SYSTEM OF THE REMOTE ACCESS VIA INTRANET/INTERNET TO THE DIGITAL SIGNAL PROCESSOR DSP56307 TO DEBUG PROGRAMS, LEARN THE PERIPHERALS AND REALIZE DIFFERENT EXPERIMENTS

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Abstract: *System of the Remote Access via Intranet/Internet to the digital signal processor DSP56307 allows to debug programs, learn the peripherals and realize different experiments of the using this processor. The worked out system represents the software/hardware complex which include three components: client, server and six working stations. Debugging module of the working station includes two DSP56307EVM which gives the opportunity to learn the peripherals of this processor really for the first time (interfaces HOST, ESSI, SCI and timer). Virtual instruments on the client side (generator, oscilograph, spectrum analyzer) give the opportunity to realize the experiments of using the DSP in the regime of the FFT, digital filtering, generation of the signals, etc. There are two regimes of the working of the system: a) N-clients – one working station; b) N-clients – six working stations.*

Keywords: *Remote Access, Virtual Instrumentation, Virtual Laboratories, DSP56307, client-server-workstation.*

System of the Remote Access through the Intranet/Internet to digital signal processor DSP56307 represents a hardware-software complex which allows debugging programs, to study peripherals of the DSP and to run various experiments with it. The diagram of system is represented on fig. 1.

The system consists of three components: the client, the server and six workstations. The debugging block is connected to each of workstations with the two cards of DSP56307EVM. Connecting next to each other two cards of DSP56307EVM for the first time has enabled to study real peripherals of the given processor (the Host-interface, the ESSI-interface, the SCI-interface and the timer; see fig. 2).

The system can work in two modes: 1) N clients - one workstation, 2) N clients - six workstations.

For a client in the remote mode there is an opportunity to work in two modes: 1) research of peripherals, 2) the local virtual device (research of various applications DSP with the help of local virtual devices).

In a mode of research of peripherals such built-in interfaces as Host, ESSI and SCI, and also the timer can be studied. Due to connecting of DSP56307EVM how it is shown on fig. 2, it is

possible most full studying of operating modes of the specified interfaces and the timer.

We shall consider work in a mode of research of peripherals on an example most functionally difficult ESSI-interface. The dialog box for this interface is shown on fig. 3.

At research ESSI-interface it is stipulated two basic modes of its work: reception and transfer. But in each of these basic modes can be chosen a lot of working regimes as follows from those radiobuttons which are resulted in a dialog box on fig. 3. The essence of these working regimes comes up from the opportunities of ESSI-interface which the user should study beforehand.

In a mode of reception the user writes the program of reception of one 24 digit word and result of reception puts in a cell X: $ 100. Similarly the user acts and in a mode of transfer when he writes the program of transfer of one word.

