



D Series Controller Method for Software Replacement

**Robot Division
Kawasaki Heavy Industries,LTD.**

E011S-031C(2002.12.12)

METHOD FOR SOFTWARE REPLACEMENT

1.0	Method for Software Replacement	2
1.1	Handling Instructions	2
1.2	Type of Software	2
1.3	Software Replacement Method for AS Group Software	3
1.3.1	Save/Load	3
1.3.2	Initialization	4
1.3.3	Dip Switch Setting After Software Replacement	4
1.4	Software Replacement Method for Servo Group Software	5
1.4.1	Dip Switch Setting After Software Replacement	5
2.0	Software Type and Version System	6
2.1	AS Group Software	6
2.2	Servo Group Software	7
2.3	Other Types of Software	9
3.0	Replacement Method for AS Group Software	10
3.1	Replacement Methods	10
3.2	Software Replacement by Daughter Board Replacement	11
3.3	Software Replacement by Download from PC Card	12
3.4	Software Replacement by Download with FTP	13
4.0	Replacement Method for Servo Group Software	17
4.1	Replacement Methods	17
4.2	Software Replacement by Daughter Board Replacement	18
4.3	Software Replacement by Download from PC Card	19
4.4	Software Replacement by Download with FTP	21

1.0 METHOD FOR SOFTWARE REPLACEMENT

1.1 HANDLING INSTRUCTIONS

This manual describes replacement procedures for the D Series Controller software. In the D Series Controller, a number of software are mounted, and the replacement method differs depending on each software as shown below.

1.2 TYPE OF SOFTWARE

The D Series Controller software consists of two types of group software, as shown below, and other types of software.

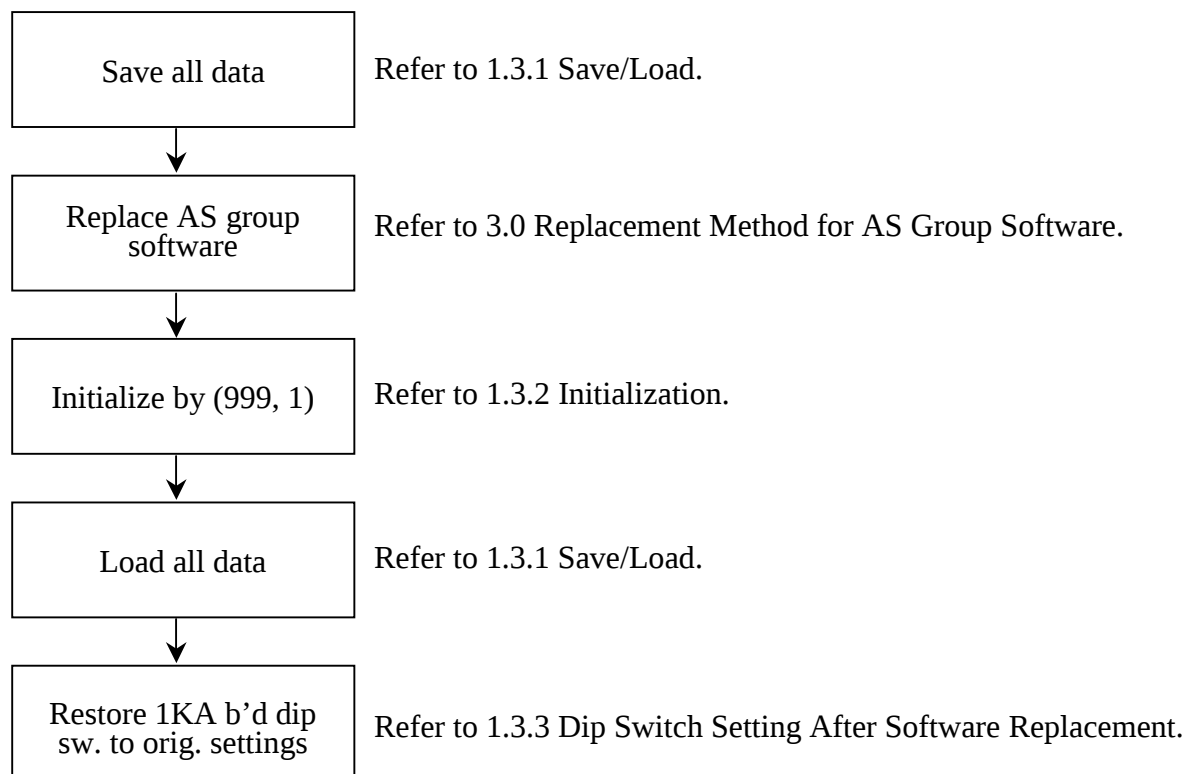
No.	Name	Destination	Executing hardware	Version name	For version confirmation
1	AS group software	1KJ board	1KA/1KB boards	AS_NNNNNNNN	ID command
2	Servo group software	1KJ board	1KB board	SV_NNNNNNNN	ID command

