

# **ATS**

## **Advanced Terminal Software**

Version 1.9

## **Reference Guide**

**for Controller-A**

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intelitek▶▶



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# 1

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## Introducing ATS

**ATS**—Advanced Terminal Software, version 1.9 and later—is supplied on diskette with the **Controller-A**, and provides access to the controller's internal **ACL** programming language from any PC computer operating under DOS.

**ATS** is a full ASCII terminal emulator operating on RS232 communication channels at 9600 baud, 8 data bits, 1 stop bit, no parity, and XON/XOFF protocol.

**ATS** provides the following features:

- Controller configuration for **ACL** and **SCORBASE** software.
- Definition of connected peripheral axes for automatic loading of parameter settings.
- Predefined and user-definable short-cut keys to simplify programming and controller processes.
- A backup manager for saving and reloading programs, positions, variables and parameters.
- A print manager for printing programs and positions.

**Note:** **ATS** may not function properly under the Windows environment, depending on your computer setup. If you experience difficulties, exit Windows and activate the software directly from DOS.



# 2

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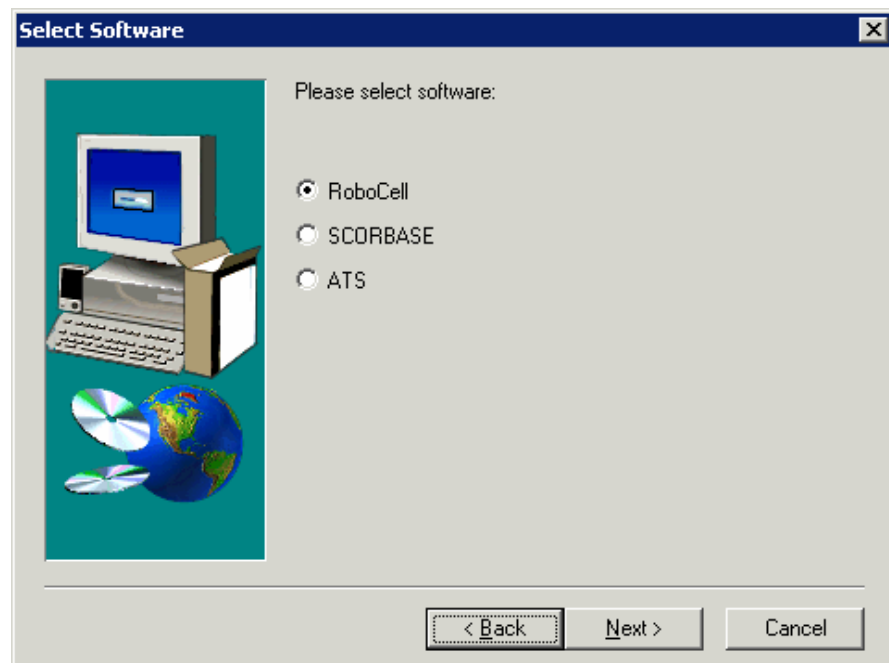
## Activating ATS

---

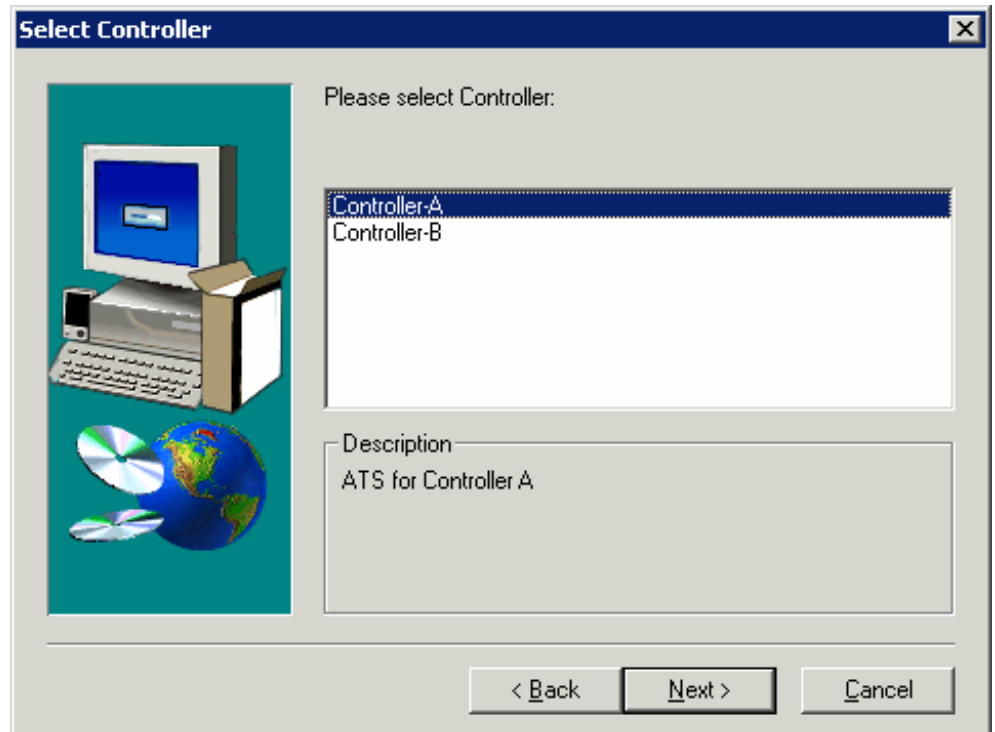
### Installation


To install the ATS;

1. Be sure you have made all the required hardware connections, as described in the *User's Manual* provided with your robot/controller. Turn on the controller power switch. The green POWER indicator LED lights up.
2. Insert the robotic software CD into the CD-ROM. The installation should begin automatically. If it does not, run **setup.exe** from the CD-ROM \Install folder.
3. The Welcome window is displayed. Click **Next**. The Software License Agreement window is displayed.
4. Click **Yes** to accept the license agreement. The Select Software window is displayed.



5. Select the **ATS** option and then click **Next**. The Select Controller window is displayed.




6. Select the required controller, as follows:
  - **Controller-A**
  - **Controller-B**
7. Click **Next** to begin the installation process. During the installation, messages and a percentage bar will be displayed on the screen to reflect the status of the installation procedure. When the installation is complete. The **ATS A**  icon is displayed on your windows desktop.

---

## Activation

Your **ATS** may not function properly under the Windows environment, depending on your computer setup. If you experience difficulties, exit Windows and activate **ATS** directly from DOS (5.0 and later), as described in *Activating ATS from DOS* on the following page.

