CUTTING PLOTTER

FC7000-75/100/130/160

FC7000MK2-60/75/100/130/160

SERVICE MANUAL

FC7000-UM-251-10-9370

GRAPHTEC

HISTORY OF REVISIONS

No.	Date issued	Description of revision	Page	Edition
1	05.06.21	First Printing	All	01
2	05.08.29	The cutting mats are added for the recommended parts list.	4-1	02
3	05.08.29	Part number for the right and left media stocker bracket corrected.	10-13	02
4	05.08.31	List of item requiring readjustment corrected.	7-1	02
5	05.11.24	Part number for the bracket bottom corrected.	10-3	03
6	05.11.24	Part number for the media sensor bracket corrected.	10-7	03
7	05.11.24	Part number for the labels added.	10-12	03
8	05.12.13	Part number for the model labels corrected.	10-12	04
9	05.12.13	Part number for the X motor belt corrected.	10-7	04
10	05.12.13	Part number for the pinch roller corrected.	10-10	04
11	06.02.26	The distance adjustment pattern size changed.	7-18	05
12	06.07.04	Part number for the Y drive pulley 38 assy corrected.	10-9	06
13	06.07.04	Part number for the idler pulley assy corrected.	10-9	06
14	06.08.08	Item number for the pinch roller sensor dog corrected.	10-10	07
15	06.10.19	Part number for the idler pulley assy corrected.	10-7	08
16	07.07.11	Information of the FC7000MK added.	All	09
17	07.07.13	Information of the new main board for FC7000 added.	4-1,7-1,7-31	09
18	07.10.19	Information of the sensor dog position added.	6-28	10
19	07.10.19	Correction of procedure.	7-14	10
20	07.10.19	Part number for the X motor corrected.	4-1,4-2,10-7,10-9	10
21	07.10.19	Part number for the Y motor corrected.	4-1,4-2,10-7,10-9	10
22	07.10.19	Part number for the Y drive pulley corrected.	10-9	10

CONTENTS

1. INTRODUCTION

1.1 Main Specifications

1.1.1 Main Specifications (FC7000 Series)

	FC7000-75	FC7000-100	FC7000-130	FC7000-160
CPU	32-bit			
Configuration	Grit-rolling plotter			
Drive	Digital servo			
Max. cutting area (expanded mode)	50m x 762 mm	50m x 1067 mm	50m x 1372 mm	50m x 1626 mm
Guaranteed precision cutting area *1	10m x 742 mm	10m x 1047 mm	10m x 1352 mm	10m x 1606 mm
Mountable media width	Max. 920 mm, Min. 50 mm	Max. 1224 mm, Min. 50 mm	Max. 1529 mm, Min. 50 mm	Max. 1834 mm, Min. 50 mm
Max. cutting speed (Axial)	148.5cm/sec (45 ips)			
Specifiable speeds	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80, 90, 100, 105 cm/sec			
Cutting pressure	48 steps, 0.196-5.88N (20-600gf)			
Min. character size	3mm (0.125 in.) alphanumeric Helvetica med. Font			
Mechanical resolution	0.005mm			
Programmable resolution	GP-GL: 0.01/0.05/0.025/0.01mm, HP-GL: 0.025mm *2			
Repeatable accuracy *1	Max. 0.1 mm/2-m unit (excluding media shrinkage)			
Number of cutters/pens	1 (2 for the optional 2-pen models) *3			
Pen types	Water-based fiber-tip, oil-based ballpoint, ceramic, and disposable ink pens			
Pouncing tool type	Pouncing tool: PPA33-TP12, 1.2-mm pin diameter) *4			
Compatible media	Mono-vinyl chloride media, fluorescent media, and media for illuminated displays, high reflective media, up to 0.25mm thick, Sandblast rubber up to 1mm thick*5			
Compatible paper for pouncing	Regular paper from 0.06 to 0.13 mm thick			
Standard interfaces	RS-232C/USB (Auto switching)			
Buffer memory	2 MB			
Resident command sets	GP-GL/HP-GL(Control panel switching)			
LCD Panel	20x4 - Supports 7 languages: with amber backlight			
Power supply	100-240VAC/50-60 Hz (Auto switching)			
Power consumption	140VA max.			
Operating environment	Temperature: +10˚C to +35˚C Humidity: 35% to 75% (non-condensing)			
Guaranteed accuracy environment	Temperature: +16 ˚C to +32 ˚C Humidity: 35% to 70%(non-condensing)			
External dimensions without stand	1260 x 402 x 477mm	1560 x1210 x 715mm	1860 x 1210 x 715mm	2120 x 1210 x 715mm
Weight	29 kg	43 kg (including stand)	51 kg (including stand)	59 kg (including stand)

*1 When the optional basket and Graphtec-specified media are used.

*2 HP-GL is a registered trademark of Hewlett-Packard Company.

*3 The 2-pen unit is a factory-installed option. It cannot be retrofitted.

*4 The PPA32-TP12 pouncing pen cannot be used.

*5 The CB15UA cutter blade and a reinforced backing sheet must be used when cutting high-intensity reflective film.

1.1.2 Main Specifications (FC7000MK2 Series)

	FC7000MK2-60	FC7000MK2-75	FC7000MK2-100	FC7000MK2-130	FC7000MK2-160
CPU	32-bit				
Configuration	Grit-rolling plotter				
Drive	Digital servo				
Max. cutting area (expanded mode)	50m x 610 mm	50m x 762 mm	50m x 1067 mm	50m x 1372 mm	50m x 1626 mm
Guaranteed precision cutting area *1	15m x 590 mm	15m x 742 mm	15m x 1047 mm	15m x 1352 mm	15m x 1606 mm
Mountable media width	Max. 866 mm, Min. 50 mm	Max. 920 mm, Min. 50 mm	Max. 1224 mm, Min. 50 mm	Max. 1529 mm, Min. 50 mm	Max. 1834 mm, Min. 50 mm
Max. cutting speed (Axial)	148.5cm/sec (45 ips)				
Specifiable speeds	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80, 90, 100, 105 cm/sec				
Cutting pressure	48 steps, 0.196-5.88N (20-600gf)				
Min. character size	3mm (0.125 in.) alphanumeric Helvetica med. Font				
Mechanical resolution	0.005mm				
Programmable resolution	GP-GL: 0.01/0.05/0.025/0.01mm, HP-GL: 0.025mm *2				
Repeatable accuracy *1	Max. 0.1 mm/2-m unit (excluding media shrinkage)				
Number of cutters/pens	1 (2 for the optional 2-pen models) *3				
Pen types	Water-based fiber-tip, oil-based ballpoint and disposable ink pens				
Pouncing tool type	Pouncing tool: PPA33-TP12, 1.2-mm pin diameter) *4				
Compatible media	Mono-vinyl chloride media, fluorescent media, and media for illuminated displays, high reflective media, up to 0.25mm thick, Sandblast rubber up to 1mm thick*5				
Compatible paper for pouncing	Regular paper from 0.06 to 0.13 mm thick				
Standard interfaces	RS-232C/USB (Auto switching)				
Buffer memory	2 MB				
Resident command sets	GP-GL/HP-GL(Control panel switching)				
LCD Panel	20x4 - Supports 7 languages: with amber backlight				
Power supply	100-240VAC/50-60 Hz (Auto switching)				
Power consumption	160VA max.				
Operating environment	Temperature: +10˚C to +35˚C Humidity: 35% to 75% (non-condensing)				
Guaranteed accuracy environment	Temperature: +16 ˚C to +32 ˚C Humidity: 35% to 70%(non-condensing)				
External dimensions without stand	1110 x 402 x 477mm	1260 x 402 x 477mm	1560 x1210 x 715mm	1860 x 1210 x 715mm	2120 x 1210 x 715mm
Weight	22 kg	29 kg	43 kg (including stand)	51 kg (including stand)	59 kg (including stand)

*1 When the optional basket and Graphtec-specified media are used.

*2 HP-GL is a registered trademark of Hewlett-Packard Company.

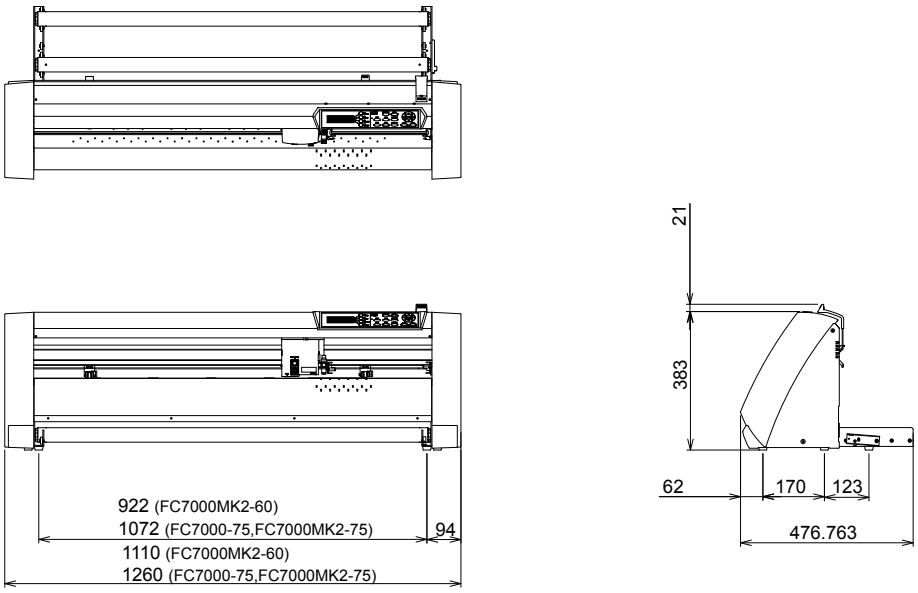
*3 The 2-pen unit is a factory-installed option. It cannot be retrofitted.

*4 The PPA32-TP12 pouncing pen cannot be used.

*5 The CB15UA cutter blade and a reinforced backing sheet must be used when cutting high-intensity reflective film.

1.2 External Dimensions

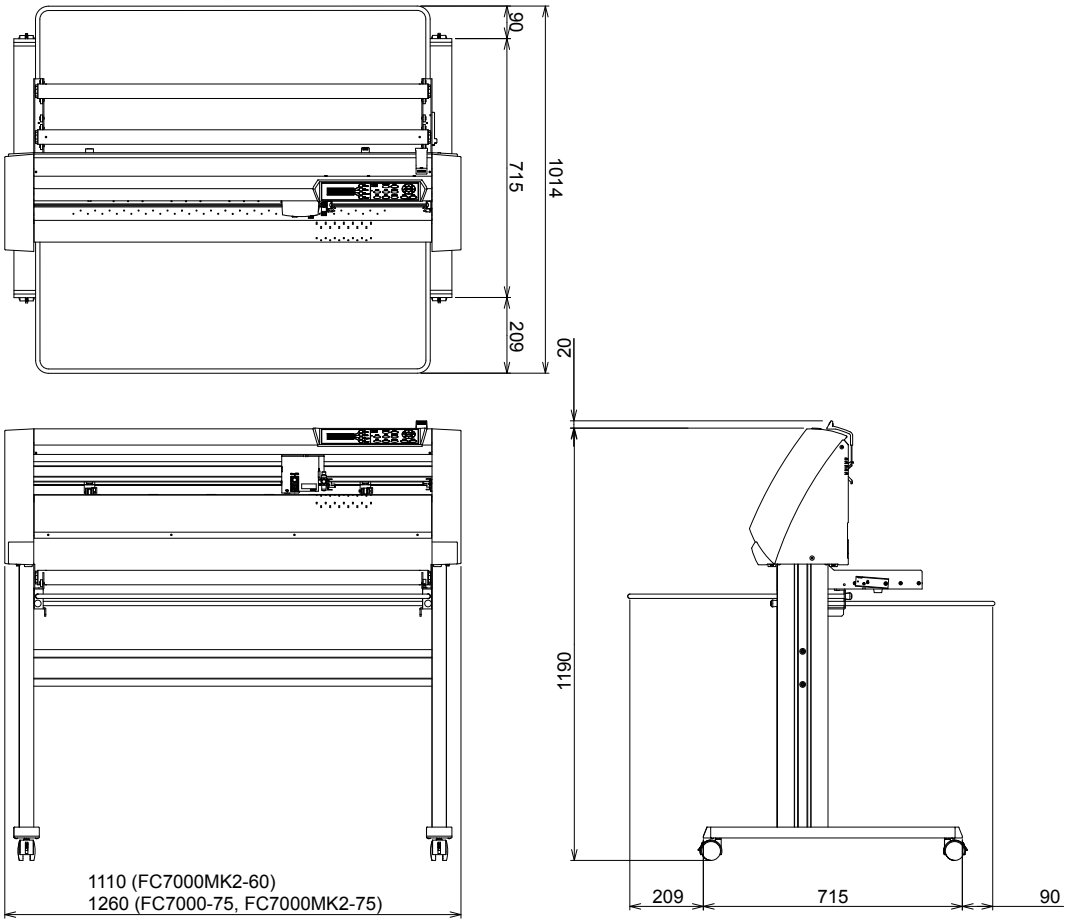
FC7000-75, FC7000MK2-60/75



Units: mm

Dimensional accuracy: ±5 mm

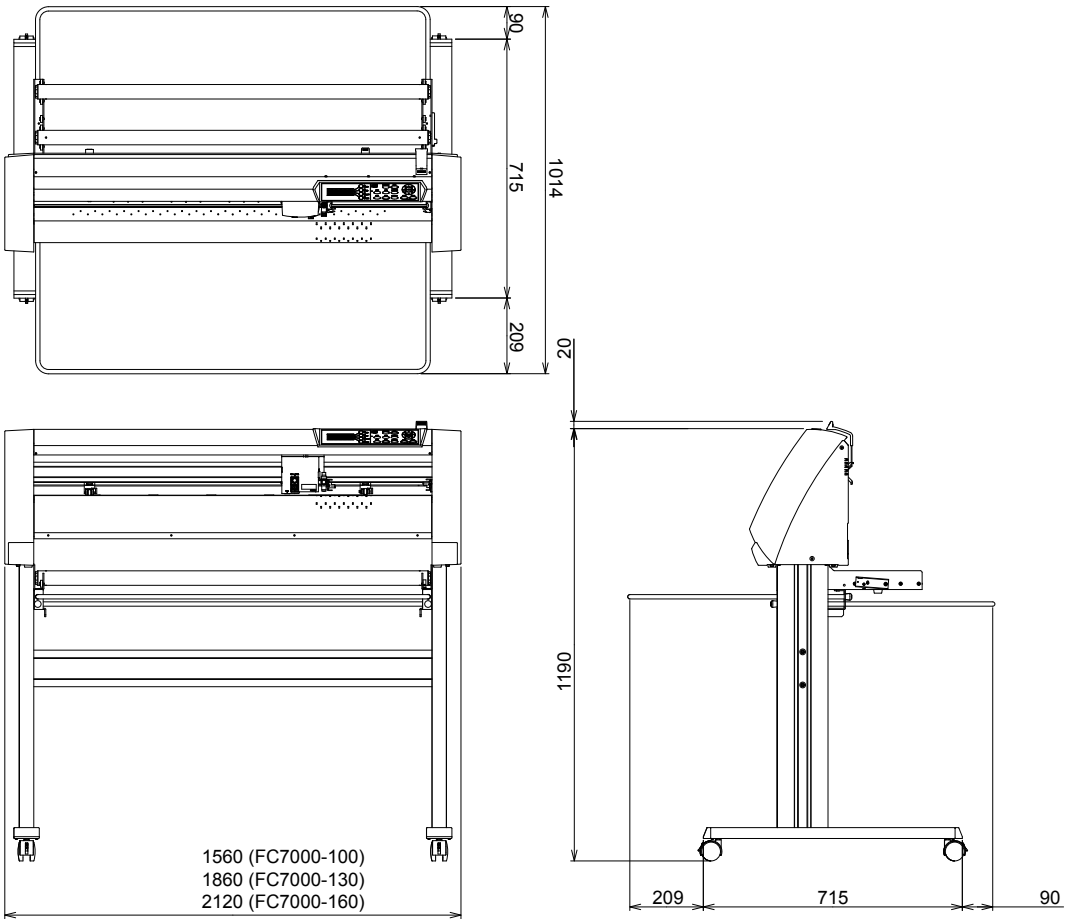
FC7000-75, FC7000MK2-60/75 with Option Stand



Units: mm

Dimensional accuracy: ±5 mm

FC7000-100/130/160



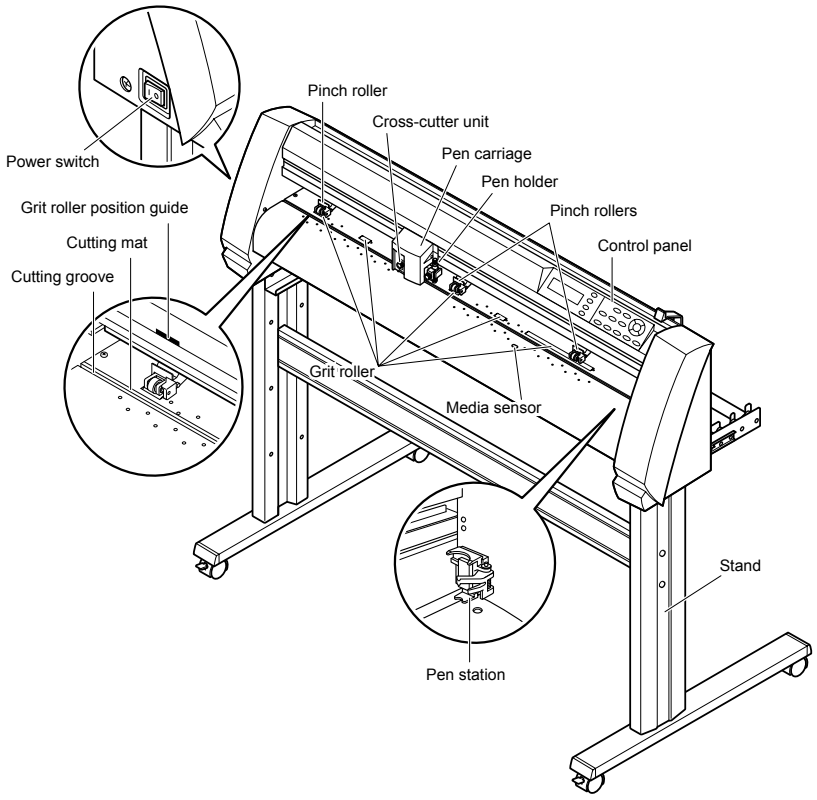
Units: mm

Dimensional accuracy: ±5 mm

2. PARTS NAMES and FUNCTIONS

2.1 Parts Names and Functions

Front View



Power switch: ..... Used to turn the plotter on and off.

Control panel: ..... Used to access various plotter functions.

Pinch rollers:..... Rollers that push the media against the grit rollers.

Grit rollers:..... Metallic rollers with a file-like surface that feed the media back and forth.

Media sensors: ..... The front sensor is used to sense the leading edge of the media. The rear sensor is used to sense the trailing edge of the media.

Pen carriage: ..... Moves the cutter-pen or plotting pen across the media during cutting or plotting.

Pen holder: ..... Holds the cutter-pen or plotting pen and moves it up or down.

Pen station (installed on 2-pen models only):
The second pen is mounted here.

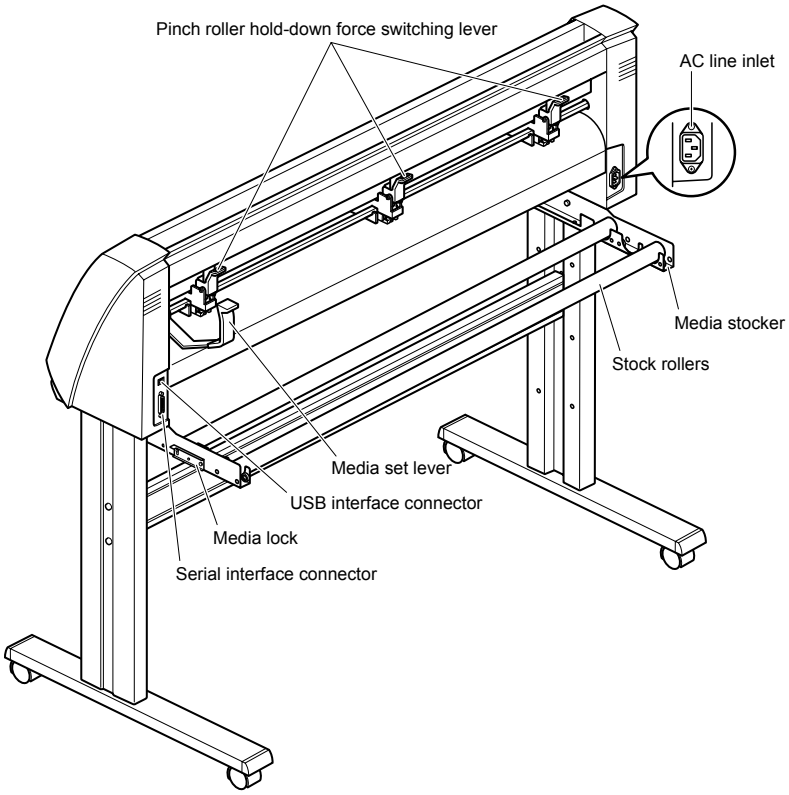
Stand: ..... Used to make the plotter more portable and to free up counter space.

Grit roller position guide:
Stickers on the front of the Y rail and the rear side of the top cover that show the position of each grit roller. Use these alignment marks as an aid in locating the pinch rollers.

Cutting groove: ..... Used when cross-cutting is performed.

Cross-cutter unit: ..... Used to perform cross-cutting of media so that the cut length can be removed from the roll.

Rear View



Media set lever: ..... Used to raise or lower the pinch rollers during the loading or unloading of media.

Pinch roller hold-down force switching lever:

Used to switch between the two pinch roller forces (strong and weak).

AC line inlet: ..... Inlet where the power cord is connected.

Media stocker: ..... Used to carry roll media and ensure its proper rotation.

Stock rollers:..... A media roll is placed on these rollers.

Media lock: ..... Used to prevent the stock rollers from rotating when the media roll has been placed on top of them. The media lock ensures that the media is pulled straight out from the roll.

USB interface connector:

Used to connect the plotter to the computer with a USB interface cable.

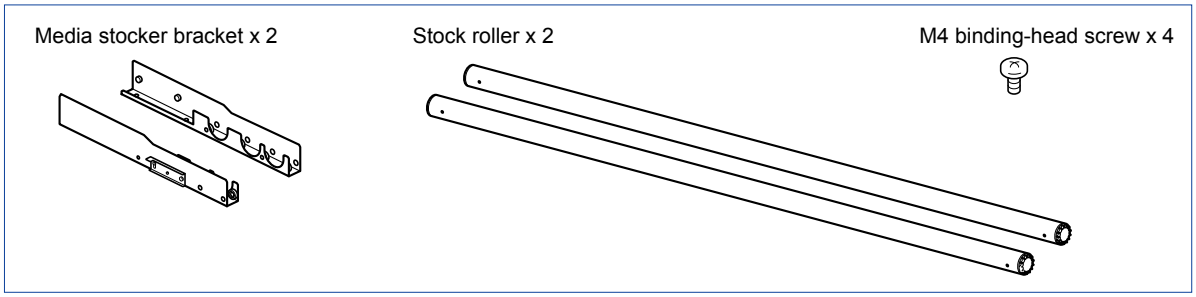
Serial interface connector:

Used to connect the plotter to the computer with an RS-232 serial interface cable.

2.2 Assembling the Plotter

FC7000-75 (desktop model; stand not provided but is available as an option)

When the FC7000-75 is used without a stand, the media stocker bracket is attached directly to the plotter. The media stocker is made up of the following parts.



ATTACHING THE MEDIA STOCKER

(1) Fasten the media stocker brackets to the left and right inside surfaces of the plotter unit, using two M4 binding-head screws for each media stocker bracket.

(2) Insert an M4 screw in the second hole from the front side of the plotter.

CHECKPOINT

- Check that all of the screws used for fastening have been tightened. The media may not be fed correctly if even one of the screws is loose.
- When installing the plotter, make sure that there are no objects in its vicinity.

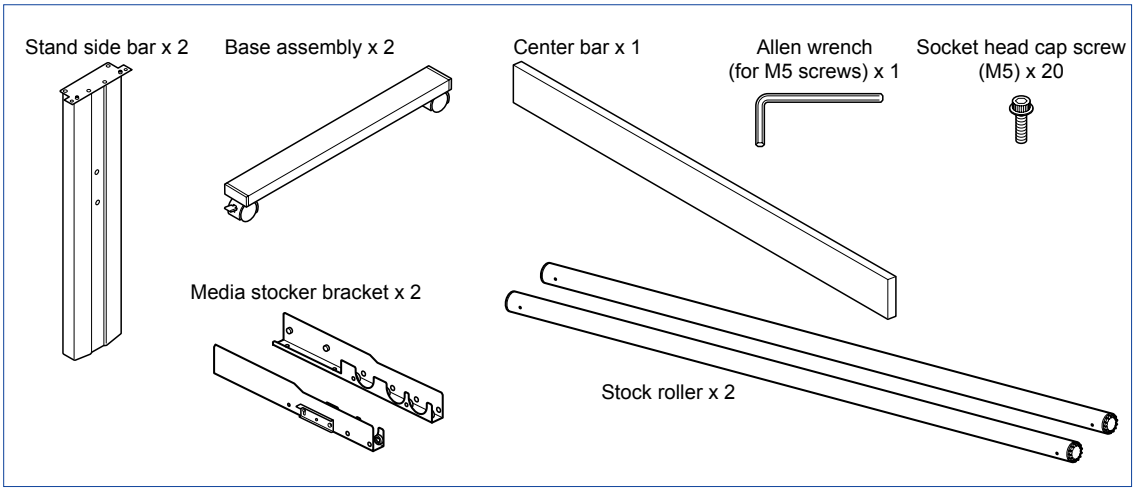
Leave a clear space of at least 300 mm around the plotter.

- When the FC7000-75 is used without a stand, the maximum diameter of the roll media that can be used is 160 mm.

FC7000-100/130/160 (stand provided)

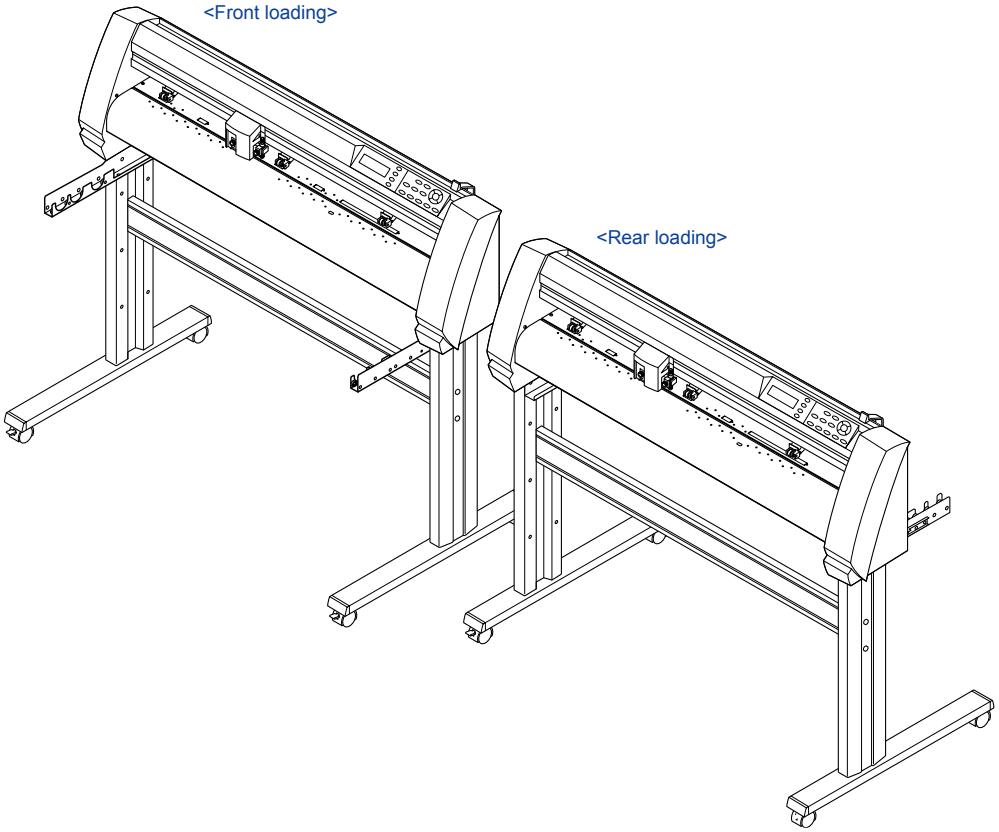
Assemble the stand, attach the media stocker to the stand, and then mount the plotter on the stand.

The stand and the media stocker are made up of the following parts.

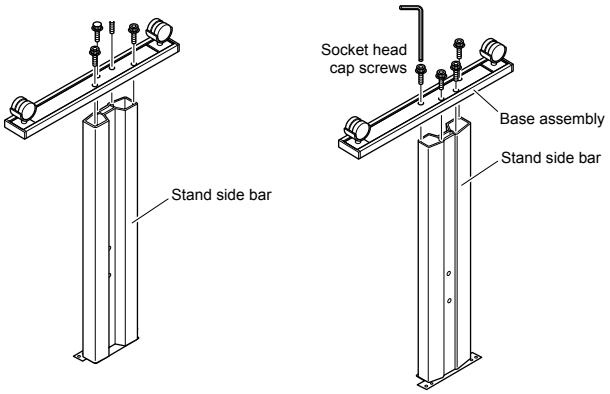


ASSEMBLING THE STAND

The mounting direction is different for the front loading and the rear loading models.



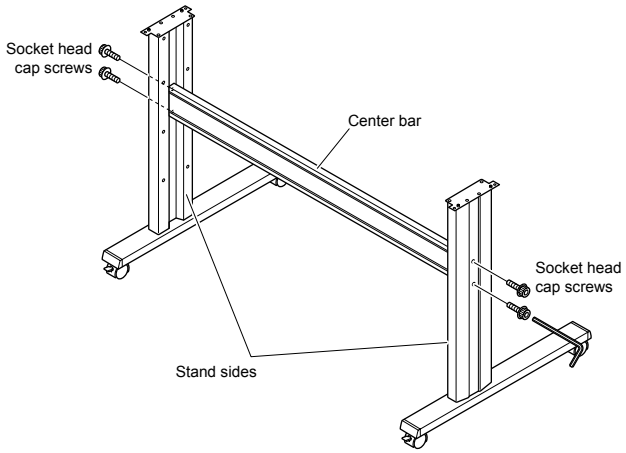
(1) Assemble the left and right stand sides. Fasten a base assembly to each of the stand side bars with four socket head cap screws, using the Allen wrench.



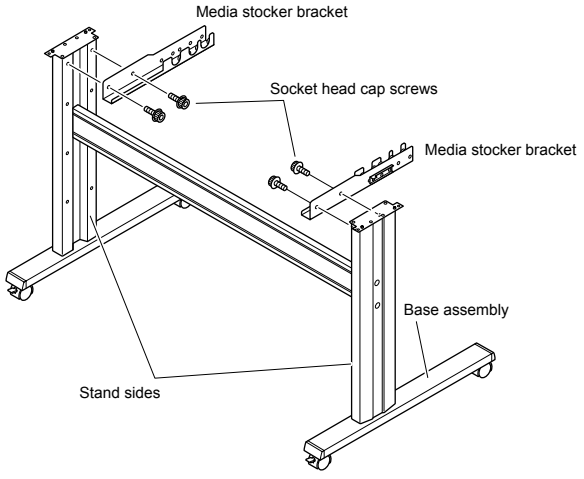
CHECKPOINT

• Assemble the stand so that the front and rear lengths of the base assembly are the same for both the left and right stand sides.

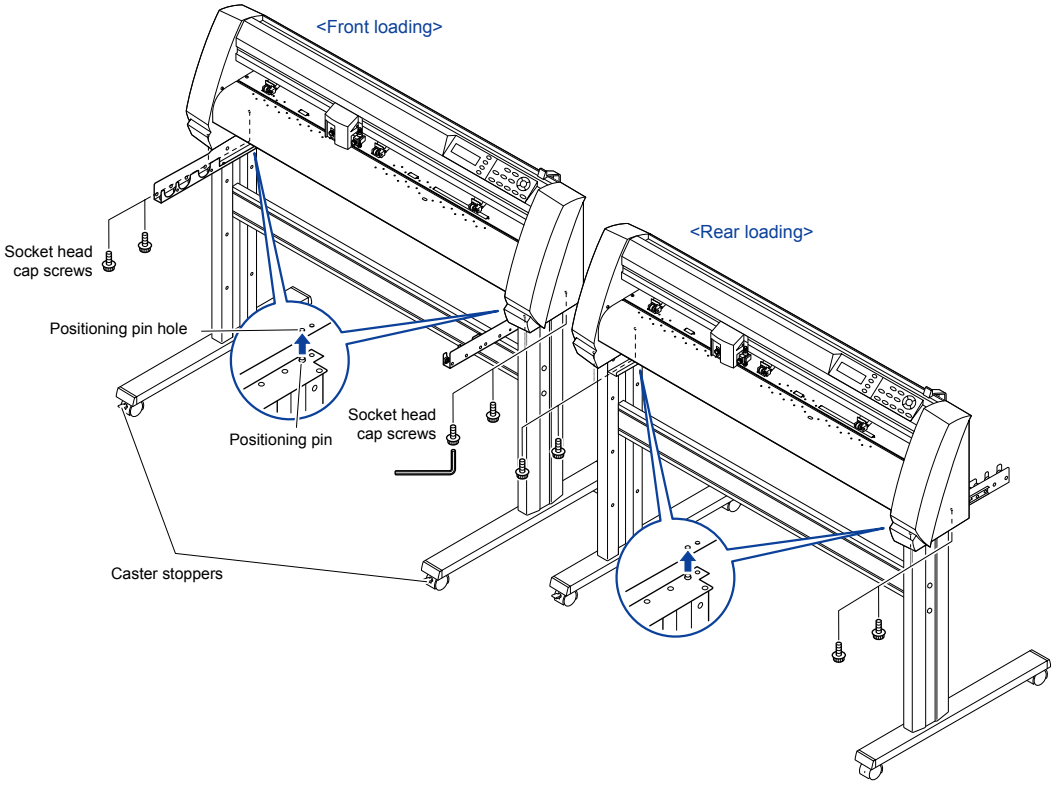
(2) Loosely fasten the center bar to the left and right stand sides with four socket head cap screws (two on each side), using the Allen wrench.