In “NNNNNNNN” part of the version name, the version number set for each software is filled. The word “group” of AS/Servo group software indicates that one software is composed of several kinds of software. For more details about software composition for each group, refer to 2.0 Software Type and Version System.

There are many other types of software for the D Series Controller in addition to those above. The most commonly used software which will be required for replacement will be the above two groups.

1.3 SOFTWARE REPLACEMENT METHOD FOR AS GROUP SOFTWARE

This flow chart shows the replacement method for the AS group software.



1.3.1 SAVE/LOAD

1. Save/Load procedure

D Series Controller can use the following three types of media to save/load data. Save or load all data by using the auxiliary function or AS command as described below.

(1) PCCARD

Aux. function: 201/202/203

AS command: CARD_SAVE/CARD_LOAD/CARD_FDIR

(2) FDD

Aux. function: 201/202/203

AS command: FD_SAVE/FD_LOAD/FD_FDIR

(3) PC

Aux. function: None

AS command: SAVE/LOAD

When using KCWIN32/KRterm, high-speed save/load with data compression is available by putting the optional "/HSP", such as "SAVE/HSP + file name" or "LOAD/HSP + file name".

2. Save/Load of hour meter data

In the D Series Controller the hardware hour meter is optional, instead the software counts the time. In order to maintain the hour meter data after software replacement, save all the data without fail just before replacement. When loading the data, the following query will be displayed. Select “9: Force load”.

OPERATION INFORMATION DATA

Load USER OPERATION INFORMATION DATA? (NOTE: Usually it need not be loaded.)

(1: Skip, 9: Force load) 9

Load OPERATION INFORMATION DATA? (NOTE: Usually it need not be loaded.)

(1: Skip, 9: Force load) 9

If the data failed to be saved or was corrupted, take the following measures:

(1) Checking hour meter by

Aux. function: 706

AS command: OPEINFO

Note the displayed time.

(2) Overwriting hour meter after replacing software by

AS command: ZHM_SET

Overwrites time of the hour meter.

1.3.2 INITIALIZATION

Before initialization, set ON dip switch SW2-8 on the 1KA board. To initialize after software replacement, select “initialization of all data” (999, 1), which corresponds to the initialization (1, 9894) of the C Series Controller.

1.3.3 DIP SWITCH SETTING AFTER SOFTWARE REPLACEMENT

After software replacement, return dip switch SW2-8 to OFF on the 1KA board, and confirm the other dip switches are set as follows.

SW1 (Black DIPSW)