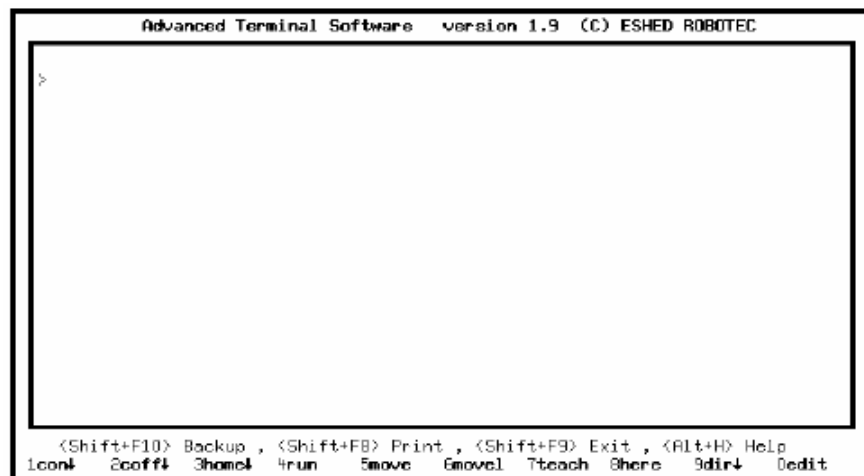
### Activating ATS from windows:

- Double click the **ATS A**  icon on your windows desktop. The **ATS A** Main Window is displayed.

### Activating ATS from DOS:

1. Make the **ATS** directory or disk drive the default.
2. At the DOS prompt, activate **ATS**:
  - **COM1**: If the controller is connected to computer port COM1 (default), type:
    - **ATS** [Enter]
  - **COM2**: If the controller is connected to computer port COM2, type:
    - **ATS /c2** [Enter]

To use additional switches at the command line, refer to the chapter, *Command Line Activation*, later in this manual.
3. Once the software has loaded, the **ATS** main screen will appear on your screen:



4. Press [Enter] to receive the > prompt, if it is not already displayed. You can now communicate directly with the controller.



# 3

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## Operating Keys

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### Short-Cut Commands

Note the **ACL** commands listed at the bottom line of the main **ATS** screen.

```
<Shift+F10> Backup , <Shift+F8> Print , <Shift+F9> Exit , <Alt+H> Help  
1conf  2coffl 3homet 4run   5move  6move1 7teach 8here  9dir↓ 0edit
```

Pressing the function key which appears next to each command issues the command. For example, F5 writes the command MOVE.

Four sets of ten function keys permit the use of forty short-cut **ACL** commands. Three sets are system-defined sets, and one is user-defined.

A display of the sets of commands can be called from the **ATS** main screen by pressing the hot-key combination:

[Alt] + H

```
Advanced Terminal Software  version 1.9  (C) ESHED ROBOTEC
```

KEY	SET-1	SET-2	SET-3
F1	conf	set	list
F2	coffl	print	remove
F3	homet	run	listp
F4	run	move1	delp
F5	move	move1d	listpw
F6	move1	movecd	init controll
F7	teach	label	listvar
F8	here	goto	delvar
F9	dir↓	del	show par
F10	edit	exit	lct par

<Ctrl+F1> for Controller Configuration  
<Ctrl+F2> for SCORBASE Controller Configuration  
<Ctrl+F3> for PERIPHERAL Setup  
<Alt+1/2/3/4> to use SET-1/2/3/4  
<↑ ↓ →> to recall previously typed commands

```
>
```

```
<Shift+F10> Backup , <Shift+F8> Print , <Shift+F9> Exit , <Alt+H> Help  
1conf  2coffl 3homet 4run   5move  6move1 7teach 8here  9dir↓ 0edit
```

The display of command sets will scroll up and off the screen as you continue entering commands at the > prompt.

Only one set of function keys is active at a time. Set 1 is active by default. To activate a different set, simultaneously press [Alt] and the number of the set desired. For example, press [Alt]+3 to use the short-cut commands in Set 3. (Do not use the numeric keypad for this purpose.)

When Set 3 is active, for example: F1 issues the command LIST and F2 issues the command REMOVE.

The ↓ (down arrow) after a command indicates that [Enter] (a carriage return) automatically follows the command. For most short-cut commands, however, you must also press [Enter] in order to activate the commands.

---

## User-Defined Short-Cut Keys

When **ATS** is loaded, it searches in the current directory for a file called **TERM.MAC**. The first 10 lines of that file define function keys F1 through F10 for Set 4.

Use a text editor to create the **TERM.MAC** file. Since the function key can activate a string of up to 20 characters, the command lines you define should not exceed 20 characters.

To include an [Enter] at the end of the command line, enter ASCII character 25; in some text editors, pressing [Ctrl]+Y will produce the ↓ character. If your editor is unable to produce the ↓ character, type either ^Y or ^y at the end of the command line. When **ATS** is loaded, ^Y or ^y will be translated to the ↓ character and interpreted as [Enter].

In the example shown here, the six **ACL** commands for RS232 communication were written to the TERM.MAC file, and thereby assigned to Set 4.

```

Advanced Terminal Software  version 1.9 (C) ESHED ROBOTEC

```

KEY	SET-1	SET-2	SET-3	SET-4
F1	conf	set	list	sencom
F2	coffl	print	remove	getcom
F3	homel	run	listp	prcom
F4	run	moved	delp	princom
F5	move	moveld	listpv	readcom
F6	movel	movecd	init controll	clrcom
F7	teach	label	listvar	
F8	here	goto	delvar	
F9	dir↓	del	show par	
F10	cdit	exit	let par	

```

<Ctrl+F1>   for Controller Configuration
<Ctrl+F2>   for SCORBASE Controller Configuration
<Ctrl+F3>   for PERIPHERAL Setup
<Alt+1/2/3/4> to use SET-1/2/3/4
<↑ ↓ →>    to recall previously typed commands
>

```

```

<Shift+F10> Backup , <Shift+F8> Print , <Shift+F9> Exit , <Alt+H> Help
lconf  2coffl  3homel  4run  5move  6movel  7teach  8here  9dir↓  0cdit

```

---

## Editor Keys

The following keys are recognized by the **ATS** software.

- ← (or backspace) Removes characters.
- → Restores characters.
- [Ins] Inserts characters. Toggles for overwrite.
- [Del] Erases characters.
- [Esc] Erases the currently typed command.
- [Ctrl] + → Restores the currently erased command.
- ↓ Repeats the last command(s) entered.

**ATS** can recall the last ten commands issued. Press ↑ (up arrow) and ↓ (down arrow) to scroll the display of previously typed commands.

Additional editing functions are activated by **ACL** commands. Refer to the chapters describing the **ACL** commands in the *ACL Reference Guide*.