(3) Attach a media stocker bracket to each of the left and right stand sides with two socket head cap screws, using the Allen wrench. Mount the media stocker brackets so that each one protrudes directly above the longer of the two base assembly lengths.



(4) Mount the plotter on the stand by inserting the positioning pins on the stand into the positioning holes on the underside of the plotter. Fasten with four socket head cap screws (two on each side), using the Allen wrench.The cutting plotter mounting direction is different for the front loading and the rear loading models.



(5) Tighten the socket head cap screws loosely fastened in Step 2.

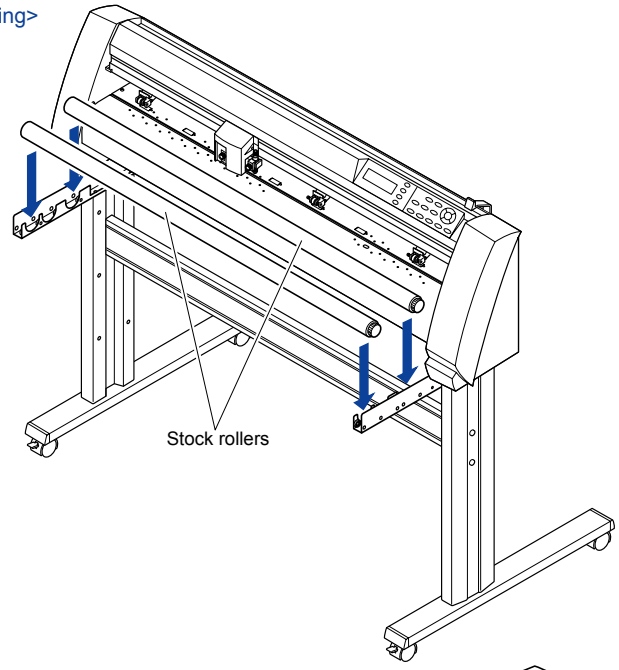
CHECKPOINT

- Check that all of the screws used for fastening have been tightened. The media may not be fed correctly if even one of the screws is loose.
- When installing the plotter, make sure that there are no objects in its vicinity. Leave a clear space of at least 300 mm around the plotter.

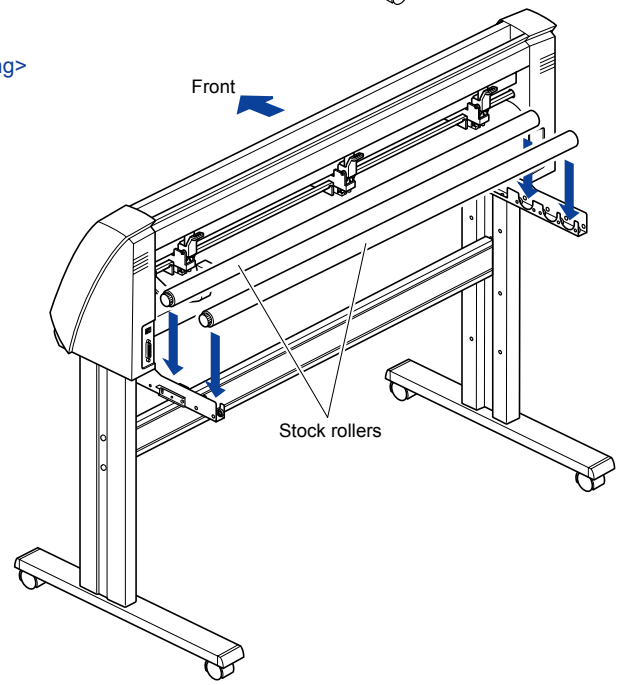
Mounting the stock rollers

Insert the stock rollers into the slots on the media stocker brackets.

<Front loading>



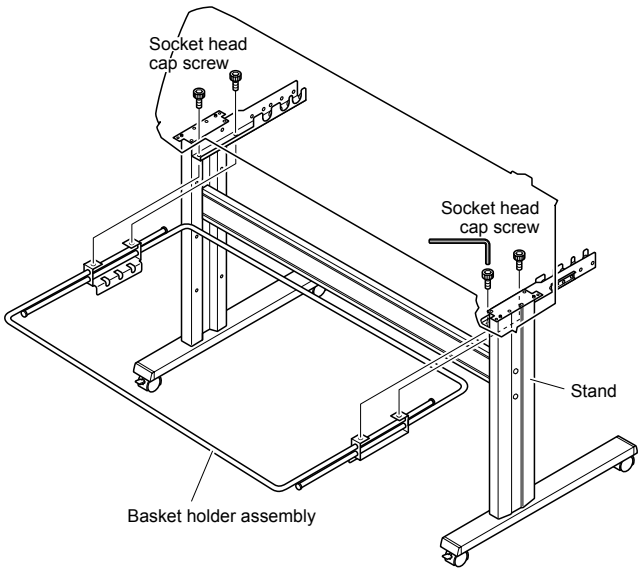
<Rear loading>



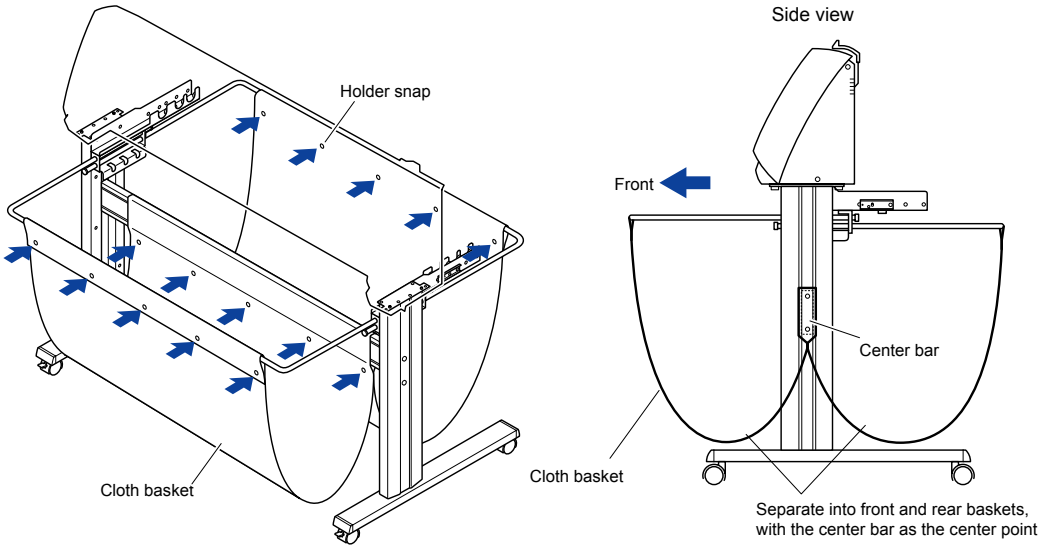
2.3 Attaching the FC7000 Basket (Option)

The FC7000 Basket box contains one basket holder assembly (one front basket tube and one rear basket tube inserted into two tube brackets), one cloth basket, and a screw/wrench set.

(1) Attach one of the two tube brackets on the basket holder assembly to the left side of the stand with two socket head cap screws, using the Allen wrench.
Repeat this step with the other side.



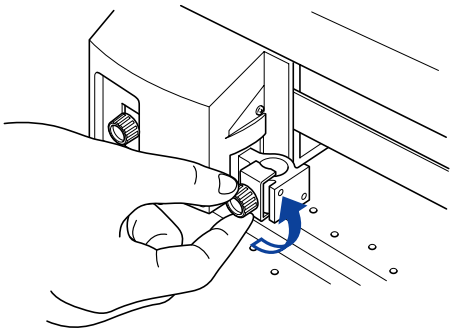
(2) Drape the middle section of the cloth basket over the stand's center bar, and then snap the middle section of the cloth basket around the center bar. Snap the front edge of the cloth basket around the front basket tube, and then snap the rear edge of the cloth basket around the rear basket tube.



2.4 Attaching a Cutter Pen

When mounting the cutter pen in the pen holder, push the pen all the way into the holder until its flange contacts the upper part of the holder and then tighten the screw firmly. To prevent injury, avoid touching the pen immediately after the cutting plotter is turned on or whenever the pen is moving.

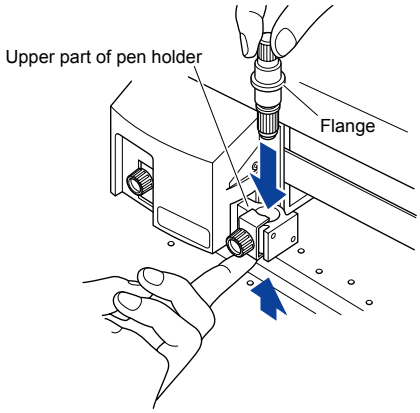
(1) Loosen the pen holder screw.



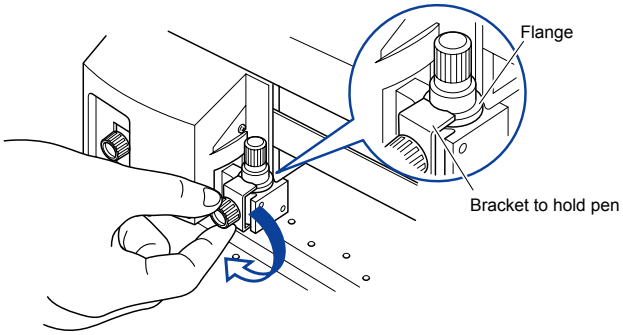
(2) While pushing the pen holder in the upward direction, push the pen all the way into the holder until its flange contacts the upper part of the holder.

CHECKPOINT

• When pushing the pen holder with your fingers, the blade tip may be protruding. Take care not to cut your fingers.



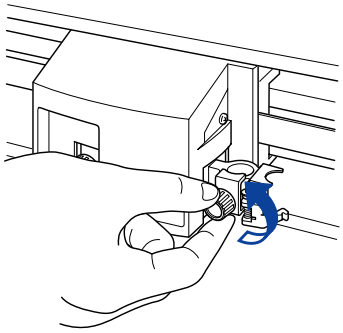
(3) Make sure that the pen bracket is engaged on the pen's flange, and then tighten the screw.



Attaching a Pen to the Two-Pen Holder (Option)

The two-pen holder is a factory-installed option, and cannot be retrofitted.

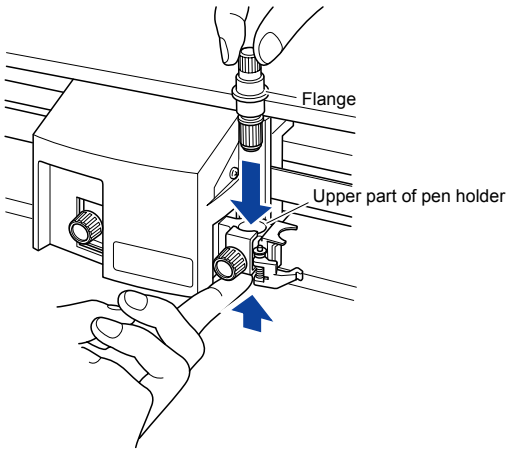
(1) Loosen the pen holder screw.



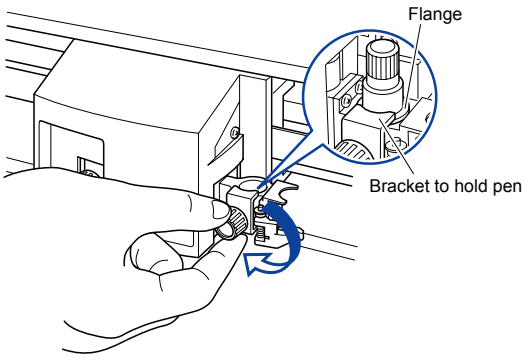
(2) While pushing the pen holder in the upward direction, push the pen all the way into the holder until its flange contacts the upper part of the holder.

CHECKPOINT

• When you push the pen holder with your fingers, the blade tip may be protruding. Take care not to cut your fingers.

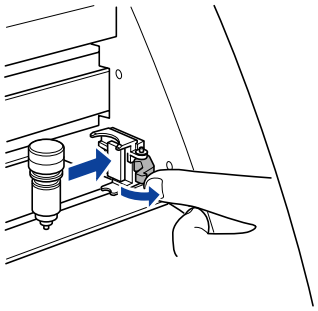


(3) Make sure that the pen bracket is engaged on the pen's flange, and then tighten the screw.

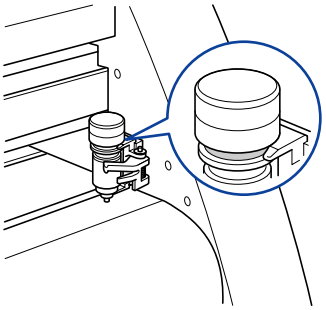


Attaching a Plotting Pen to the Pen Station

(1) Open the pen-hold mechanism on the pen station, and then attach a pen.



(2) Make sure that the bracket of the pen station is engaged in the upper groove of the pen.



(3) Close the pen-hold mechanism on the pen station to hold the pen in place.

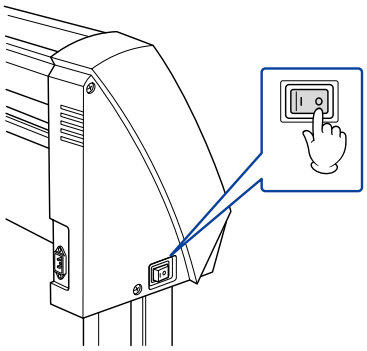
CHECKPOINT

- Do not leave a pen attached to the pen station for a long period of time, as the pen tip will dry up and make it unusable.
- To store the pen, remove it from the pen station and replace its protective cap.

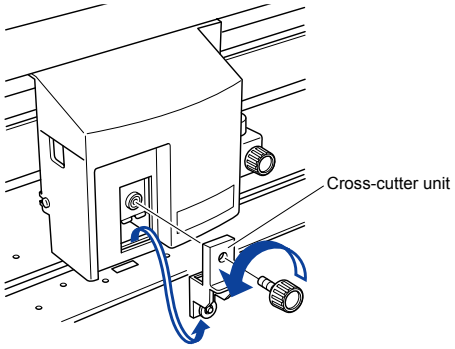
2.5 Replacing the Cross-Cutter Unit

Follow the procedure below to replace the cross-cutter unit that is used to cut the media after the plotting or cutting operation has been completed.

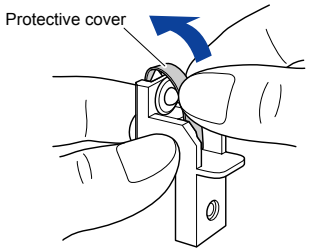
(1) Check that the power switch is turned off (the “O“ side is pressed down).



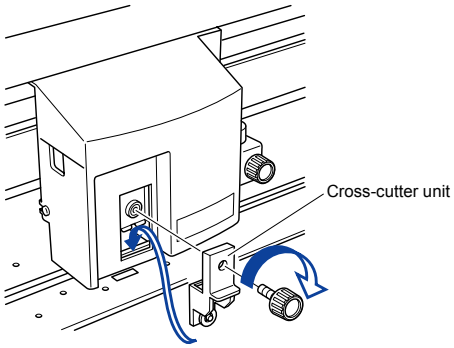
(2) Remove the screw holding the cross-cutter unit in place, and then remove the cross-cutter unit.



(3) Remove the protective cover from the replacement cross-cutter unit. Be sure to remove the protective cover while holding the part of the unit shown in the figure below.



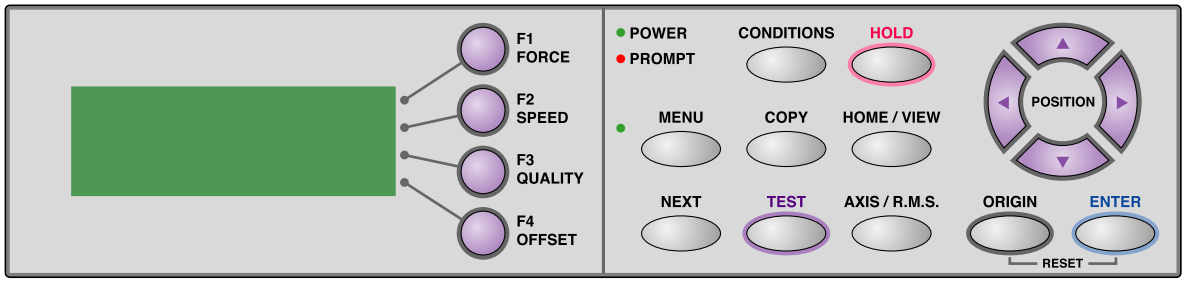
(4) Attach the replacement cross-cutter unit, and tighten the screw to hold it in place.



WARNING: The cross-cutter unit uses a very sharp blade. Take care not to cut yourself on the blade.

3. OPERATIONS

3.1 Control Panel



Indicator Lamps

POWER lamp: ..... Remains lit (green) while the plotter is on.

PROMPT lamp: ..... Lights green when the cutting data goes beyond the effective cutting area.

Function Keys

These four keys [F1, F2, F3 and F4] have functions which change as each menu changes. Depending on the menu being displayed, these keys are used to:

F1 (FORCE) key:..... When the FC7000 is in MENU mode, press the F1 key to select a function. When the FC7000 is online, press F1 to select the Condition numbers 1 and 5. After pressing the CONDITIONS key, use F1 to adjust the cutting/pen FORCE.

F2 (SPEED) key: ..... When the FC7000 is in MENU mode, press the F2 key to select a function. When the FC7000 is online, press F2 to select the Condition numbers 2 and 6. After pressing the CONDITIONS key, use F2 to adjust the cutting SPEED.

F3 (QUALITY) key:..... When the FC7000 is in MENU mode, press the F3 key to select a function. When the FC7000 is online, press F3 to select the Condition numbers 3 and 7. After pressing the CONDITIONS key, use F3 to adjust the cutting QUALITY.

F4 (OFFSET) key: ..... When the FC7000 is in MENU mode, press the F4 key to select a function. When the FC7000 is online, press F4 select the Condition numbers 4 and 8. After pressing the CONDITIONS key, use F4 to adjust the cutting OFFSET.

Position Keys

POSITION keys..... Depending on the operating status of the FC7000, the POSITION keys have the following functions.

When the FC7000 is in MENU mode, use the POSITION keys to change the setting values shown in the various menu displays. The POSITION keys are also used to move the pen carriage and the media. If a POSITION key is pressed once, the pen carriage moves the length of the step specified in Section 5.9, “Using the MOVE STEP Function of the FC7000 User’s Manual”. If the key is held down, the movement is continuous. To speed up the movement of the pen carriage, press the NEXT key together with a POSITION key.

Menu Keys

CONDITIONS key: ..... Press CONDITIONS to change the pen conditions shown on the FC7000 display panel.

HOLD key:..... Press HOLD to temporarily suspend cutting or plotting. While the cutting or plotting operation is suspended, the media set lever can be lowered to enable skewed media to be reset if necessary.

MENU key: ..... Press MENU to access the MENU mode. When this key is pressed, the MENU mode is accessed and the green LED lights. Press it again to cancel MENU mode. The green LED goes out. Use this key to set the various menu functions. If data is received after the MENU key has been pressed, that data is temporarily stored in the plotter's buffer.

COPY key:..... Press COPY to repeat the cutting operation defined by the data in the plotter's buffer.

HOME/VIEW key:..... Press HOME/VIEW to move the pen carriage to the standby position. Press it again to move the pen carriage to the origin point. Press it one more time to return the pen carriage to its former position.

NEXT key: ..... When the FC7000 is in MENU mode, press NEXT to move to the next menu page.

TEST key:..... Press TEST to run a cutting test to check whether the currently-selected cutting conditions are compatible with the media loaded.

AXIS/R.M.S. key:..... Press AXIS/R.M.S. to initiate automatic reading of the registration marks. If Off has been selected for the registration mark mode, this key is used to perform axis alignment.

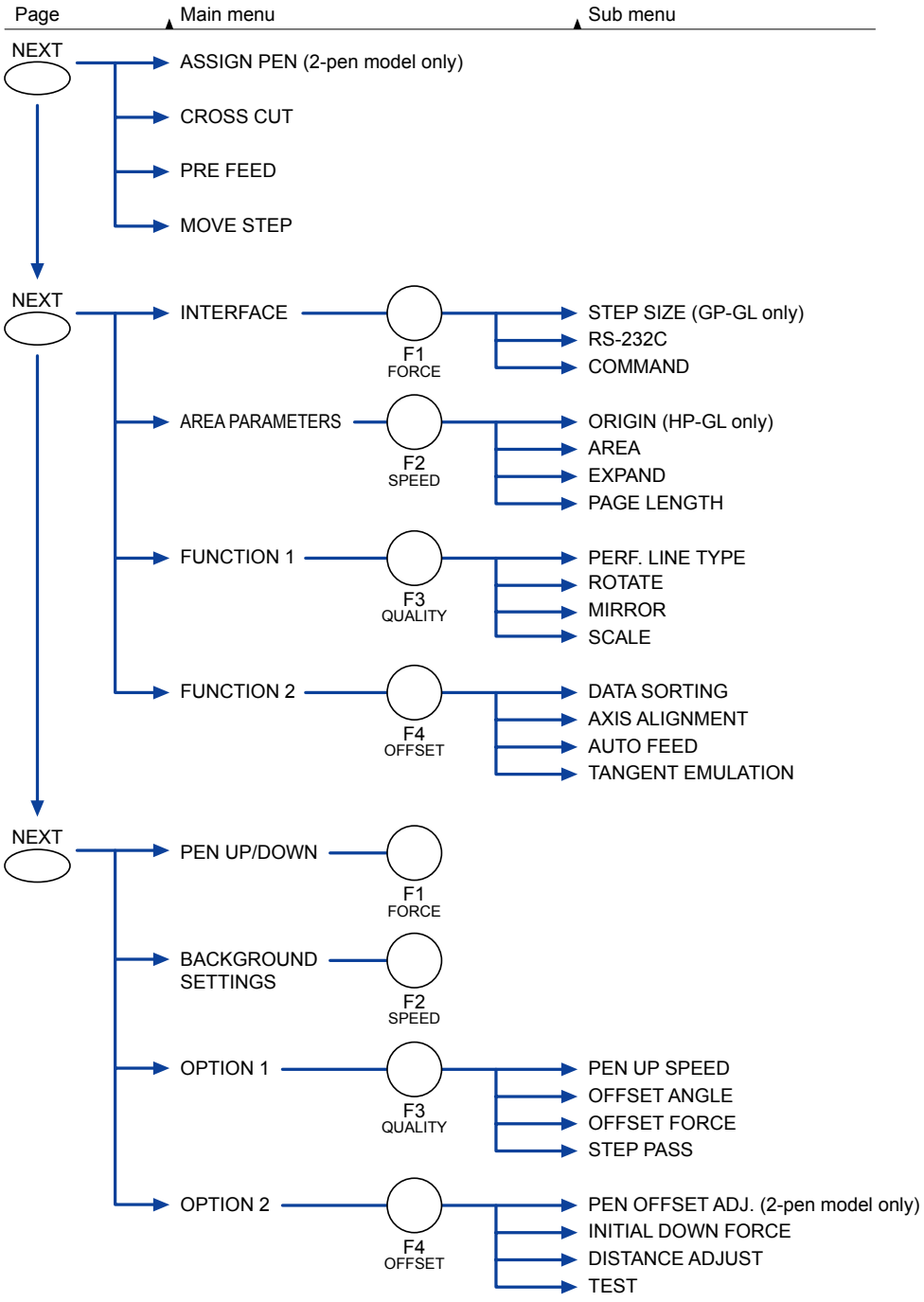
ORIGIN key: ..... Press ORIGIN to move the origin point. To reset the FC7000, press ORIGIN and ENTER together when the initial MENU mode screen is displayed.

ENTER key:..... Press ENTER to register your setting after setting a function.
To reset the FC7000, press ENTER and ORIGIN together when the INITIAL MENU mode screen is displayed. The cutting area can also be displayed by pressing the ENTER key in Ready status.

3.2 Menu List

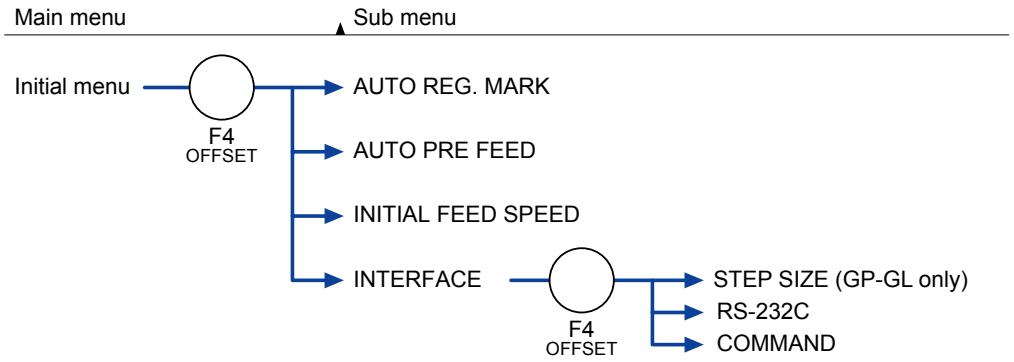
When the FC7000 is in MENU mode

The Main menu can be accessed by pressing the NEXT key when the plotter is in MENU mode (the MENU lamp is lit). Press the corresponding function key to select the sub menu when the desired main menu appears.



When the power is turned on without any media loaded

If the power is turned on without any media loaded in the plotter, the initial menu is displayed on the LCD. The initial menu configuration is as follows.



3.3 Description of Background Settings

The FC7000 is provided with the special functions listed below.

• Display Language Setting (LANGUAGE SELECTION)

This function sets the language used on the display. One of seven languages can be selected: English, French, German, Italian, Portuguese, Spanish, or Japanese.

• Enabling/Disabling the ";" and ":" Commands (COMMAND ; and :)

Note: This function can only be specified when the COMMAND setting is GP-GL.

This function enables or disables the ";" and ":" commands when the COMMAND setting is GP-GL. If the first part of the data is lost, these commands may be having an adverse effect. In this case, set this function to DISABLED (the default setting is ENABLED).

• Moving the Pen While Raised or Lowered in Response to the "W" Command ("W" COMMAND)

Note: This function can only be specified when the COMMAND setting is GP-GL.

This function selects whether, upon receipt of the "W" command for the drawing of arcs, the plotter moves the pen to the specified starting position in the raised status or in the pen status (raised or lowered) that was in effect immediately prior to receipt of the "W" command.

When PEN DOWN is selected, the pen is moved to the starting position for the drawing of arcs in the pen status (raised or lowered) that was in effect immediately prior to receipt of the "W" command. When PEN UP is selected, the pen is moved to the starting position for the drawing of arcs in the raised status. This setting is only effective if a cutter blade has been selected in the cutter-pen settings.

• Model ID Response (MODEL EMULATED)

Note: This function can only be specified when the COMMAND setting is HP-GL™.

This function sets the response to the "OI" command when the COMMAND setting is HP-GL™.

When 7550 is set, the "OI" command response is 7550.

When 7586 is set, the "OI" command response is 7586.

• Setting Priority (CONDITION PRIORITY)

This function sets whether the plotter places priority on the cutting conditions specified through command input from the computer or through manual settings (on the plotter control panel).

When MANUAL is selected, cutting is performed using the cutting conditions set at the control panel, and cutting conditions sent from the computer are ignored.

When PROGRAM is selected, the cutting conditions can be set either at the plotter's control panel or by command input from the computer. The most recent setting conditions are set. When the power is turned off, only the conditions set at the control panel are retained in the plotter's internal memory.

• Enabling/Disabling the Pen Select Command (PEN SELECT)

Note: This function can only be specified for a 2-pen model.

This function enables or disables the PEN SELECT command ("J" Command in GP-GL mode or the "SP" command in HP-GL™ mode) for a 2-pen model.

• Initial Blade Tip Position Setting (INITIAL BLADE CONTROL POSITION)

The cutter blade is placed on the medium to orient it after the power is turned on or the cutter-pen conditions are set. This is referred to as “initializing” the cutter blade.

This function sets the “Initial Blade Tip Position” for this operation.

When 2 mm BELOW is selected, initial blade control is performed at a position 2 mm below the cutting start position.

When OUTSIDE is selected, initial blade control is performed outside of the effective cutting/plotting area.

• Setting the Display Length Unit (LENGTH UNIT)

This function enables you to set the unit for coordinates appearing on the display panel to either millimeter or inch units.

• Enabling/Disabling Pen Up Move (PEN UP MOVE)

This function sets whether the pen will travel to each point specified or only from the initially specified point to the last specified point when consecutive commands are received specifying pen movement while it is raised.

When ENABLED is selected, the pen travels consecutively to each coordinate specified by the data received.

When DISABLED is selected, the pen travels directly from the initially specified point to the last specified point.

• Enabling/Disabling the Media Sensors (MEDIA SENSOR)

This function enables or disables the media sensors that detect the size of the medium in the feed direction.

When ENABLED is selected, the feed-direction media sensors are enabled.

When DISABLED is selected, the feed-direction media sensors are disabled.

• Enabling/Disabling the Pinch Roller Sensors (PINCH ROLLER SENSOR)

This function enables or disables the pinch roller sensors that detect the width of the medium.

When ENABLED is selected, the pinch roller sensors are enabled.

When DISABLED is selected, the pinch roller sensors are disabled.

CHECKPOINT

- Since the pinch roller sensors are also used for the cross-cutting operation, cross-cutting cannot be performed if DISABLED is selected.

• Circle-Command Resolution Setting (CIRCLE RESOLUTION)

Note: This function can only be specified when the COMMAND setting is HP-GL™.

This function sets whether the resolution is automatically set or fixed at a constant 5 degrees when a plotter circle command is output while the COMMAND setting is HP-GL™.

• Cross-cut Force Setting (CROSS CUT PRESSURE)

This function sets the cutting force for the cross-cut operation.

The default value is 30, but the setting should be changed to suit the media type.

Thin media: Decrease the value.

Thick media: Increase the value.

• Enabling or Disabling the 1/2 Pen Setting (CHECK PEN)

Note: This function can only be specified for a 2-pen model.

This function checks whether the physical PEN 2 is actually mounted in the pen station during the media detection operation on a 2-pen model.

When ENABLED is selected, a check is performed

When DISABLED is selected, a check is not performed. If DISABLED is selected, always check that PEN 2 is mounted in the pen station before turning on the power.

• Fan Suction Setting (FAN POWER)

This function sets the suction force used to affix media to the plotter.

Thin media: Weak

Normal media: Normal

• Enabling/Disabling the Beep Setting (BEEP FOR KEY OPERATION)

This function selects whether to enable or disable the beep that is emitted whenever a control panel key is pressed.

ON: The beep sounds.

OFF: The beep does not sound.

• Enabling/Disabling Auto Registration Mark Recognition (MARK AUTO SCAN)

This function enables or disables the automatic sensing of registration marks from the plug-in software.

ON: The registration marks are sensed automatically.

OFF: The registration marks are not sensed automatically.

CAUTION: If DISABLED was selected for the media or pinch roller sensors, be sure to specify the cutting or plotting area. If the cutting or plotting area is not specified, the blade tip and the cutting mat may be damaged, and the pen carriage may strike the sides of the plotter.

3.4 Setting the Background Settings

SETTING PROCEDURE

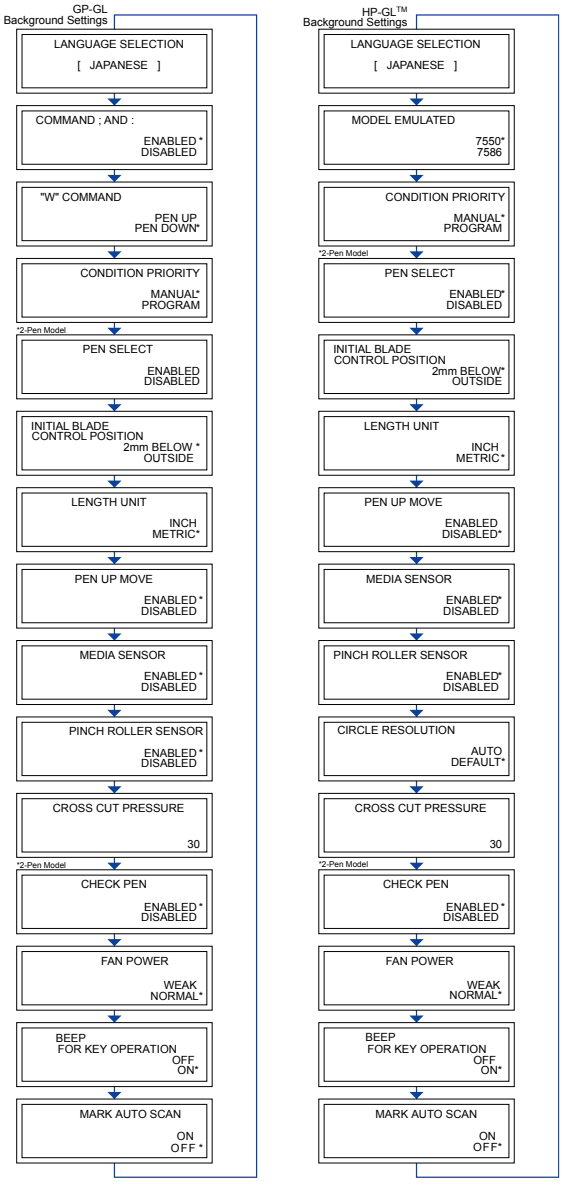
(1) Use the following procedure to display the background setting menus.