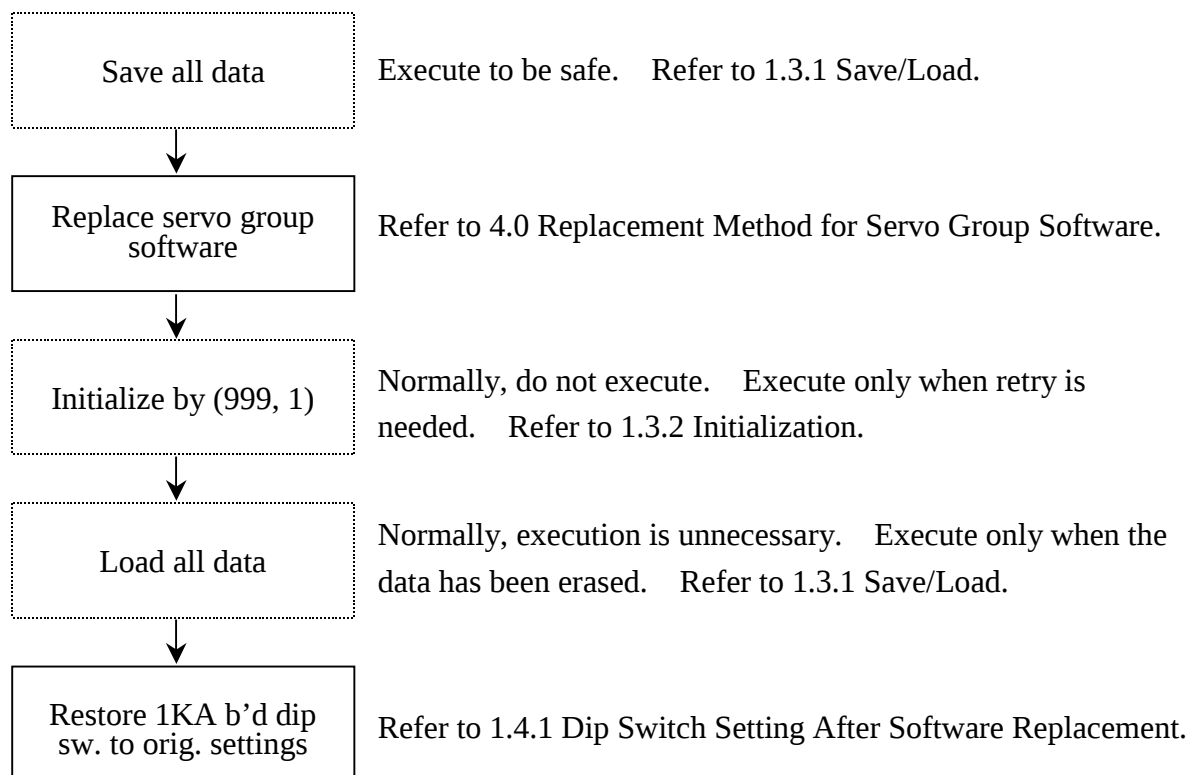
ON	2
OFF	1, 3, 4

SW2 (Red DIPSW)

ON	1
OFF	2, 3, 4, 5, 6, 7, 8

1.4 SOFTWARE REPLACEMENT METHOD FOR SERVO GROUP SOFTWARE

This flow chart shows the replacement method for the servo group software. The steps enclosed by the dotted squares can be skipped, but execution is recommended to prevent data erasure.



1.4.1 DIP SWITCH SETTING AFTER SOFTWARE REPLACEMENT

After software replacement, return dip switch SW2-8 to OFF on the 1KA board, and confirm the other dip switches are set as follows.

SW1 (Black DIPSW)

ON	2
OFF	1, 3, 4

SW2 (Red DIPSW)

ON	1
OFF	2, 3, 4, 5, 6, 7, 8

2.0 SOFTWARE TYPE AND VERSION SYSTEM

2.1 AS GROUP SOFTWARE

1. The AS group software consists mainly of software that performs following functions.

No.	Module name	Function
1	USER_AS	AS system software working on the 1KA board
		Monitor part (corresponding to KCWIN/KRterm)
		Robot operation planning
		PC programs, etc.
2	USER_TP	TP software working on the 1KA board
		TP software functions
3	ARM_AS	AS system software working on the 1KB board
		Robot command value calculation
		Power sequence
4	IPL (Initial Program Loader)	Software to load each software to the 1KA/1KB boards
		Initial load
		Kernel function

2. The AS group software consists of the following files.

No.	File name	Software contents	Category	Version name	For version confirmation
1	ipl.abs	1KA-IPL software	IPL	UIPNNNNNNNNN	ID command
2	ipl_arm.abs	1KB-IPL software	IPL	AIPNNNNNNNNN	ID command
3	useras.abs	User interface AS software	USER_AS	UASNNNNNNNNN	ID command
4	usertp.abs	User interface TP software	USER_TP	UTPNNNNNNNNN	ID command
5	armas.abs	Arm control AS software	ARM_AS	AASNNNNNNNNN	ID command
6	as_msg.jp	AS message (Japanese) file	USER_AS	MASNNNNNNNJP	ID command
7	as_msg.en	AS message (English) file	USER_AS	MASNNNNNNNEN	ID command
8	tp_msg.jp	TP message (Japanese) file	USER_TP	MTPNNNNNNNJP	ID command