In an information window on fig.3 the circuit of connection between leading and driven card of DSP56307EVM in the block of the debugging, connected to a workstation is submitted. On a leading card in a mode of reception the standard program of transfer of one word is started, and on a driven card the user program of reception is started.
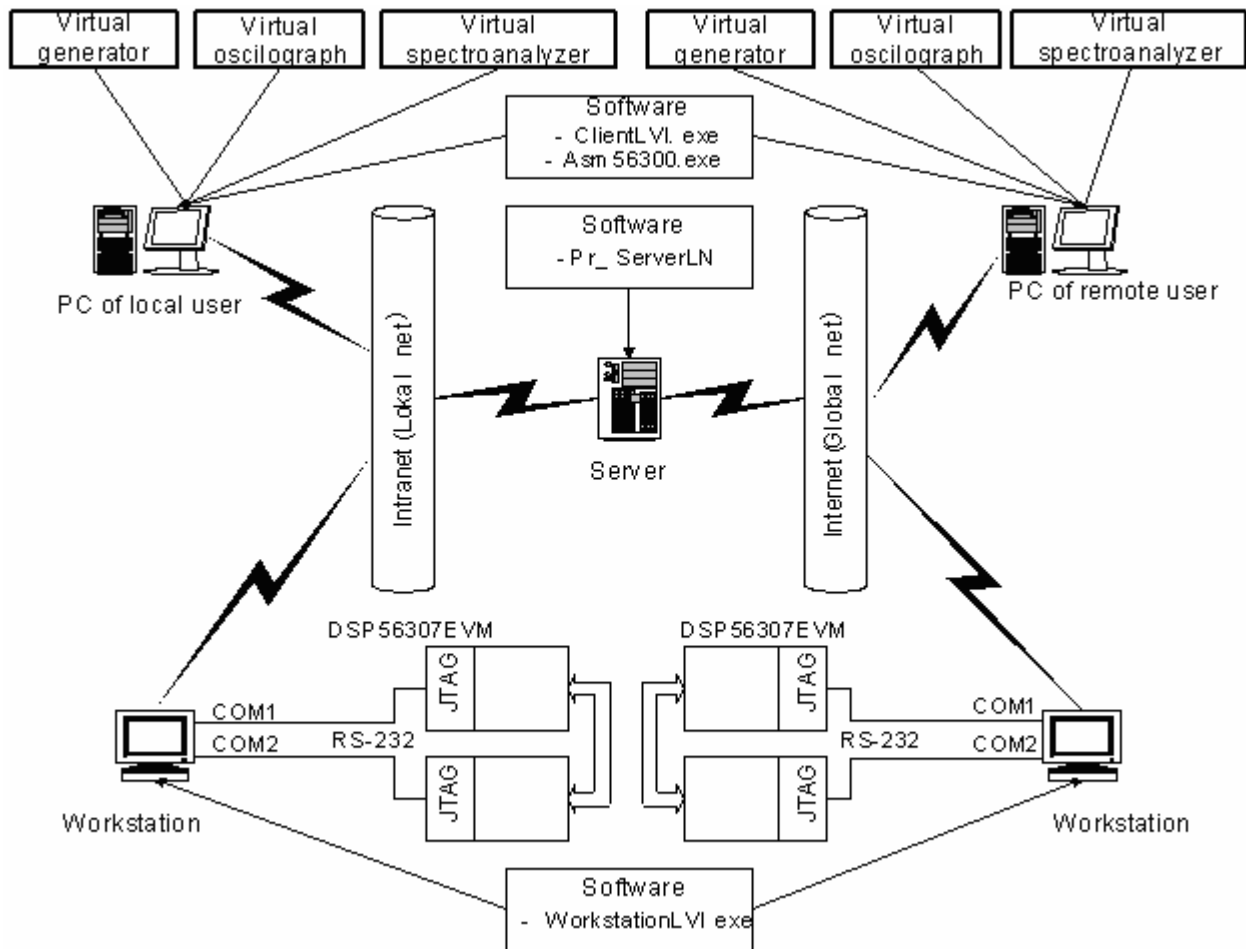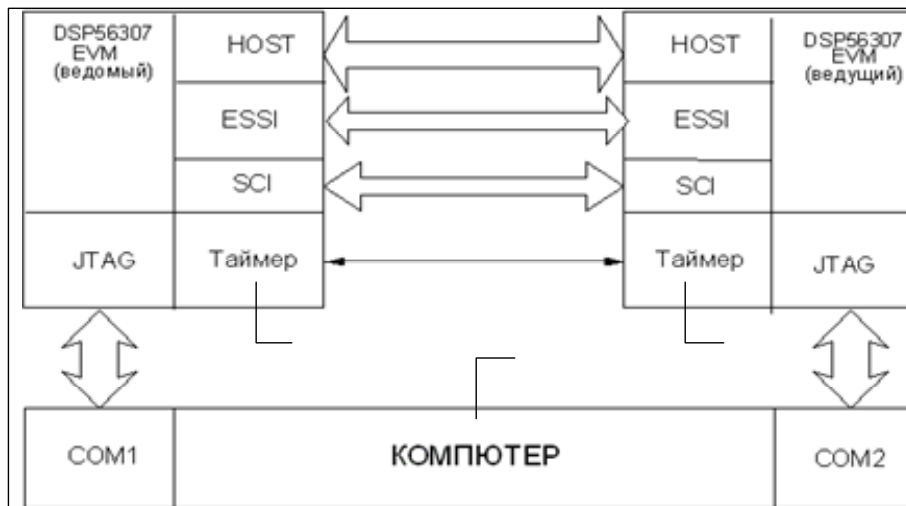
Fig. 1 - The diagram of system

1- Timer, 2 - Computer
Fig. 2 - The circuit of connection hardware DSP56307EVM and a workstation.