Load media in the plotter, and then turn on the power. Press the MENU key and then press the NEXT key until the following menu appears.

```
          PEN UP/DOWN>
BACKGROUND SETTINGS>
          OPTION 1>
          OPTION 2>
```

Press the F2 key (BACKGROUND SETTINGS) to enter the setting mode.

(2) Press the NEXT key to move through the BACKGROUND SETTINGS menus in the displayed sequence.



(3) At the LANGUAGE SELECTION menu, use the (△▽) POSITION keys to select the desired language and then press the ENTER key.

At the CROSS CUT PRESSURE menu, use the (△▽) POSITION keys to increase or decrease the value and then press the ENTER key.

For all other displays, press the F3 or the F4 key to move the asterisk to your desired choice, and then press the ENTER key. The asterisk indicates the currently selected setting. If you do not wish to change the currently displayed setting, press the NEXT key to move to the next menu.

(4) Turn off the power when all the settings are completed.

CHECKPOINT

- These settings are retained in the plotter's memory even when the power is turned off.

4. RECOMMENDED PARTS LIST

FC7000-75/100/130/160

No.	Part No.	Description	-75	-100	-130	-160	Remarks
1	772126500	Main Board for FC7000	1	1	1	1	FC7000
	792700703	New Main Board for the FC7000	1	1	1	1	Same as FC7000Mk2
2	500052449	Switching Power Supply Unit	1	1	1	1	PS3122
3	500052478	LG-217D-3, Cam Sensor	1	1	1	1	
4	500052515	PS-117ED1	2	2	2	2	Paper Sensor
5	682132430	UGJMEE-A7JGR34	–	1	1	1	X motor
6	682132440	UGJMEE-A7MGR73	2	1	1	1	Y motor, XY motor for 75
7	772126660	Pen Board	1	1	1	1	
8	772126650	Pinch Roller Sensor Board	1	1	1	1	
9	692126531	FFC312203A, Flexible Cable 75	1	–	–	–	
10	692126541	FFC312204A, Flexible Cable 100	–	1	–	–	
11	692126551	FFC312205A, Flexible Cable 130	–	–	1	–	
12	692126561	FFC312206A, Flexible Cable 160	–	–	–	1	
13	772126700	Pen Block Assembly	1	1	1	1	
14	772126710	Light Pointer Assembly	1	1	1	1	
15	772126720	Registration Mark Sensor Board, PR312207A	1	1	1	1	
16	500052472	TDS-05B-DC12V, Fan	1	2	2	2	
17	772126560	LCD Assembly	1	1	1	1	
18	772126570	Control Panel Board, PR312208A	1	1	1	1	
19	692126521	FFC312202A, Control Panel Flexible Cable	1	1	1	1	
20	772126340	Cross Cutter Assembly	1	1	1	1	
21	621261220	150S2M-1150, Y Belt 75	1	–	–	–	
22	621262020	Drive Roller Set 75	1	–	–	–	
23	621262010	Drive Roller Shaft 75	1	–	–	–	
24	621271220	300S2M-1450, Y Belt 100	–	1	–	–	
25	621272020	Drive Roller Set 100	–	1	–	–	
26	621272010	Drive Roller Shaft 100	–	1	–	–	
27	621281220	300S2M-1750	–	–	1	–	
28	621282020	Drive Roller Set 130	–	–	1	–	
29	621282010	Drive Roller Shaft 130	–	–	1	–	
30	621291220	300S2M-2010	–	–	–	1	
31	621292020	Drive Roller Set 160	–	–	–	1	
32	621292011	Drive Roller Shaft 160	–	–	–	1	
33	095002121	Push Roller	2	3	3	3	
34	378413041	130TN15-10W, Motor Belt	2	2	2	2	
35	095013010	Roller BB13, Y Slider Roller	7	7	7	7	
36	621261053	Cutting Mat 75	1	–	–	–	
37	621271053	Cutting Mat 100	–	1	–	–	
38	621281053	Cutting Mat 130	–	–	1	–	
39	621291053	Cutting Mat 160	–	–	–	1	

FC7000MK2

No.	Part No.	Description	-60	-75	-100	-130	-160	Remarks
1	792700703	Main Board for FC7000Mk2	1	1	1	1	1	FC7000MK2
2	500052449	Switching Power Supply Unit	1	1	1	1	1	PS3122
3	500052478	LG-217D-3, Cam Sensor	1	1	1	1	1	
4	500052515	PS-117ED1	2	2	2	2	2	Paper Sensor
5	682126200	DMN37HE-003	1	1	–	–	–	X motor
	682132430	UGJMEE-A7JGR34	–	–	1	1	1	
6	682126200	DMN37HE-003	1	1	1	1	1	Y motor
7	772126660	Pen Board	1	1	1	1	1	
8	772126650	Pinch Roller Sensor Board	1	1	1	1	1	
9	692126531	FFC312203A, Flexible Cable 60/75	1	1	–	–	–	
	692126541	FFC312204A, Flexible Cable 100	–	–	1	–	–	
	692126551	FFC312205A, Flexible Cable 130	–	–	–	1	–	
	692126561	FFC312206A, Flexible Cable 160	–	–	–	–	1	
10	772126700	Pen Block Assembly	1	1	1	1	1	
11	772126710	Light Pointer Assembly	1	1	1	1	1	
12	772126720	Registration Mark Sensor Board, PR312207A	1	1	1	1	1	
13	500052472	TDS-05B-DC12V, Fan	1	1	2	2	2	
14	772126560	LCD Assembly	1	1	1	1	1	
15	772126570	Control Panel Board, PR312208A	1	1	1	1	1	
16	692126521	FFC312202A, Control Panel Flexible Cable	1	1	1	1	1	
17	772126340	Cross Cutter Assembly	1	1	1	1	1	
18	621391220	150S2M1000, Y Belt 60	1	–	–	–	–	
	621261220	150S2M-1150, Y Belt 75	–	1	–	–	–	
	621271220	300S2M-1450, Y Belt 100	–	–	1	–	–	
	621281220	300S2M-1750, Y Belt 130	–	–	–	1	–	
	621291220	300S2M-2010, Y Belt 160	–	–	–	–	1	
19	621392020	Drive Roller set 60	1	–	–	–	–	
	621262020	Drive Roller Set 75	–	1	–	–	–	
	621272020	Drive Roller Set 100	–	–	1	–	–	
	621282020	Drive Roller Set 130	–	–	–	1	–	
	621292020	Drive Roller Set 160	–	–	–	–	1	
20	621391340	Drive Roller Shaft 60	1	–	–	–	–	
	621262010	Drive Roller Shaft 75	–	1	–	–	–	
	621272010	Drive Roller Shaft 100	–	–	1	–	–	
	621282010	Drive Roller Shaft 130	–	–	–	1	–	
	621292011	Drive Roller Shaft 160	–	–	–	–	1	
21	095002121	Push Roller	2	2	3	3	3	
22	378413041	130TN15-10W, Motor Belt	2	2	2	2	2	
23	095013010	Roller BB13, Y Slider Roller	7	7	7	7	7	
24	621390050	Cutting Mat 60	1	–	–	–	–	
	621261053	Cutting Mat 75	–	1	–	–	–	
	621271053	Cutting Mat 100	–	–	1	–	–	
	621281053	Cutting Mat 130	–	–	–	1	–	
	621291053	Cutting Mat 160	–	–	–	–	1	

5. LIST OF TOOLS

5.1 Tools

No.	Adjustment Item	Jig	Tool
1	Pen force adjustment	Cutter Pen Holder (CB09)	Colex gauge (50,300,500 gf)
2	Distance adjustment		Glass scale
3	Pen block height adjustment	10 mm height block	
4	Firmware update		PC, USB I/F cable
5	X-drive belt tension adjustment		Push-pull gauge (2 kg)
6	Y-drive belt tension adjustment		Push-pull gauge (2 kg)
7	Replacing the main board		Screwdriver
8	Replacing the vacuum fan		

5.2 Greasing And Gluing Points

No.	Grease or Glue Point	Grease or Glue name	Application quantity
1	Cam	Shinetu silicon grease G501	Suitable quantity
2	X-drive motor pulley	Shinetu silicon grease G501	Suitable quantity
3	Y-drive motor pulley	Shinetu silicon grease G501	Suitable quantity
4	X-drive pulley	Shinetu silicon grease G501	Suitable quantity
5	Y-drive pulley	Shinetu silicon grease G501	Suitable quantity
6	Y-tension pulley	Shinetu silicon grease G501	Suitable quantity
7	Y-rail, pinch roller assy sliding area	Shinetu silicon grease G501	Suitable quantity
8	Y-motor drive pulley set screws	Loctite 222	Small quantity
9	X-motor drive pulley set screws	Loctite 222	Small quantity
10	X-drive pulley set screws	Loctite 222	Small quantity

6. DISASSEMBLY AND REASSEMBLY

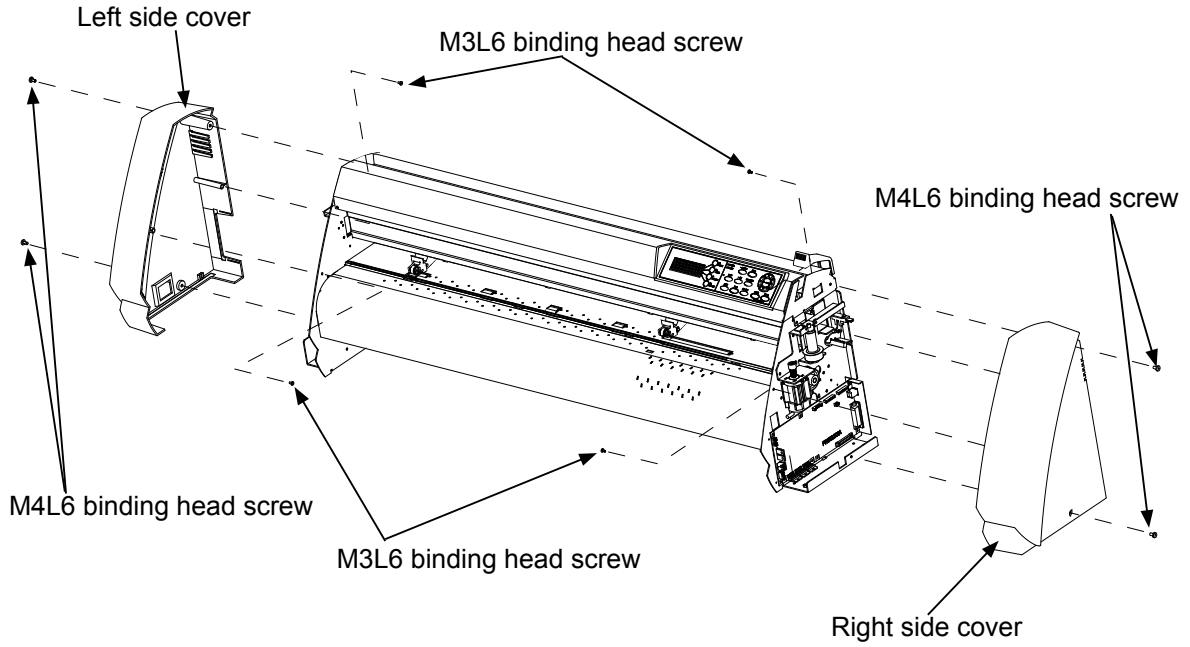
6.1 Exterior Parts

6.1.1 How to Replace the Right Side Cover

How to detach the right side cover

(1) Remove the two M4L6 binding head screws from the right side cover.

(2) Remove the two M3L6 binding head screws from the right side plate.



How to reinstall the right side cover

(1) Mount the right side cover to the right side plate.

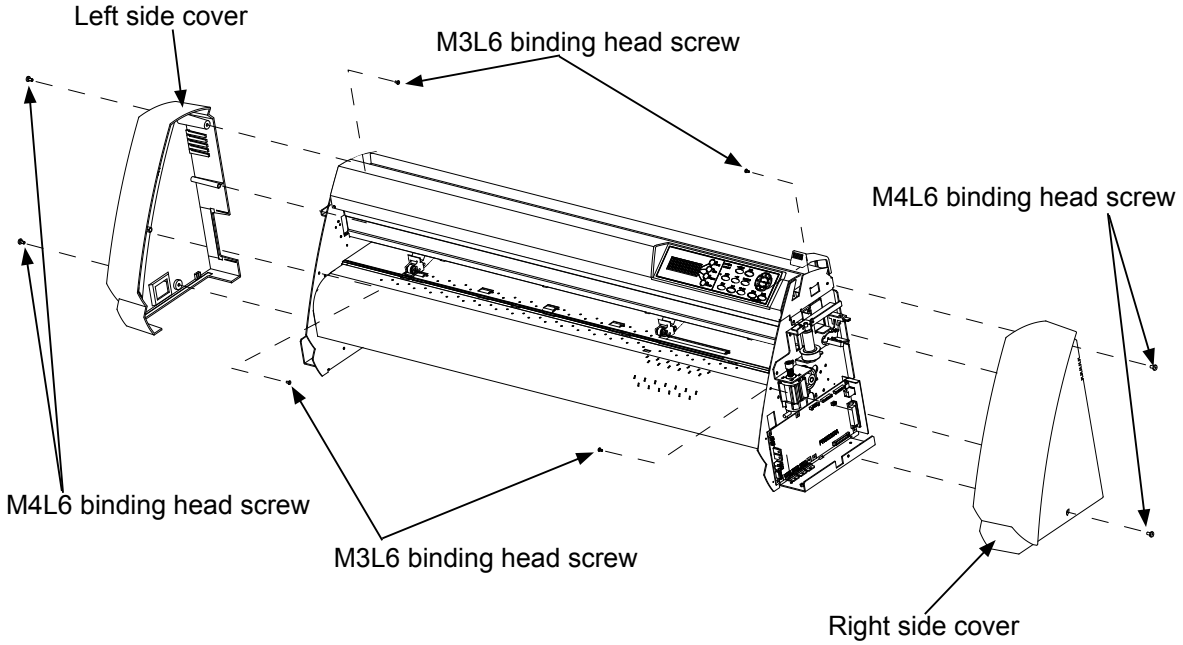
(2) Fasten the two M4L6 binding head screws and the two M3L6 binding head screws.

6.1.2 How to Replace the Left Side Cover

How to detach the left side cover

(1) Remove the two M4L6 binding head screws from the left side cover.

(2) Remove the two M3L6 binding head screws from the left side plate.



How to reinstall the left side cover

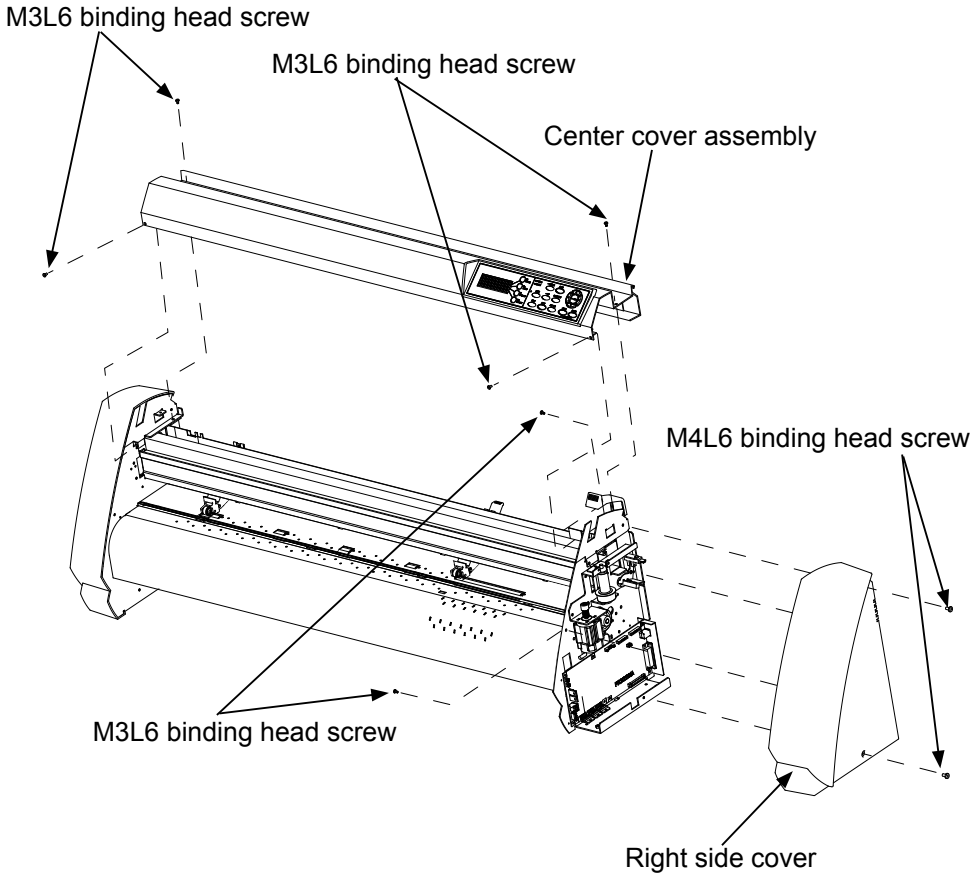
(1) Mount the left side cover to the left side plate.

(2) Fasten the two M4L6 binding head screws and the two M3L6 binding head screws.

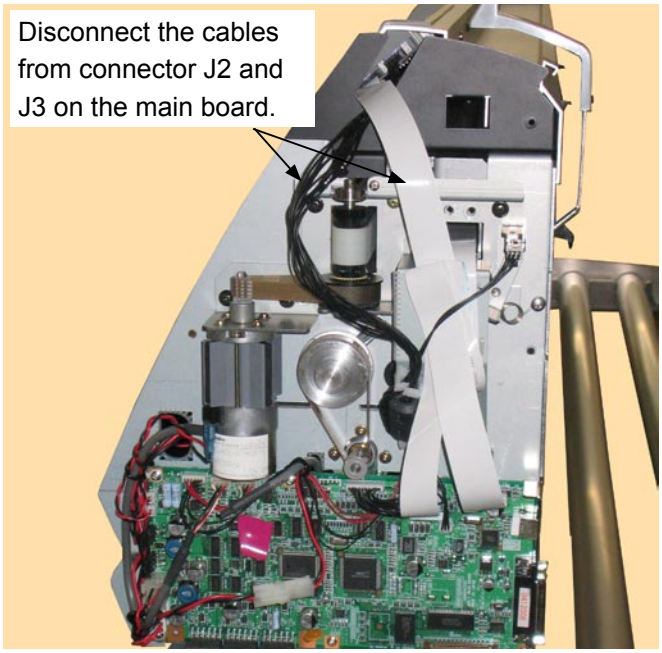
6.1.3 How to Replace the Center Cover

How to detach the center cover

(1) Detach the right side cover (see Subsection 6.1.1).



(2) Disconnect the cables from connector J2 and J3 on the main board.



(3) Remove the four M3L6 binding head screws from the center cover assembly.

(4) Detach the center cover assembly.

How to reinstall the center cover assembly

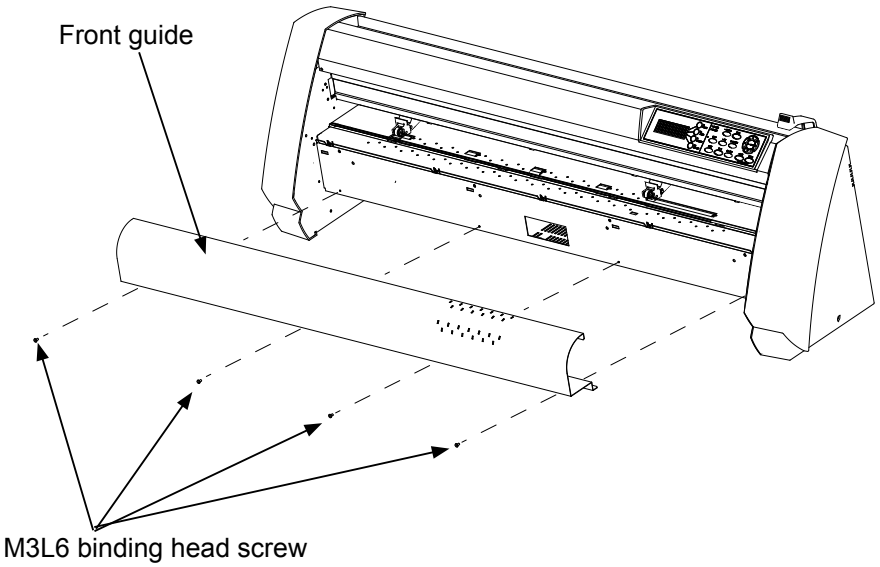
(1) Reattach the center cover assembly in the reverse order in which it was detached.

6.1.4 How to Replace the Front Guide

How to detach the front guide

(1) Remove the four M3L6 binding head screws from the front guide for the FC7000-75.
(Remove the five M3L6 binding head screws from the front guide for the FC7000-100.
Remove the six M3L6 binding head screws from the front guide for the FC7000-130.
Remove the seven M3L6 binding head screws from the front guide for the FC7000-160.)

(2) Detach the front guide.



How to reinstall the front guide

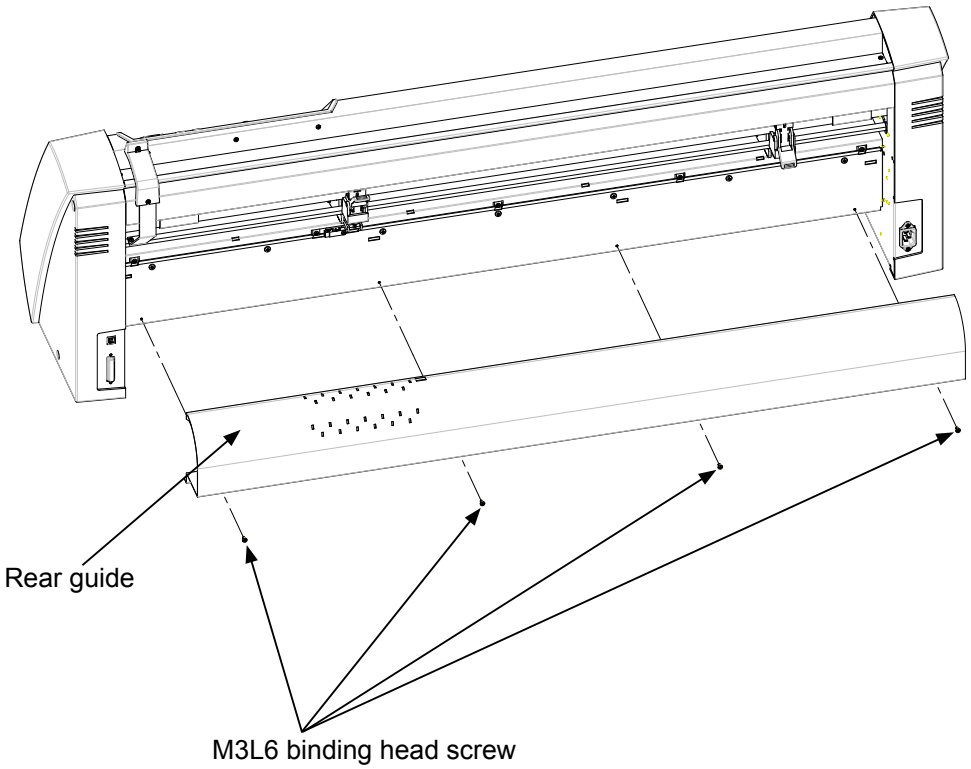
(1) Reattach the front guide in the reverse order in which it was detached.

6.1.5 How to Replace the Rear Guide

How to detach the rear guide

(1) Remove the four M3L6 binding head screws from the rear guide for the FC7000-75.
(Remove the five M3L6 binding head screws from the rear guide for the FC7000-100.
Remove the six M3L6 binding head screws from the rear guide for the FC7000-130.
Remove the seven M3L6 binding head screws from the rear guide for the FC7000-160.)

(2) Detach the rear guide.



How to reinstall the rear guide

(1) Reattach the rear guide in the reverse order in which it was detached.

6.1.6 How to Replace the Rear Writing Panel

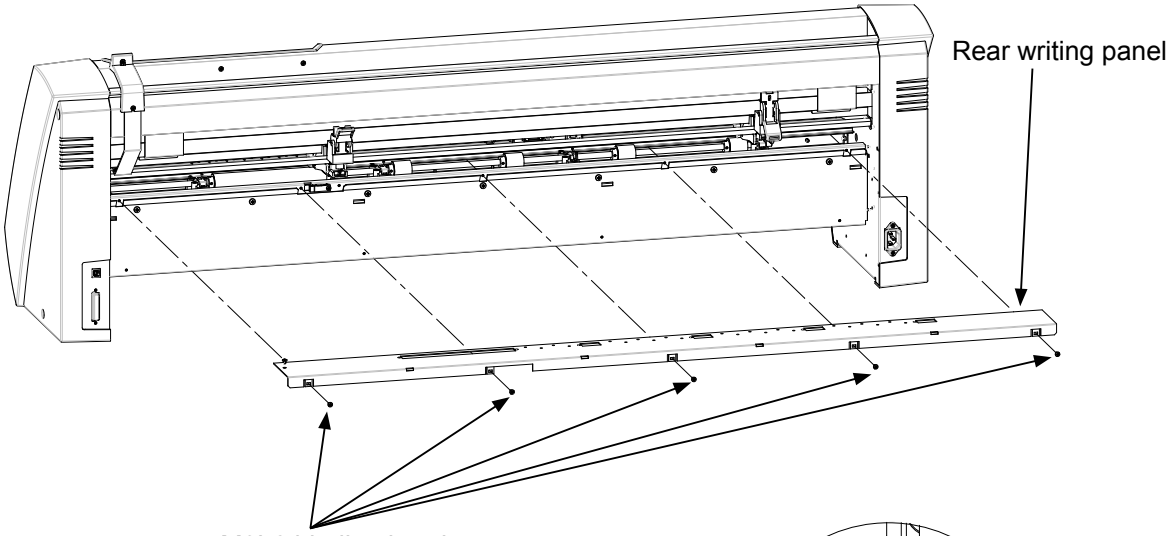
How to detach the rear writing panel

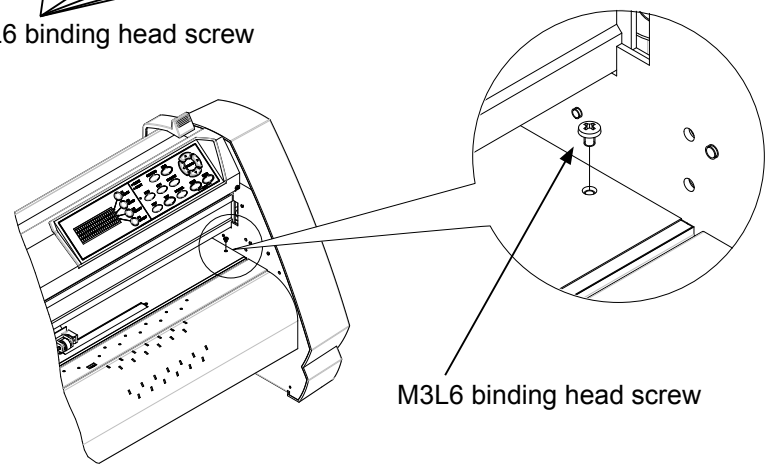
(1) Detach the rear guide (see Subsection 6.1.5).

(2) Remove the M3L6 binding head screw from the top of the rear writing panel.

(3) Remove the five M3L6 binding head screws from the rear of the rear writing panel for the FC7000-75.
(Remove the five M3L6 binding head screws from the rear of the rear writing panel for the FC7000-100.
Remove the six M3L6 binding head screws from the rear of the rear writing panel for the FC7000-130.
Remove the seven M3L6 binding head screws from the rear of the rear writing panel for the FC7000-160.)

(4) Detach the rear writing panel.





How to reinstall the rear writing panel

(1) Reattach the rear writing panel in the reverse order in which it was detached.

6.1.7 How to Replace the Front Writing Panel Assembly

How to detach the front writing panel assembly

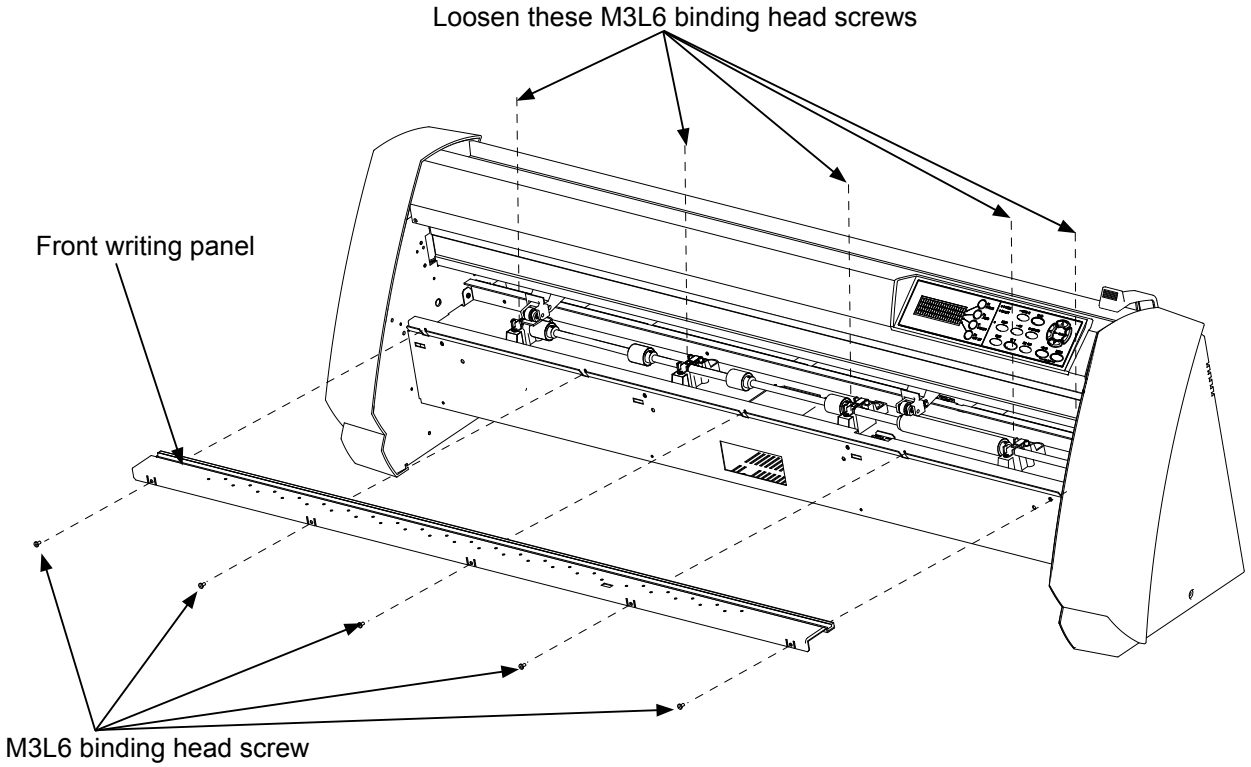
(1) Detach the front guide (see Subsection 6.1.4).

(2) Detach the rear writing panel (see Subsection 6.1.6).

(3) Remove the five M3L6 binding head screws from the front writing panel assembly for the FC7000-75.
(Remove the six M3L6 binding head screws from the front writing panel assembly for the FC7000-100.
Remove the seven M3L6 binding head screws from the front writing panel assembly for the FC7000-130.
Remove the eight M3L6 binding head screws from the front writing panel assembly for the FC7000-160.)

(4) Loosen the five M3L6 binding head screws at the top of the front writing panel assembly for the FC7000-75.
(Loosen the six M3L6 binding head screws at the top of the front writing panel assembly for the FC7000-100.
Loosen the seven M3L6 binding head screws at the top of the front writing panel assembly for the FC7000-130.
Loosen the eight M3L6 binding head screws at the top of the front writing panel assembly for the FC7000-160.

(5) Detach the front writing panel assembly.



How to reinstall the front writing panel assembly

(1) Reattach the front writing panel in the reverse order in which it was detached.

6.2 Mechanical Parts

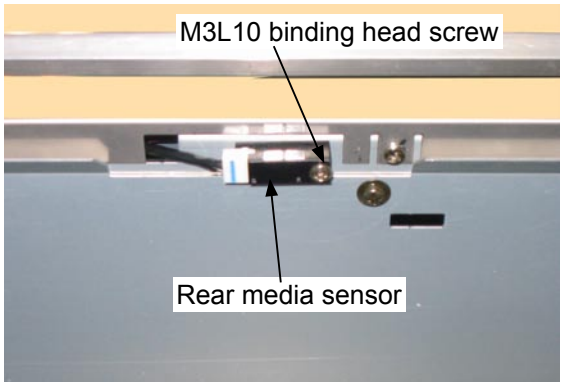
6.2.1 How to Replace the Rear Media Sensor

How to detach the rear media sensor

(1) Detach the rear guide (see Subsection 6.1.5).