---

## Special Key Combinations

Additional key combinations provide the following special functions:

[Ctrl] + [Shift] + C

Restarts **ATS** and displays a cleared **ATS** main screen.

[Ctrl] + C

Stops the controller from sending data to the screen, such as after a **LIST** or **SHOW ENCO** command. Also halts printing.

During a controller backup or restore operation, pressing [Ctrl]+C will halt the procedure.

[Alt] + M

Toggles activation of keyboard manual mode. (Sends **ACL** command character ~ to the controller.)

# 4

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## Controller Configuration

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### ACL Controller Configuration

ATS provides a short- form controller configuration which loads default parameter settings.

However, you will need to use the **ACL** command **CONFIG** when your specific installation or application requires parameter settings other than the defaults loaded by this procedure. Note that the command **CONFIG** will override all existing settings.

*Note: If you wish to configure the controller after it has been in operation, be sure to backup all data before initiating this configuration procedure.*

The configuration procedure is initiated from the **ATS** main screen by pressing the hot-key combination:

**[Ctrl] + [F1]**

You are prompted:

Controller Configuration

ARE YOU SURE (Y/N)? N

Press **Y** to proceed with the configuration, or

Press **N** or [Enter] to cancel the configuration.

You are prompted by a short series of Controller Configuration options.

```
Advanced Terminal Software version 1.9 (C) ESHED ROBOTEC

Controller Configuration
Robot type : ER V / ER V plus / ER VII / OTHER
How many axes are installed (B)? 6
Is expanded memory installed (Y/N)? Y
Does the controller have an auxiliary RS232 board (Y/N)? N
Working directory is: c:\ats
Is this correct (Y/N)? Y

WARNING ! USER RAM WILL BE ERASED !!
ARE YOU SURE(Y/N)? N

<Shift+F10> Backup , <Shift+F8> Print , <Shift+F9> Exit , <Alt+H> Help
1cont 2coeff 3hone 4trun 5noov 6noovel 7teach 8here 9dir 0edit
```

*Note: Make sure you select the proper options for your installation.*

*Incorrect selections may result in damage to your equipment.*

**Robot type: ER V/ ER Vplus /ER VII / OTHER**

This defines the robot which is connected to the controller.

- Use the left and right arrow keys to highlight the name of the robot which is connected to the controller. Then press [Enter] to accept.

If you have selected one of the robot types (not OTHER), the controller reserves axis 6 (the first available axis after the robot axes) for an electric servo gripper.

**How many axes are installed (8)? ..**

This defines the number of axes which can be driven by the controller.

- Press [Enter] to accept the default (8)

OR

- Type any other valid number and press [Enter].

If you have defined the robot type as OTHER, you will also be prompted to define group A:

**How many axes in Group A (6)? ..**

- Press [Enter] to accept the default (6)

OR

- Type any other valid number and press [Enter].

**Is expanded memory installed (Y/N) Y**

- Press Y or [Enter] if controller has 128KB RAM (default)

OR

- Press N if controller has 32KB RAM .

**Does the controller have an auxiliary RS232 board? (Y/N) ?N**

- Type Y if the auxiliary multiport RS232 board is installed in your controller

OR

- Press N or [Enter] if the board is not installed.

**Working directory is: c:\ATS**

**Is this correct (Y/N)?Y**

The first time this prompt appears, it shows the DOS directory from which the **ATS** software was activated.

The Working directory must be the directory which contains the parameter files and the **SCORBASE** program file (.CBU files).

If you change the directory definition, it is written to a file named **SETUP.DIR**. Thereafter, whenever **ATS** is loaded, the Working directory is set according to the definition in the **SETUP.DIR** file. Similarly, the **SETUP.DIR** file determines the definition of the Backup directory shown in the Backup Manager screen.

SETUP.DIR is updated when either the Working directory or Backup directory definition is changed.

- Press N if you want to change the directory. The cursor moves to the directory line, prompting you to type and [Enter] a different directory.
- Press Y if the directory is correct.
- Press [Esc] if you are not sure whether the displayed directory is correct. This will cancel the configuration procedure. Press F10 to access the **ATS** Backup Manager menu to verify the proper directory definition. Or exit to DOS to verify the location of the .CBU files.

**WARNING ! USER RAM WILL BE ERASED !!**  
**ARE YOU SURE (Y/N) ? N**

- Press Y to proceed with the configuration.
- Press N or [Enter] to cancel the configuration.

After you confirm, **ATS** compares your selections with the controller's current configuration. You are warned of any differences, and again prompted to confirm the configuration.

After you again confirm, **ATS** performs the configuration and loads the proper parameter files in accordance with your selections.

As soon as the configuration is completed, the Peripheral Setup screen appears; this screen is used for defining the devices which are connected to the controller and for loading the parameters for these devices. (The Peripheral Setup is fully described later in this chapter.)

For definitions not included in the short-form controller configuration procedure—such as axes in control group C, a robot of another make, and memory allocation—you will need to use the **ACL** command CONFIG. (Refer to the *ACL Reference Guide*.)

## Overriding the Configuration Default Settings

### **CONFIG.ACL File**

When the **ATS** short form is used to configure **Controller-A**, it searches the current directory for a user file named **CONFIG.ACL**. If this file does not exist (or, if it exists, but defines a robot type other than the one you have selected to configure), the controller is configured with factory-set defaults according to the selections you made during the configuration procedure.

The **CONFIG.ACL** file allows you to redefine the default configuration of the controller in order to meet controller memory limitation, to change defaults, or to define a configuration for a customized application.

This file is not included in the **ATS** distribution diskette. You can create the 16-line file **CONFIG.ACL** using any ASCII text editor. Each line of the program must contain a number which defines a specific configuration, in the order shown below. Any comments must be preceded by a space, and must not exceed the end of the line.

An optional 17th line may be added, which gives the name of the file which contains parameters for a specific robot, as shown in the following example; **par5plus** refers to parameter file **PAR5PLUS.CBU** for the **SCORBOT-ER Vplus** robot.

If the 17th line exists in the **CONFIG.ACL** file, **ATS** will load the specified parameter file during short-form configuration. If the line does not exist, **ATS** will simply load the default parameters for the selected robot.

<b>File Lines</b>	<b>Explanation</b>
16	Inputs
16	Outputs
8	Total number of axes (encoders)
0	Auxiliary ports
5	Robot type (0, 5, or 7)
5	Number of servo axes in Group A (must match robot type)
6	Servo gripper axis
2	Number of servo axes in Group B
512	RAM size

<b>File Lines</b>	<b>Explanation</b>
150	User programs
3000	User program lines
600	Variables
2380	User positions in Group A
2380	User positions in Group B
0	User positions in Group C
550	User comments
Par7	Name of parameter file for specific robot (SCORBOT-ER VII)

Refer to the chapter, *User Memory Configuration* in the *ACL Reference Guide* for an explanation on how to calculate the available number of programs, lines and other data.

