ICL-4300 Modular PC Compatible Controller

MV4300 User's Manual

(Modem/Voice Utility for the ICL-4300)

Revision A
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compatible with MV4300 v2.02

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Chapter 1 – Overview

ICL-4300

The ICL-4300 is a modular PC compatible controller that supports various optional hardware configurations. The ICL-4300 hardware options are described in more detail in the ICL-4300 Hardware Reference Guide.

Hardware Features

- Intel 386EX Processor
- 33MHz Internal Clock
- 16-bit Data Bus
- 512K to 1024K SRAM (512K battery backed)
- 2M, 4M or 8M Flash Memory (used for operating system and file system)
- Real Time Clock
- Up to 7 Serial Communication Ports (including RS-232, RS-485 and internal dialup modem)
- Voice module with flexible menu system for alarm annunciation and remote access.
- Modular card-based I/O system supports up to 16 analog or digital I/O points per card (maximum of 4 cards, supporting up to 64 on-board I/O points)
- Expandable I/O via remote I/O modules (up to 32 modules)
- Ethernet (ICL-4300E)

Operating System Features

- BIOS Support
- ROM-DOS 6.22
- Flash File System (non-volatile storage)
- Multitasking kernel (ICL XINU) available

The ICL-4300 comes with the BIOS/ROM-DOS/Flash File System software pre-installed.

ICL-4300 Utilities

A set of useful utilities is available in the ICL-4300 Utilities package. This package also contains ROM-DOS documentation on diskette. The standard utilities are documented in the ICL-4300 Utilities Reference Manual.

ESP

A handy tool called ESP (Easy Setup without Programming) is available for free download for the ICL-4300. It allows you to set up the ICL-4300 for many command applications with minimal effort. ESP has the following features:

- A configuration file (INI file) determines its operation.
- Multiple communications protocols supported (Modbus, BrickNet, TAP, etc.).
- Configurable Textual User Interface (TUI) for viewing and editing register values.
- Voice User Interface (VUI) for remote system access.
- Local and remote alarm annunciation, using I/O, numeric/alphanumeric pagers, voice and the HotLink operator interface terminal.
- No run-time royalties or license fees.
- ESP configuration files can also be used in programs developed with the C or ISaGRAF Software Development Kits[1].

Without any programming, ESP can be used to implement:

- An expansion or remote I/O module.
- An RTU (Remote Telemetry Unit) that includes simple control logic.
- A text-based user interface display, when connected to HotLink operator interface terminal or a monochrome/color terminal or terminal emulator.
- An alarm system with annunciation via local output, voice or numeric/alphanumeric pager.

Software Development Kits

If you need to implement complex control logic, or other features that are not built into ESP, you'll need to use a software development kit. The ICL-4300 is available with the following types of software development kits (SDKs):

ICL-4300 C/C++ Standard SDK

Allows development of single tasking ICL-4300 applications using Borland C or C++.

ICL-4300 C/C++ Multitasking SDK

Provides additional components for development of multitasking ICL-4300 applications using Borland C or C++.

[1] The syntax of an ESP configuration file is somewhat different when used with ISaGRAF -- see the ICL-4300 ISaGRAF Target Kit Reference Manual.

ICL-4300 ISaGRAF SDK

The ICL-4300 also supports the ISaGRAF IEC-1131 SDK, which allows the development of ICL-4300 applications using IEC-1131 languages. The languages supported by the ISaGRAF environment are:

- Sequential Function Chart
- Function Block Diagram
- Flow Chart Diagram
- Ladder Diagram
- Structured Text
- Instruction List

MV4300

The MV4300 utility comes as part of the ICL-4300 Voice Accesory Kits (model numbers 43-VAS and 43-VA-KIT). MV4300 allows you to make voice recordings for use with the optional voice recording/playback capability of the ICL-4300.

Voice Hardware Options

There are several different voice hardware options available for the ICL-4300:

Model Number	Modem	Recording Method	Purpose
43-VA8-2400	2400 baud (internal)	over telephone	Alarm annunciation and remote access/control over telephone, plus low speed data connection support.
43-VA8-14400	14400 baud (internal)	over telephone	Alarm annunciation and remote access/control over telephone, plus medium speed data connection support.
43-VA8-33600	33600 baud (internal)	over telephone	Alarm annunciation and remote access/control over telephone, plus high speed data connection support.
43-VA8-MIC	none	directly connected microphone	Alarm annunciation through PA (Public Address) system and audio radio systems.

Chapter 2 – Installing and Running MV4300

Installing MV4300

To install ESP, run the `INSTALL.EXE` program from the installation disk. The executable program file (`MV4300.EXE`) is normally installed in the following directory on your development PC:

```
c:\icl4300\mv4300
```

For a list of changes since the last release, see the readme.txt file that is installed in the same directory:

Transferring MV4300 to the ICL-4300

In order to run MV4300 on your ICL-4300, you need to transfer the program to the ICL-4300. This may be accomplished using the standard RSZ utility, as described below. The RSZ utility comes pre-installed on the ICL-4300.