(2) Remove the M3L10 binding head screw attaching the rear media sensor.

(3) Disconnect the sensor from the connector.



How to reinstall the rear media sensor

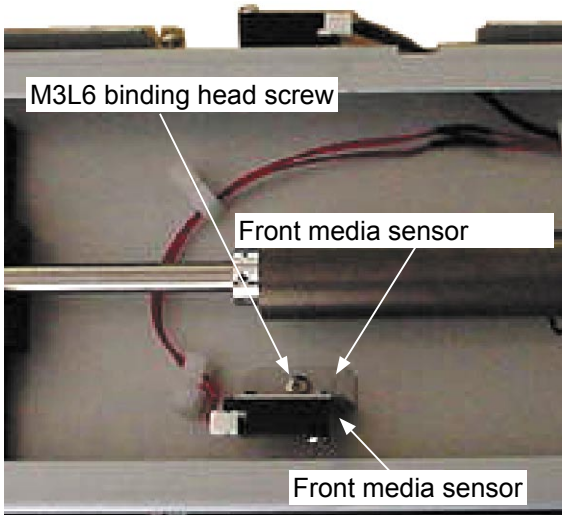
(1) Reattach the rear media sensor in the reverse order in which it was detached.

6.2.2 How to Replace the Front Media Sensor

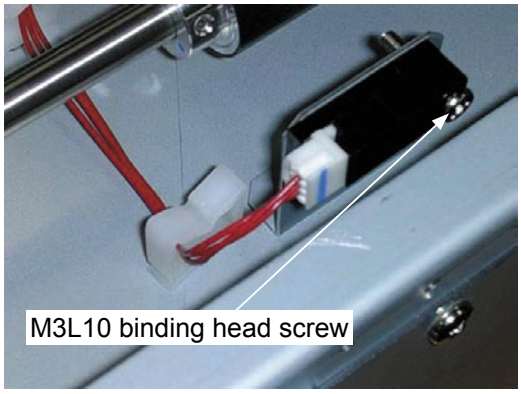
How to detach the front media sensor

(1) Detach the front writing panel (see Subsection 6.1.7).

(2) Remove the M3L6 binding head screw attaching the front media sensor bracket.



(3) Remove the M3L10 binding head screw attaching the front media sensor.



(4) Disconnect the sensor from the connector.

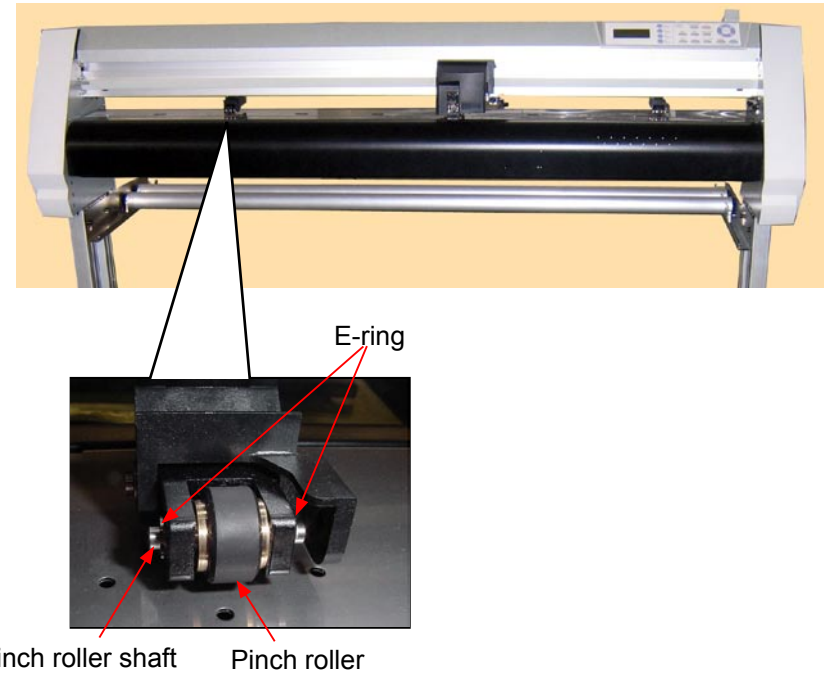
How to reinstall the front media sensor

(1) Reattach the front media sensor in the reverse order in which it was detached.

6.2.3 How to Replace the Pinch Roller

How to detach the pinch roller

(1) Detach the right side of the E-ring from the pinch roller shaft.



(2) Detach the pinch roller shaft from the pinch roller arm from the left side.

(3) Detach the pinch roller.

How to reinstall the pinch roller

(1) Reattach the pinch roller in the reverse order in which it was detached.

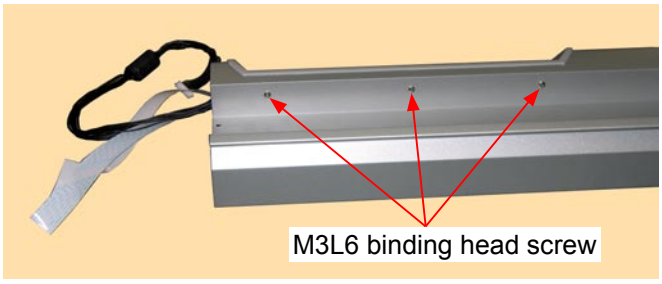
6.2.4 How to Replace the Control Panel Board, LCD Assembly

How to detach the control panel board, LCD assembly

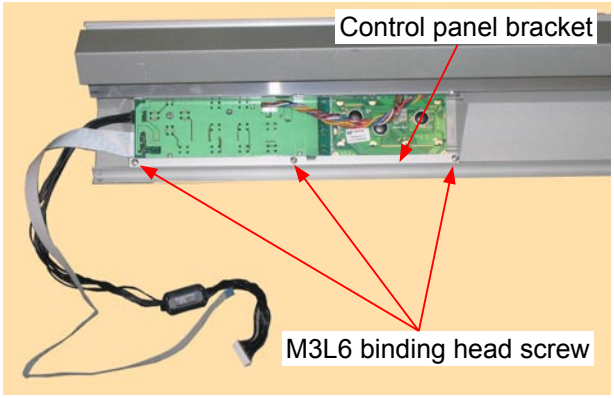
(1) Detach the right side cover (see Subsection 6.1.1).

(2) Detach the center cover (see Subsection 6.1.3).

(3) Remove the three M3L6 binding head screws attaching the control panel board from the top of the center cover.

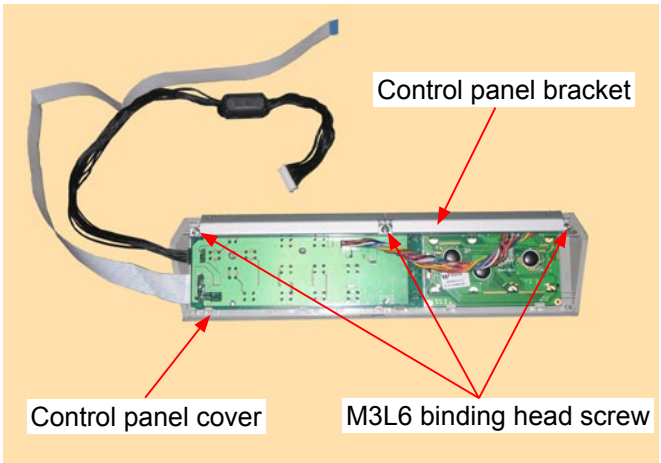


(4) Remove the three M3L6 binding head screws holding the control panel bracket and the center cover.

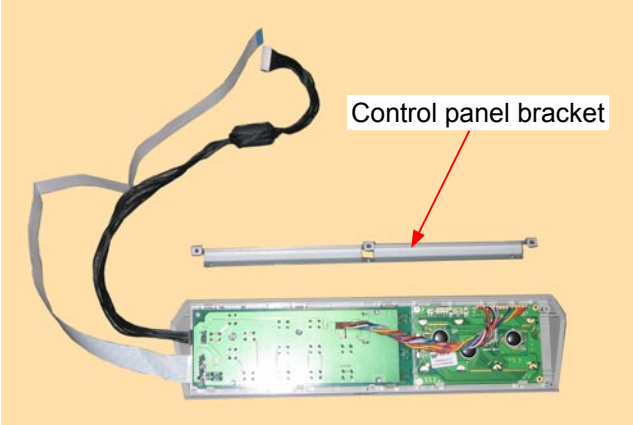


(5) Detach the control panel board assembly from the center cover.

(6) Remove the three M3L6 binding head screws holding the control panel bracket to the control panel cover.

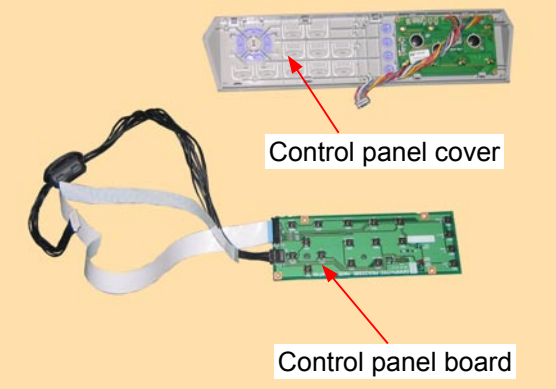


(7) Detach the control panel bracket from the control panel cover.

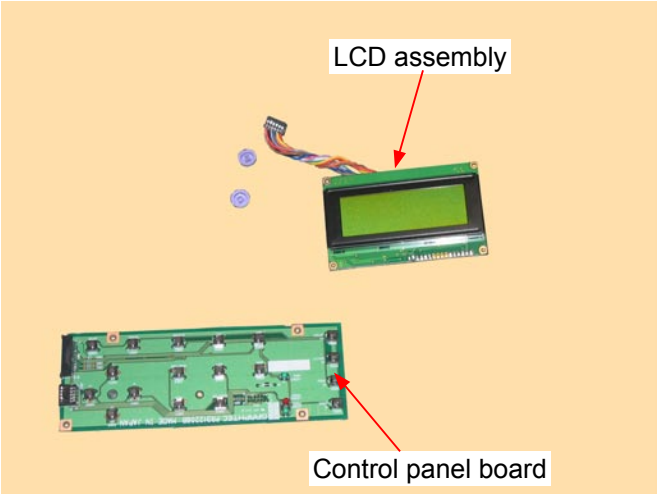


(8) Disconnect the cable from the LCD assembly.

(9) Detach the control panel board from the control panel cover.



(10) Detach the LCD assembly from the control panel cover.



How to reinstall the control panel board, LCD assembly

(1) Reattach the control panel board and LCD assembly in the reverse order in which they were detached.

6.2.5 How to Replace the Pen Block

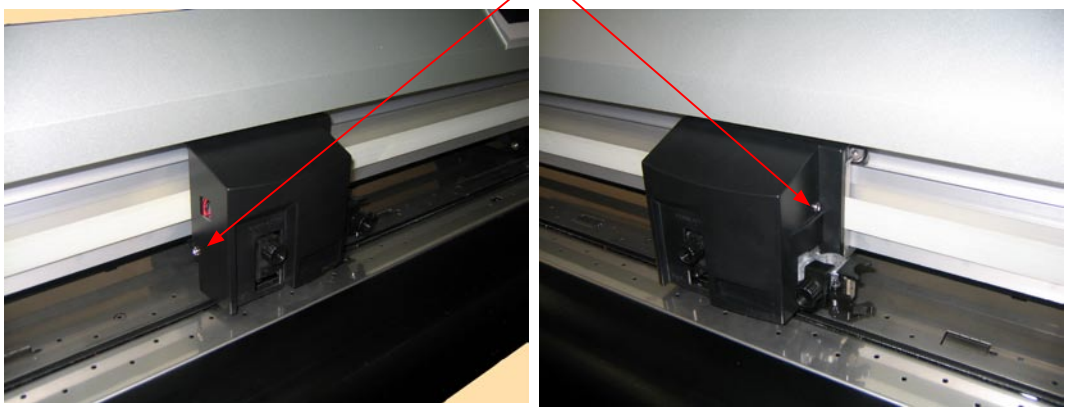
How to detach the pen block

(1) Detach the right side cover (see Subsection 6.1.1).

(2) Detach the center cover (see Subsection 6.1.3).

(3) Loosen the two M3L6 binding head screws attaching the pen block cover.

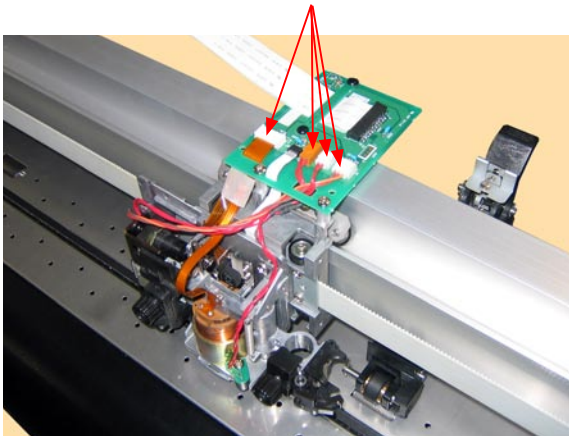
M3L6 binding head screw



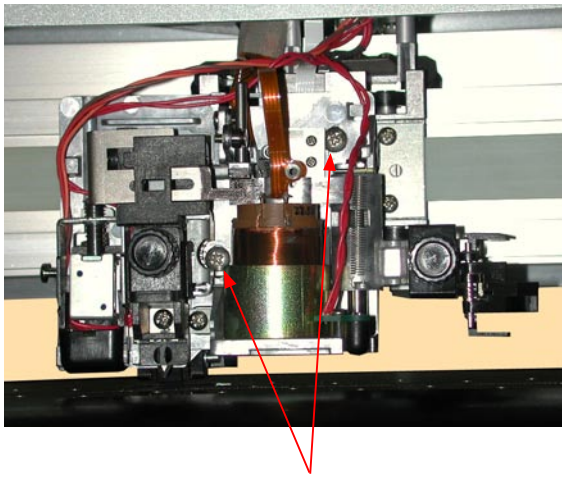
(4) Detach the pen block cover.

(5) Disconnect the cables from connector J502, J504, J505 and J506 on the Y-relay board.

Disconnect these cables from the connectors.



(6) Remove the two M4L6 binding head screws attaching the Y-relay block.

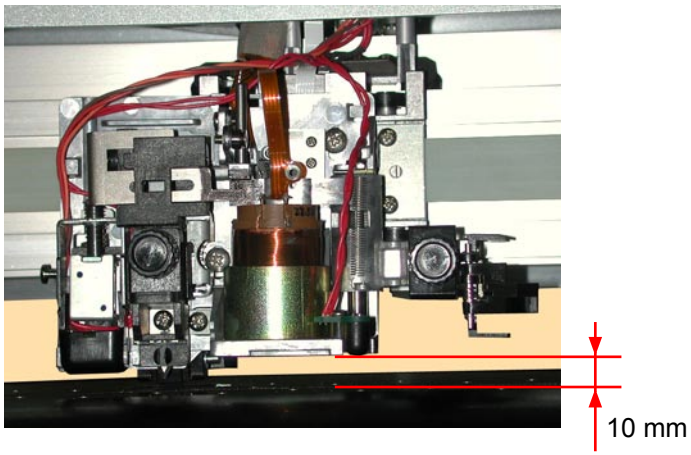


M4L6 binding head screw

How to reinstall the pen block

(1) Attach the pen block to the Y-slider.

(2) Fasten the two M4L6 binding head screws to attach the pen block so that there is a gap of 10 mm between the bottom of the pen block and the cutting mat. Perform a visual check to make sure that the pen block is not mounted at an angle.



(3) Reattach the other parts in the reverse order in which they were detached.

(4) Perform the pen force adjustment (see Section 7.3.7).

(5) Perform the auto registration mark sensor sensitivity adjustment (see Section 7.3.9).

(6) Perform the auto registration mark sensor offset adjustment (see Section 7.3.10).

6.2.6 How to Replace the Y-belt

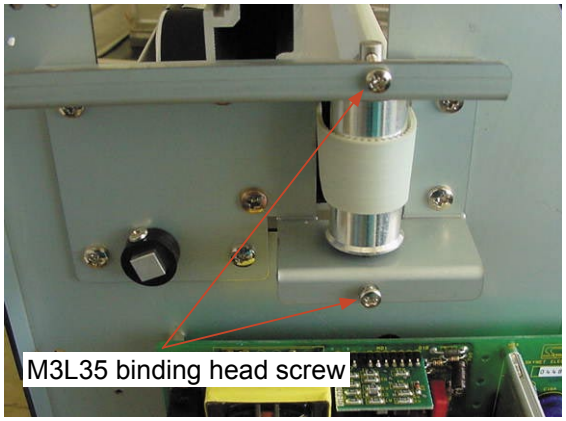
How to detach the Y-belt

(1) Detach the right and left side covers (see Subsection 6.1.1 and Subsection 6.1.2).

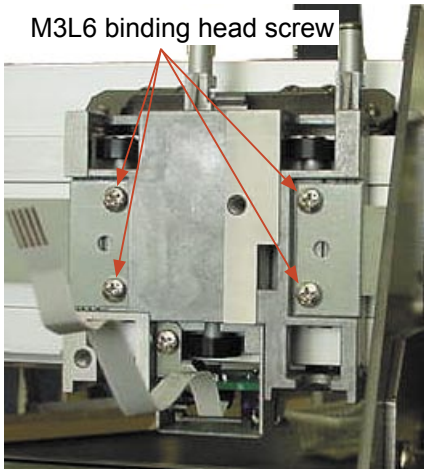
(2) Detach the center cover (see Subsection 6.1.3).

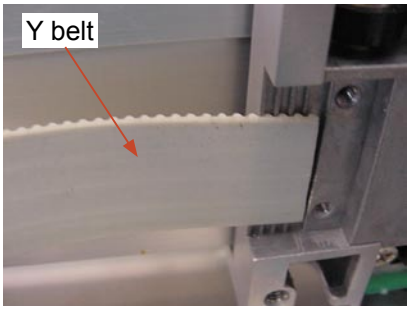
(3) Detach the pen block (see Subsection 6.2.5).

(4) Loosen the two M3L35 binding head screws adjusting the Y-belt tension.



(5) Remove the four M3L6 binding head screws attaching the right and left Y-belt stopper plates to the slider.

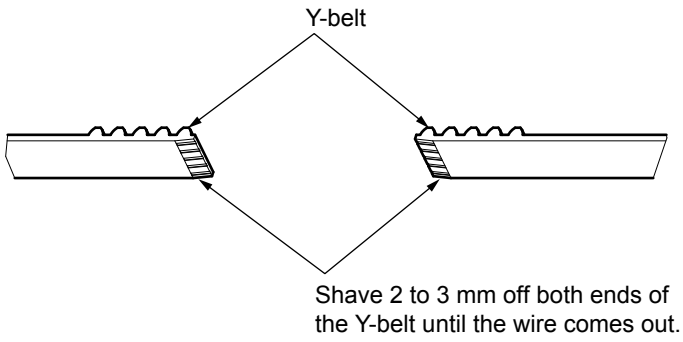




(6) Detach the Y-belt from the unit.

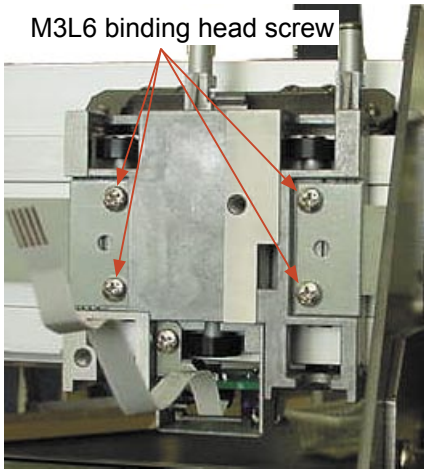
How to reinstall the Y-belt

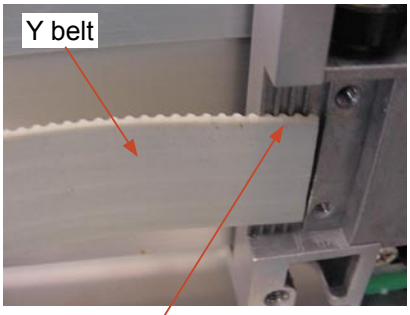
(1) Shave 2 to 3 mm off both ends of the Y-belt until the wire comes out as shown below.



(2) Hang the Y-belt on both sides of the pulley.

(3) Attach both ends of the Y-belt to the Y-slider so that four notches of the Y-belt fit into the Y-slider, then attach with the Y-belt stopper plates removed in step (5) in the previous subsection.





(4) Attach the pen block (see Subsection 6.2.5).

(5) Reattach the other parts in the reverse order in which they were detached.

(6) Perform the Y-belt tension adjustment. (see Subsection 7.2.1).

6.2.7 How to Replace the Pinch Roller Sensor

How to detach the pinch roller sensor

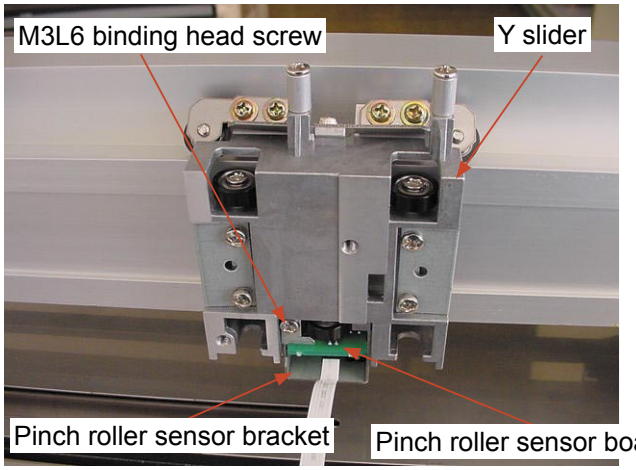
(1) Detach the center cover (see Subsection 6.1.3).

(2) Detach the pen block (see Subsection 6.2.5).

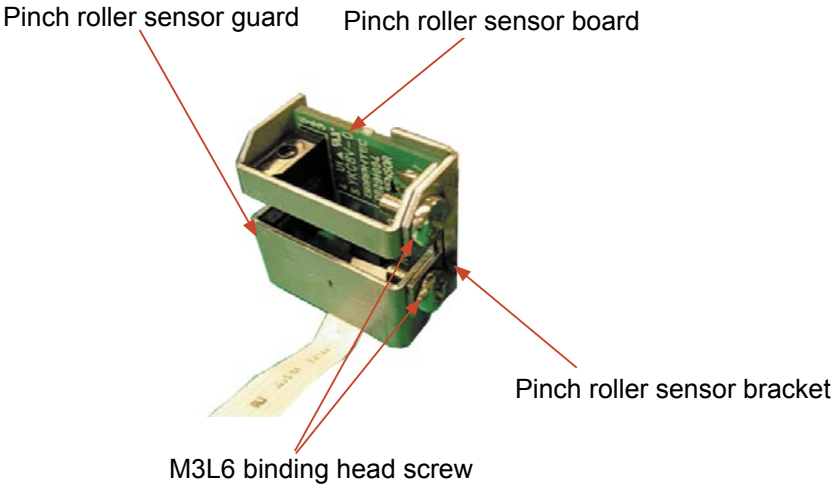
(3) Disconnect the pinch roller flexible cable from the Y-relay board.

(4) Remove the pinch roller flexible cable that is attached with double-sided adhesive tape to the Y-slider.

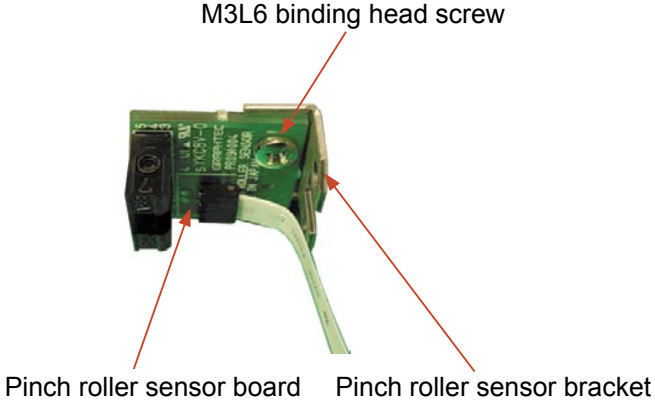
(5) Remove the M3L6 binding head screw attaching the pinch roller sensor bracket to the slider.



(6) Remove the two M3L6 binding head screws attaching the pinch roller sensor guard.



(7) Remove the M3L6 binding head screw attaching the pinch roller sensor board.



(8) Disconnect the pinch roller flexible cable from the pinch roller sensor board.

How to reinstall the pinch roller sensor

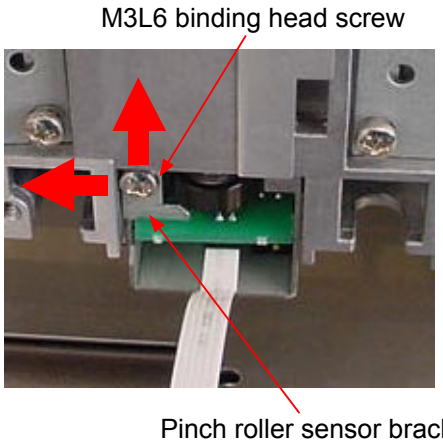
(1) Attach the pinch roller bracket to the pinch roller sensor board.

(2) Connect the pinch roller flexible cable to the pinch roller sensor board.

(3) Attach the pinch roller sensor guard to the pinch roller sensor board bracket.

(4) Attach the pinch roller bracket to the Y-slider.

Fit the top and left edges of the pinch roller bracket to the Y-slider as shown in the figure below.



(5) Attach the pen block (see Subsection 6.2.5).

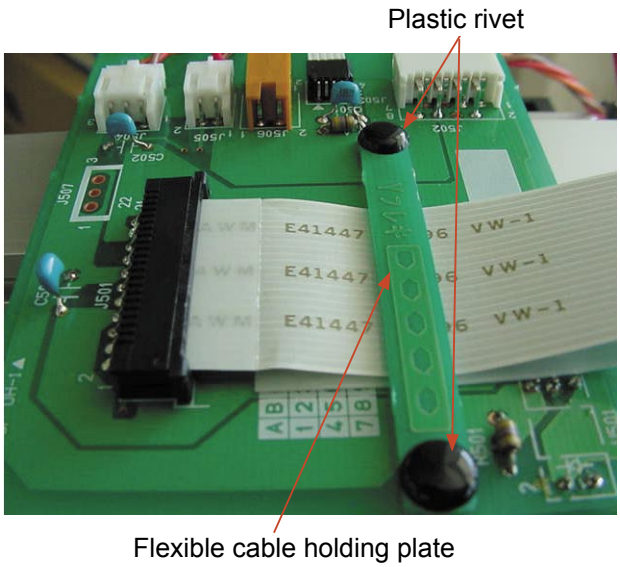
(6) Reattach the other parts in the reverse order in which they were detached.

6.2.8 How to Replace the Y-relay Board

How to detach the Y-relay board

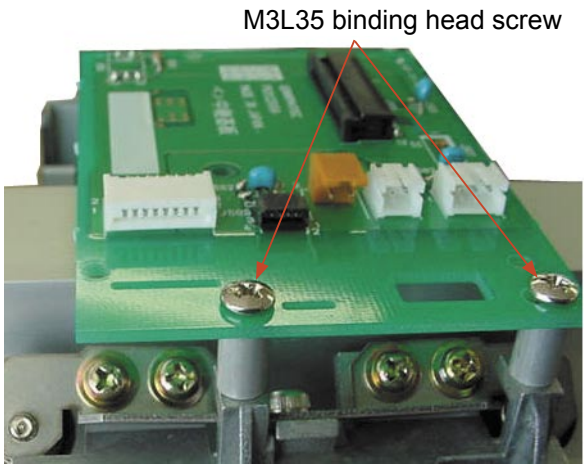
(1) Detach the center cover (see Subsection 6.1.3).

(2) Remove the two plastic rivets attaching the flexible cable holding plate.



(3) Disconnect all the cables from the Y-relay board.

(4) Remove the two M3L35 binding head screws attaching the Y-relay board.



(5) Detach the Y-relay board from the Y-slider.

How to reinstall the Y-relay board

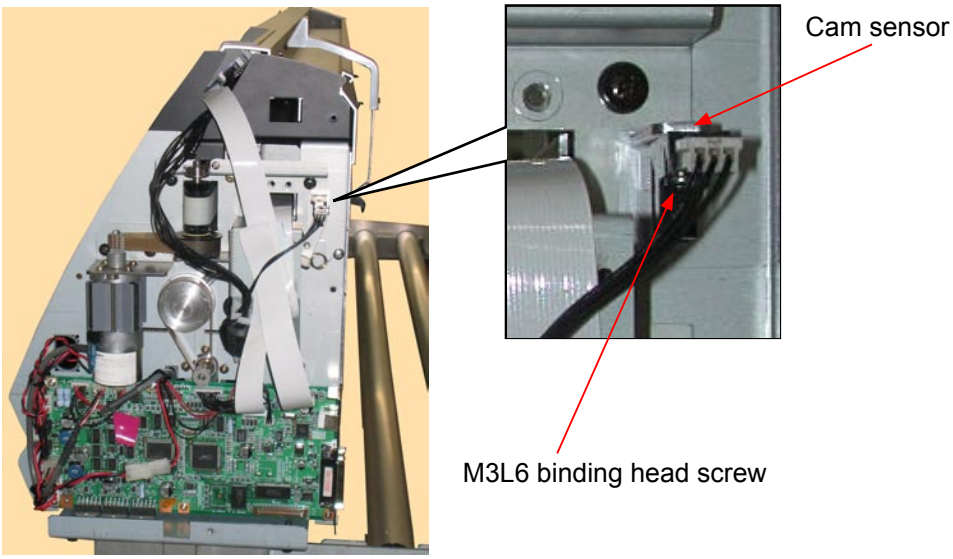
(1) Reattach the Y-relay board in the reverse order in which it was detached.

6.2.9 How to Replace the Cam Sensor

How to detach the cam sensor

(1) Detach the right side cover (see Subsection 6.1.1).

(2) Disconnect the cable from the cam sensor.



(3) Remove the M3L6 binding head screw attaching the cam sensor.

How to reinstall the cam sensor

(1) Reattach the cam sensor in the reverse order in which it was detached.

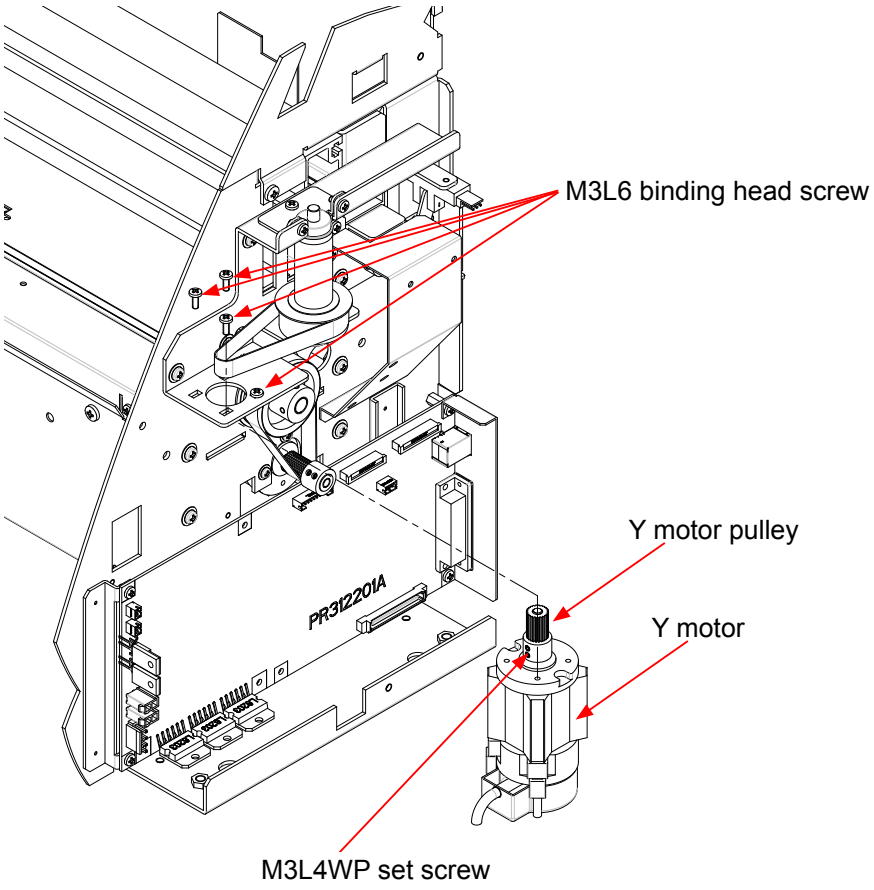
6.2.10 How to Replace the Y-motor

How to detach the Y-motor

(1) Detach the right side cover (see Subsection 6.1.1).

(2) Disconnect the Y-motor cables from connector J7 and J13 on the main board.

(3) Loosen the two M3L4WP set screws to detach the Y-motor pulley.



(4) Remove the four M3L6 binding head screws holding the Y-motor.

(5) Detach the Y-motor pulley, then detach the Y-motor.

How to reinstall the Y-motor

(1) Attach the Y-motor to the Y-motor bracket.

(2) Hang the Y-drive belt on the Y-motor pulley and the Y-idler pulley.

(3) Attach the Y-motor pulley to the Y-motor.

(4) Tighten the two M3L4WP set screws that hold the Y-motor pulley.

(5) Spread a suitable quantity of Loctite 222 on the two M3L4WP set screws that hold the Y-motor pulley.

(6) Spread a suitable quantity of the Shinetu silicon grease G501 on the Y-motor pulley and Y-idler pulley.