---

## **SCORBASE Controller Configuration**

ATS provides a short- form procedure to configure **Controller-A** for use with the **SCORBASE** for DOS software.

*Note: If you wish to configure the controller after it has been in operation, be sure to backup all data before initiating this configuration procedure.*

To configure **Controller-A** for use with the **SCORBASE** software, initiate the configuration procedure from the **ATS** main screen by pressing the hot-key combination:

**[Ctrl] + [F2]**

*Note: When you want to configure the controller for **SCORBASE**, this procedure is used instead of the configuration procedure initiated by **[Ctrl]+[F1]**.*

```
Advanced Terminal Software  version 1.9 (C) ESHED ROBOTEC
SCORBASE Controller Configuration
Robot type : ER V / ER V plus / ER VII
How many axes are installed (0)? 10
Speed Controlled Conveyor : not used / used
Is expanded memory installed (Y/N)? Y
Does the controller have an auxiliary RS232 board (Y/N)? N
Working directory is: c:\ats
Is this correct (Y/N)? Y
WARNING ! USER RAM WILL BE ERASED !!
ARE YOU SURE(Y/N)? N
<Shift+F10> Backup , <Shift+F8> Print , <Shift+F9> Exit , <Alt+H> Help
1cont  2coff  3home  4run  5move  6move1  7teach  8here  9dir  0edit
```

You are prompted:

**SCORBASE Controller Configuration**

**ARE YOU SURE (Y/N)? N**

- Press Y and [Enter]

OR

- Press N to cancel the configuration.

You are then prompted by a short series of Controller Configuration options.

*Note: Make sure you select the proper options for your installation. Incorrect selections may result in damage to your equipment.*

**Robot type: ER V/ ER Vplus / ER VII**

This defines the robot which is connected to the controller. Use the left and right arrow keys to highlight the name of the robot which is connected to the controller. Then press [Enter] to accept.

**How many axes are installed (8)? ..**

This defines the number of axes which can be driven by the controller.

- Press [Enter] to accept the default (8)

OR

- Type any other valid number and press [Enter].

If you have defined more than six axes for the **SCORBASE** configuration, you will be also be prompted to define the speed controlled conveyor:

**Speed Controlled Conveyor : not used / used**

A standard **SCORBOT** conveyor can be installed and controlled like any other peripheral axis, or as a speed controlled conveyor.

- If a conveyor is installed for use as a normal peripheral, enter NOT USED at this prompt.
- If a conveyor is installed for use as speed controlled conveyor, select USED. *The speed controlled conveyor must be connected to the last defined axis.*

Use the left and right arrow keys to highlight your response. Then press [Enter] to accept.

**Is expanded memory installed (Y/N) Y**

- Press Y or [Enter] if controller has 128KB RAM (default)

OR

- Press N if controller has 32KB RAM.

**Does the controller have an auxiliary RS232 board? (Y/N)?N**

- Type Y and [Enter] if the auxiliary multiport RS232 board is installed in your controller.
- Press [Enter] if the board is not installed.

**Working directory is: c:\ATS**

**Is this correct (Y/N)?Y**

The first time this prompt appears, it shows the DOS directory from which the **ATS** software was activated.

The Working directory must be the directory which contains the parameter files and the **SCORBASE** program file (.CBU files).

If you change the directory definition, it is written to a file named **SETUP.DIR**.

Thereafter, whenever **ATS** is loaded, the Working directory is set according to the definition in the **SETUP.DIR** file. Similarly, the **SETUP.DIR** file determines the definition of the Backup directory shown in the Backup Manager screen. **SETUP.DIR** is updated when either the Working directory or Backup directory definition is changed.

- Press N if you want to change the directory. The cursor moves to the directory line, prompting you to type and [Enter] a different directory.
- Press Y if the directory is correct.
- Press [Esc] if you are not sure whether the displayed directory is correct. This will cancel the configuration procedure. Press F10 to access the **ATS** Backup Manager menu to verify the proper directory definition. Or exit to DOS to verify the location of the .CBU files.

**WARNING ! USER RAM WILL BE ERASED !!**

**ARE YOU SURE (Y/N)? N**

- Press Y and [Enter] to accept
- OR
- Press N to cancel the configuration.

ATS will now perform the configuration and load the parameter file and the ACL programs required for SCORBASE. You will see the following displayed on your screen:

```
Advanced Terminal Software version 1.9 (C) ESHED ROBOTEC

PERFORMING CONFIGURATION

DOWNLOADING SERVICE PROGRAMS
MOVE is valid.
MOVEL is valid.
MOVEC is valid.
DPEN is valid.
CLOSE is valid.
MOVED is valid.
GSENS is valid.
MUMAM is valid.
MUT is valid.
MULT is valid.
JAN is valid.
MCONV is valid.
PICKO is valid.
-DONE-
Speed controlled conveyor must be connected to axis 10
>

<Shift+F10> Backup , <Shift+F8> Print , <Shift+F9> Exit , <Alt+H> Help
1con+ 2coff+ 3homc+ 4run 5move 6movel 7teach 8here 9dir+ 0edit
```

The programs MCONV and PICKO are included in the configuration only when a speed controlled conveyor is installed. Also, the speed controlled conveyor is automatically configured for use as the last existing axis.

Be sure the conveyor is properly connected to the controller.

As soon as the configuration is completed, the Peripheral Setup screen appears; this screen is used for defining the devices which are connected to the controller and for loading the parameters for these devices. (The Peripheral Setup is fully described in the following section.)

## Peripheral Setup: Group B Axes

The Peripheral Setup screen appears as soon as the system has downloaded the configuration files and completed a short-form controller configuration procedure. In addition, the peripheral definition screen can be accessed in either of two ways:

- From the ATS main screen, press the hot-key combination:  
[Ctrl] + [F3]
- From the Home Menu in **SCORBASE**, select the **Peripheral** option.



The Peripheral Setup menu allows you to define the peripheral devices connected to axis control group B.

If a robot is not configured, **ACL** for **Controller-A** can allow up to 11 axes in group B; however, only five axes can be defined in this screen.

If a robot is configured, the first axis in group B is the first available axis after the axes reserved for the robot (group A) and the gripper.

If a speed controlled conveyor has been defined in the **SCORBASE** controller configuration, it will automatically appear at the specified axis. All other devices, including a standard conveyor, are defined in this screen.

*Note: Be sure your selections are in accordance with the actual installation.*

Using the arrow keys and [Enter] to make your selections, define the specific devices installed at each axis.