After information interchange to the user on the screen the information window with result which has been transferred to the user program (usually this word equally $123456) is displayed. Similarly and in a mode of transfer when on a leading card the standard program of reception of one word is started, and on a driven card - user programs of transfer of one word. The conclusion of result on transfer by the user of one word is shown in an information window similarly to a mode "reception", but this result will be already equal to value of that word which was passed by the user.

In a mode of the local virtual device to the client the dialog box shown on fig. 4 is displayed.
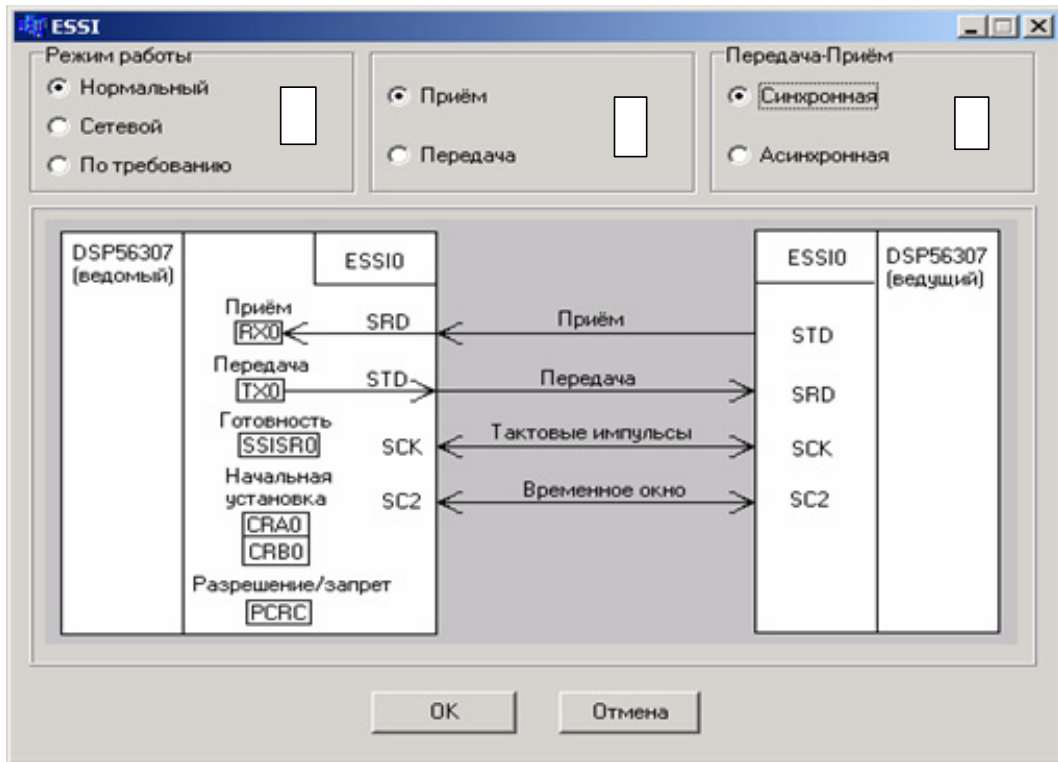
1 – Operating modes: normal, network, on demand; 2 – reception, transfer;
3- Reception-Transfer: synchronous, asynchronous.
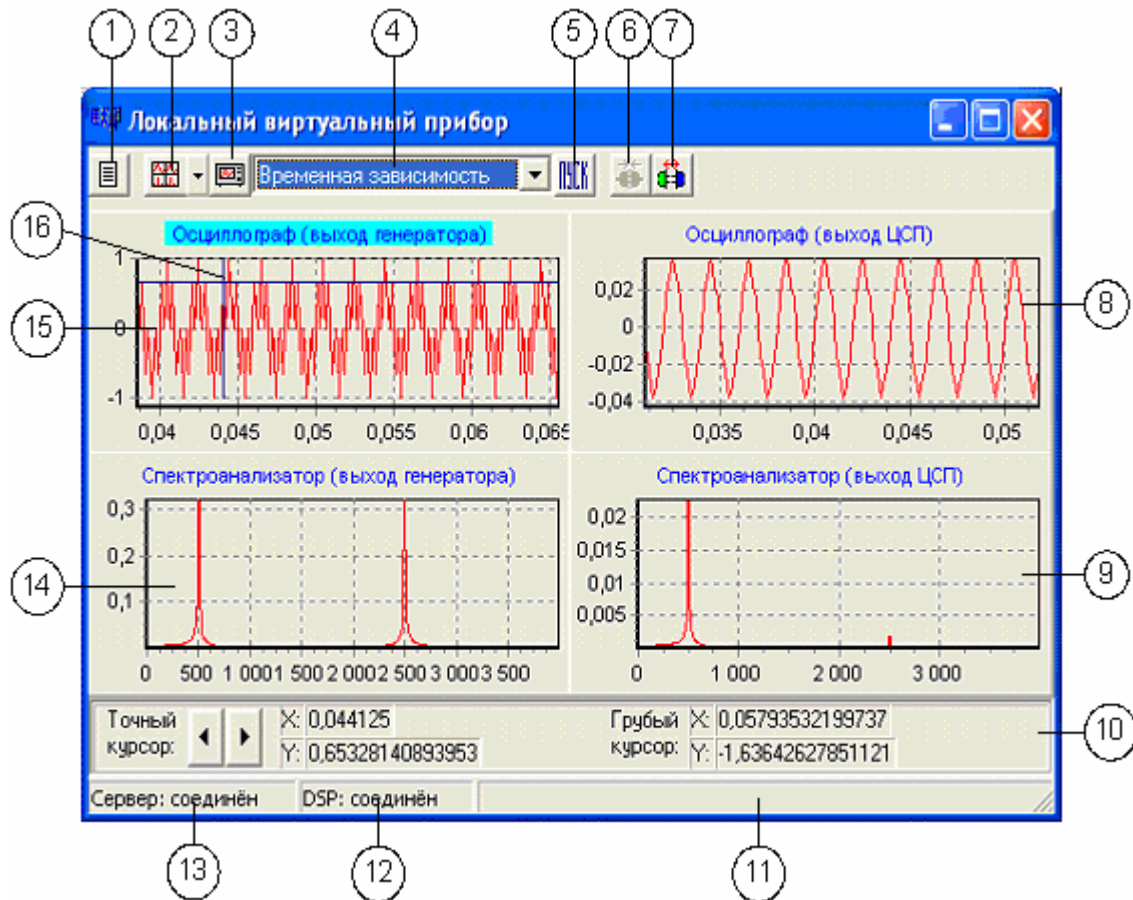**Fig. 3 - A dialog box for job with ESSI-interface.**

