

BoxServer



TCP/IP Debug Server

A Product of Domain Technologies, Inc.

BoxServer
User's Guide,
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CHAPTER 1 - Overview

BoxServer is a 32-bit application running under Windows 95 or Windows NT 4.0. It provides remote access to Digital Signal Processors (DSPs) through hardware emulators such as SoftBox or EVM. BoxServer works as a multithreaded TCP/IP server. The main purpose of BoxServer is to service remote clients - BoxView debugger sessions. Each BoxView can communicate with one device attached to the server and configured for BoxServer purposes.

Communication between clients (BoxViews) and server (BoxServer) is typically handled by TCP/IP protocol. That allows for full flexibility in using different physical connections and topologies (dial-up access, Internet, LAN, WAN). To get access to a particular DSP processor available under BoxServer, client needs to know the IP address of the server (or name in DNS), the port number (usually default), and DSP number within BoxServer.

BoxServer, while running, present to the user a status of connected clients and target DSPs under debugging. Information could be presented in a few different views (icons, detailed list, DSP names only, dialog box with details).

1.1 - Software modules

Following is the list of files required to run BoxServer:

- *BoxServ.exe* - main application,
- *BoxServ.ini* - configuration file containing information about hardware available on a particular system and other options defining behavior of the server,
- *Application extensions such as Gcl52fw.dll, sb56kd32.dll, etc.* - which are installed depending on the hardware configuration of the system and represent different emulator interfaces
- *TCP/IP stack (including WinSock32)* - part of Windows 95 / NT software installation

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CHAPTER 2 - Configuration

BoxServer, at the initialization, reads the configuration file *BoxServ.ini* which contains information about:

- last state of the user interface window: position, size, options
- server configuration such as default port number, debugging flags, etc.
- hardware resources available for the server; each emulator has to be identified by COM port number (COM1, COM2, ...), redefined name (SB56K, EVM56002, ...), and a list of targets with redefined names of processors; optionally, *userNames* could be assigned to emulators and targets; these *userNames* are displayed on the screen instead of generic names (i.e. instead of "DSP56300" user can see "DSP for Voice Reco #1")

Description of hardware resources looks like this:

```
[COMn]
EMULATOR=SB56K [userName]
TARGET1=DSP56300 [userName]

[COMn+1]
EMULATOR=SB56K [userName]
TARGET1=DSP56300 [userName]
TARGET2=GENERIC cmdlen bypasscmd bypasslen [userName]
TARGET3=DSP56300 [userName]
```

Here is an example of a valid *BoxServ.ini* file:

```
[COM1]
EMULATOR=SB56K
TARGET1=DSP56000

[COM2]
EMULATOR=SB56K
TARGET1=DSP56300 Master
TARGET2=DSP56300 Slave

[COM3]
EMULATOR=SB56K EMU-OnCE
TARGET1=DSP56000 DSP56002-Master
TARGET2=DSP56000 DSP56002-Slave
```

```
[ServerOptions]
TYPE=SOCKET
PORT=5417
DEBUG=OFF
BAUD=115200
ADDRESS=boxserver.softbox.com
```

```
[Window]
SizeX=513
SizeY=151
PositionX=229
PositionY=136
ViewType=1
```

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If the list of the target devices is empty (only emulator type is specified), BoxServer will auto-detect target devices during initialization. This option can be used to verify JTAG connectivity, and sequence of the target devices on the JTAG scan-chain. Auto-detect feature is supported from version 1.06.07.

The ADDRESS field of the [ServerOptions] is required to select correct IP address in case of the computers with multiple network interfaces. This field can be entered either as a numeric value (for example: 207.43.181.2) or alias name (as in example above). This feature is supported from version 1.06.11.

If the SB-56K emulator is used in the OnCE mode, only two target devices can be specified.

CHAPTER 3 - User Interface

Graphical user interface of the server presents to the user the current state of hardware resources and clients connected to the server. To be exact, the information is current up to the second's resolution (the main window is updated about once per second).

Position on the screen and size of the main server window is preserved when BoxServer is closed so the next time user will have the same setup on the screen.

3.1 - Views

Main window of the server contains four areas: menus, buttons, list of targets, and the status line. From the main menu, option *View* allows to disable / enable buttons and/or status line. The rest of the *View* submenu controls the mode of operation for the central part of the window - the same options are available as buttons (if buttons are enabled). There are three main modes of operations for the main part of the window: detailed list, short list, and icons.