When a device is selected, additional option lines appear, for selecting the specific type of device and its homing method, as shown below.

```

CONTROLLER A - PERIPHERAL SETUP

AXIS 7 : Not connected / Slidebase / Rotary table / Conveyor / Other
Slidebase : 1.0m u / 1.8m u / 1m s / 1.5m s / 1.0m b / 1.8m b / 0.3m
Home type : No homing / Hard home / Microswitch

AXIS 8 : Not connected / Slidebase / Rotary table / Conveyor / Other

AXIS 9 : Not connected / Slidebase / Rotary table / Conveyor / Other

AXIS 10 : Not connected / Slidebase / Rotary table / Conveyor / Other

AXIS 11 : Not connected / Slidebase / Rotary table / Conveyor / Other

Press <Esc> to accept definitions and return to main screen

```

Slidebase 1.0m u and Slidebase 1.8m u are belt-driven slidebases with the following serial numbers (the last four digits):

- Slidebase 1.0m u – 1020
- Slidebase 1.8mu – 1021

**Note:** Clients that have different slidebases (48, and 72 inches), must exit this application and go to the `ATS_A` directory and then run the `LSB4872.bat` file.

## Device Type and Homing Method

Once you have defined a device for a peripheral axis, a second line allows you to select

the specific type of this device. A third line automatically displays the default homing method for the selected device, as follows:

- **Slidebase:** hard home
- **Rotary Table:** microswitch
- **Conveyor:** no homing
- **Other device:** no homing

You may alter these settings to allow homing by different means; for example, you can define a microswitch home for the linear slidebase.

The home type settings are required only for **SCORBASE** operation. When operating the axes from **ACL**, the user specifies the homing method: the command `HOME n` executes a microswitch search on the specified axis ( $n = axis\ 1-11$ ); the command `HHOME n` executes a search for a hard stop.

When you exit the Peripheral Setup menu, the proper parameters for the type of device and its homing method are loaded into the controller.

## Peripheral Configuration Files

Three files contain peripheral configuration data used by **ATS** and **SCORBASE**:

- **SETUP.ROB** (device type)
- **SETUP.HTP** (device homing method)
- **SETUP.PAR** (device parameters)

You may use a text editor to alter these files. It is recommended that you save a back-up copy of the original files before making any changes to them.

## Peripheral ID

The peripheral configuration files use figures which correspond to the specific type of peripheral device, as indicated below:

<b>ID</b>	<b>Peripheral Device</b>	<b>Type (according to SETUP.PAR)</b>
0	Not Connected	
1	Slidebase (first type)	20"
2	Rotary Table (first type)	Black
3	Conveyor (first type)	Gray
4	Not Connected	
5	Slidebase (second type)	48"
6	Rotary Table (second type)	ASRS Carousel
7	Conveyor (second type)	
8	Not Connected	
9	Slidebase (third type)	72"
10	Rotary Table (third type)	
11	Conveyor (third type)	
12	Not Connected	
13	Slidebase (fourth type)	1 meter
14	Rotary Table (fourth type)	
15	Conveyor (fourth type)	
16	Not Connected	

ID	Peripheral Device	Type (according to SETUP.PAR)
17	Slidebase (fifth type)	1.5 meter
18	Rotary Table (fifth type)	
19	Conveyor (fifth type)	
20	Not Connected	
21	Slidebase (sixth type)	
22	Rotary Table (sixth type)	
23	Conveyor (sixth type)	
24	XY Table (X)	
25	XY Table (Y)	
26–31	Reserved	

Peripheral types 0, 4, 8, 12, 16 and 20 (not connected) and 26–31 are all reserved for future factory definition; they are not user-definable.

## SETUP.ROB File

The SETUP.ROB file identifies the types of peripheral devices which have been defined for each axis in group B.

The SETUP.ROB file is created the first time you set the definitions in the Peripheral Setup menu, and updated whenever you change the definitions.

The file contains five figures, which correspond to the five axes (shown in the shaded row) defined in the Peripheral Setup menu. These figures identify the devices connected at axis 7 through axis 11.

For example:

Axis 7	Axis 8	Axis 9	Axis 10	Axis 11
5	2	7	0	0

The axis are configured as follows:

- Axis 7 is configured for the second type of slidebase (48").
- Axis 8 is configured for the first type of rotary table (black).
- Axis 9 is configured for the first type of conveyor (gray).
- Axis 10 and Axis 11 are not connected.

If you change the Home Type settings, the value of each figure in the SETUP.ROB file is increased as follows:

<b>Value</b>	<b>Homing Procedure</b>
+256	No homing procedure
+512	Hard home (2× 256)
+768	Microswitch home (3× 256)

For example:

Axis 7	Axis 8	Axis 9	Axis 10	Axis 11
773	258	7	0	0

The axis are configured as follows:

- Axis 7 is configured for a the second type of slidebase (48") and will be homed using a microswitch (5+768).
- Axis 8 is configured for the first type of rotary table (black) and will not be homed (2+256).
- Axis 9 is configured for the first type of conveyor (gray), and will not be homed (default).

## SETUP.HTP File

The SETUP.HTP file defines the default homing procedure for each peripheral device.

This file is required only by **SCORBASE**.

Each figure indicates the procedure used to home each peripheral device. The peripheral ID numbers (shaded rows) are not included in this file.

#	Homing Procedure
0	No homing performed
1	Hard home
2	Microswitch home

0	1	2	3	4	5	6	7
0	1	2	0	0	1	2	0
8	9	10	11	12	13	14	15
0	1	2	0	0	1	2	0
16	17	18	19	20	21	22	23
0	1	2	0	0	1	2	0
24	25	26	27	28	29	30	31
0	0	0	0	0	0	0	0

For example:

The default homing procedure for the first (black) rotary table (Peripheral ID 6) is by means of a microswitch (2).

## SETUP.PAR File

The SETUP.PAR file defines the parameter values for each type of peripheral.

A SETUP.PAR file is shown on the following pages. The peripheral ID type numbers and parameter numbers (shaded rows) are not included in this file. The numbers in each column refer to the value of the corresponding parameter.

For example:

- The ID number of the 48" slidebase is 5. If in the Peripheral Setup menu the slidebase was defined as connected at axis 7, the values from column 5 will be assigned to the parameters for axis 7. In other words, parameters 27, 47, 67, 87, 107, 127, 147, 167, 187, 207, 227, 247, 267, 287, and 307 will, respectively, receive the values 700, 500, 1200, 0, 12000, -80, 16000, 4500, 10, 2200, 3000, 5, 10, 4000, and 0.

The last lines in this file define the types of devices which are displayed in the Peripheral Setup menu.

Refer to the *ACL Reference Guide* for a complete explanation of system parameters.