No.	File name	Software contents	Category	Version name	For version confirmation
9	tp_msg.en	TP message (English) file	USER_TP	MTPNNNNNNNEN	ID command
10	armprm.dat	Arm data file	ARM_AS	ARMNNNNNNNNN	ID command
11	as.ver	AS group version name file	-	AS_NNNNNNNNN	ID command
12	autoexec.cmd	Command file for AS activation	-	None	None
13	d_load.cmd	Command file for PC card download	-	None	None
14	dload_as.bat	FTP download batch file	-	None	None
15	dload_as.txt	Command file for FTP download	-	None	None

Remarks: In “NNNNNNNN” part of the version name, the version number set for each software is filled.

(i) Version name for the AS group software: AS_NNNNNNNNN

(ii) Drawing file name for the AS group software: AS_NNNNNNNNN.zip

A ZIP extension is set for the file name because most mail servers do not accept EXE files as precaution against viral infection.

2.2 SERVO GROUP SOFTWARE

1. The servo group software consists mainly of software that performs following functions.

No.	Module name	Function
1	ARM_SV	Software working on the 1KB-VR side
		Notch filter/ DFF/ Observer
		Download of robot model parameters, etc.
2	ARM_SC	Software working on the 1KB-VR side
		Control loop
		Power sequence, etc.

2. The servo group software consists of the following files.

No.	File name	Software contents	Category	Version name	For version confirmation
1	armsv.abs	Arm control AS software	IPL	AASNNNNNNNN	ID command
2	srvprm.dat	Servo parameter file	IPL	ASPNNNNNNNN	ID command
3	armsc.mb	Arm control servo control software	USER_AS	ASCNNNNNNNN	ID command
11	servo.ver	Servo group version name file	-	SV_NNNNNNNNN	ID command
12	autoexe2.cmd	Command file for servo activation	-	None	None
13	d_load.cmd	Command file for PC card download	-	None	None
14	dload_sv.bat	FTP download batch file	-	None	None
15	dload_sv.txt	Command file for FTP download	-	None	None

Remarks: In “NNNNNNNN” part of the version name, the version number set for each software is filled.

(i) Version name for the servo group software: SV_NNNNNNNNN

(ii) Drawing file name for the servo group software: SV_NNNNNNNNN.zip

A ZIP extension is set for the file name because most mail servers do not accept EXE files as precaution against viral infection.

2.3 OTHER TYPES OF SOFTWARE

The following list shows the other types of the D Series Controller software.

No.	Name	Destination	Executing hardware	Version name	For version confirmation
1	User interface board mini kernel	1KA board	1KA board	UMKNNNNNNNNN	ZID command
2	User interface board ROM kernel	1KA board	1KA board	URKNNNNNNNNN	ZID command
3	Arm control board mini kernel	1KB board	1KB board	AMKNNNNNNNNN	ZID command
4	Arm control board ROM kernel	1KB board	1KB board	ARKNNNNNNNNN	ZID command
5	Arm control board (SC) FlashBoot monitor	1KB board	1KB board	SFMNNNNNNNNN	ZID command
6	Arm control board (SC) HW check program	1KB board	1KB board	SHPNNNNNNNNN	ZID command
7	Arm control board (SC) SRAMBoot monitor	1KB board	1KB board	SSMNNNNNNNNN	ZID command
8	Arm control board (SC) mini Boot	1KB board	1KB board	SMBNNNNNNNNN	ZID command
9	TP ROM software	TP	TP	MFPNNNNNNNNN	ZID command
10	PCCARD_FDD board software	1KF board	1KF board	PCCNNNNNNNNN	ZID command
11	Mitsubishi single axis amplifier IF board software	Mitsubishi single axis amplifier IF	Mitsubishi single axis amplifier IF	SSCNNNNNNNNN	ZID command

Remarks: In “NNNNNNNN” part of the version name, the version number set for each software is filled.

Exchangeability of these software is low compared to the AS group software and servo group software. Because the download procedure differs for each software, follow the procedure presented separately.

