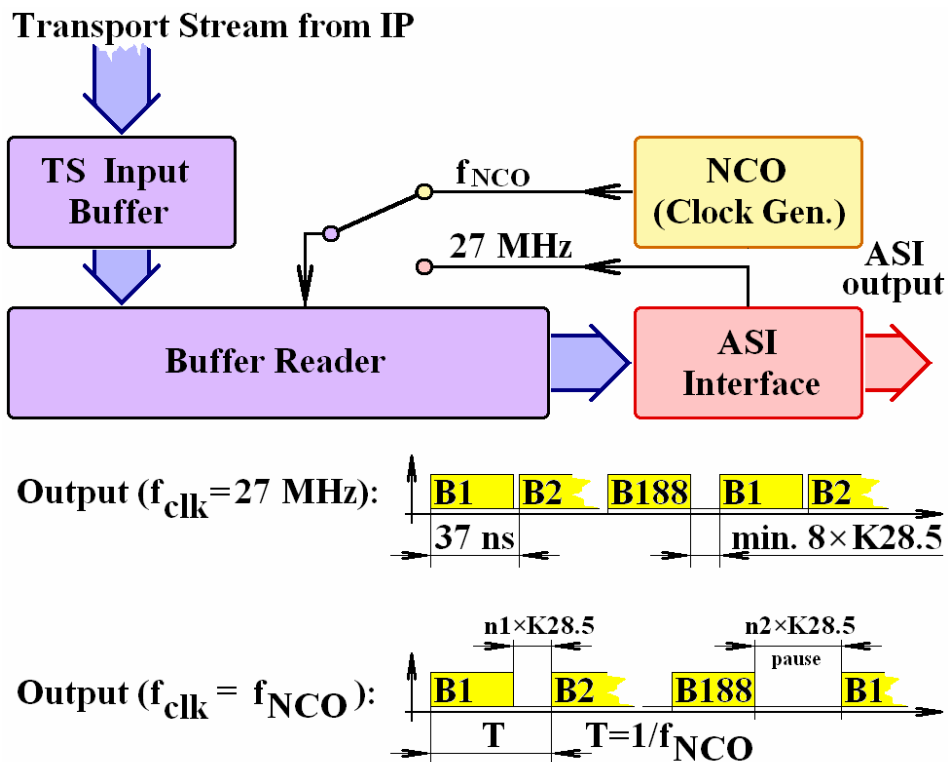


Figure 2

Procedure of the IP to ASI conversion in the CW-4843.
The available ASI signal formats comply with TM 1449 Rec.1.

12. Comments, further information

We are pleased to receive (at cableworld@cableworld.hu) comments and remarks pertaining to our products and software and we take the included suggestions and ideas into consideration at further developments. At the same address we are ready to provide further information about the application of the products.