Parameters	Peripheral ID Type							
	0	1	2	3	4	5	6	7
par 20+axis	700	700	500	200	700	700	700	200
par 40+axis	500	500	800	200	500	500	500	200
par 60+axis	1200	1200	1100	3000	1200	1200	1200	1000
par 80+axis	0	0	0	0	0	0	0	0
par 100+axis	32767	10300	25000	32767	32767	12000	32767	32767
par 120+axis	-32768	-80	-25000	-32768	-32768	-80	-32768	-32768
par 140+axis	16000	16000	20000	21520	16000	16000	7000	2700
par 160+axis	4500	4500	4500	4000	4500	4500	4500	4500
par 180+axis	10	10	8	6	10	10	10	6
par 200+axis	3000	1800	5000	3000	3000	2200	3000	3000
par 220+axis	3000	3000	3000	3000	3000	3000	3000	6000
par 240+axis	5	5	10	10	5	5	5	60
par 260+axis	10	10	10	10	10	10	10	25
par 280+axis	4000	4000	4000	4000	4000	4000	4000	4000
par 300+axis	0	0	1	2	0	0	0	2
reserved	0	0	0	0	0	0	0	0
	8	9	10	11	12	13	14	15
par 20+axis	700	700	500	800	700	700	700	200
par 40+axis	500	500	800	600	500	500	500	200
par 60+axis	1200	1200	1000	3000	1200	1200	1200	1000
par 80+axis	0	0	0	0	0	0	0	0
par 100+axis	32767	17500	32767	32767	32767	17500	32767	32767
par 120+axis	-32768	-80	-32768	-32768	-32768	-80	-32768	-32768
par 140+axis	16000	16000	16000	18000	16000	16000	16000	2700
par 160+axis	4500	4500	4500	4500	4500	4500	4500	4500
par 180+axis	10	10	8	6	10	10	10	6
par 200+axis	3000	1800	3000	3000	3000	2200	3000	3000
par 220+axis	3000	3000	3000	3000	3000	3000	3000	6000
par 240+axis	5	5	16	10	5	5	5	60
par 260+axis	10	10	10	10	10	10	10	25
par 280+axis	4000	4000	4000	4000	4000	4000	4000	4000
par 300+axis	0	0	0	0	0	0	0	2
reserved	0	0	0	0	0	0	0	0

Parameters	Peripheral ID Type								
	16	17	18	19	20	21	22	23	
par 20+axis	100	800	500	800	700	700	700	200	
par 40+axis	100	800	800	600	500	500	500	200	
par 60+axis	1200	1000	1000	3000	1200	1200	1200	1000	
par 80+axis	0	0	0	0	0	0	0	0	
par 100+axis	32767	19200	32767	32767	32767	17500	32767	32767	
par 120+axis	-32768	-200	-32768	-32768	-32768	-80	-32768	-32768	
par 140+axis	16000	13000	16000	18000	16000	16000	16000	2700	
par 160+axis	4500	4000	4500	4500	4500	4500	4500	4500	
par 180+axis	10	10	8	6	10	10	10	6	
par 200+axis	3000	1000	3000	3000	3000	2200	3000	3000	
par 220+axis	3000	1000	3000	3000	3000	3000	3000	6000	
par 240+axis	5	15	16	10	5	5	5	60	
par 260+axis	10	10	10	10	10	10	10	25	
par 280+axis	4000	4000	4000	4000	4000	4000	4000	4000	
par 300+axis	0	4	0	0	0	0	0	2	
reserved	0	0	0	0	0	0	0	0	
	24	25	26	27	28	29	30	31	
par 20+axis	0	0	0	0	0	0	0	0	
par 40+axis	32767	15000	32767	32767	32767	32767	32767	32767	
par 60+axis	-100	-80	-32768	-32768	-32768	-32768	-32768	-32768	
par 80+axis	20000	2700	16000	16000	16000	16000	16000	16000	
par 100+axis	4500	4500	4500	4500	4500	4500	4500	4500	
par 120+axis	100	100	10	10	10	10	10	10	
par 140+axis	1500	3000	3000	3000	3000	3000	3000	3000	
par 160+axis	1000	3000	3000	3000	3000	3000	3000	3000	
par 180+axis	10	10	5	5	5	5	5	5	
par 200+axis	100	25	10	10	10	10	10	10	
par 220+axis	4000	4000	4000	4000	4000	4000	4000	4000	
par 240+axis	1	1	0	0	0	0	0	0	
par 260+axis	0	0	0	0	0	0	0	0	
par 280+axis	100	200	700	700	700	700	700	700	
par 300+axis	100	200	500	500	500	500	500	500	
reserved	1000	1000	1200	1200	1200	1200	1200	1200	
	\$DATE 19/02/95 \$\$ Slidebase : 20" / 48" / 72" / 1m / 1.5m \$R Rotary Table: Black / ASRS Carousel \$C Conveyor : Gray \$O Other type : XY Table-X / XY Table-Y								

# 5

---

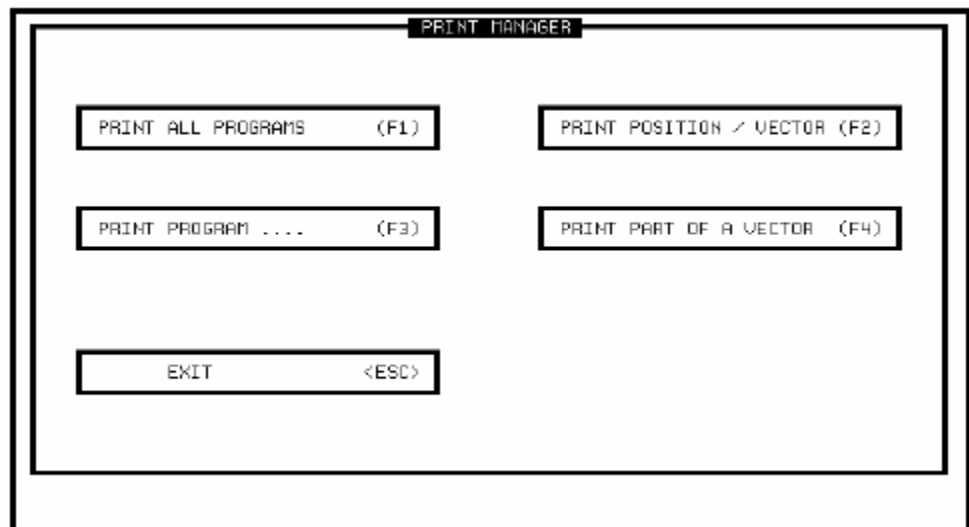
---

## Print Manager

The Print Manager allows you to print copies of the user programs and/or positions currently in the controller's RAM.