(7) Perform the Y-drive belt tension adjustment. (see Subsection 7.2.2).

(8) Reattach the other parts in the reverse order in which they were detached.

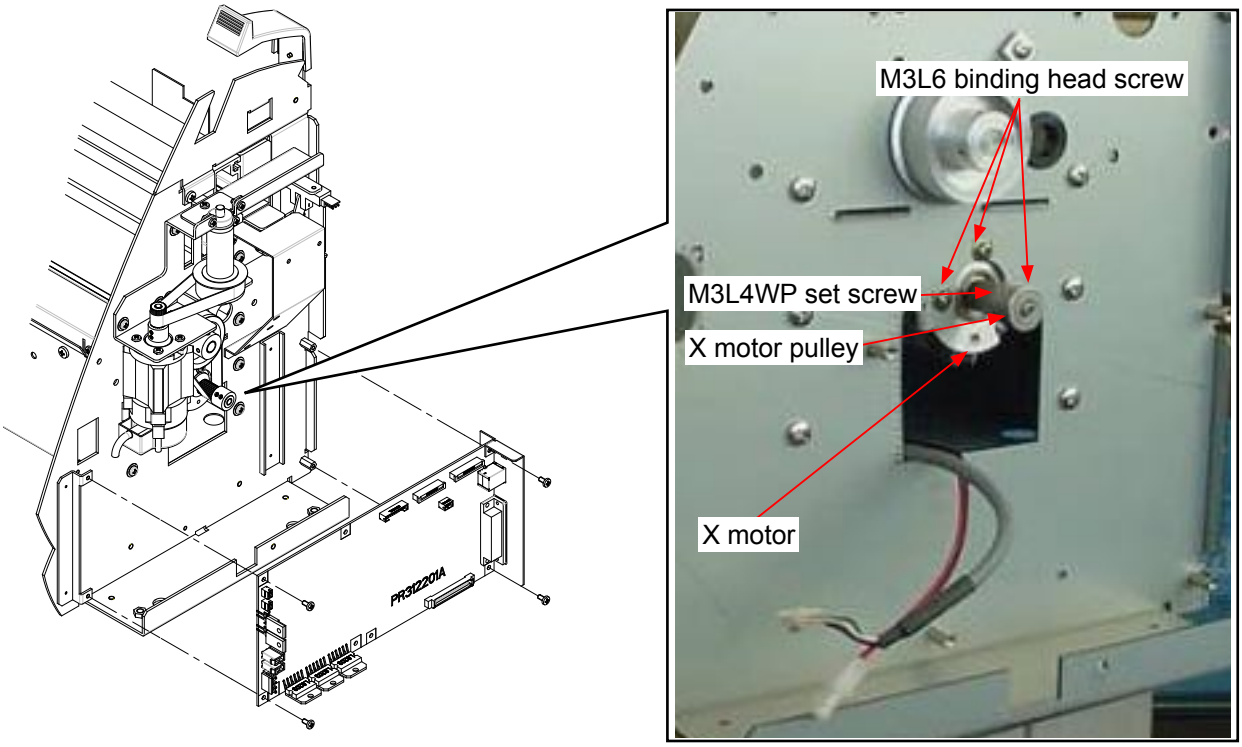
6.2.11 How to Replace the X-motor

How to detach the X-motor

(1) Detach the right side cover (see Subsection 6.1.1).

(2) Detach the main board (see Subsection 6.2.12).

(3) Loosen the two M3L4WP set screws holding the X-motor pulley, then detach the X-motor pulley.



(4) Remove the three M3L6 binding head screws holding the X-motor, then detach the X-motor.

How to reinstall the X-motor

(1) Attach the X-motor to the right side plate.

(2) Hang the X-drive belt on the X-drive pulley.

(3) Attach the X-motor pulley to the X-motor.

(4) Tighten the two M3L4WP set screws that hold the X-motor pulley.

(5) Spread a suitable quantity of Loctite 222 on the two M3L4WP set screws that hold the X-motor pulley.

(6) Perform the X-drive belt tension adjustment. (see Subsection 7.2.3).

(7) Tighten the mounting screws that hold the X-motor.

(8) Spread a suitable quantity of the Shinetu silicon grease G501 on the X-motor pulley.

(9) Move the X-drive pulley and check the tension of the X-drive belt.

(10) Reattach the other parts in the reverse order in which they were detached.

6.2.12 How to Replace the Main Board

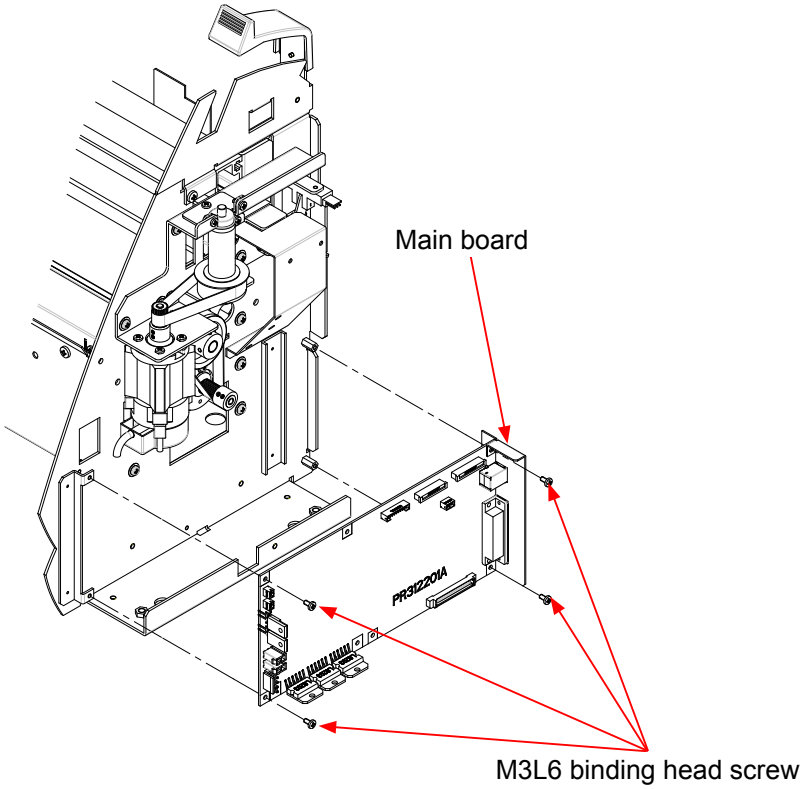
How to detach the main board

(1) Detach the right side cover (see Subsection 6.1.1).

(2) Disconnect all the cables and flexible cables from their connectors on the main board.

(3) Remove the four M3L6 binding head screws holding the main board to the chassis.

(4) Detach the main board from the chassis.



How to reinstall the main board

(1) Reattach in the reverse order in which it was detached.

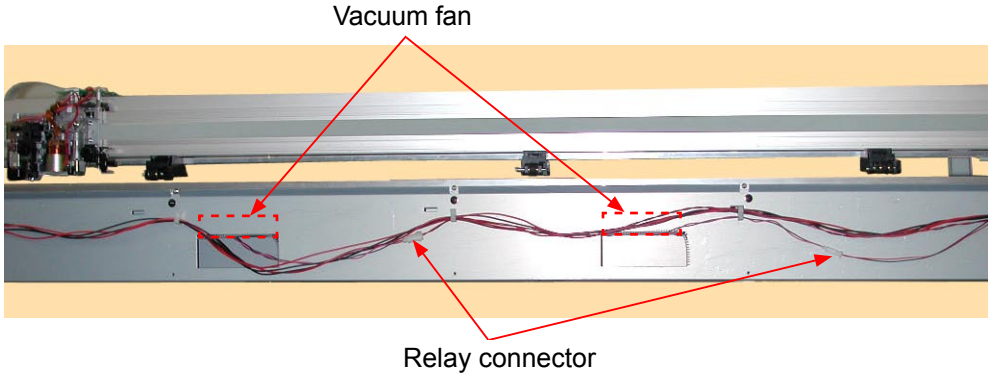
(2) Perform any adjustments required (see Section 7.1).

6.2.13 How to Replace the Vacuum Fan

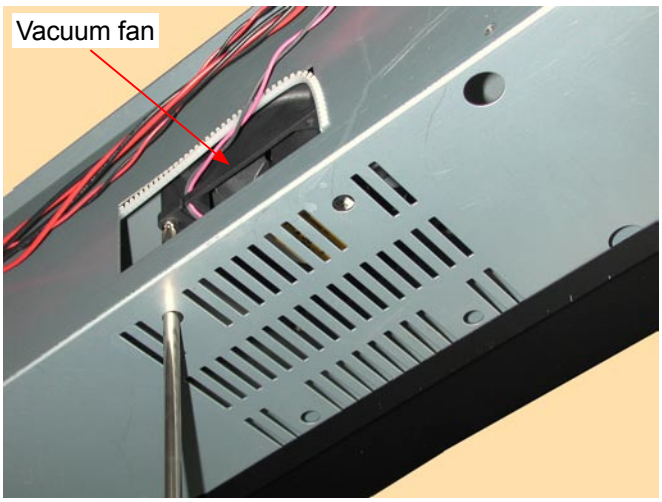
How to detach the vacuum fan

(1) Detach the front guide (see Subsection 6.1.4).

(2) Disconnect the vacuum fan from the relay connector.



(3) Use a long screwdriver to remove the two M3L35 binding head screws holding the vacuum fan as shown in the figure below.



(4) Detach the vacuum fan.

How to reinstall the vacuum fan

(1) Reattach in the reverse order in which it was detached.

6.2.14 How to Replace the Drive Roller

How to detach the drive roller

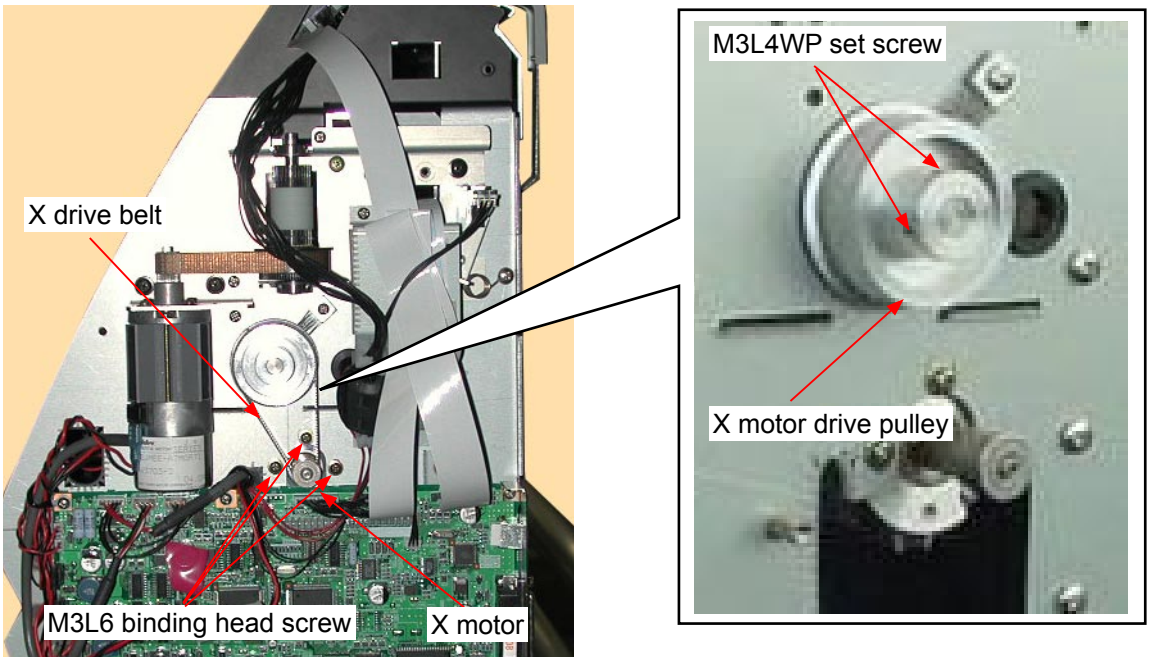
(1) Detach the right and left side covers (see Subsection 6.1.1).

(2) Detach the front guide and rear guide (see Subsection 6.1.4 and Subsection 6.1.5).

(3) Detach the rear and front writing panels. (see Subsection 6.1.6 and Subsection 6.1.7).

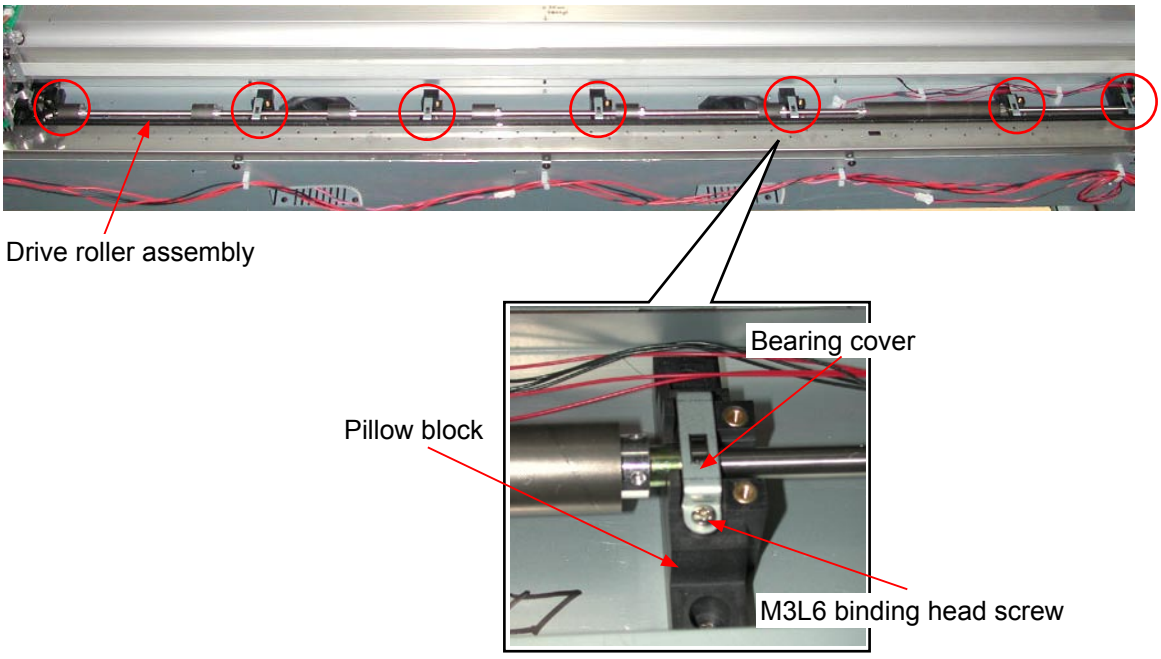
(4) Loosen the three M3L6 binding head screws holding the X-motor to loosen the X drive belt.

(5) Remove the two M3L4WP set screws holding the X-drive pulley and detach the X-drive pulley from the drive roller.



(6) Remove the X drive belt from the X-motor pulley.

(7) Remove the M3L6 binding head screws holding the bearing covers and detach the bearing covers from the pillow blocks. (Don't remove the M3L6 binding head screws holding the pillow blocks.)



(8) Slide out the X-drive roller to the left side and detach the X drive roller assembly from the unit.

How to reinstall the drive roller

(1) Reattach in the reverse order in which it was detached.

(2) Spread a suitable quantity of Loctite 222 on the two M3L4WP set screws holding the X-drive pulley.

(3) Perform the X-drive belt tension adjustment. (see Subsection 7.2.3).

(4) Spread a suitable quantity of the Shinetu silicon grease G501 on the X-motor pulley.

(5) Move the X-drive pulley and check the tension of the X-drive belt.

(6) Reattach the other parts in the reverse order in which they were detached.

6.2.15 How to Replace the Cutting Mat

How to detach the cutting mat

(1) Peel off the cutting mat from the cutting mat base.

How to reinstall the cutting mat

(1) Clean the surface of the cutting mat base with alcohol where the cutting mat was attached.

(2) Attach the new cutting mat to the cutting mat base.

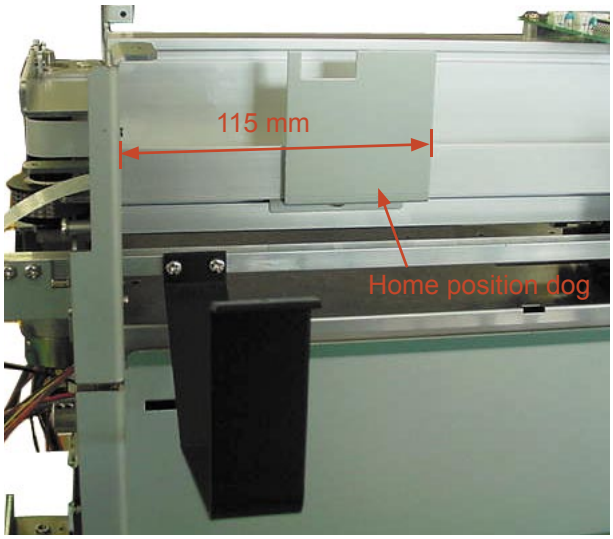
(3) Make sure that there is no air between the cutting mat and the cutting mat base.

6.2.16 Home Dog Position

Home dog position

Adjust the home dog position when you remove or replace the dog as shown below.

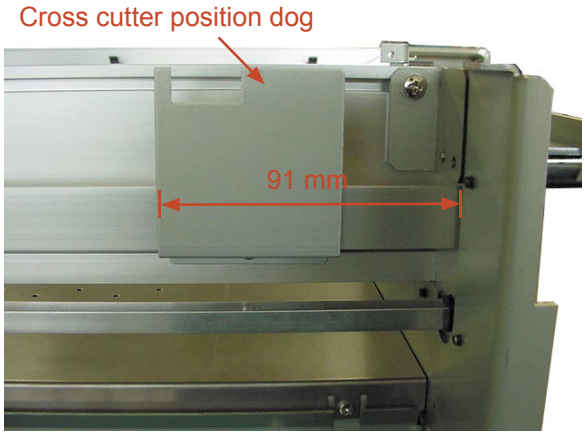
If you have an error about the pinch roller position, confirm position of this dog.



6.2.17 Cross Cutter Dog Position

Cross cutter dog position

Adjust the cross cutter position dog when you remove or replace the dog as shown below.



7. ADJUSTMENTS

7.1 List of Items Requiring Readjustment

If you replaced any of the units listed in the table below or altered their sensor positions, be sure to readjust the corresponding items.

Item \ Unit name	Main board	Light pointer	Pen block	Pinch roller sensor	X,Y motor	Drive roller	X,Y Motor drive belt	Auto registration mark sensor
NOV-RAM clear	M							
Pen force adjustment	M		M					
Distance adjustment	M					M	M	
Auto registration mark sensor adjustment	N		N	N				M
Light pointer adjustment	N	M	N					
Firmware upgrade	M							
Belt tension adjustment					M	M	M	
Pinch roller pressure adjustment						M		
2-Pen option adjustment	N		N					
DIP switch setting	N							
Servo gain adjustment	N				N			

No mark: Unnecessary M: Must always be adjusted N: To be adjusted as necessary

Note: The main board must have the latest version of firmware unless otherwise specified.

7.2 Mechanical Adjustments

7.2.1 Y-Belt Tension Adjustment

How to adjust the Y-belt tension

Belt tension adjustment is required to set proper tension of the belt to maintain machine performance, reduce overshoot, and correct any out-of-phase condition in the Y-axis.

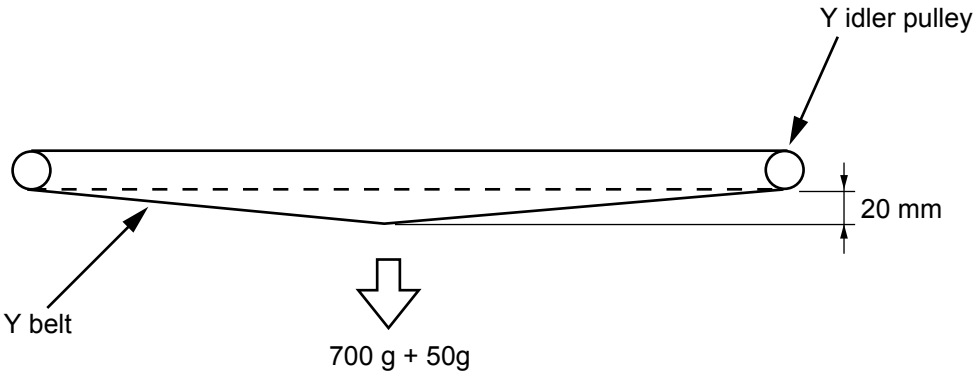
(1) Detach the right side cover (see Subsection 6.1.1).

(2) With the Y-slider on the Y-rail and the belt attached, adjust the Y-tension pulley adjustment screws that hold the Y-tension pulley onto the left side plate in order to tighten the Y-slider belt. Do not over-tighten. Move the Y-slider from left to right several times to verify that the tension is set correctly.

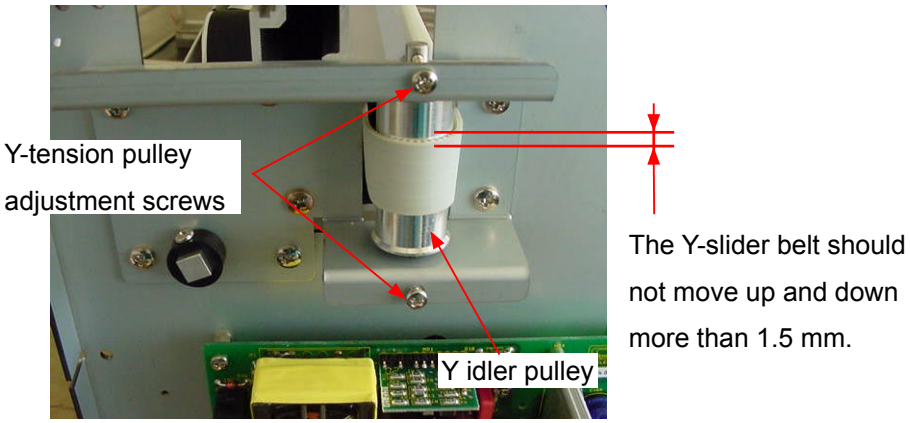
(3) Move the Y-slider all the way to the right and pull the belt 20 mm towards the center using a force gauge. Adjust the Y-tension pulley adjustment screws evenly until the tension reads as follows:

Specification of the Belt Tension

Model	Force gauge reading specification
FC7000-75	700 g+50
FC7000-100	700 g+50
FC7000-130	700 g+50
FC7000-160	700 g+50



(4) Verify that the Y-slider belt is centered and does not move up and down when the Y-slider is moved from left to right several times. The Y-slider belt should not move up and down more than 1.5 mm.



(5) If the Y-slider belt continues to move up and down or exhibits less clearance, re-adjust the Y-tension pulley adjustment screws and check the belt tension again.

(6) Reattach the right side cover.

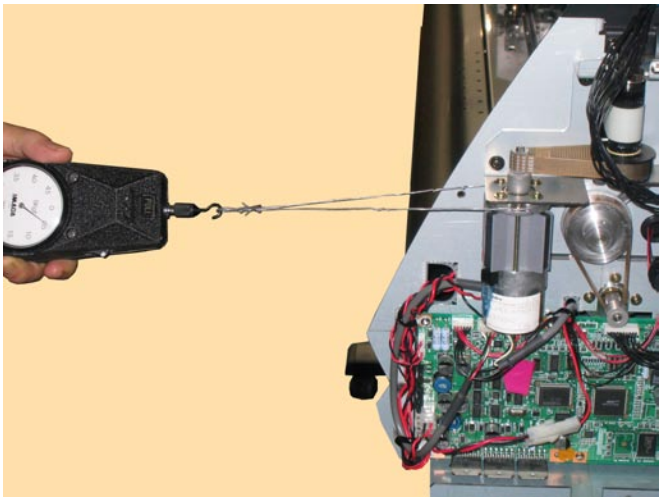
7.2.2 Y-Drive Belt Tension Adjustment

How to adjust the Y-Drive belt tension

(1) Detach the right side cover (see Subsection 6.1.1).

(2) Loosen the four M3L6 binding head screws that hold the Y-motor.

(3) Use the force gauge to pull the Y-drive motor pulley flange with a 2.25 kg force.



(4) Tighten the four M3L6 binding head screws that hold the Y-motor.

(5) Spread a suitable quantity of the Shinetu silicon grease G501 on the Y-motor pulley.

(6) Move the pen block and check the tension of the Y-drive belt.

(7) Reattach the right side cover.

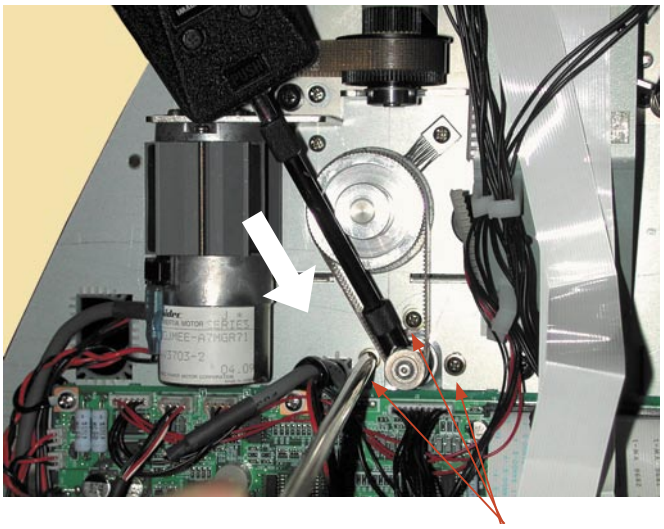
7.2.3 X-Drive Belt Tension Adjustment

How to adjust the X-Drive belt tension

(1) Detach the right side cover (see Subsection 6.1.1).

(2) Loosen the three M3L6 binding head screws that hold the X-motor.

(3) Use the force gauge to push the X-drive motor pulley flange with a 2.25 kg force as shown in the figure below.



M3L6 binding head screw

(4) Tighten the mounting screws that hold the X-motor.

(5) Spread a suitable quantity of the Shinetu silicon grease G501 on the X-motor pulley.

(6) Move the X-drive pulley and check the tension of the X-drive belt.

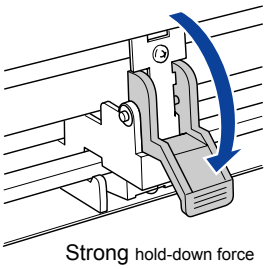
(7) Reattach the right side cover.

7.2.4 Pinch Roller Pressure Adjustment

How to adjust the pinch roller pressure

(1) Detach the center cover (see Subsection 6.1.3).

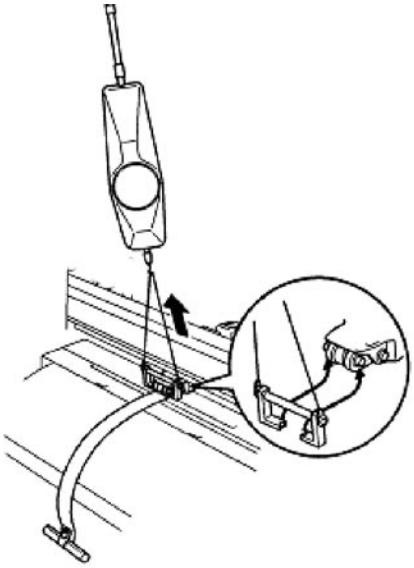
(2) Change the hold-down force switching lever to the Strong position.



Strong hold-down force

(3) Place the pinch roller on the grit roller.

(4) Sandwich the stainless steel plate jig as shown in the figure below and catch the push pressure wire jig on the pinch roller shaft.

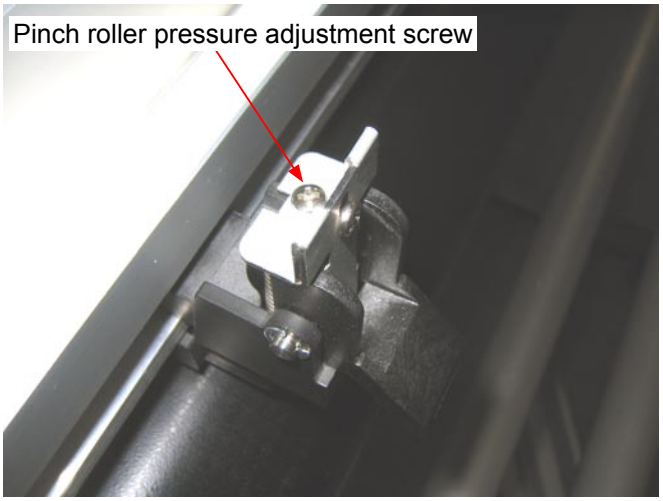


(5) Pull the wire of the push pressure wire jig in the direction of the arrow with the 10 kgf push-pull gauge.

Note *Be sure to pull in the correct direction.
*Be sure to pull at the angle shown in the figure above (the angle at which the wire jig is almost touching the Y rail).

(6) Read out the value at which the stainless steel plate jig slips out.
The pinch roller pressure should be 6.5 kg ±0.25 force.
The pressure difference between each pinch roller should be less than 0.4 kg.

(7) If the measurement does not match this value, adjust the pinch roller pressure adjustment screw and check again.

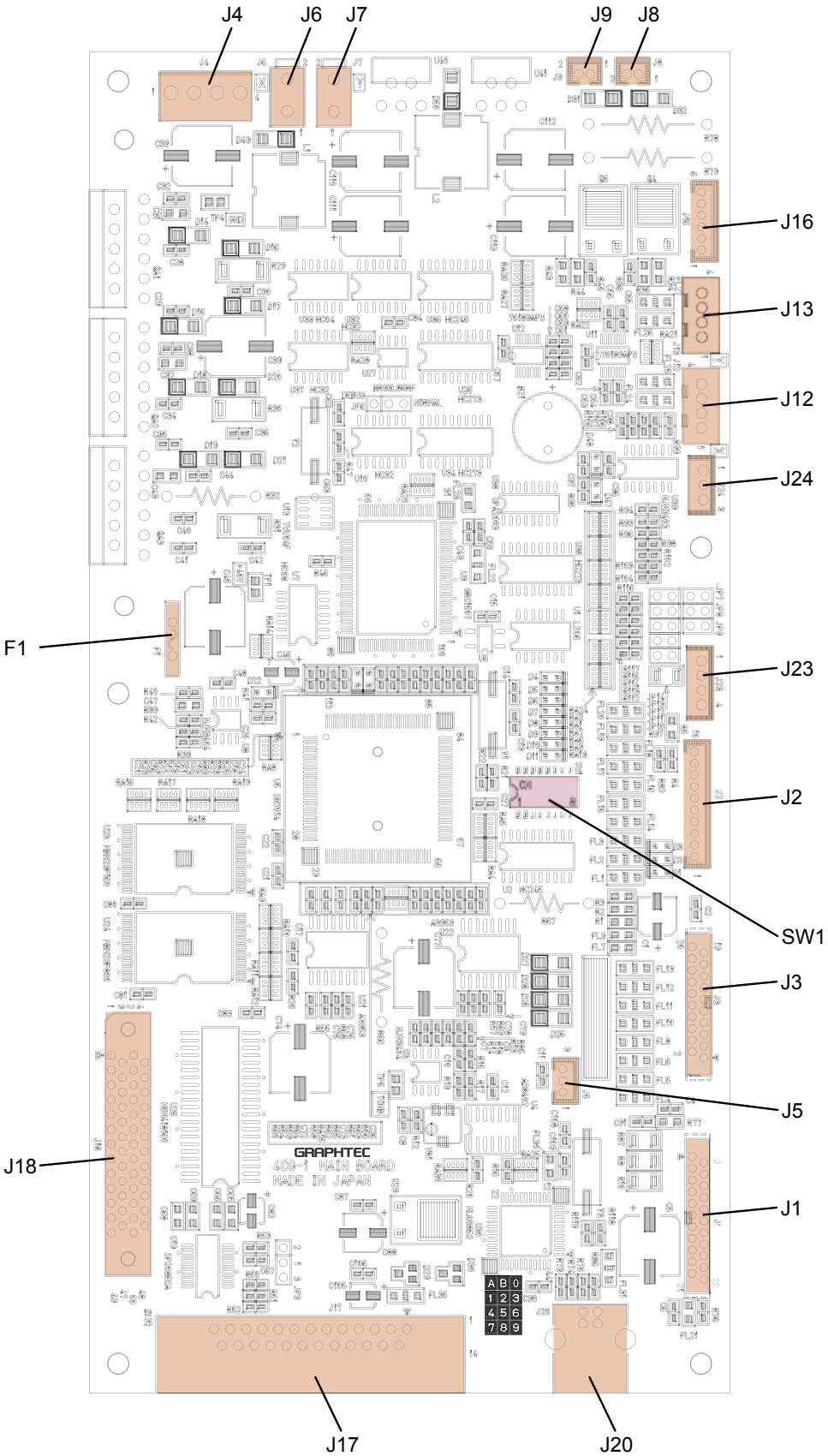


(8) Reattach the center cover.