3.0 REPLACEMENT METHOD FOR AS GROUP SOFTWARE

3.1 REPLACEMENT METHODS

The following three methods are available for replacing AS group software in the D Series Controller. Each has advantages and disadvantages, select the best method for the condition.

No.	Replacement method	Advantage	Disadvantage
1	Board replacement (1KJ daughter board replacement)	Short replacement time.	1KJ must be prepared.
		Convenient for replacing in many robots.	Insertion/pull-out of board required.
2	Download by PC card	No special preparation required.	Lengthy replacement time.
3	Download by FTP	Short replacement time.	1KN must be available and prepared.
		Best suited in network setting.	Without 1KN, time is required for preparation.

1. Replacing time

Time for replacement is as follows in order of convenience.

Superior		Inferior
Download by FTP	>	Board replacement (Daughter board replacement)
1 minute		3 minutes
	>	Download by PC card
		10 minutes

2. Preparation

Preparation required for replacement is as follows in order of convenience.

Superior						Inferior
Download by PC card	>	Board replacement (Daughter board replacement)	>			Download by FTP
Preparation for PC card		Preparation for 1KJ board (daughter b'd) Pre-installation of software				Preparation for 1KN board and PC

[NOTE]

Usually, board replacement (daughter board replacement) is recommended. If time is available, downloading via PC card is recommended. If the controller is connected to a PC and network, downloading via FTP is recommended.

3.2 SOFTWARE REPLACEMENT BY DAUGHTER BOARD REPLACEMENT

In this method, the target software is installed on a new 1KJ board, which then replaces the old 1KJ daughter board screw-mounted on the 1KA board.

1. Preparation

Install the target software in the 1KJ daughter board.

2. Replacement Procedure

Be sure to save all data before starting this procedure.

- (1) Turn OFF the control power.
- (2) Remove the 1KA board, and replace the 1KJ board mounted on the 1KA board.
- (3) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1, 8
OFF	2, 3, 4, 5, 6, 7

- (4) Insert the 1KA board.
- (5) Turn ON the control power, and take initialization operation.

3. Caution

- (1) To install the target software on the 1KJ board, use FTP or PC card to download.
- (2) The 1KJ board is available in 8M or 16M capacity. Be sure to check the capacity to be used before replacement.

3.3 SOFTWARE REPLACEMENT BY DOWNLOAD FROM PC CARD

In this method, the target software is copied to a PC card, the controller is set in download mode, and then the software is downloaded.

1. Preparation

- (1) Target software is posted on the shared message board. Decompress the software from ZIP format before proceeding.
- (2) One version consists of 10 and more files. Copy all the files to the route directory of the PC card. (About 5Mbyte as of July, 2002)

2. Replacement Procedure

Be sure to save all data before starting this procedure.

- (1) Turn OFF the control power.
- (2) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1, 3, 5, 8
OFF	2, 4, 6, 7

(This setting is same as at download for the C Series Controller.)

- (3) Insert the prepared PC card to the slot.
- (4) Turning ON the control power starts download automatically. At this time, motor power lamp, cycle start lamp and error lamp blink. The download process is displayed **on** screen, on the PC installed with terminal software KCWIN/KRterm and the teach pendant.
- (5) When the following message is displayed, download has been completed.
All download completed.
At this time, only the cycle start lamp lights.
- (6) Turn OFF the control power.
- (7) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1, 8
OFF	2, 3, 4, 5, 6, 7

(This setting is same as after download for the C Series Controller.)

- (8) Turn ON the control power, and take initialization operation.

3. Supplementary Explanation

(1) Download is executed in the order described in “d_load.cmd”.

(Example of “d_load.cmd”)

ipl.abs		<= Copies “ipl.abs” to the route directory.
ipl_arm.abs		
autoexec.cmd		
useras.abs	/as/useras.abs	<= Copies “useras.abs” in the “/as” directory of the same name.
as_msg.jp	/as/as_msg.jp	
as_msg.en	/as/as_msg.en	
usertp.abs	/as/usertp.abs	
tp_msg.jp	/as/tp_msg.jp	
tp_msg.en	/as/tp_msg.en	
armas.abs	/as/armas.abs	
armprm.dat	/as/armprm.dat	

(2) Download is executed for only the parts described in “d_load.cmd” in one file segments, and then the download is completed as shown below.