The print menu is activated from the **ATS** main screen by pressing the hot-key combination:

[Shift] + [F8]



Make sure a printer is properly connected and ready for operation. If your printer is not fully IBM compatible, you may see the message:

POSSIBLE PRINTER ERROR, PRINT ANYWAY? (Y/N)? N

The print menu contains the following elements. To activate an option, press the corresponding function key.

## **PRINT ALL PROGRAMS <F1>**

Prints all user programs.

ATS prompts you to confirm before printing will begin:

ARE YOU SURE (Y/N) ?

## **PRINT POSITION/VECTOR <F2>**

Prints the coordinates of a specified position or all the positions in a specified vector, as follows.

- For absolute robot positions, coordinates are printed in both joint (encoder) and Cartesian values.
- For relative robot positions, offset values are printed in either joint (encoder) or Cartesian values, according to how the position was recorded.
- For peripheral device positions, all coordinates are in joint (encoder) values.

ATS prompts you for the name of a position or vector. Type the name and press [Enter].

## **PRINT PROGRAM <F3>**

Prints the program specified.

ATS prompts you for a program name. Type the program name and press [Enter].

## **PRINT PART OF VECTOR <F4>**

Prints part of a position vector.

ATS prompts you for a vector name. Type the name and press [Enter]. You are then prompted to specify the indices:

FROM \_\_\_\_\_ TO \_\_\_\_\_

Type the indices and press [Enter] after each entry.

## **EXIT <Esc>**

Returns to the main ATS screen.

## **<Ctrl>+C**

Use this hot-key combination to halt printing.

# 6

---

---

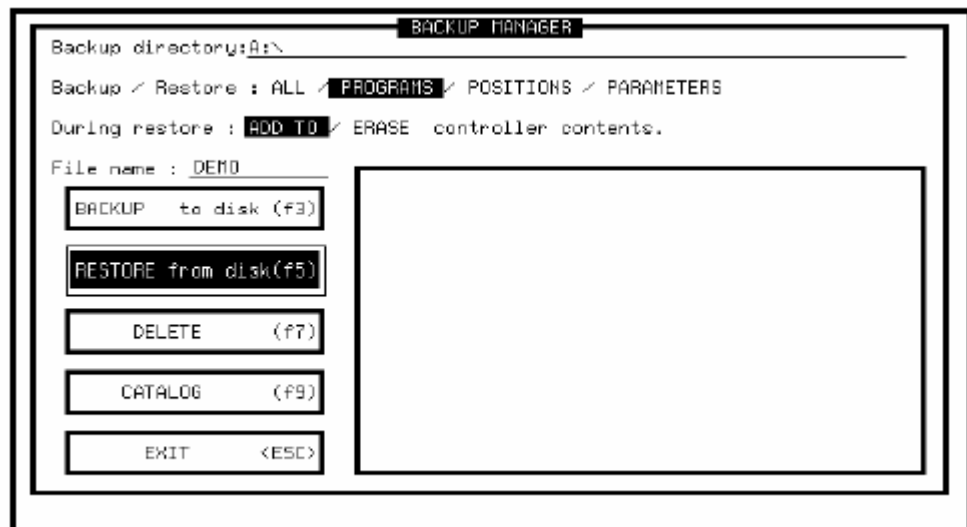
## Backup Manager

The Backup Manager allows you to perform a complete or partial backup of the controller RAM. Similarly, it can restore to the controller the contents of a previously created controller backup (.CBU) file.

Note that in **ATS** version 1.9 (and later), parameter files for peripheral devices are loaded through the Peripheral Setup screen, and not the Backup Manager.

The backup utility is activated from the **ATS** main screen by pressing the hot-key combination:

**Shift] + [F10]**



The backup menu contains the following elements. Use the arrow and [Enter] keys to move the cursor and enter your selections. To activate an option, press the corresponding function key.

---

## Backup/Restore Information

The backup manager contains the following backup/restore information, each of which is described in the following sections:

- **Backup Directory**
- **Backup/Restore**
- **During Restore**
- **File Name**

### Backup Directory

The first time this prompt appears, it shows the DOS directory from which the **ATS** software was activated.

For Restore operations, the Backup directory must be the directory which contains the parameter (.CUB) files.

If you change the directory definition, it is written to a file named **SETUP.DIR**. Thereafter, whenever **ATS** is loaded, the Backup directory is set according to the definition in the **SETUP.DIR** file. Similarly, the **SETUP.DIR** file determines the definition of the Working directory displayed during the controller configuration procedure. **SETUP.DIR** is updated when either the Backup directory or Working directory definition is changed.

You may change the directory definition by typing any valid DOS directory; for example:

```
B:  
A:\PROGBU  
C:\ROBOT
```

## Backup/Restore: ALL / POSITIONS / PARAMETERS / PROGRAMS

Select the items you want to backup or restore. The options are:

- ALL : Includes all data elements: programs, positions, variables, parameters.
- PROGRAMS : Includes all data except parameters.
- POSITIONS : Includes only the positions.
- PARAMETERS : Includes only the parameters.

## During Restore: ADD TO/ERASE CONTROLLER CONTENT

Select the manner in which data will be restored. The options are:

- ADD TO : Adds the restored data to the existing data in the controller RAM. Only new data is restored. If an element already exists in the controller, it will not be changed. The only exception is in restoring positions. If a position is defined but has not been assigned coordinate values, it will receive the coordinates from the backup file.
- ERASE : Replaces all existing data in the controller with the new data.
- The ERASE option erases all data elements except parameters, regardless of the elements being restored.

## File Name

Type the name of the file containing the backup data. Do not use an extension. **ATS** adds the extension **.CBU** to all backup files.

---

## Backup Manager Options

The backup manager contains the following options, each of which is described in the following sections:

- **Backup to Disk <F3>**
- **Restore from Disk <F5>**
- **Delete <F7>**
- **Catalog <F9>**
- **Exit <ESC>**

### BACKUP to Disk <F3>

The backup procedure reads the selected data from the controller and writes it to the specified backup file. Press F3 to activate.

If a file of the same name already exists on the disk, a warning message will be displayed, prompting you to confirm the overwrite.

### RESTORE from Disk <F5>

The restore procedure reads the selected data from the backup file and loads it into the controller RAM. Press F5 to activate.

If you select the option Restore/ALL, a message is displayed, warning you that the controller RAM will be erased, and prompting you to confirm. If, in addition, you select the option During Restore/ERASE, an additional message is displayed, prompting you to confirm the overwrite of controller parameters. If you respond N, the restore operation will proceed as if the option Restore/PROGRAMS was selected, and the parameters will not be restored from disk.