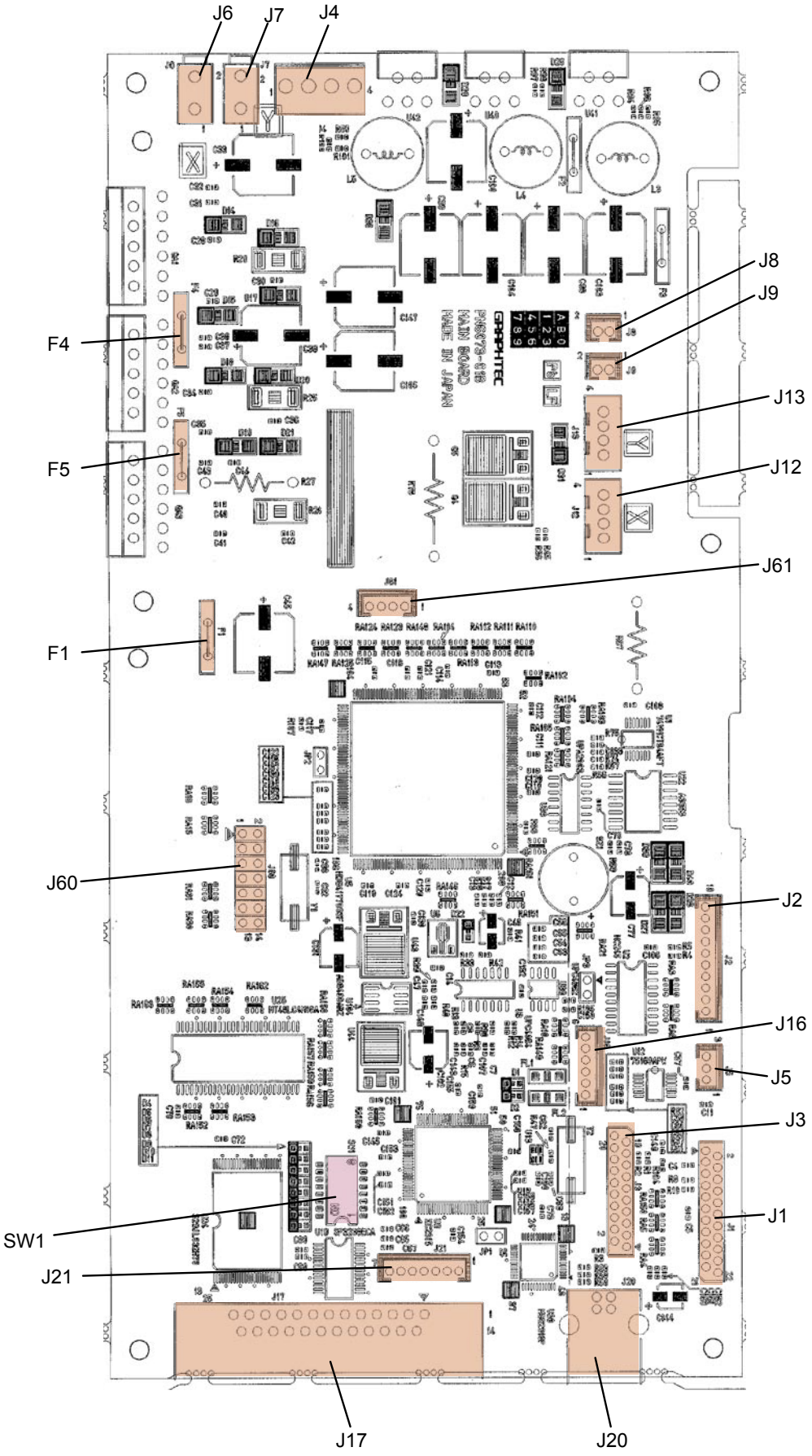
7.3 Electrical Adjustments

7.3.1 Position of the DIP Switch and Connectors

FC7000



FC7000MK2

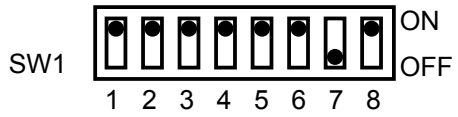

J6
J7
J4
J8
J9
F4
J13
F5
J12
J61
F1
J60
J2
J16
J5
J3
SW1
J1
J21
J17
J20

7.3.2 DIP Switch Settings

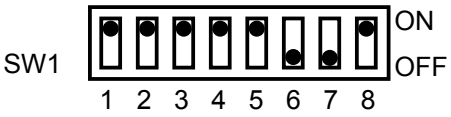
The black circles indicate the position of each switch.

Factory presets (Normal Mode)

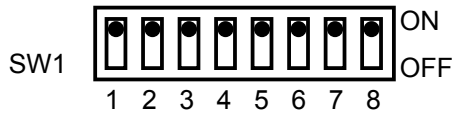
FC7000MK2-60



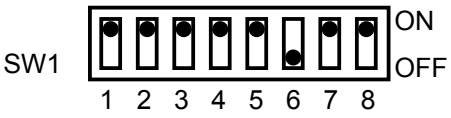
FC7000MK2-60 (2-Pen Model)



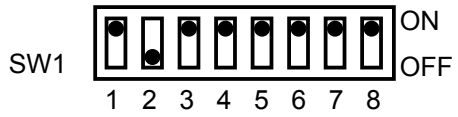
FC7000-75/MK2-75



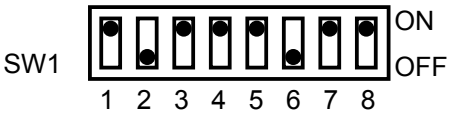
FC7000-75/MK2-75 (2-Pen Model)



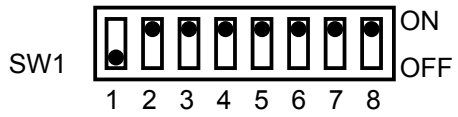
FC7000-100/MK2-100



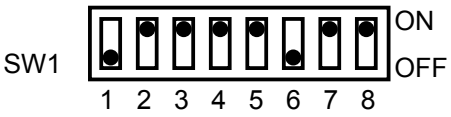
FC7000-100/MK2-100 (2-Pen Model)



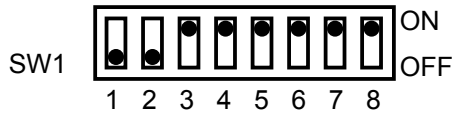
FC7000-130/MK2-130



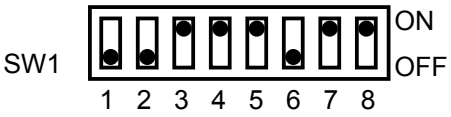
FC7000-130/MK2-130 (2-Pen Model)



FC7000-160/MK2-160

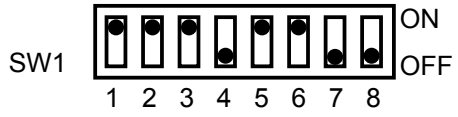


FC7000-160/MK2-160 (2-Pen Model)

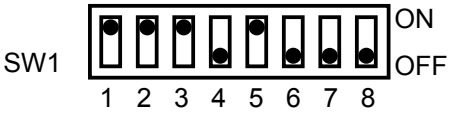


NOV-RAM Clear

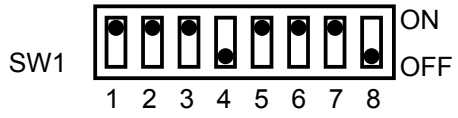
FC7000Mk2-60



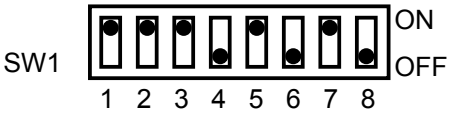
FC7000Mk2-60 (2-Pen Model)



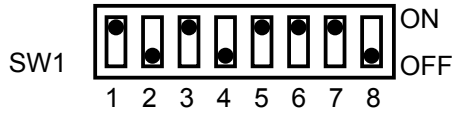
FC7000-75/MK2-75



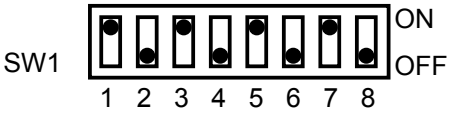
FC7000-75/MK2-75 (2-Pen Model)



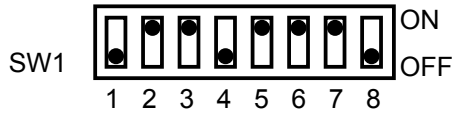
FC7000-100/MK2-100



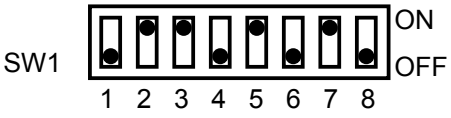
FC7000-100/MK2-100 (2-Pen Model)



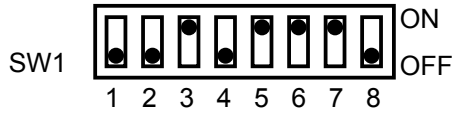
FC7000-130/MK2-130



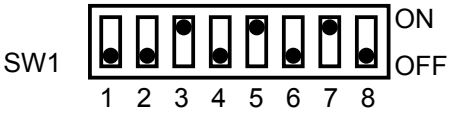
FC7000-130/MK2-130 (2-Pen Model)



FC7000-160/MK2-160



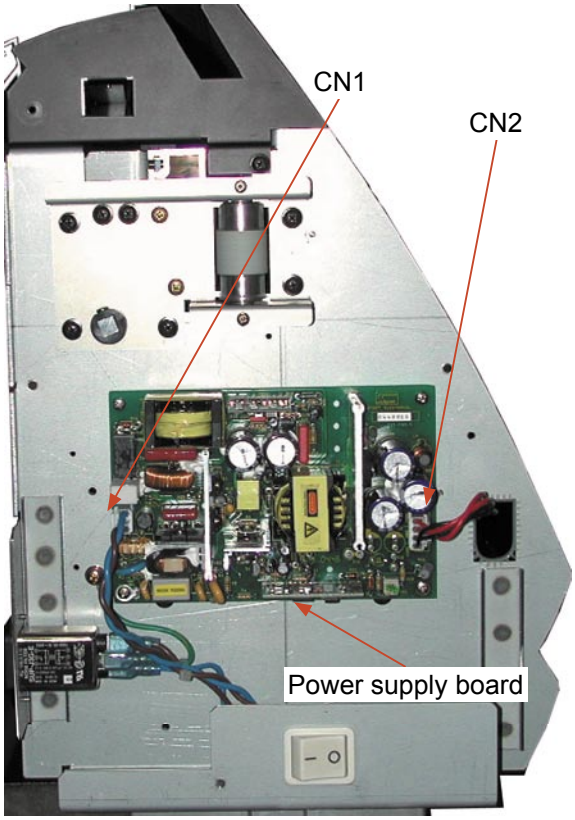
FC7000-160/MK2-160 (2-Pen Model)



7.3.3 Checking the Power Supply Board Voltage Levels

(1) Detach the left side cover (see Subsection 6.1.2).

(2) Turn on the power switch and then check the voltage levels.



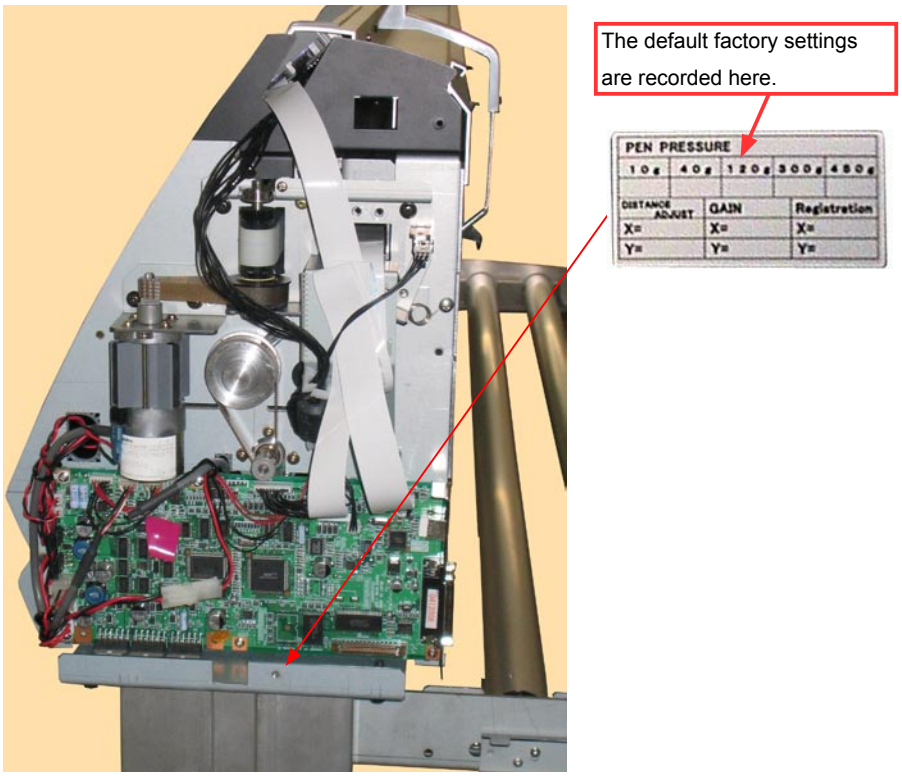
(3) The output voltage levels of the pins are shown in the table below.

Connector name	Pin No.	Name	Output voltage
CN1	1	AC (L)	AC power voltage (Depends on the supply voltage.
	2	Not used	
	3	AC (N)	
CN2	1	+40 V	DC +40V
	2	+40 V	DC +40V
	3	GND	-
	4	GND	-

7.3.4 Explanation of the Values of the Main Board Settings

(Default factory settings)

The default factory settings are recorded in the location shown below.



The contents of an example record are shown below.

25	47	100	228	346
X= 0	X= 80	X= -		
Y= 4	Y= 50	Y= -		

Explanation of the values

Pen force values				
10 g	40g	120 g	300 g	450 g (400g)

Distance adjustment values	Gain adjustment values	Auto registration mark position adjustment values
X	X	X
Y	Y	Y

You can input the same values when you have replaced the main board without making any adjustments.

If you have changed any values by making adjustments, record those values for the next maintenance check.

7.3.5 Clearing the Non-Volatile RAM

When you replace the main board, you must clear the Non-Volatile RAM (NOV-RAM).

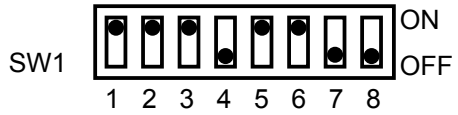
If you clear the Non-Volatile RAM, you will lose the setup parameters for each adjustment.

Input the adjustment values to the main board after you clear the Non-Volatile RAM.

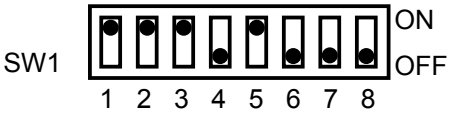
How to clear the Non-Volatile RAM.

(1) Set SW1 to the NOV-RAM clear mode as shown below.

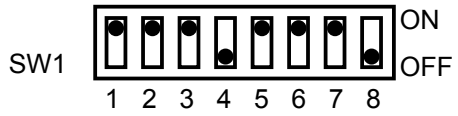
FC7000MK2-60



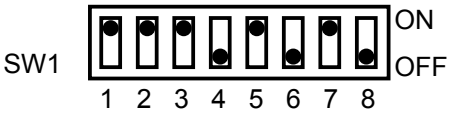
FC7000MK2-60 (2-Pen Model)



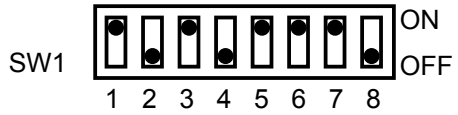
FC7000-75/MK2-75



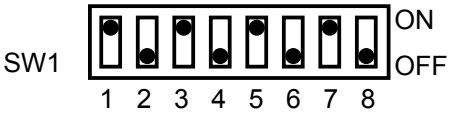
FC7000-75/MK2-75 (2-Pen Model)



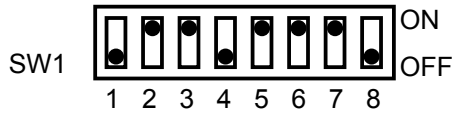
FC7000-100/MK2-100



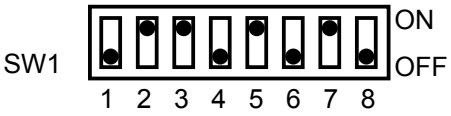
FC7000-100/MK2-100 (2-Pen Model)



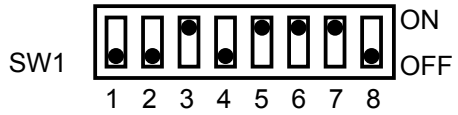
FC7000-130/MK2-130



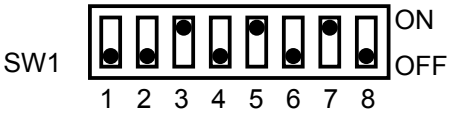
FC7000-130/MK2-130 (2-Pen Model)



FC7000-160/MK2-160

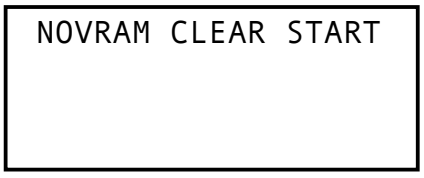


FC7000-160/MK2-160 (2-Pen Model)

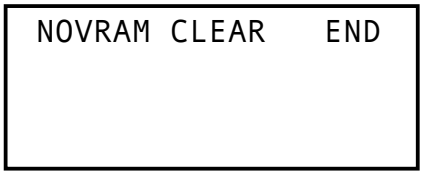


(2) Turn on the power to the plotter.

(3) The NOVRAM CLEAR START menu appears. The plotter immediately starts to clear the parameters on the NOV-RAM, and then sets the default values.



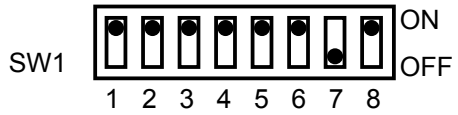
(4) When the programming is complete, the NOVRAM CLEAR END menu appears.



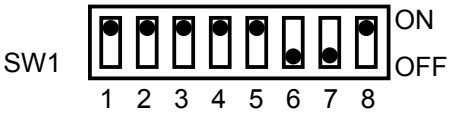
(5) Turn off the power to the plotter.

(6) Return the SW1 setting to the normal mode as shown below.

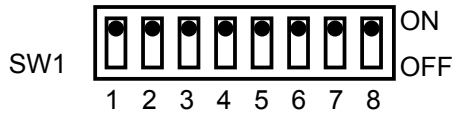
FC7000MK2-60



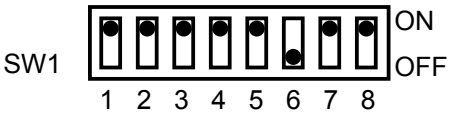
FC7000MK2-60 (2-Pen Model)



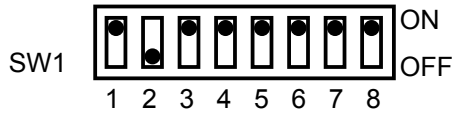
FC7000-75/MK2-75



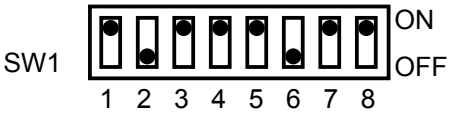
FC7000-75/MK2-75 (2-Pen Model)



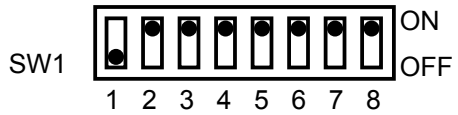
FC7000-100/MK2-100



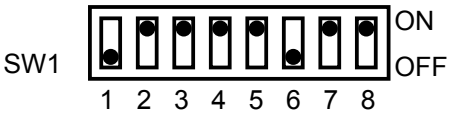
FC7000-100/MK2-100 (2-Pen Model)



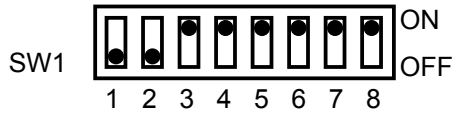
FC7000-130/MK2-130



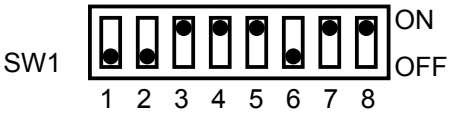
FC7000-130/MK2-130 (2-Pen Model)



FC7000-160/MK2-160



FC7000-160/MK2-160 (2-Pen Model)



7.3.6 How to Enter the Adjustment Menu

(1) Turn on the power while pressing the TEST and ENTER keys.

Or

After turning on the power, press the TEST key and the ENTER key simultaneously within 2 seconds.

(2) Load a sheet of paper in the plotter.

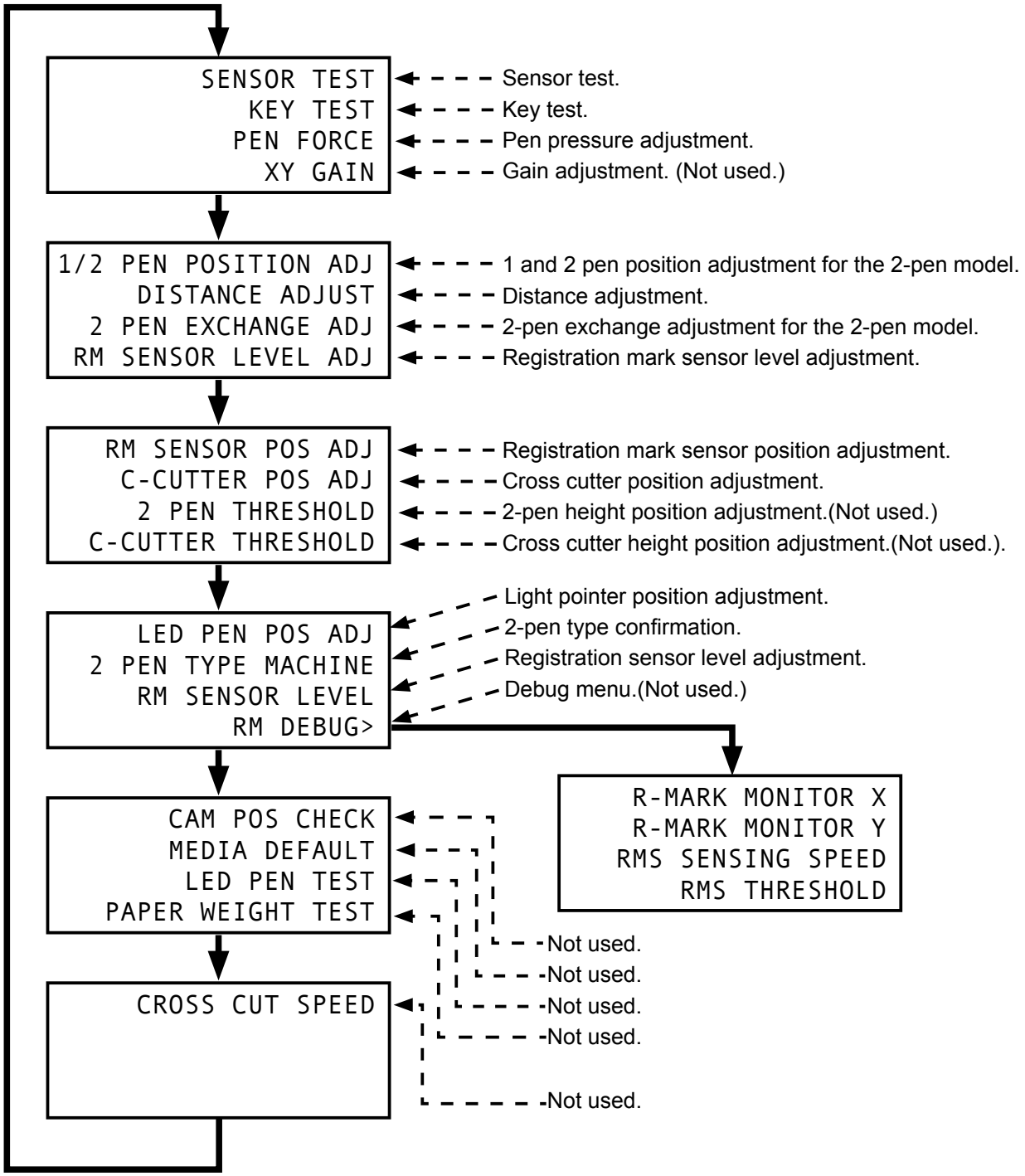
(3) The plotter displays the menu shown below.

```
 CONDITION 1      12
                  20
READY              4
             PEN
```

(4) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

Adjustment Menu List



7.3.7 Adjusting the Pen Force

This adjustment will set the pen force.

If you replace the main board, use the following procedure to input the recorded adjustment values.

If you replace the moving coil and/or the pen block assembly, you must adjust the pen force using the following procedure.

How to adjust the pen force

(1) Mount a 0.9 mm diameter cutter pen in the pen holder.

(2) Load a sheet of paper in the plotter.

(3) Enter the adjustment menu (see Section 7.3.6).

(4) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
           PEN FORCE
             XY GAIN
```

(5) Press the F3 key to display the menu shown below.
Don't select AUTO!

```
PEN PRESS ADJUST

   AUTO with gauger>
              MANUAL>
```

(6) Press the F4 key to display the menu shown below.

```
PRS 10g D/A=  20
```

(7) The pen is lowered. If you have replaced the moving coil and/or the pen block assembly, use the force gauge to measure the actual force. If you have only replaced the main board, input the adjustment values that were recorded.
Use the UP ARROW key or DOWN ARROW key to change the force setting. The number on the LCD will increase or decrease. If you have replaced the moving coil and/or the pen block assembly, measure the actual pen force again.
If you replaced the moving coil and/or the pen block assembly, adjust the 10g-pen force. If the measured value is within the specification range (10±2g) or if you have input the recorded value, press the ENTER key to store the setting. The next specified pen force appears.

(8) Adjust the 40g-pen force. If the measured value is within the specification range (40±4g) or if you have input the recorded value, press the ENTER key to store the setting. The next specified pen force appears.

(9) Adjust the 120g-pen force. If the measured value is within the specification range (120±10g) or if you have input the recorded value, press the ENTER key to store the setting. The next specified pen force appears.

(10) Adjust the 300g-pen force. If the measured value is within the specification range (300±20g) or if you have input the recorded value, press the ENTER key to store the setting. The next specified pen force appears.

(11) Adjust the 450 (400) g-pen force. If the measured value is within the specification range (FC7000: 450 ±20g, FC7000Mk2 and FC7000 with new main board, 9 Series: 400±20g) or if you have input the recorded value, press the ENTER key to store the setting.

Note: When adjusting the pen force, it is important to do it quickly. Delaying the pen force adjustment changes the temperature of the actuator and causes artificially lower readings. When this happens the actual pen force may be higher than the specification. This is especially true for the upper pen force adjustment.

(12) Press the NEXT key to complete this adjustment.

(13) Turn off the power to exit from the adjustment menu.

Specification of the actual pen force

Specified pen force	Actual force range			
	FC7000	FC7000 with new Main boaed	FC7000MK2	9 Series
10g	8 to 12g	8 to 12g	8 to 12g	8 to 12g
40g	36 to 44g	36 to 44g	36 to 44g	36 to 44g
120g	110 to 130g	110 to 130g	110 to 130g	110 to 130g
300g	280 to 320g	280 to 320g	280 to 320g	280 to 320g
450g (400g)	430 to 470g	380 to 420g	380 to 420g	380 to 420g

7.3.8 Adjusting the Distance Accuracy

This adjustment will set the distance accuracy.

If you replace the main board, use the following procedure to input the recorded adjustment values.

If you replace the drive roller, you must adjust the distance accuracy using the following procedure.

How to adjust the distance accuracy

(1) Enter the adjustment menu (see Section 7.3.6).

(2) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(3) Load an A2 or larger size sheet of paper in the plotter. The paper color must be white, and it is recommended that high-quality paper made for ink-jet printers be used.

(4) Mount a disposable ink pen (0.2 mm tip size) in the pen holder.

(5) Set the plotting conditions to the following settings:
Force: 12, Speed: 40, Quality: 1, Tool: Pen

(6) Lower the media set lever to raise the pinch rollers, and then raise the media set lever to detect the paper size.
The menu shown below is displayed after the media set lever is raised.

```
 CONDITION         12
                   40
  READY             1
              PEN
```

(7) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(8) Press the NEXT key to display the menu shown below.

```
     DISTANCE ADJUST

 RM SENSOR LEVEL ADJ
```

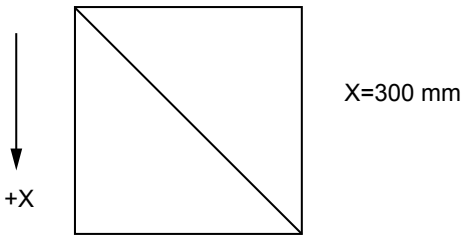
1-PEN MODEL

```
1/2 PEN POSITION ADJ
     DISTANCE ADJUST
  2 PEN EXCHANGE ADJ
 RM SENSOR LEVEL ADJ
```

2-PEN MODEL

(9) Press the F2 key to start the test. The plotter immediately plots the test pattern, and the following menu appears.

```
DADJ.X=   0 Y=   0
```



(10) Remove the paper and measure the Y-axis distance. If you have replaced the main board only, use the recorded values.

(11) Input the values using the POSITION keys.
Press the LEFT or RIGHT ARROW key to select the Y-axis or X-axis distance adjustment.
The UP and DOWN ARROW keys are used to change the Y-axis or X-axis adjustment value.
The formula of the input value is as follows:
Input value for X-axis = (300mm - measured X distance) x 10
Input value for Y-axis = (300mm - measured Y distance) x 10
For example:
If you measured 299.0mm for the Y-axis then input 10 for the adjustment value.
Adjustable range: -9.9 mm to +9.9mm , 0.1-mm steps

(12) Press the ENTER key to store the setting. The following menu appears.

```
XY LENG L=XXX.XX
```

The value of the XY LENG L is showing the calculated value, so you do not need to adjust this value.

(13) If you wish to complete this adjustment, press the NEXT key. If you wish to plot the adjusted test pattern, press the ENTER key.

(14) Turn off the power to exit from the adjustment menu.

7.3.9 Adjusting the Auto-Registration Mark Sensor Sensitivity

If you replace the main board, you need to adjust the sensitivity.

How to adjust the auto-registration mark sensor sensitivity

(1) Load an A4 (Letter) or larger size sheet of paper in the plotter. The paper color must be white, and it is recommended that high-quality paper made for ink-jet printers be used.

(2) Enter the adjustment menu (see Section 7.3.6).

(3) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
           PEN FORCE
             XY GAIN
```

(4) Press the NEXT key to display the menu shown below.

```
     DISTANCE ADJUST

 RM SENSOR LEVEL ADJ
```

1-PEN MODEL

```
1/2 PEN POSITION ADJ
     DISTANCE ADJUST
  2 PEN EXCHANGE ADJ
 RM SENSOR LEVEL ADJ
```

2-PEN MODEL

(5) Press the F4 key to start the registration mark sensor gain adjustment. The plotter immediately adjusts the registration mark sensor gain automatically. Press the ENTER key immediately to display the menu shown below. The plotter displays the menu shown below while pressing the ENTER key is hold down.

```
■■■■          50
```

Confirm that the output level is between 50 to 60.

(6) The plotter displays the menu shown below when this adjustment has been completed.

```
     DISTANCE ADJUST

 RM SENSOR LEVEL ADJ
```

1-PEN MODEL

```
1/2 PEN POSITION ADJ
     DISTANCE ADJUST
  2 PEN EXCHANGE ADJ
 RM SENSOR LEVEL ADJ
```

2-PEN MODEL

(7) Turn off the power to exit from the adjustment menu.

7.3.10 Adjusting the Offset of the Auto-Registration Mark Sensor

If you replace the Auto-registration mark sensor or the main board, you need to adjust the offset.

How to adjust the auto-registration mark sensor

(1) Enter the adjustment menu (see Section 7.3.6).

(2) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(3) Load an A2 or larger size sheet of paper in the plotter. The paper color must be white, and it is recommended that high-quality paper made for ink-jet printers be used.

(4) Mount a disposable ink pen (0.2 mm tip size) in the pen holder.

(5) Set the plotting conditions to the following settings:
Force: 12, Speed: 40, Quality: 1, Tool: Pen

(6) Lower the media set lever to raise the pinch rollers, and then raise the media set lever to detect the paper size.
The menu shown below is displayed after the media set lever is raised.

```
 CONDITION         12
                   40
  READY             1
              PEN
```

(7) Press the MENU key to display the menu shown below.

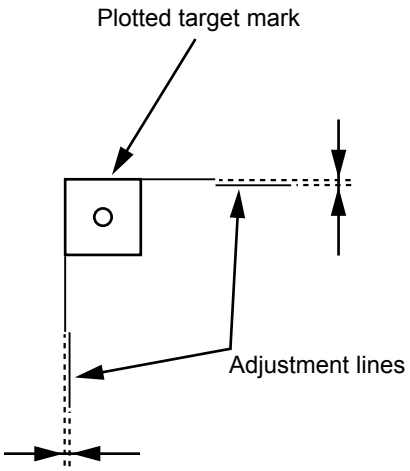
```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(8) Press the NEXT key until the menu shown below is displayed.

```
   RM SENSOR POS ADJ
    C-CUTTER POS ADJ
     2 PEN THRESHOLD
 C-CUTTER  THRESHOLD
```

(9) Use the ARROW keys to move the pen to an open area to plot the adjustment pattern.

(10) Press the F1 key to plot the adjustment pattern shown below.



(11) The plotter immediately adjusts the registration mark sensor position automatically, and adds a vertical line and a horizontal line to the scanned plotted pattern.

(12) Measure the offset between the lines and confirm that they are within 0.25 mm.

(13) Turn off the power to exit from the adjustment menu.

7.3.11 Adjusting the Cross Cutter Home Position

This adjustment will set the cross cutter home position value.

If you replace the main board, use the following procedure to input the recorded adjustment values.

How to adjust the cross cutter home position

(1) Enter the adjustment menu (see Section 7.3.6).

(2) Load an A3 or larger size sheet of paper in the plotter. The paper must cover the front and rear media sensors.

(3) Lower the media set lever to raise the pinch rollers, and then raise the media set lever to detect the paper size.

The menu shown below is displayed after the media set lever is raised.