(Example)

<usertp.abs> -> </as/usertp.abs> 1157204 byte

```
|-----+-----|
|*****|
```

<end>

3.4 SOFTWARE REPLACEMENT BY DOWNLOAD WITH FTP

This method replaces the software by connecting the robot controller and the PC by Ethernet, and then downloading the target software by FTP.

1. Preparation

- (1) Target software is posted on the shared message board. Decompress the software from ZIP format before proceeding.
- (2) One version consists of 10 and more files. Copy all the files to the local directory of the PC. (About 5Mbyte as of July, 2002)
- (3) When downloading to a controller that is not connected to a network, prepare the following.
 - 1) 1KN board
 - 2) Ethernet cross cable

2. Replacement Procedure

Be sure to save all data before starting this procedure.

(1) Check if target controller is connected to the network.

1) When the controller is connected to the network:

Use the following auxiliary function or AS command and note down the network setting.

Aux. function: 812

AS command: netconf

IP address	
Host name	
Subnet mask	
Gateway IP	
DNS server1 IP	
DNS server2 IP	
Domain name	

2) When the controller is not connected to the network:

Use the following auxiliary function or AS command and note down the network setting.

Aux. function: 812

AS command: netconf

IP address	192.168.0.2
Host name	test
Subnet mask	255.255.255.0
Gateway IP	0.0.0.0
DNS server1 IP	0.0.0.0
DNS server2 IP	0.0.0.0
Domain name	test

Then, turn OFF the control power, remove the 1KA board and install the 1KN board. Also, connect the robot controller and PC by the Ethernet cross cable, and turn ON the control power.

(2) Check if the PC for downloading is connected to the network.

1) When the controller is connected to the network:

Input the following command on the DOS prompt screen, and check if communication is possible with the controller.

After ">" is displayed, input "ping" and the IP address, and then press .

(i) Reply from ...

When this message is displayed, the controller has been connected to the network and communication is possible.

(ii) Request timed out ...

When this message is displayed, the controller failed to be connected to the network. In this case, contact the network administrator for solution.

2) When the controller is not connected to the network:

Set the network settings for the PC as follows.

Specify IP address	
IP address	192.168.0.1
Subnet mask	255.255.255.0

Input the following command on the DOS prompt screen, and check if communication is possible with the controller.

After ">" is displayed, input "ping" and the IP address, and then press .

(i) Reply from ...

When this message is displayed, the controller has been connected to the network and communication is possible.

(ii) Request timed out ...

When this message is displayed, the controller failed to be connected to the network. In this case, the setting might be incorrect, check the network setting for the controller and the PC.

(3) Turn OFF the control power.

(4) Edit "dload_as.bat" in the directory with the target software.

ftp -s:dload_as.txt 192.168.0.1

Change the end of the IP address for the download destination to reflect the robot controller address checked in step (1).

(Example) If the address in step (1) is: 192.168.0.30

Change "ftp -s:dload_as.txt 192.168.0.1" to: "ftp -s:dload_as.txt 192.168.0.30"

- (5) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1, 3, 5, 6, 7	Setting of ROM kernel mode
OFF	2, 4, 8	

- (6) Turn ON the control power. (Only the motor power lamp on the operation panel blinks, and other lamps turn OFF.)
- (7) Double-clicking “dload_as.bat” starts download automatically. The download process is displayed on the DOS window of the PC.
- (8) When the prompt is displayed on the DOS window, download has been completed.
- (9) Turn OFF the control power.
- (10) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1, 8
OFF	2, 3, 4, 5, 6, 7

- (11) Turn ON the control power, and take initialization operation. After loading all data, the IP address of the robot controller is automatically set back to its original, and no further recovery is required.

3. Supplementary Explanation

Download by FTP is executed in the order described in “dload_as.bat”.

(Example of “dload_as.bat”)

dbg	
dbg	
bin	
put autoexec.cmd	<= Downloads “autoexec.cmd”
put ipl.abs	
put ipl_arm.abs	
mkdir as	
cd as	<= Moves to “as” directory.
put useras.abs	<= Downloads “useras.abs”
put as_msg.jp	
put as_msg.en	
put usertp.abs	
put tp_msg.jp	
put tp_msg.en	
put armas.abs	
put armprm.dat	
put as.ver	
quit	<= End of download

4.0 REPLACEMENT METHOD FOR SERVO GROUP SOFTWARE

4.1 REPLACEMENT METHODS

The following three methods are available for replacing servo group software in the D Series Controller. Each has advantages and disadvantages, select the best method for the condition.