3.2 - Detailed list

This is the default mode of view presenting on the screen the list of targets with details about type of the hardware involved and information about currently connected clients. List of targets is formatted as a table where rows represent targets and columns describe different attributes or states of these targets. Here is a short description of columns provided in the window:

Target	name of the target specified in the configuration file, or if not specified, a name derived from the type of DSP;
Emulator	name of the emulator specified in the configuration file, or if not specified, a name derived from the type of the emulator;
State	current known state of the target, could be: run, halt (breakpoint), init (first state after establishing communication);
User	empty if no connection, or address of the current client;
Start time	time and date when current client established connection to the target;

Last end time	time and date when the last client was disconnected from this target;
Count	number of clients who established connection since the server was started;
Notes	errors and other notes regarding the target and/or communication with clients.

The first column *Target* contains also two icons: a “street lights” icon and a target icon. The “lights” icon represents the state of the target DSP:

Yellow	means target just initialized; processor state is unknown at this moment;
Green	stands for “run” and means that processor executes code requested by debugger;
Red	means “halt”; processor is suspended on a breakpoint.

The green icon background indicates that the target entered the debug mode through the breakpoint or trace counter. The type of the breakpoint will be displayed in the State field as: Halt-Hw, Halt-Sw or Halt-Trc.

3.3 - Short list / column view

Short list mode of the operation is useful in case a large number of DSP connected to the server. It provides only the name of the target and the current state. The list of targets is rearranged automatically into multiple columns if the size of window is too small to show all targets in one column.

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3.4 - Icon view

Icon view of the targets presents each processor as an icon with a name and state icon (green, red, yellow light).

3.5 - Target dialog box

Selection of a target from a target list, for example by a mouse double-click, causes pop-up of a dialog box containing detailed snapshot information about the selected target. Information in the dialog box window is very similar to what is provided in the detailed list view (see above).

3.6 - Activating client application

BoxServer can send message to any of its clients, requesting bringing its windows to top. User can select any of the target devices by “right-clicking” on the target name within BoxServer target status area.

3.7 - Minimizing client applications

BoxServer can request all client application to minimize. Minimize and restore options are available in the “File” pull-down menu. If the “Minimize all” is selected, BoxServer will send request to all client debuggers to minimize. If the particular target device is “activated” (as described in paragraph 3.6), it's size will be first “restored”. All clients can be restored with the “Restore all” menu option.

This feature is supported by BoxView version 1.08.48 and newer, and BoxServer version 1.06.12.

3.8 - Changing device within client

BoxServer can request change of the active target device monitored by the BoxView application. Double click on the unused device will send a message to the BoxView with active monitor attribute. BoxView debugger can activate the “monitoring” function with the MONITOR command. By default first active instance of the BoxView debugger has this feature enabled. This device change does not reload symbol table, and it expects that the new device is the same type as the old one.

This feature is supported by BoxView version 1.08.45 and newer, and BoxServer version 1.06.10.

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CHAPTER 4 - Diagnostics

There are two facilities built into the server which allows to diagnose problems with configuration or communication to/from server. First one, logging, is always available and could be used by developers, support personnel, and end users. The second one, debug mode, is an option in the configuration file allowing much more detailed logging which could be interpreted only by individuals knowing internals of the server.

4.1 - Logging

Built into the BoxServer is logging facility. Standard logging always goes into redefined file *BoxServer.log*. This file is limited in size; whenever it reaches size of 1MB, *BoxServer.log* is renamed to *BoxServ.bak* and empty *BoxServ.log* is ready for new logging.

Logged into this file is information about:

- loading/terminating server
- loading emulators based on the configuration
- clients getting connected/disconnected from the server
- all errors (configuration, communication, etc.)

Here is a sample content of a log file:

```
01/05/97 12:24:41 EVM56002 emulator loaded
01/05/97 12:49:44 Server initialized
01/05/97 12:50:09 Accepted client 123.123.123.1
01/05/97 12:50:20 Error -1010: Receive error
01/05/97 12:50:20 Disconnected client 123.123.123.1
01/05/97 12:50:20 Server terminated
```

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4.2 - Debug Mode

In order to log all the messages between server and clients, there is a DEBUG mode of operation for the server. One of the options in file *BoxServ.ini* enables / disables this mode. Logging of all communication messages is very costly from the system performance perspective and should be used only for the purpose of debugging the system.