```
CONDITION        12
                 40
 READY            1
            PEN
```

(4) Press the MENU key to display the menu shown below.

```
         SENSOR TEST
            KEY TEST
           PEN FORCE
             XY GAIN
```

(5) Press the NEXT key until the menu shown below is displayed.

```
  RM SENSOR POS ADJ
   C-CUTTER POS ADJ
    2 PEN THREAHOLD
 C-CUTTER THREAHOLD
```

(6) Press the F2 key to display the menu shown below.

The menu shown below is displayed after the paper size is detected.

```
         SENSOR TEST
            KEY TEST
           PEN FORCE
             XY GAIN
```

(7) Press the NEXT key until the menu shown below is displayed.

```
  RM SENSOR POS ADJ
   C-CUTTER POS ADJ
    2 PEN THREAHOLD
 C-CUTTER THREAHOLD
```

(8) Press the F2 key to display the menu shown below.

The pen head moves to the left side of the cross cutter home position.

```
C-CUTTER POS ADJ
        20

            CONFIRM>
```

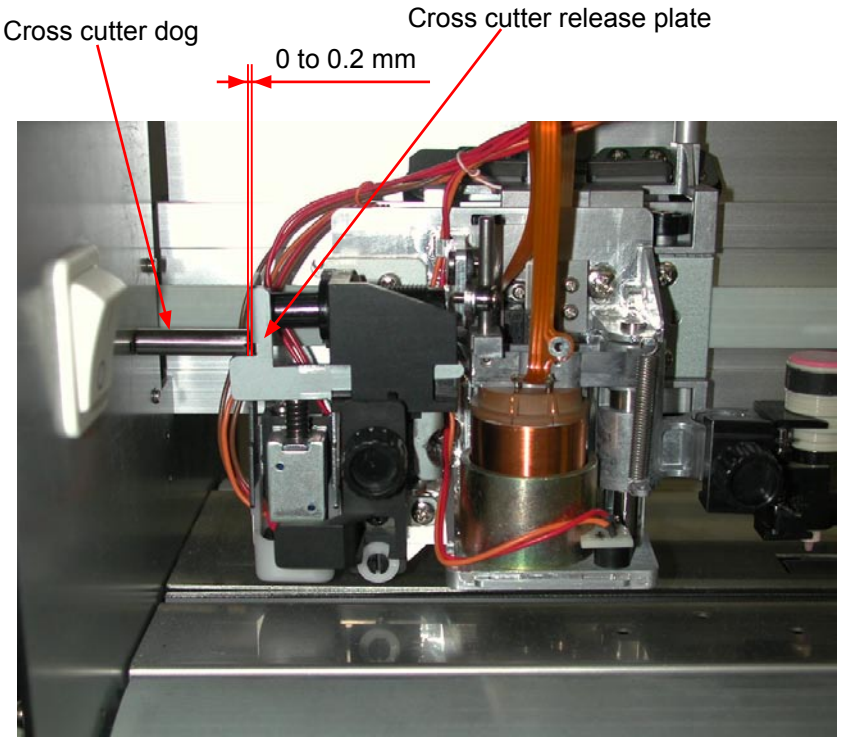
(9) Confirm the gap between the cross cutter dog and the cross cutter release plate.

(10) Press the F4 key to confirm the gap.

(11) Adjust the gap to a value in the range of 0 mm to 0.2 mm.

Press the UP or DOWN ARROW key to adjust the gap.

(1 unit = 0.05 mm)



(12) Press the F4 key to confirm the gap.

If the cross cutter dog presses on the cutter release plate too much, a position alarm error will be displayed.

At this time reduce the C-CUTTER POS ADJ value.

(13) Press the ENTER key to store the setting.

(14) Turn off the power to exit from the adjustment menu.

7.3.12 Adjusting the Offset of the Light Pointer Position

If you replace the light pointer or the main board, you need to adjust the offset.

How to adjust the offset of the light pointer position

(1) Enter the adjustment menu (see Section 7.3.6).

(2) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(3) Load an A2 or larger size sheet of paper in the plotter.

(4) Mount a disposable ink pen (0.2 mm tip size) in the pen holder.

(5) Set the plotting conditions to the following settings:

Force: 12, Speed: 40, Quality: 1, Tool: Pen

(6) Lower the media set lever to raise the pinch rollers, and then raise the media set lever to detect the paper size.

The menu shown below is displayed after the media set lever is raised.

```
 CONDITION          12
                    40
  READY              1
              PEN
```

(7) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

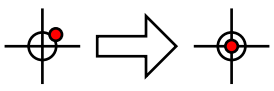
(8) Press the NEXT key until the menu shown below is displayed.

```
     LED PEN POS ADJ
  2 PEN TYPE MACHINE
     RM SENSOR LEVEL
            RM DEBUG
```

(9) Use the POSITION keys to move the pen to an open area to plot the adjustment pattern.

(10) Press the F1 key to plot the adjustment pattern shown below.

(11) Move the light pointer to the center of the adjustment pattern using the POSITION keys, and then press the ENTER key to register the position.



(12) Turn off the power to exit from the adjustment menu.

7.3.13 Confirming the 2-Pen Model (2-pen model)

This setting will confirm that the plotter is a 2-pen model.

If you replace the main board, use the following procedure to make the 2-pen model setting.

(1) Load an A2 or larger size sheet of paper in the plotter.

(2) Enter the adjustment menu (see Section 7.3.6).

(3) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
           PEN FORCE
             XY GAIN
```

(4) Press the NEXT key until the menu shown below is displayed.

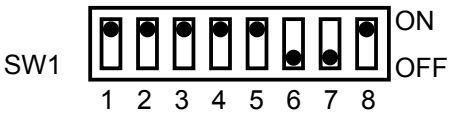
```
     LED PEN POS ADJ
  2 PEN TYPE MACHINE
     RM SENSOR LEVEL
            RM DEBUG
```

(5) Press the F2 key to display the menu shown below.

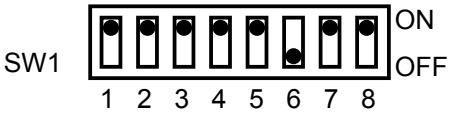
```
2 PEN SYSTEM

             ENABLED*
            DISABLED
```

(6) Change DIP switch 6 of SW1 from ON to OFF if the 2-pen system is disabled.

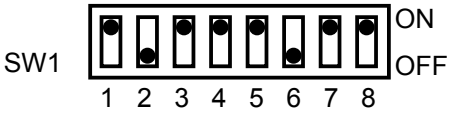
FC7000MK2-60 (2-Pen Model)



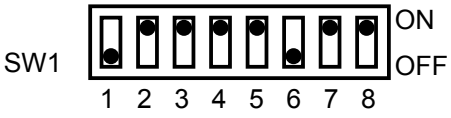
FC7000-75/MK2-75 (2-Pen Model)



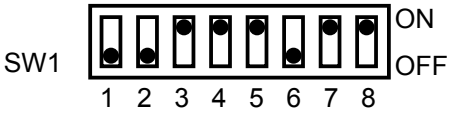
FC7000-100/MK2-100 (2-Pen Model)



FC7000-130/MK2-130 (2-Pen Model)



FC7000-160/MK2-160 (2-Pen Model)



(7) Turn off the power to exit from the adjustment menu.

7.3.14 Adjusting the Pen Exchange Y Direction Value (2-pen model)

This adjustment will set the pen exchange Y direction value.

This value is used for the 2nd pen pen exchange.

If you replace the main board, use the following procedure to input the recorded adjustment values.

(1) Confirm that DIP switch 6 of SW1 is OFF. (2-pen model mode)

(2) Enter the adjustment menu (see Section 7.3.6).

(3) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(4) Load an A2 or larger size sheet of paper in the plotter.

(5) Mount a disposable ink pen (0.2 mm tip size) in the 2nd pen station.

(6) Set the plotting conditions to the following settings:

Force: 12, Speed: 40, Quality: 1, Tool: Pen

(7) Lower the media set lever to raise the pinch rollers, and then raise the media set lever to detect the paper size.

The menu shown below is displayed after the media set lever is raised.

```
 CONDITION         12
                   40
  READY             1
              PEN
```

(8) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(9) Press the NEXT key until the menu shown below is displayed.

```
1/2 PEN POSITION ADJ
     DISTANCE ADJUST
  2 PEN EXCHANGE ADJ
 RM SENSOR LEVEL ADJ
```

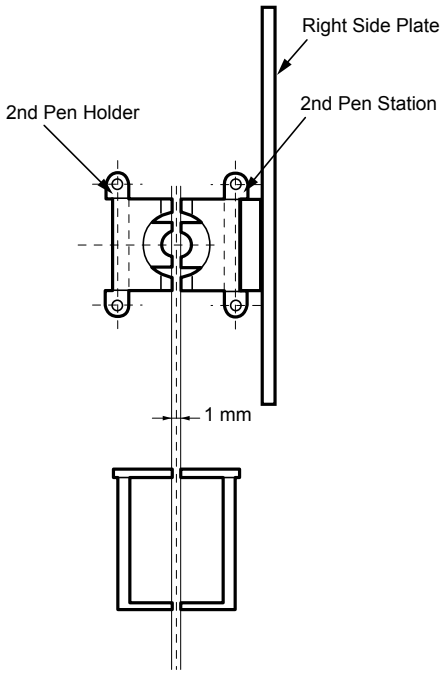
(10) Press the F3 key to display the following menu for moving the second pen holder to the second pen station.

```
     PENSELE ACTION>
PENSELE POS.
      + 70 (0.05mm)
```

(11) Press the F1 key; the 2nd pen holder moves to the 2nd pen station and takes the second pen.

Press the F2 key; the 2nd pen holder stops at the exchange position.

(12) Measure the gap between the 2nd pen holder and the 2nd pen station.



(13) Adjust the gap to a value of 1 mm.

Press the LEFT or RIGHT ARROW key to change the PENSELE POS. value.

(1 unit = 0.05 mm)

(14) Press the ENTER key to store the setting and complete the adjustment.

7.3.15 Adjusting the Spacing Between Pen 1 and Pen 2 (2-pen model)

This adjustment will set the spacing between pen 1 and pen 2.

If you replace the main board, use the following procedure to input the recorded adjustment values.

If you replace the pen block, you must adjust this value using the following procedure.

(1) Enter the adjustment menu (see Section 7.3.6).

(2) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(3) Load an A2 (Letter) or larger size sheet of paper in the plotter.

(4) Mount a disposable ink pen (0.2 mm tip size) in both the pen 1 holder and the pen 2 holder.

(5) Set the plotting conditions to the following settings:
Force: 12, Speed: 40, Quality: 1, Tool: Pen

(6) Lower the media set lever to raise the pinch rollers, and then raise the media set lever to detect the paper size.

(7) The menu shown below is displayed after the media set lever is raised.

```
    ROLL-1 REAR SET>
    ROLL-2 REAR SET>
              SHEET>
            CONTINUE
```

(8) Press the F2 key to display the menu shown below.

```
 CONDITION          12
                    40
  READY              1
              PEN
```

(9) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
            PEN FORCE
              XY GAIN
```

(10) Press the NEXT key until the menu shown below is displayed.

```
1/2 PEN POSITION ADJ
     DISTANCE ADJUST
  2 PEN POSITION ADJ
 RM SENSOR LEVEL ADJ
```

(11) Press the F1 key to display the menu shown below.

```
PEN 1-2 OFFSET
 ADJUST
       TEST PATTERN>
      PARAMETER SET>
```

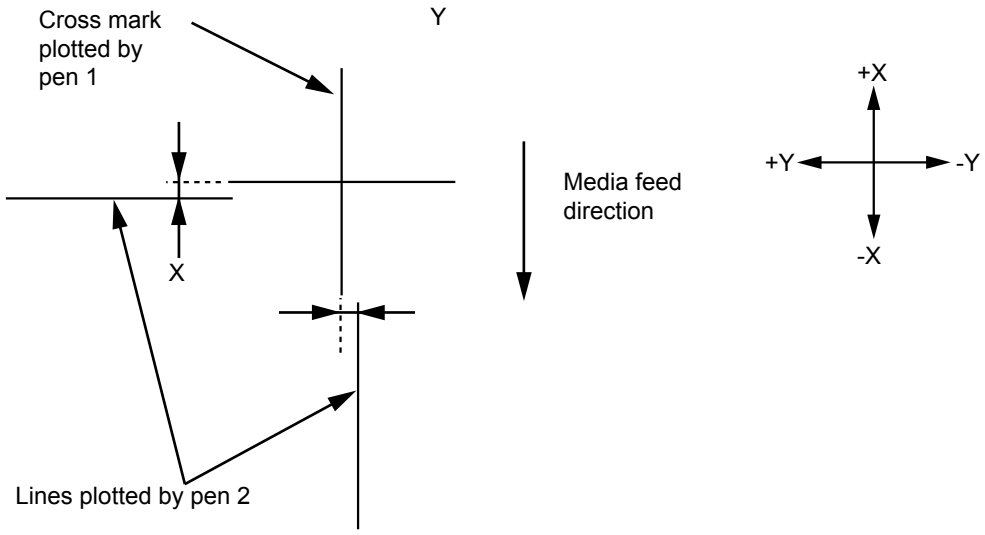
(12) Use the ARROW keys to move the pens to an open area to plot the cross marks.

(13) Press the F3 key to plot the cross marks by pen 1 and pen 2 shown below.

When they have been plotted, the menu shown below is displayed.

```
PEN 1-2 OFFSET
 ADJUST
       TEST PATTERN>
      PARAMETER SET>
```

(14) Measure the offset between the pen 1 cross mark and the pen 2 lines.



(15) Press the F4 key to display the menu shown below.

```
PEN 1-2 OFFSET
 ADJUST
           X=+ 0.0 mm
           Y=+ 0.0 mm
```

(16) Set the offset value(s). Press the UP ARROW key or DOWN ARROW key to change the number based on the pen 1 cross mark.

Press the F3 key or F4 key to select the X or Y direction.

(17) Verify that the plotted pen 1 cross mark is located at the center of the plotted pen 2 lines.

(18) Repeat steps (13) to (16) if the plotted cross marks are incorrectly positioned. If the plotted cross marks are in the correct positions, press the ENTER key to store the setting and complete the adjustment.

7.3.16 Adjusting the Servo Gain

This adjustment will set the servo gain for controlling the X/Y motor.

When you replace the main board of FC7000-75 to new type of main board (Main board for the FC7000MK2 series) this procedure is required.

The servo gain value is set to the default of firmware, except using the new type of main board (Main board for the FC7000MK2 series) for the FC7000-75.

Note: You must readjust the servo gain when you performed the Nov-RAM Clear to the FC7000-75, which is installed new main board.

How to adjsut the servo gain

(1) Mount a 0.9 mm diameter cutter pen in the pen holder.

(2) Load a sheet of paper in the plotter.

(3) Turn on the power while pressing the TEST and ENTER keys or after turning on the power, press the TEST key and the ENTER key simultaneously within 2 seconds.

(4) Press the PAUSE key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
           PEN FORCE
             XY GAIN
```

(5) Press the F4 key to display the menu shown below.

```
         GAIN
 X=40           Y=70
```

(6) Input the values that are shown below.

Model	X-Gain	Y- Gain
FC7000-75 with new main board	30	32

Press the UP or DOWN ARROW key to change the X-Gain value.

Press the LEFT or RIGHT ARROW key to change the Y-Gain value.

(7) Press the ENTER key to store the setting and complete the adjustment.

7.4 Upgrading the System Firmware

To upgrade the system firmware you need to have the following files. In addition, you need to use a computer and USB cable.

- FC7000V***.X :FC7000 firmware

  Use the firmware version 1.8 or former to the FC7000.

  Use the firmware version 3.0 or later to the FC7000Mk2.

  Also use the firmware version 3.0 or later to new main board of the FC7000.
- SEND.EXE :Utility to transfer files using Windows®
- OPS662 :USB Driver software for the FC7000

Preparation

Install the USB Driver software to your computer before upgrading the system firmware.

How to upgrade the system firmware

(1) Connect the computer and the plotter via the USB interface.

(2) Load a sheet of paper in the plotter.

(3) Turn on the power while pressing the LEFT ARROW and RIGHT ARROW keys.

Or

After turning on the power, press the LEFT ARROW key and the RIGHT ARROW key simultaneously within 2 seconds.

(4) The plotter displays the menu shown below.

```
UPDATE ?     No
```

(5) Select “Yes” using the UP ARROW or DOWN ARROW key.

```
UPDATE ?     Yes
```

(6) Press the ENTER key to display the menu shown below.

```
PLEASE SEND PRG.
```

(7) Send firmware to the plotter from the computer.

Execute SEND.EXE.

Select the system firmware file from the SEND.EXE menu.

Output the system firmware file to the FC7000.

(8) The following menu is displayed while data is being received.

(9) The plotter will start the initialization routine when all the data has been received. The firmware version is displayed during the initialization routine. Check the firmware version that you upgraded.

(10) Turn off the power.

8. SERVICE MODES

8.1 Sensor Test Mode

This mode checks the sensor status. If there is a bad sensor you will observe one of the symptoms in the table below.

Please check the relevant sensor(s).

Sensor	Symptom
Y home sensor	The pen block hits the right side plate.
Cam sensor	The plotter displays “LOAD MEDIA!” when media is already loaded.
Pinch roller sensor	The pen block hits the left side plate.
+X, -X media sensor	Media drops out of the plotter.

How to test the sensors

(1) Load an A2 or larger size sheet of paper in the plotter.

(2) Enter the adjustment menu (see Section 7.3.6).

(3) Press the MENU key to display the menu shown below.

```
SENSOR TEST
   KEY TEST
 PEN FORCE
   XY GAIN
```

(4) Press the NEXT key until the menu shown below is displayed.

```
SENSOR TEST
   KEY TEST
 PEN FORCE
   XY GAIN
```

(5) Press the F1 key to display the menu shown below.

```
YL CH PL -XL +XL
```

Y: Y home sensor, C: Cam sensor, P: Pinch roller sensor, -X: -X media sensor, +X: +X media sensor

(6) Cover the front media sensor with a piece of paper.
The status of +X changes from “L” to “H”.

(7) Cover the rear media sensor with a piece of paper.
The status of -X changes from “L” to “H”.

(8) Move the pen block to the far right. When the pen block reaches the home position flag, the status of Y changes from “L” to “H”.

(9) Lower the media set lever to raise the pinch rollers. The status of C changes from “L” to “H”.

(10) Move the pen block to the left and right. When the pen block crosses the pinch roller, the status of P changes from “L” to “H”.

(11) When testing is complete, turn off the power to the plotter.

8.2 Control Panel Switch Test Mode

This mode checks the control panel switch status. If there is a bad switch you may have trouble with the control panel switch panel or the control panel relay board.

How to test the control panel switches

(1) Load an A2 or larger size sheet of paper in the plotter.

(2) Enter the adjustment menu (see Section 7.3.6).

(3) Press the MENU key to display the menu shown below.

```
          SENSOR TEST
             KEY TEST
           PEN FORCE
             XY GAIN
```

(4) Press the NEXT key until the menu shown below is displayed.

```
          SENSOR TEST
             KEY TEST
           PEN FORCE
             XY GAIN
```

(5) Press the F2 key to display the menu shown below.

```
00000000
00000000
```

(6) Press each key on the control panel; the status will change from “0” to “1”.

The status of each digit:

Key	Status Bit
LEFT ARROW (-Y)	1st row 1st digit
NEXT	1st row 2nd digit
AXIS/RM	1st row 3rd digit
	1st row 4th digit
CONDITION	1st row 5th digit
RIGHT ARROW (+Y)	1st row 6th digit
DOWN ARROW (-X)	1st row 7th digit
UP ARROW (+X)	1st row 8th digit
F1	2nd row 1st digit
F2	2nd row 2nd digit
F3	2nd row 3rd digit
F4	2nd row 4th digit
COPY	2nd row 5th digit
TEST	2nd row 6th digit
ORIGIN	2nd row 7th digit
ENTER	2nd row 8th digit
PAUSE	STATUS Lamp (lights when the PAUSE key is pressed, but only the first time)

(7) When testing is completed, turn off the power to the plotter.

9. TROUBLESHOOTING

9.1 The Plotter is Turned On But Doesn't Operate

Symptom	Verification item	Solution
The control panel's LED lamp does not light or the LCD does not display anything.	(1) Is the plotter being supplied with power?	No .....Check that the power cord is securely connected to the plotter's AC line inlet. Yes....Verify item (2).
	(2) Is the FFC312202A flexible cable securely connected to the main board and the control panel?	No .....Connect the flexible cable securely. Yes....Verify item (3).
	(3) Is the FFC312202A flexible cable broken?	No .....Verify item (4). Yes....Replace the FFC312202A flexible cable.
	(4) Is the AC line electrical output correct?	No .....Change the AC line. Yes....Verify item (5).
	(5) Does the power supply unit have a 40 V output?	No .....Replace the power supply unit. Yes....Replace the main board.

9.2 Media Loading Operations

Symptom	Verification item	Solution
The media drops to the front of the plotter.	(1) Is the front edge of the media curled?	Yes....Replace the media. No .....Verify item (2).
	(2) Is the front media sensor dirty?	Yes....Clean the front media sensor. No .....Verify item (3).
	(3) Is the front media sensor cable securely connected to the main board and the sensor?	Yes....Replace the front media sensor. No .....Connect the cable securely.
The media drops to the rear of the plotter.	(1) Is the rear edge of the media curled?	Yes....Replace the media. No .....Verify item (2).
	(2) Is the rear media sensor dirty?	Yes....Clean the rear media sensor. No .....Verify item (3).
	(3) Is the rear media sensor cable securely connected to the main board and the sensor?	Yes....Replace the rear media sensor. No .....Connect the cable securely.
The plotter displays “LOAD MEDIA!” when media has been loaded.	(1) Does the cam sensor plate block the cam sensor?	Yes....Check the cam sensor plate and attach it at the correct position. No .....Verify item (2).
	(2) Is the cam sensor cable securely connected to the main board and the sensor?	No .....Connect the cable securely. Yes....Replace the cam sensor board.
The plotter can’t recognize the Y direction of the media size.	(1) Is there any dust on the pinch roller sensor?	Yes....Clean the pinch roller sensor. No .....Verify item (2).
	(2) Is the pinch roller sensor flexible cable securely connected to each connector?	Yes....Replace the pinch roller sensor. No .....Connect the cable securely.
The plotter can’t recognize the X direction of the media size.	(1) Is there any dust on the front media sensor and the rear media sensor?	Yes....Clean the front media sensor and the rear media sensor. No .....Verify item (2).
	(2) Are the front media sensor and the rear media sensor cables securely connected to each connector?	No .....Connect the cables securely. Yes....Replace the sensor(s).
The media is fed at an angle.	(1) Are the pinch rollers worn down?	Yes....Replace the pinch roller(s). No .....Verify item (2).
	(2) Is there anything on the drive roller?	Yes....Clean the drive roller with a brush. No .....Verify item (3).
	(3) Do the pinch rollers have the correct pressure?	No .....Replace the pinch roller spring(s). Yes....Verify item (4).
	(4) Is the drive roller worn down?	Yes....Replace the drive roller. No .....Verify item (5).
	(5) Is the drive roller attached correctly?	Yes....Replace the bearing of the drive roller. No .....Attach the drive roller correctly.

9.3 Cutting Operations

Symptom	Verification item	Solution
The cut line is crooked.	(1) Does the blade turn well in the blade holder?	No .....Replace the blade holder. Yes....Verify item (2).
	(2) Do the X and Y drive motor belts have the correct tension?	No .....Adjust the tension. No .....Verify item (3).
	(3) Is the Y belt attached correctly?	No .....Attach it correctly. Yes....Verify item (4).
	(4) Is the pen block attached correctly?	No .....Attach it correctly. Yes....Verify item (5).
	(5) Is the pen arm shaky?	Yes....Adjust the pen arm shaft slider tension.
The blade skips and does not completely cut lines that should be solid.	(1) The blade is extended too far.	Adjust the blade length.
	(2) The cutting SPEED is too high.	Adjust the SPEED setting.
	(3) Verify the pen force.	Adjust the pen force.
	(4) Verify the pen block height.	Adjust the pen block height.
The cutting position is shifted.	(1) The media is skewing.	Confirm the position of the pinch roller(s).
	(2) The X or Y belt tension is incorrect.	Adjust the belt tension.
	(3) Is the Y belt installed correctly?	Install the Y belt correctly.
	(4) Is there any play in the Y drive pulley?	Replace the Y drive pulley.

9.4 Error Messages

9.4.1 Hardware Error Messages

Error Display	Cause	Verification item	Solution
XY POSITION ERROR	Cutting conditions do not suit the cutting medium.	Cutting conditions	Lower the cutting SPEED and/or the cutting FORCE.
	Movement of the pen carriage is being obstructed.	Is there anything blocking the X or Y slider?	Turn off the plotter, remove the obstacle, then turn the plotter back on.
	Excessive load is causing the current to the motor to exceed the rated value.	(1) Does the X or Y slider move smoothly?	No.....Check and adjust the X or Y belt tension and X or Y motor belt tension. Yes....Verify item (2).
		(2) Is the X or Y flexible cable securely connected?	No.....Connect it securely. Yes....Replace the X or Y flexible cable if defective.
	Home sensor or sensor plate adjustment.	(3) Is the X or Y home sensor plate position correct?	No.....Check and adjust the X or Y home sensor plate position. Yes....Verify item (4).
		(4) Is the X or Y home sensor position correct?	No.....Check and adjust the X-home sensor position. Yes....Replace the X-home sensor if defective.
	Motor	(5) Does the X-motor turn smoothly?	No.....Replace the X-motor if defective. Yes....Replace the main board if defective.
CPU ADDRESS ERROR	Address error.		Replace the main board.
DMA ADDRESS ERROR	DMA address error.		Replace the main board.

9.4.2 Error Messages in GP-GL Command Mode

Error Display	Cause	Verification item	Solution
ERROR 1 COMMAND ERROR	The plotter received an unrecognizable command.	(1) Did the plotter receive an unrecognizable command?	No .....Verify item (2) Yes....Send correct data to plotter.
		(2) Is there any noise on the line?	No .....Verify item (3) Yes....Check the interface cable or move the plotter to another location.
		(3) Has the correct model name been set for the plotter?	No .....Set the correct model name. Configure your software application menu to permit Graphtec plotter control. Re-specify the software application's interface conditions.
ERROR 4 PARAMETER OVERFLOW	• The software configuration regarding the output device has been changed. • The plotter's interface conditions have been changed.	The numeric parameter of an input command exceeds its permissible range.	Configure your software application menu to permit Graphtec plotter control. Re-specify the software application's interface conditions. Set the correct model name if it was incorrect.
ERROR 5 I/O ERROR		An error related to the receipt of data occurred within the interface.	

9.4.3 Error Messages in HP-GL Emulation Mode

If any of the following command errors occur, they are nearly always caused by one of the reasons below:

(1) The software configuration regarding the output device has been changed; or

(2) The plotter's interface conditions have been changed.

When a command error occurs in HP-GL™ emulation mode, therefore, first check the two corresponding points below:

(1) Configure the software to drive your plotter, and ensure that the software's interface conditions are correctly set; and

(2) Ensure that the plotter's interface conditions are set to match those of the software.

Error Display	Cause	Verification item	Solution
ERROR 1 Instruction not recognized	An unrecognizable instruction was executed. Execute a recognizable command.	(1) Did the plotter receive an unrecognizable command?	No .....Verify item (2) Yes....Send correct data to plotter.
		(2) Is there any noise on the line?	No .....Verify item (3) Yes....Check the interface cable or move the plotter to another location.
		(3) Has the correct model name been set for the plotter?	No .....Set the correct model name. Configure your software application menu to permit Graphtec plotter control. Re-specify the software application's interface conditions.
ERROR 2 Wrong number of parameters	A command was executed with the wrong number of parameters.	Execute the command with the correct number of parameters.	Configure your software application menu to permit Graphtec plotter control. Re-specify the software application's interface conditions. Set the correct model name if it was incorrect.
ERROR 3 Out of range parameters	A command containing an unusable parameter was specified.	Execute the command with its parameters specified within their permissible ranges.	
ERROR 5 Unknown character set	An unrecognizable character set was specified.	Specify a recognizable character set.	

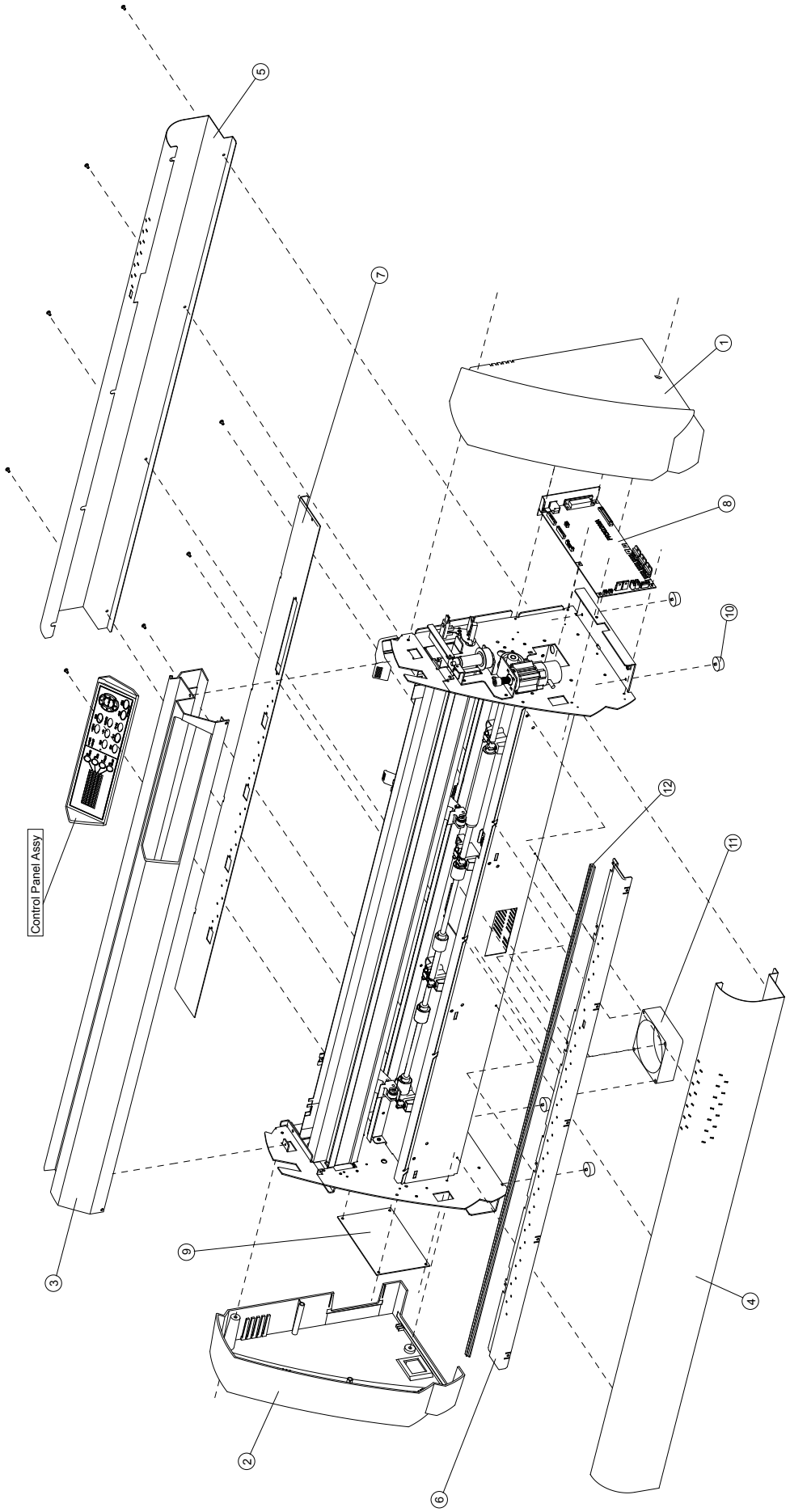
Error Display	Cause	Verification item	Solution
ERROR 6 Position overflow	A command was executed with coordinate data that exceeds the effective cutting/plotting area.	Execute the command with its coordinate data specified within the effective cutting/plotting area.	Configure your software application menu to permit Graphtec plotter control. Re-specify the software application's interface conditions. Set the correct model name if it was incorrect.
ERROR 7 Buffer overflow	The data being input exceeded the capacity of the plotter's downloadable character buffer, polygon buffer, etc.	Decrease the downloadable characters, polygons.	
ERROR 10 Invalid I/O output request	During execution of an output command, another output command was executed.	Check the flow of your programmed data.	
ERROR 11 Invalid byte following ESC	The ESC character was followed by an invalid byte.	Check the ESC commands in your program.	
ERROR 12 Invalid byte I/O Control	A device control command containing an invalid byte was received.	Check the device control commands in your program.	
ERROR 13 Out of range I/O parameter	A parameter outside of the permissible numeric range was specified.	Check the program.	
ERROR 14 Too many I/O parameters	Too many parameters were received.	Check the number of command parameters.	
ERROR 15 Error in I/O transmission	During data transfer, a framing error, parity error, or overrun error occurred.	Check the settings of the interface conditions.	
ERROR 16 I/O buffer overflow	The I/O buffer received data at a faster pace than it could process, indicating that handshaking is not successful.	Check the settings of the handshaking mode and other interface conditions.	