Fig. 4 - A dialog box in a mode the local virtual device.

This mode is intended for loading DSP by the program of the user and processing with its help of a signal generating of the virtual generator (regime « Time Dependence » or « Frequency Dependence ») or for the generation of a signal by the program of the user loaded in DSP (regime « Generation of a signal »). Transition in the mentioned above regimes gets out in the menu 4 with the subsequent pressing of the button 5 - "Start-up" (see fig. 3).

In the top part of a window there is a tool panel with buttons 1-7, in the bottom part of a window - a status bar, above a status bar the block of management where the cursor of virtual devices 10 is placed, another part of a window is occupied with virtual devices: 15, 14 - connected to an output of the virtual generator virtual oscilograph and spectroanalyzer accordingly; 8, 9 - showing signal processed of DSP virtual oscilograph and spectroanalyzer accordingly.

In fields 13 and 12 status bar displays a status of connection of the program with the server and a workstation accordingly. In field 11 actions of the program carried out at present are displayed.

The button of 1 toolbar starts the text editor. In it the user can look through, edit, open and save text files on a disk. Also it is possible to compile the program written for DSP.

The button of 2 toolbars allows choosing necessary virtual devices for display. The button 3 starts the virtual generator. The drop out menu 4 serves for definition the type of the data which are read from debugging hardware DSP (the signal generated by the user, time dependence or frequency dependence). The button 5 ("Start-up") begins a stage of data transfer on a workstation with the purpose of loading, start and polling DSP. Buttons of the 6-th and 7-th toolbars establish a connection with the server and end accordingly.

For example, if the user will want to start the program of Fast Fourier Transform he should generate a signal with virtual generator which moves on an input of the program. Then the user with the help of the button 4 should choose frequency dependence and press the button 5 "Start-up". In the further dialogue the user specifies memory DSP where results are loaded and then the received data are read and specifies the program which will be loaded in DSP.

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