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Appendix A - Limitations

Maximum number of targets per emulator (JTAG mode):	255
Maximum number of targets per emulator (OnCE mode):	2
Maximum number of emulators per server:	16
Maximum size of a user name for target or emulator:	32 characters
Maximum size of a bypass string:	32 characters
Maximum size of a log file (<i>BoxServ.log</i> , <i>BoxServ.bak</i>):	1MB
Default port number for TCP/IP connection:	5417

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Appendix B - Troubleshooting

NOTE: In order to identify the cause of a problem, in most of the cases it is required to verify the content the log file *BoxServ.log*. See the chapter "Logging" for more details.

PROBLEM	POSSIBLE SOLUTION
Server terminates immediately after start?	Verify if there are any errors in <i>BoxServ.log</i> file. It is possible that configuration file <i>BoxServ.ini</i> expects different communication software than is installed on this system. If TCP/IP is configured, verify that WinSock32 DLL is available.
Server window does not show any or not all expected emulators or DSP targets?	Verify if there are any errors in <i>BoxServ.log</i> file; depending on the error condition the problem could be in the configuration file by itself or installation/configuration of the server; it is possible that the configuration file <i>BoxServ.ini</i> does not have the correct names of emulator or DSP.
Client can not get access to the server?	Verify first if there is proper communication on the network level between client and server. For TCP/IP connection run utility PING to see if link could be established. Check the server configuration file for type of the network and port number to see if it matches what client is expecting. If network seems to work OK verify errors reported in <i>BoxServ.log</i> ; possible reasons for the problem might be a mismatch in interface between client and server, or unreliable connection
Slow response from server?	Make sure that server is not configured in DEBUG mode which generates a lot of unnecessary log information in <i>BoxServ.log</i> ; other reason might be a poor quality of the communication link specially in connections over a modem

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Appendix C - Errors

ERROR ID	NAME	DESCRIPTION
-1001	GENERIC	Internal error; not specified otherwise
-1002	OWN_ADDR	Can not identify local IP address
-1003	LOAD_WINSOCK	WinSock Version 1.1 is not available
-1004	WRONG_IP_ADDR	Can not reach specified IP address; either the address does not exist or network communication does not work properly
-1005	WRONG_HOST_NAME	Can not reach specified host name; name specified is not known to the naming services used on this machine
-1006	INVALID_SOCKET	Can not create TCP/IP socket; it indicates a problem with TCP/IP installation or configuration
-1007	SOCKET_BIND	Can not bind a socket; it indicates a problem with TCP/IP installation, configuration, or too many processes are using TCP/IP
-1008	SOCKET_CONNECT	Can not connect a socket; it indicates a problem with TCP/IP installation, configuration, , or too many processes are using TCP/IP
-1009	SOCKET_SEND	Send error; TCP/IP operation SEND reports errors during transmission
-1010	SOCKET_RECV	Receive error; TCP/IP operation RECV reports an error
-1011	SOCKET_LISTEN	Socket listen error
-1012	SOCKET_ACCEPT	Socket accept error
-1013	WRONG_VERSION	Mismatch between client and server versions; make sure that both sides are using compatible message set; upgrade one or both sides
-1015	LOAD_DLL	Can not load DLL; Emulator specified in the configuration file does not have a corresponding DLL file; check if the specified DLL is in the current subdirectory and it is the right version; verify configuration in <i>BoxServ.ini</i>
-1016	DATA_SIZE	Internal data size error

Commands

-1017	WRONG_MSG	Lost communication packet; verify that both sides (client and server) are running compatible versions
-1018	SYSTEM	Operating system error
-1020	CONNECT_PIPE	Connect Named Pipe error; check your Windows configuration
-1021	CREATE_PIPE	Create Named Pipe error; check if Named Pipe service is installed and configured correctly on the system (note: Windows 95 does not support Named Pipe server)
-1022	PIPE_NOT_AVAILABLE	Named Pipe connection error
-1023	READ_PIPE	Named Pipe read error
-1024	WRITE_PIPE	Pipe write error
-1025	CONNECTION	Other connection related error

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