During partial Restore/ADD TO operations, the controller may display warning messages, indicating that data already exists, and is therefore not being restored from the disk.

### DELETE <F7>

Deletes the specified file from the backup directory. Press F7 to activate.

### CATALOG <F9>

Displays the list of backup files in the backup directory. Press F9 to activate.

### EXIT <Esc>

Returns to the main ATS screen.

# 7

---

---

## Command Line Activation

Three controller functions can be performed from the DOS command line without activating ATS: controller configuration, controller backup, and restore to controller.

In addition, switches for a number of options can be included in the command line when ATS is activated from either the batch file or the executable file TERM\_ACL.

To see a list of the options and format, type `ATS /?` from the ATS directory. The following is displayed:

```
Advanced Terminal Software version 1.9 (C) ESHED ROBOTEC
Syntax : TERM_ACL [/options] [filename]
/?          displays options
/Cn         n=COM #
/Dn         n=printer port #
/TA/B      controller type for off-line
/B or /R   Backup or Restore
/ADD       Adds to existing data during Restore
/ERASE     Erases existing data during Restore
/ALL       Programs, positions, variables and parameters
/PROGRAM   Programs, positions and variables
/POS       Positions only
/PAR       Parameters only
[filename] File to be backed up or restored
/CONFIG    Controller configuration
/Xn        n=number of axes installed
/RS232     Auxiliary multiport RS232 board installed
/SCOR      SCORBASE controller configuration
/CONV      Speed controller conveyor installed
/ROBOT_TYPE=xx xx=type of robot: 5, 5+, 7, 9, 14, 2, 0
/PRF       Loads peripheral parameters

C:\ATS>
```

---

## Controller Configuration Options

To perform a controller configuration, use the following format:

**ats /config**

You must specify the type of robot, or assume the default robot type **SCORBOT-ER Vplus** (shown in parentheses).

<code>/robot_type=5</code>	or <code>/v</code>	Loads parameters for <b>SCORBOT-ER V</b> .
<code>(/robot_type=5+</code>	or <code>/v+ )</code>	Loads parameters for <b>SCORBOT-ER Vplus</b> .
<code>/robot_type=7</code>	or <code>/vii</code>	Loads parameters for <b>SCORBOT-ER VII</b> .
<code>/robot_type=0</code>		Separate axes; kinematics unknown.

You may add the following options:

<code>/xn</code>	If specified, $n$ =number of axes. Default is 8.
<code>/scor</code>	Configures controller for <b>SCORBASE</b> .
<code>    /conv</code>	( <b>SCORBASE</b> configuration.) Speed controlled conveyor is installed.
<code>/rs232</code>	Auxilliary multiport RS232 board is installed.
<code>/center</code>	Configures Central CIM Controller.

**Example:** **ATS /CONFIG /ROBOT\_TYPE=5 /X8 /SCOR/CONV/GRAY**

Loads **ATS**, configures the controller for **SCORBASE**, eight axes of control, a gray speed controlled conveyor, and loads the parameters for **SCORBOT-ER V**.

---

## Backup / Restore Options

These options are the same as those in the Backup Manager screen. For a complete explanation, refer to the chapter which describes the backup and restore procedures.

To backup the controller or restore data upon loading **ATS**, use the following format:

**ats filename /b** Backup operation.

**ats filename /r** Restore operation.

You must include a file name:

filename Name of file to be saved or restored.

You may specify the following options, or assume the defaults (shown in parentheses).

<code>/add</code>	Adds data to existing data during restore.
<code>/erase</code>	Erases existing data during restore.
<code>/all</code>	Programs, positions and parameters.
<code>(/program)</code>	Programs, positions, variables.
<code>/pos</code>	Positions only.
<code>/par</code>	Parameters only.

**Example:** `ATS POSLIST /B /POS`

Performs backup of the positions currently in the controller to a file named POSLIST.

---

## Peripheral Option

`/prf` When **ATS** is loaded, the parameters for the peripheral equipment are automatically loaded according to the peripheral setup last defined.

---

## Device Options

<code>/C</code>	Defines the computer's RS232 port to be used for communication with the controller.
<code>(/C1)</code>	COM1 port.
<code>/C2</code>	COM2 port.
<code>/O</code>	Defines the computer's parallel port to be used for printing.
<code>(/O1)</code>	PRN1.
<code>/O2</code>	PRN2.
<code>/O3</code>	PRN3.

**Example:** `ATS /C2`

Loads **ATS** with communication on COM2.

---

## Off-Line Options

When loaded, the **ATS** software automatically recognizes the type of controller with which it is operating. Accordingly, **ATS** knows which robots are compatible with the controller, and displays the proper screens and menus.

If you are working off-line (not communicating with controller), and want **ATS** to display the proper screens, load the software with the following options:

`ats (/ta)`                      Simulates communication with **Controller-A**

`ats /tb`                         Simulates communication with **Controller-B**

When running off-line, **ATS** continually attempts to establish communication with the controller. As soon as the controller responds to **ATS**, the actual controller type is recognized, and the switch is cancelled; the switch will subsequently be ignored, even if communication fails.

# 8

---

---

## The SEND Utility Program

The SEND.EXE utility program contained on the ATS diskette can be used to send **ACL** commands to the controller from the DOS command line. This is useful if you do not want to activate **ATS**.

In addition to this utility, **ACL** commands can be sent to the controller from programs written in high-level languages, such as C or Pascal, by directing them to the serial port by means of a communication driver.

The controller's responses to the commands are automatically displayed on your computer screen.

To send an **ACL** command to the controller, use the following command line format:

**SEND** message [/C com] [/N] [/R] [/T time] [/F filename]

The switches are optional, as indicated by the square brackets.

---

### Options

<i>message</i>	The <b>ACL</b> command you want to transmit to the controller.
/C	Defines the RS232 port used for communication with the controller. Default is COM1 (/C1).
/N	Controller responses will not be displayed on the computer screen.
/R	Controller responses will be displayed on the computer screen until a key is pressed.
/T	The maximum pause between controller responses. Value is in tenths of a second. If the pause exceeds the defined value, it is assumed that the controller has completed its response. Default value is 1 second (/T10).
/F <i>filename</i>	The controller response is sent to a file (and not displayed on screen).
/F PRN	The controller response is sent to the printer (and not displayed on screen).
/?	Displays the Help lines.

### Examples:

SEND SET OUT[1]=1

Turns on output #1.

SEND OPEN

Opens the gripper.

SEND RUN PAINT

Activates execution of a program named PAINT.

SEND LISTVAR

Displays a list of all variables currently in the controller's memory.

SEND LISTP /F POSITS

Creates a file named POSITS, which contains a list of all the defined positions in the controller's memory. This list will not be displayed on the computer screen.