Using a terminal emulation program (such as HyperTerminal) connected to the console port on the ICL-4300 (normally COM1), type the following command at the DOS prompt, followed by the Enter key: [2]

```
R
```

Then start a Z-modem protocol transfer (sometimes called an "upload") using your terminal emulator, sending the file `ESP.EXE`.

For additional details, see the ICL-4300 Utilities Reference Manual.

Running MV4300

To start running the MV4300 program on the ICL-4300, use the command syntax shown below:

```
MV4300 [file] [-n]
```

The optional *file* parameter specifies the ESP or ISaGRAF configuration file that contains the definition of the voice messages for your application. If no filename is specified, the program tries to read the default file, `ICL4300.INI`. If no file extension is given, `.INI` is assumed.

The optional command line switch "`-n`" tells MV4300 not to load the predefined VUI message IDs (more on this later). You might want to use this switch if you are using voice recording and playback, but are not using the VUI.

[2] This actually runs a DOS batch file (R.BAT) which contains the command "RSZ /R".

Chapter 3 – Using MV4300

This chapter shows you how to use MV4300, walking you through some of the basic features using a tutorial approach. For more details on creating applications that use voice, see the appropriate manual for your software development environment (ESP, C or ISaGRAF).

Defining Voice Messages

You can use the voice recording/playback capability of the ICL-4300 in a variety of ways – for alarm annunciation, remote system monitoring and remote control/maintenance.

In your ESP or ISaGRAF configuration file, you define voice messages for these purposes. Each voice message has a defined length and an associated numeric ID that is used to refer to the voice message elsewhere within the configuration file.

When you first create an ESP, C or ISaGRAF application, you typically make the initial voice recordings "locally" with the MV4300 utility program using a telephone or a microphone. After the system is installed, you can then maintain (re-record) your messages remotely using a telephone (if your configuration file allows that).

Predefined Messages

To provide basic menu prompting and representation of numeric values, the system uses a set of predefined messages. The IDs for these messages range from 0-50. Messages 51-99 are reserved for future use. User-defined messages may be assigned message IDs starting at 100.

The list of predefined messages is shown in the table below:

ID	Recording
0	"zero"
1	"one"
2	"two"
3	"three"
4	"four"
5	"five"
6	"six"
7	"seven"
8	"eight"
9	"nine"
10	"ten"
11	"eleven"
12	"twelve"
13	"thirteen"
14	"fourteen"
15	"fifteen"
16	"teen"

ID	Recording
17	"twenty"
18	"thirty"
19	"forty"
20	"fifty"
21	"sixty"
22	"seventy"
23	"eighty"
24	"ninety"
25	"hundred"
26	"thousand"
27	"million"
28	"billion"
29	"point"
30	"minus"
31	"error"
32	"acknowledged"
33	"alarms"

ID	Recording
34	"A.M."
35	"clock"
36	"date"
37	"decimal"
38	"enter"
39	"goodbye"
40	"ID"
41	"is"
42	"no"
43	"oh"
44	"P.M."
45	"press"
46	"the"
47	"time"
48	"to play"
49	"to record"
50	"value"

If you are going to use any of the VUI (Voice User Interface) menus or functions, you must record these predefined messages. The VUI is a feature that is available in ESP, C or ISaGRAF applications, and allows you to remotely access and interact with the ICL-4300 over a telephone connection, similar to a voice mail system interface.

User Defined Messages

You may define your own voice messages in the configuration file using `[VoiceMsg]` records, as shown below in this excerpt from the sample file `VUISIMP.INI`:

```
[VoiceMsg]
msg=100     0.8   "degrees"
msg=101     1.2   "temperature"

msg=102     3.0   "to hear the current"
msg=103     2.0   "to hangup"

msg=104     5.0   "you have reached the ICL-4300 remote access system"
msg=105     2.0   "main menu"
```

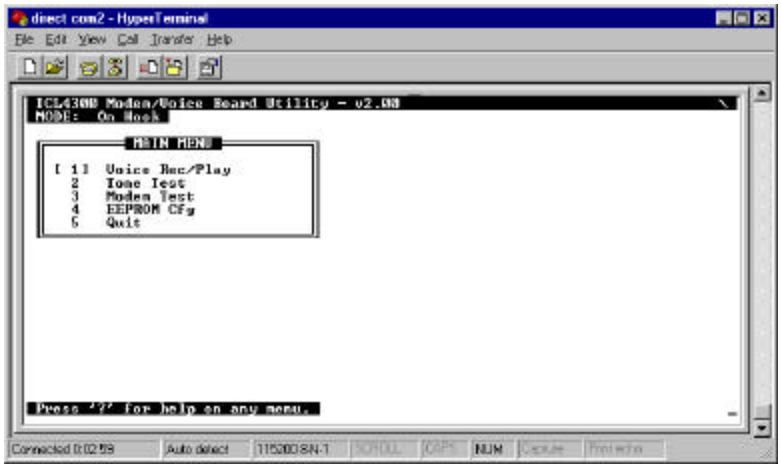
Six voice messages are defined. Each has a message ID (the first one shown is 100), followed by the number of seconds of recording time that is allocated to the message, and finally a tag that is associated with the message. The tag is used in the MV4300 program to make it easier to record the messages. Recordings can be shorter than the time allocated; the allocated time defines the maximum recording length. The length can range from 0.4 seconds up to the full length of the voice chip (480 seconds). The message length granularity is 0.4 seconds and is rounded upward (0.5 seconds will be rounded to 0.8, 3.1 will be rounded to 3.2, etc.).