No.	Replacement method	Advantage	Disadvantage
1	Board replacement (1KJ daughter board replacement)	Short replacement time. Convenient for replacing in many robots.	1KJ must be prepared. Insertion/pull-out of board required.
2	Download by PC card	No special preparation required.	Lengthy replacement time.
3	Download by FTP	Short replacement time. Best suited in network setting.	1KN must be available and prepared. Without board, time is required for preparation.

1. Replacing time

Time for replacement is as follows in order of convenience.

Superior					Inferior
Download by FTP	>	Download by PC card	>		Board replacement (Daughter board replacement)
1 minute		2 minutes			3 minutes

2. Preparation

Preparation required for replacement is as follows in order of convenience.

Superior					Inferior
Download by PC card	>	Board replacement (Daughter board replacement)	>		Download by FTP
Preparation for PC card		Preparation for 1KJ board (daughter b'd) Pre-installation of software			Preparation for 1KN board and PC

[NOTE]

Usually, board replacement (daughter board replacement) is recommended. If time is available, downloading via PC card is recommended. If the controller is connected to a PC and network, downloading via FTP is recommended.

4.2 SOFTWARE REPLACEMENT BY DAUGHTER BOARD REPLACEMENT

In this method, the target software is installed on a new 1KJ board, which then replaces the old 1KJ daughter board screw-mounted on the 1KA board.

1. Preparation

Install the target software in the 1KJ daughter board.

2. Replacement Procedure

Be sure to save all data before starting this procedure. (To be safe)

- (1) Turn OFF the control power.
- (2) Remove the 1KA board, and replace the 1KJ board mounted on the 1KA board.
- (3) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1
OFF	2, 3, 4, 5, 6, 7, 8

- (4) Insert the 1KA board.
- (5) Turn ON the control power. If no trouble arises, replacement is complete.

3. Caution

- (1) To install the target software on the 1KJ board, use FTP or PC card to download.
- (2) The 1KJ board is available in 8M or 16M capacity. Be sure to check the capacity to be used before replacement.

4.3 SOFTWARE REPLACEMENT BY DOWNLOAD FROM PC CARD

In this method, the target software is copied to a PC card, the controller is set in download mode, and then the software is downloaded.

1. Preparation

- (1) Target software is posted on the shared message board. Decompress the software from ZIP format before proceeding.
- (2) One version consists of 5 to 10 files. Copy all the files to the route directory of the PC card. (About 1Mbyte as of July, 2002)

2. Replacement Procedure

Be sure to save all data before starting this procedure. (To be safe)

- (1) Turn OFF the control power.

- (2) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1, 3, 5, 8
OFF	2, 4, 6, 7

(This setting is same as at download for the C Series Controller.)

- (3) Insert the prepared PC card to the slot.

- (4) Turning ON the control power starts download automatically. At this time, motor power lamp, cycle start lamp and error lamp blink. The download process is displayed on screen, on the PC installed with terminal software KCWIN/KRterm and the teach pendant.

- (5) When the following message is displayed, download has been completed.

All download completed.

At this time, only the cycle start lamp lights.

- (6) Turn OFF the control power.

- (7) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1
OFF	2, 3, 4, 5, 6, 7, 8

- (8) Turn ON the control power. If no trouble arises, replacement is complete.

3. Supplementary Explanation

- (1) Download is executed in the order described in “d_load.cmd”.

(Example of “d_load.cmd”)

autoexe2.cmd		<= Copies “autoexec2.cmd” to the route directory.
armsv.abs	/sv/armsv.abs	<= Copies “armsv.abs” in the “/sv” directory of the same name.
srvprm.dat	/sv/srvprm.dat	
armsc.mb	/sv/armsc.mb	
servo.ver	/sv/servo.ver	

- (2) Download is executed for only the parts described in “d_load.cmd” in one file segments, and then the download is completed as shown below.