It is important to note that if you reorganize your voice messages (change message IDs, or the times associated with messages) the recordings may be "scrambled" and you will have to re-record your messages. The exceptions to this are that you may add new messages after those that have already been defined, and you may increase the message length of the last message on the list.[3]

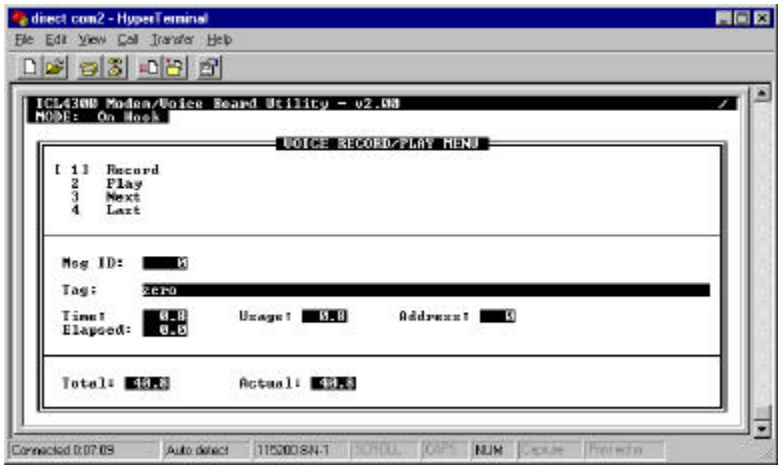
[3] The recordings are stored in the voice chip in the order in which they are defined in your configuration file. The message ID numbers that you assign are arbitrary and do not affect the order in which the recordings are stored in the chip.

Making Recordings

The MV4300 main menu is shown below:



To record and play voice messages that are stored in the ICL-4300, select the first option on the main menu. You will see the following screen appear:



In order to play and record, you must either dial in to the ICL-4300 with a telephone and connect to it, or you must use an external microphone and speaker[4]. The status of the dialup connection is shown on the title bar of the display (either "on hook" or "off hook").

For help on what keys perform what functions, press the "?" key. You may select a message to play/record by using the Next/Last commands or by pressing the "E" key and typing in the message ID number. Once you have selected the desired message, you may play the current recording by pressing "P" or make a new recording by pressing "R". To terminate a recording, either let it time out, or press the "R" key again before the time elapses.You may also

[4] The ICL-4300 voice option is available in two basic options – one that supports a dial-up telephone connection, and one that supports a direct microphone/speaker connection (for use with a public address system, for instance).

select menu options with the Up/Down arrow keys and the Enter key. To exit this screen and return to the main menu, press the Esc key.

Here is an explanation of the different fields that are shown on the screen:

`Time`:	the maximum time for the message as specified in the configuration file
`Elapsed`:	the elapsed time during record or play
`Usage`:	the maximum time actually allocated for this message, taking into account message granularity
`Address`:	the voice chip hardware address of the beginning of the message
`Total`:	the total time for all messages specified in the configuration file
`Actual`:	the total actual time allocated, taking into account message granularity

When the ICL-4300 is actively recording or playing a message, an asterisk "`*`" will appear next to the `Record` or `Play` menu options.

The "`Tone Test`" option on the main menu is used to test the ability of the ICL-4300 to detect and generate DTMF tones[5]. To use this function, you must be connected to the ICL-4300 with a telephone – use a telephone to dial the phone number that the ICL-4300 is connected to. Pressing keys on the DOS console keyboard will generate corresponding tones, which you should hear through the telephone handset. When you press keys on the telephone, the corresponding numbers should light up on the MV4300 display.

The "`Modem Test`" option on the main menu sets up a connection between the console port and the internal modem in the ICL-4300. This allows you to type commands that are sent to the modem, and see responses that are displayed on the screen. For instance, if you type the command "`AT`" and press Enter, the modem should respond with "`OK`". When you choose the modem test option you must first choose a baud rate before you are connected to the modem. Be aware that the maximum usable baud rate may depend upon the model of the modem that is installed in ICL-4300. When you are done using the modem test function, press the Esc key to return to the main menu.

The ICL-4300 modem/voice board option has an on-board EEPROM memory that stores serial number and other manufacturing information. To access this information, choose the "`EEPROM Cfg`" option from the main menu. To return to the main menu, press the Esc key.

[5] DTMF (Dual Tone Multi-Frequency) tones are used by a standard "touch tone" telephone for dialing.