(Example)

<armsv.abs> -> </sv/armsv.abs> 48128 byte

|+|

<end>

4.4 SOFTWARE REPLACEMENT BY DOWNLOAD WITH FTP

This method replaces the software by connecting the robot controller and the PC by Ethernet, and then downloading the target software by FTP.

1. Preparation

- (1) Target software is posted on the shared message board. Decompress the software from ZIP format before proceeding.
- (2) One version consists of 5 to 10 files. Copy all the files to the local directory of the PC. (About 1Mbyte as of July, 2002)
- (3) When downloading to a controller that is not connected to a network, prepare the following.
 - 1) 1KN board
 - 2) Ethernet cross cable

2. Replacement Procedure

Be sure to save all data before starting this procedure. (To be safe)

- (1) Check if target controller is connected to the network.

- 1) When the controller is connected to the network:

Use the following auxiliary function or AS command and note down the network setting.

Aux. function: 812

AS command: netconf

IP address	
Host name	
Subnet mask	
Gateway IP	
DNS server1 IP	
DNS server2 IP	
Domain name	

2) When the controller is not connected to the network:

Use the following auxiliary function or AS command and note down the network setting.

Aux. function: 812

AS command: netconf

IP address	192.168.0.2
Host name	test
Subnet mask	255.255.255.0
Gateway IP	0.0.0.0
DNS server1 IP	0.0.0.0
DNS server2 IP	0.0.0.0
Domain name	test

Then, turn OFF the control power, remove the 1KA board and install the 1KN board. Also, connect the robot controller and PC by the Ethernet cross cable, and turn ON the control power.

(2) Check if the PC for downloading is connected to the network.

1) When the controller is connected to the network:

Input the following command on the DOS prompt screen, and check if communication is possible with the controller.

After ">" is displayed, input "ping" and the IP address, and then press .

(i) Reply from ...

When this message is displayed, the controller has been connected to the network and communication is possible.

(ii) Request timed out ...

When this message is displayed, the controller failed to be connected to the network. In this case, contact the network administrator for solution.

2) When the controller is not connected to the network:

Set the network settings for the PC as follows.

Specify IP address	
IP address	192.168.0.1
Subnet mask	255.255.255.0

Input the following command on the DOS prompt screen, and check if communication is possible with the controller.

After ">" is displayed, input "ping" and the IP address, and then press .

(i) Reply from ...

When this message is displayed, the controller has been connected to the network and communication is possible.

(ii) Request timed out ...

When this message is displayed, the controller failed to be connected to the network. In this case, the setting might be incorrect, check the network setting for the controller and the PC.

(3) Turn OFF the control power.

(4) Edit "dload_sv.bat" in the directory with the target software.

```
ftp -s:dload_sv.txt 192.168.0.1
```

Change the end of the IP address for the download destination to reflect the robot controller address checked in step (1).

(Example) If the address in step (1) is: 192.168.0.30

Change "ftp -s:dload_sv.txt 192.168.0.1" to: "ftp -s:dload_sv.txt 192.168.0.30"

(5) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1, 3, 5, 6, 7	Setting of ROM kernel mode
OFF	2, 4, 8	

(6) Turn ON the control power. (Only the motor power lamp on the operation panel blinks, and other lamps turn OFF.)

(7) Double-clicking "dload_sv.bat" starts download automatically. The download process is displayed on the DOS window of the PC.

(8) When the prompt is displayed on the DOS window, download has been completed.

(9) Turn OFF the control power.

(10) Set the 1KA board SW2 dip switches as follows.

SW2 (Red DIPSW)

ON	1
OFF	2, 3, 4, 5, 6, 7, 8

(11) Turn ON the control power. If no trouble arises, replacement is complete. After loading all data, the IP address of the robot controller is automatically set back to its original, and no further recovery is required.

3. Supplementary Explanation

Download by FTP is executed in the order described in “dload_sv.bat”.

(Example of “dload_sv.bat”)

dbg	
dbg	
bin	
put autoexe2.cmd	<= Downloads “autoexe2.cmd”
mkdir sv	
cd sv	<= Moves to “sv” directory
put armsv.abs	<= Downloads “armsv.abs”
put srvprm.dat	
put armsc.mb	
put servo.ver	
quit	<= End of download