10. PARTS LIST

10.1 Outer Casing

No.	Part No.	Description	Q'ty	Remarks
1	621264032	Right Side Cover	1	FC7000/MK2
	621314120	Right Side Cover 9	1	9 series
2	621264022	Left Side Cover	1	FC7000/MK2
	621314110	Left Side Cover 9	1	9 series
3	621391170	Center Cover 060	1	FC7000MK2-60
	621264211	Center Cover 075	1	FC7000-75/MK2-75
	621274211	Center Cover 100	1	FC7000-100/MK2-100
	621284211	Center Cover 130	1	FC7000-130/MK2-130
	621294211	Center Cover 160	1	FC7000-160/MK2-160
	621312130	Center Cover 9060	1	960
	621314130	Center Cover 9075	1	975
	621315130	Center Cover 9100	1	9100
	621316130	Center Cover 9130	1	9130
	621317130	Center Cover 9160	1	9160
4	621390080	Front Guide 60	1	FC7000MK2-60
	621261082	Front Guide 75	1	FC7000-75/MK2-75
	621271083	Front Guide 100	1	FC7000-100/MK2-100
	621281083	Front Guide 130	1	FC7000-130/MK2-130
	621291083	Front Guide 160	1	FC7000-160/MK2-160
5	621390090	Rear Guide 60	1	FC7000MK2-60
	621261093	Rear Guide 75	1	FC7000-75/MK2-75
	621271093	Rear Guide 100	1	FC7000-100/MK2-100
	621281093	Rear Guide 130	1	FC7000-130/MK2-130
	621291093	Rear Guide 160	1	FC7000-160/MK2-160
6	621390030	Front Writing Panel 60	1	FC7000MK2-60
	621261034	Front Writing Panel 75	1	FC7000-75/MK2-75
	621271034	Front Writing Panel 100	1	FC7000-100/MK2-100
	621281034	Front Writing Panel 130	1	FC7000-130/MK2-130
	621291035	Front Writing Panel 160	1	FC7000-160/MK2-160
7	621390040	Rear Writing Panel 60	1	FC7000MK2-60
	621261042	Rear Writing Panel 75	1	FC7000-75/MK2-75
	621271042	Rear Writing Panel 100	1	FC7000-100/MK2-100
	621281042	Rear Writing Panel 130	1	FC7000-130/MK2-130
	621291043	Rear Writing Panel 160	1	FC7000-160/MK2-160
8	772126500	Main Board for FC7000	1	FC7000-75/100/130/160
	792700703	Main Board for FC7000MK2	1	FC7000MK2-60/75/100/130/160
	792700700	Main Board for 9 series	1	975/9100/9130/9160
	792700704	Main Board for 960		960
9	500052449	Power Supply Board (PS3122)	1	
10	363024101	Foot (NT24)	4	
11	500052449	Fan (TDS-05B-DC12V)	1	
12	621390050	Cutting Mat 60	1	FC7000MK2-60
	621261053	Cutting Mat 75	1	FC7000-75/MK2-75
	621271053	Cutting Mat 100	1	FC7000-100/MK2-100
	621281053	Cutting Mat 130	1	FC7000-130/MK2-130
	621291053	Cutting Mat 160	1	FC7000-160/MK2-160

Outer Casing


Control Panel Assy
1
2
3
4
5
6
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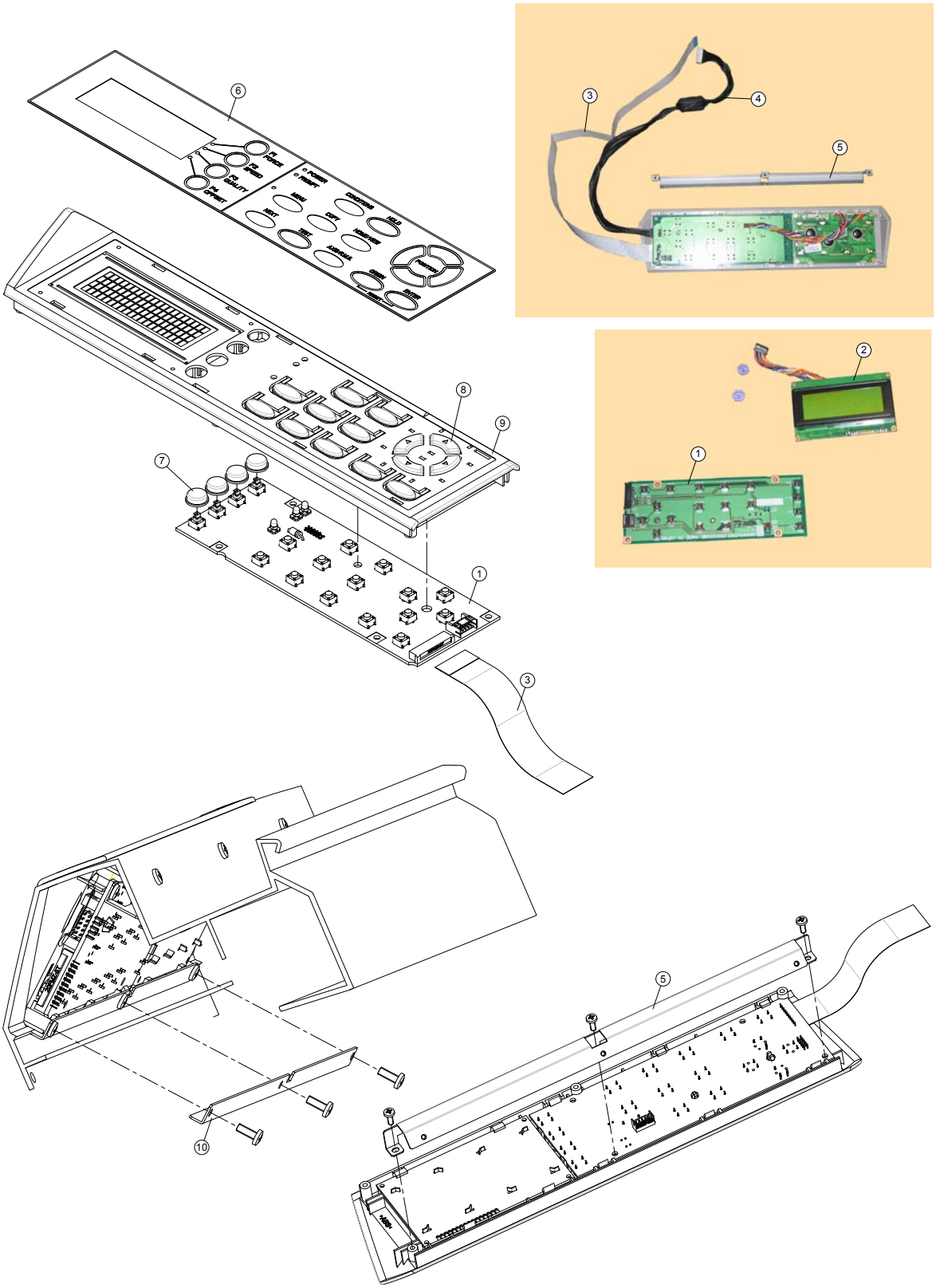
8
9
10
11
12

10.2 Control Panel

No.	Part No.	Description	Q'ty	Remarks
1	772126570	Control Panel Board	1	
2	772126560	LCD Board Assy	1	
3	692126521	Cable, FFC312202A	1	Control Panel Flexible Cable
4	692126170	Cable, CA312217	1	Main Board to Control Panel
5	621264161	Bracket, Top	1	
6	621264143	Control Panel Sheet	1	
	621394140	Control Panel Sheet MK2	1	FC7000MK2
7	621264110	Key Top, Function	4	
8	621264120	Key Top, Cursor	4	
9	621264132	Control Panel	1	
10	621264170	Bracket, Bottom	1	

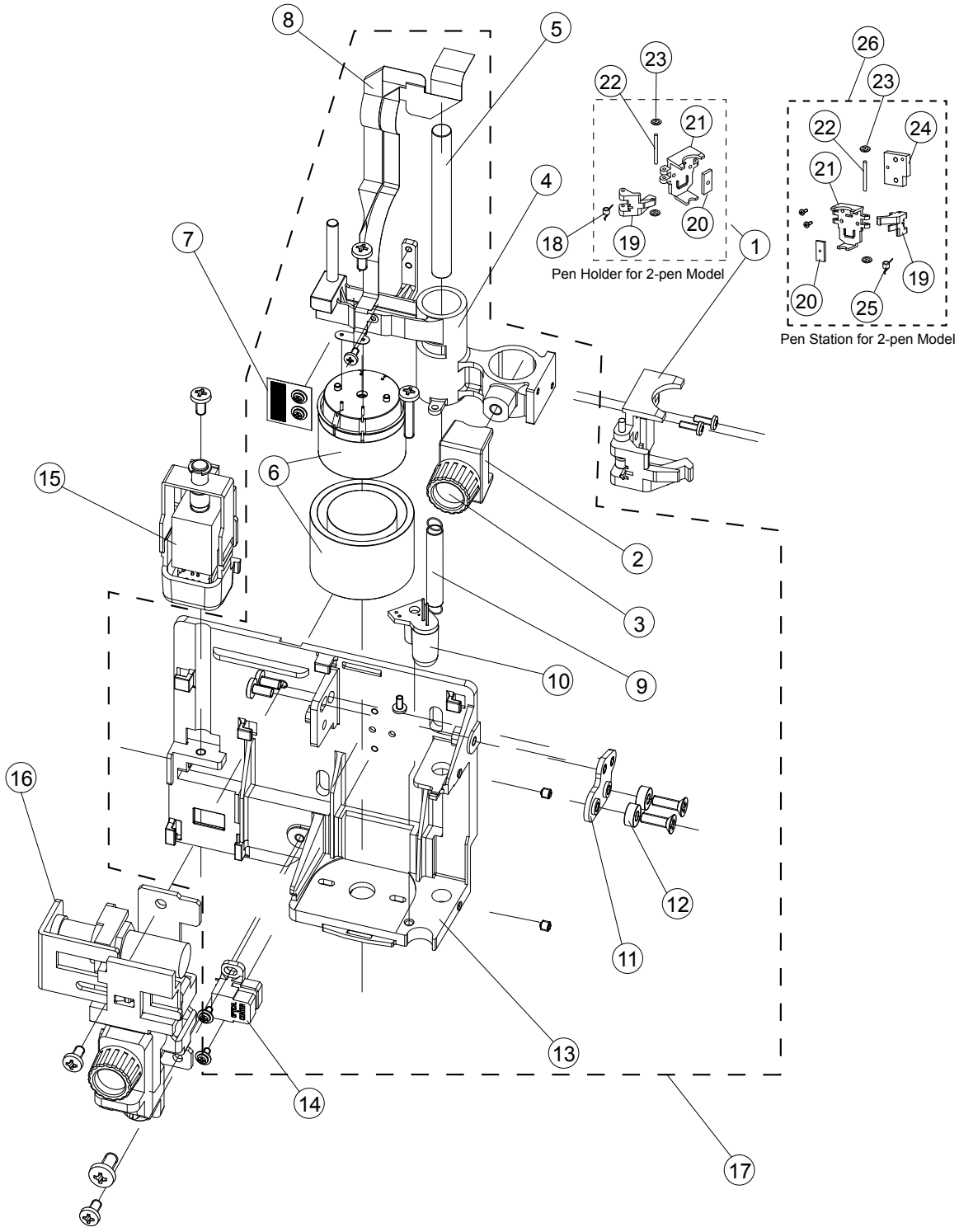
Control Panel



10.3 Pen Block

No.	Part No.	Description	Q'ty	Remarks
1	792219702	Pen Holder Assy 4200	1	For 2-pen model
2	621263281	Cutter Pen Holder	1	
3	621113581	Thumb Screw L14	1	
4	621263222	Pen Arm	1	
5	621263230	Slide Shaft	1	
6	682126520	Moving Coil with Yoke (PM1306)	1	
7	617363351	Pen Encoder Strip	1	
8	691700521	Pen Flexible Cable, FPC601103A	1	
9	380205511	Pen Arm Spring E-551	1	
10	772126710	Light Pointer Assy	1	
11	621263251	Bearing Roller Base Bracket	1	
12	310068320	Bearing Roller	2	683ZZMC3PS2S
13	621263212	Moving Coil Base	1	
14	500050122	Encoder Sensor, HEDS-9720#P50	1	
15	772126720	Auto Registration Mark Sensor Assy	1	
16	772126340	Cross Cutter Assy	1	
17	772126700	Pen Block Assy	1	
18	622192091	Arm Spring 2	1	For 2-pen model
19	622192070	Lock Arm	2	For 2-pen model
20	053203420	Magnet	2	For 2-pen model
21	622192060	Pen Holder AP	2	For 2-pen model
22	337120250	Shaft Pin D2L25H7	2	For 2-pen model
23	333302001	Stopper Ring CS 2 mm	4	For 2-pen model
24	621163200	Pen Holder Spacer	1	For 2-pen model
25	622192081	Arm Spring 1	1	For 2-pen model
26	792219703	Pen Station Assy 4200	1	For 2-pen model

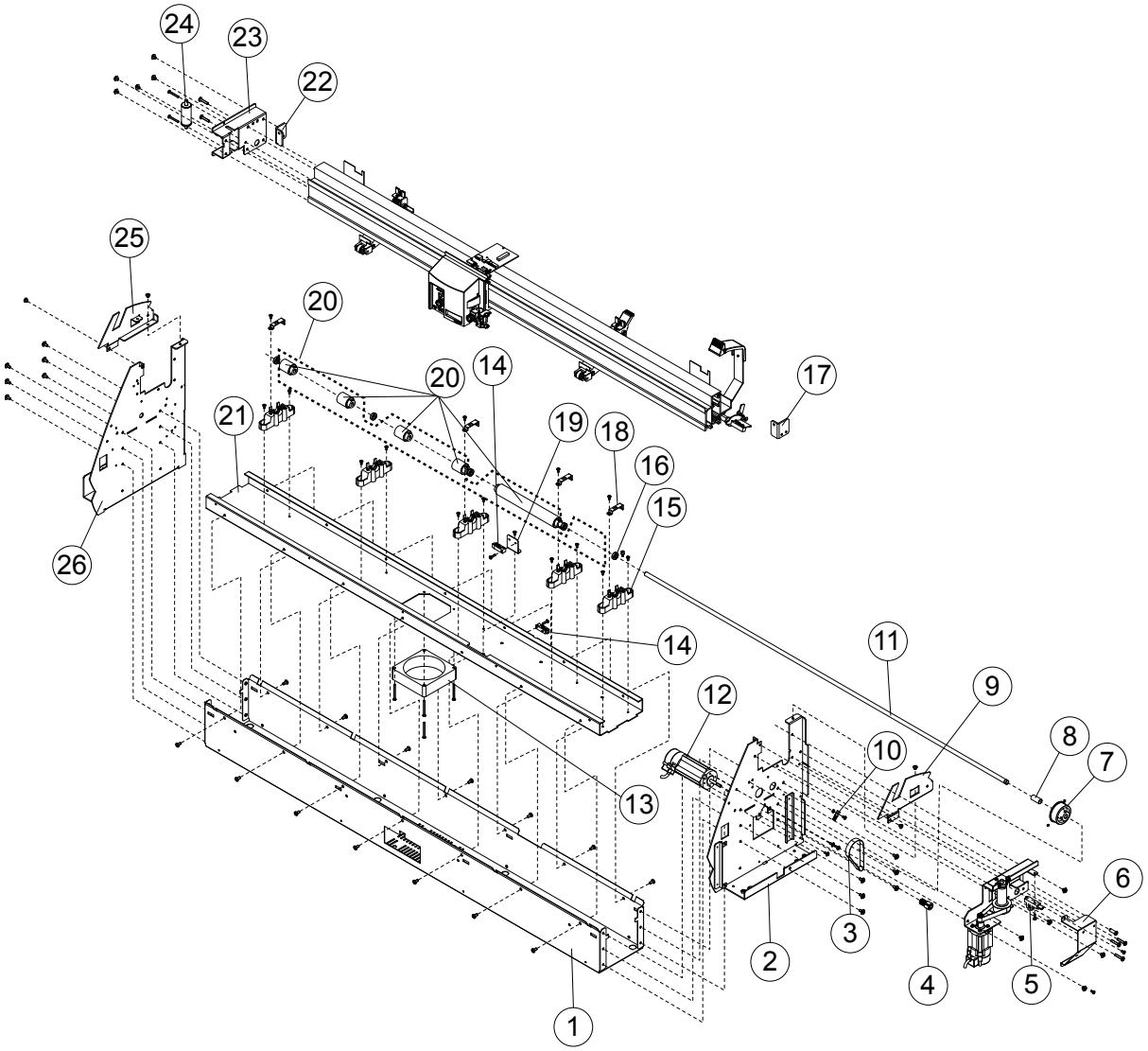
Pen Block



10.4 Main Frame

No.	Part No.	Description	Q'ty	Remarks
1	621390020	Sub Chassis 60	1	FC7000MK2-60
	621261023	Sub Chassis 75	1	FC7000-75
	621271023	Sub Chassis 100	1	FC7000-100
	621281023	Sub Chassis 130	1	FC7000-130
	621291023	Sub Chassis 160	1	FC7000-160
2	621260081	Right Side Plate	1	FC7000
	621260380	Right Side Plate for MK2		FC7000MK2
3	378413041	X Drive Belt, 130TN15-10W	1	
4	010012022	X Motor Pulley	1	
5	500052478	Cam Sensor, LG-217D-3	1	
6	621260230	Cable Bracket	1	
7	617362100	X Drive Shaft Pulley, 85Z	1	
8		Bush, D8L21	1	
9	621260222	Right Side Sub Plate	1	
10	035132220	Brush	1	
11	621392010	X Drive Roller Shaft 60	1	FC7000MK2-60
	621262010	X Drive Roller Shaft 75	1	FC7000-75/MK2-75
	621272010	X Drive Roller Shaft 100	1	FC7000-100/MK2-100
	621282010	X Drive Roller Shaft 130	1	FC7000-130/MK2-130
	621292011	X Drive Roller Shaft 160	1	FC7000-160/MK2-160
12	682132430	X Motor, UGJMEE-A7JGR34	1	FC7000/MK2-100/130/160
	682132440	X Motor, UGJMEE-A7MGR73	1	FC7000-75
	682126200	X Motor, DMN37HE-003	1	FC7000MK2-60/75
13	500052451	Fan, KLDC12B4-940	1	FC7000-75/MK2-60/75
	500052451	Fan, KLDC12B4-940	2	FC7000/MK2-100,130,160
14	500052515	Media Sensor, PS-117ED1	2	
15	621260011	Pillow Block	5	FC7000-75/FC7000MK2-60
	621260011	Pillow Block	7	FC7000-100/MK2-100
	621260011	Pillow Block	9	FC7000-130/MK2-130
	621260011	Pillow Block	11	FC7000-160/MK2-160
16	310014820	Bearing, MR148ZZMC3PS2S	5	FC7000-75/FC7000MK2-60
	310014820	Bearing, MR148ZZMC3PS2S	7	FC7000-100/MK2-100
	310014820	Bearing, MR148ZZMC3PS2S	9	FC7000-130/MK2-130
	310014820	Bearing, MR148ZZMC3PS2S	10	FC7000-160/MK2-160
17	621271250	Flexible Cable Reinforcement 100	1	FC7000-100/MK2-100
	621281250	Flexible Cable Reinforcement 130	1	FC7000-130/MK2-130
	621291250	Flexible Cable Reinforcement 160	1	FC7000-160/MK2-160
18	621260021	Bearing Cover	4	FC7000-75/FC7000MK2-60
	621260021	Bearing Cover	5	FC7000-100/MK2-100
	621260021	Bearing Cover	6	FC7000-130/MK2-130
	621260021	Bearing Cover	6	FC7000-160/MK2-160
19	621260132	Media Sensor Bracket	1	
20	621392020	X Drive Roller Set 60	1	FC7000MK2-60
	621262020	X Drive Roller Set 75	1	FC7000-75/MK2-75
	621272020	X Drive Roller Set 100	1	FC7000-100/MK2-100
	621282020	X Drive Roller Set 130	1	FC7000-130/MK2-130
	621292020	X Drive Roller Set 160	1	FC7000-160/MK2-160
21	621390010	Main Chassis 60	1	FC7000MK2-60
	621261014	Main Chassis 75	1	FC7000-75/MK2-75
	621271014	Main Chassis 100	1	FC7000-100/MK2-100
	621281014	Main Chassis 130	1	FC7000-130/MK2-130
	621291014	Main Chassis 160	1	FC7000-160/MK2-160
22	621263140	Y Rail Reinforcement Bracket	1	
23	621263133	Idler Bracket	1	
24	792700702	Idler Pulley Assy	1	
25	621260212	Left Side Sub Plate	1	
26	621260071	Left Side Plate	1	FC7000
	621260370	Left Side Plate	1	FC7000MK2

Main Frame

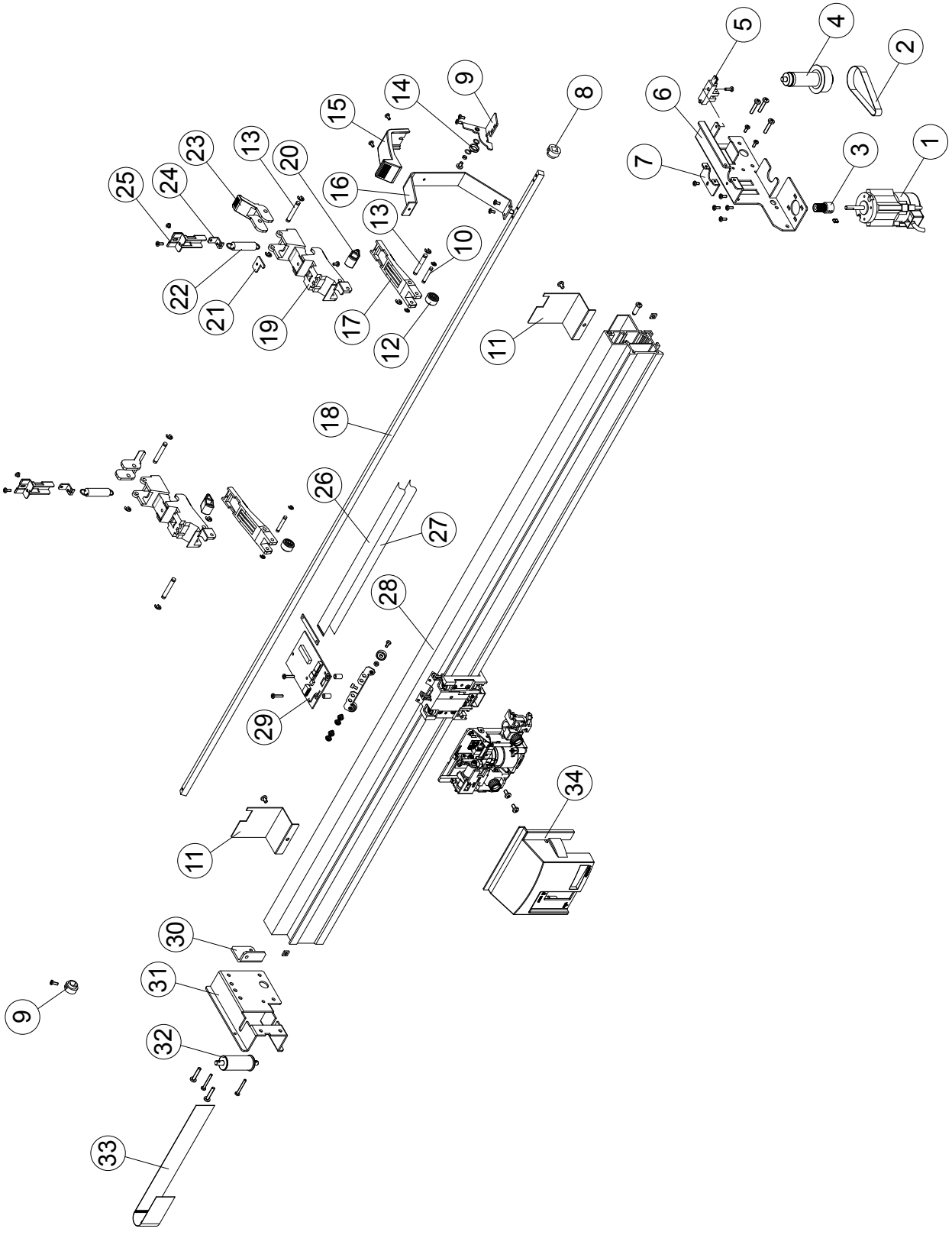


10.5 Y Rail

No.	Part No.	Description	Q'ty	Remarks
1	682132440	Y Motor, UGJMEE-A7MGR73	1	FC7000
	682126200	Y Motor, DMN37HE-003	1	FC7000MK2
2	378413041	Y Motor Belt, 130TN15-10W	1	
3	010012022	Y Motor Pulley Z24	1	
4	792700705	Y Drive Pulley Assy	1	
5	500052478	Cam Sensor, LG-217D-3	1	
6	621393110	Y Drive Bracket	1	FC7000MK2
	621293113	Y Drive Bracket	1	FC7000
7	621263120	Y Drive Adjustment Plate	1	
8	621230101	Cam Shaft Holder	2	
9	621263072	Cam Sensor Dog	1	
10	092002041	Pinch Roller Shaft	2	FC7000/MK2-75, FC7000MK2-60
	092002041	Pinch Roller Shaft	3	FC7000/MK2-100/130
	092002041	Pinch Roller Shaft	4	FC7000-160/MK2-160
11	621230390	Pinch Roller Sensor Dog	2	
12	095002121	Pinch Roller	2	FC7000/MK2-75, FC7000MK2-60
	095002121	Pinch Roller	3	FC7000/MK2-100/130
	095002121	Pinch Roller	4	FC7000/MK2-160
13	621112120	Pinch Roller Arm Shaft	4	FC7000/MK2-75, FC7000MK2-60
	621112120	Pinch Roller Arm Shaft	6	FC7000/MK2-100/130/160
	621112120	Pinch Roller Arm Shaft	8	FC7000/MK2-160
14	621261250	Cam Lever Spring	1	
15	621264012	Cam Lever Top	1	
16	621261231	Cam Lever	1	
17	621112100	Pinch Roller Arm	2	FC7000/MK2-75, FC7000MK2-60
	621112100	Pinch Roller Arm	3	FC7000/MK2-100/130
	621112100	Pinch Roller Arm	4	FC7000/MK2-160
18	621391240	Cam Shaft 60	1	FC7000MK2-60
	621261241	Cam Shaft 75	1	FC7000/MK2-75
	621271241	Cam Shaft 100	1	FC7000/MK2-100
	621281241	Cam Shaft 130	1	FC7000/MK2-130
	621291241	Cam Shaft 160	1	FC7000/MK2-160
19	621263011	Pinch Roller Base	2	FC7000/MK2-75, FC7000MK2-60
	621263011	Pinch Roller Base	3	FC7000/MK2-100/130
	621263011	Pinch Roller Base	4	FC7000/MK2-160
20	621230111	Cam	2	FC7000/MK2-75, FC7000MK2-60
	621230111	Cam	3	FC7000/MK2-100/130
	621230111	Cam	4	FC7000/MK2-160
21	621263052	Stopper Plate	1	FC7000/MK2-75, FC7000MK2-60
	621263052	Stopper Plate	2	FC7000/MK2-100/130/160
22	621263060	Pinch Roller Spring	2	FC7000/MK2-75, FC7000MK2-60
	621263060	Pinch Roller Spring	3	FC7000/MK2-100/130
	621263060	Pinch Roller Spring	4	FC7000/MK2-160
23	621263042	Pinch Roller Spring Lever	2	FC7000/MK2-75, FC7000MK2-60
	621263042	Pinch Roller Spring Lever	3	FC7000/MK2-100/130
	621263042	Pinch Roller Spring Lever	4	FC7000-160
24	621263031	Spring Hook Adjustment Bracket	2	FC7000/MK2-75, FC7000MK2-60
	621263031	Spring Hook Adjustment Bbracket	3	FC7000/MK2-100/130
	621263031	Spring Hook Adjustment Bracket	4	FC7000/MK2-160
25	621263022	Spring Hook Base Bracket	2	FC7000/MK2-75, FC7000MK2-60
	621263022	Spring Hook Base Bracket	3	FC7000/MK2-100/130
	621263022	Spring Hook Base Bracket	4	FC7000/MK2-160
26	692126532	Y Flexible Cable, FFC312203B	1	FC7000/MK2-75, FC7000MK2-60
	692126542	Y Flexible Cable, FFC312204B	1	FC7000/MK2-100
	692126552	Y Flexible Cable, FFC312205B	1	FC7000/MK2-130
	692126562	Y Flexible Cable, FFC312206B	1	FC7000/MK2-160
27	621271250	Flexible Cable Reinforcement Bracket 100	1	FC7000/MK2-100
	621281250	Flexible Cable Reinforcement Bracket 130	1	FC7000/MK2-130
	621291250	Flexible Cable Reinforcement Bracket 160	1	FC7000/MK2-160
28	621391210	Y Rail 60	1	FC7000MK2-60
	621261210	Y Rail 75	1	FC7000/MK2-75
	621271210	Y Rail 100	1	FC7000/MK2-100
	621281210	Y Rail 130	1	FC7000/MK2-130
	621291210	Y Rail 160	1	FC7000/MK2-160
29	772126660	Pen Board	1	
30	621263140	Y Rail Reinforcement Bracket	1	

No.	Part No.	Description	Q'ty	Remarks
31	621263133	Idler Bracket	1	
32	792700702	Idler Pulley Assy	1	
33	621391220	Y Belt, 150S2M-1000	1	FC7000MK2-60
	621261220	Y Belt, 150S2M-1150	1	FC7000/MK2-75
	621271220	Y Belt, 300S2M-1450	1	FC7000/MK2-100
	621281220	Y Belt, 250S2M-1750	1	FC7000/MK2-130
	621291220	Y Belt, 300S2M-2010	1	FC7000/MK2-160
34	621263271	Pen Block Cover	1	

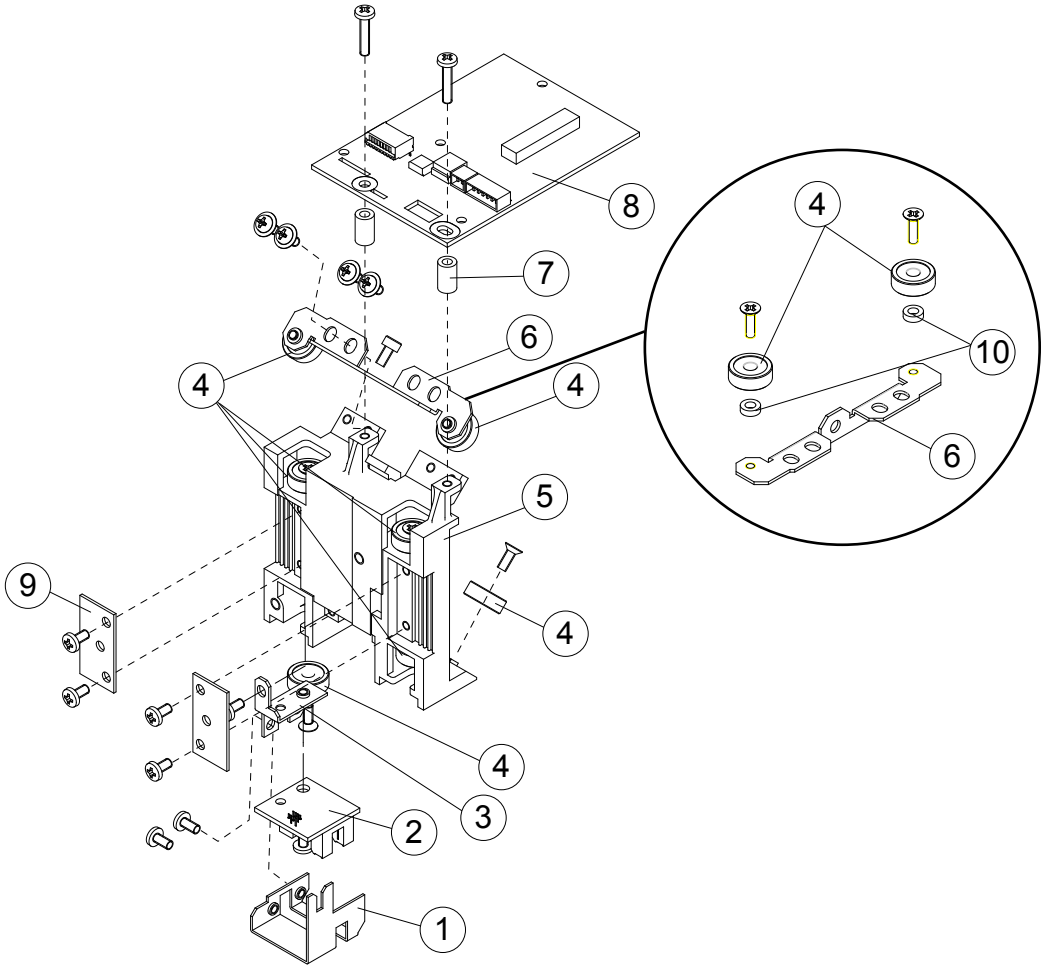
Y Rail



10.6 Y Slider

No.	Part No.	Description	Q'ty	Remarks
1	621173160	Y Sensor Guard	1	
2	772126650	Pinch Roller Sensor Board	1	
3	621173150	Y Sensor Bracket B	1	
4	095013010	Roller B13	8	
5	621183403	Y Slider L-FC51	1	
6	621183410	Roller Tension Plate L	1	
7	692123350	Spacer CL-310N	2	
8	772126660	Pen Board	1	
9	692123320	Y Belt Fixing Plate L-51	2	
10	392230020	Spacer CE302	2	

Y Slider



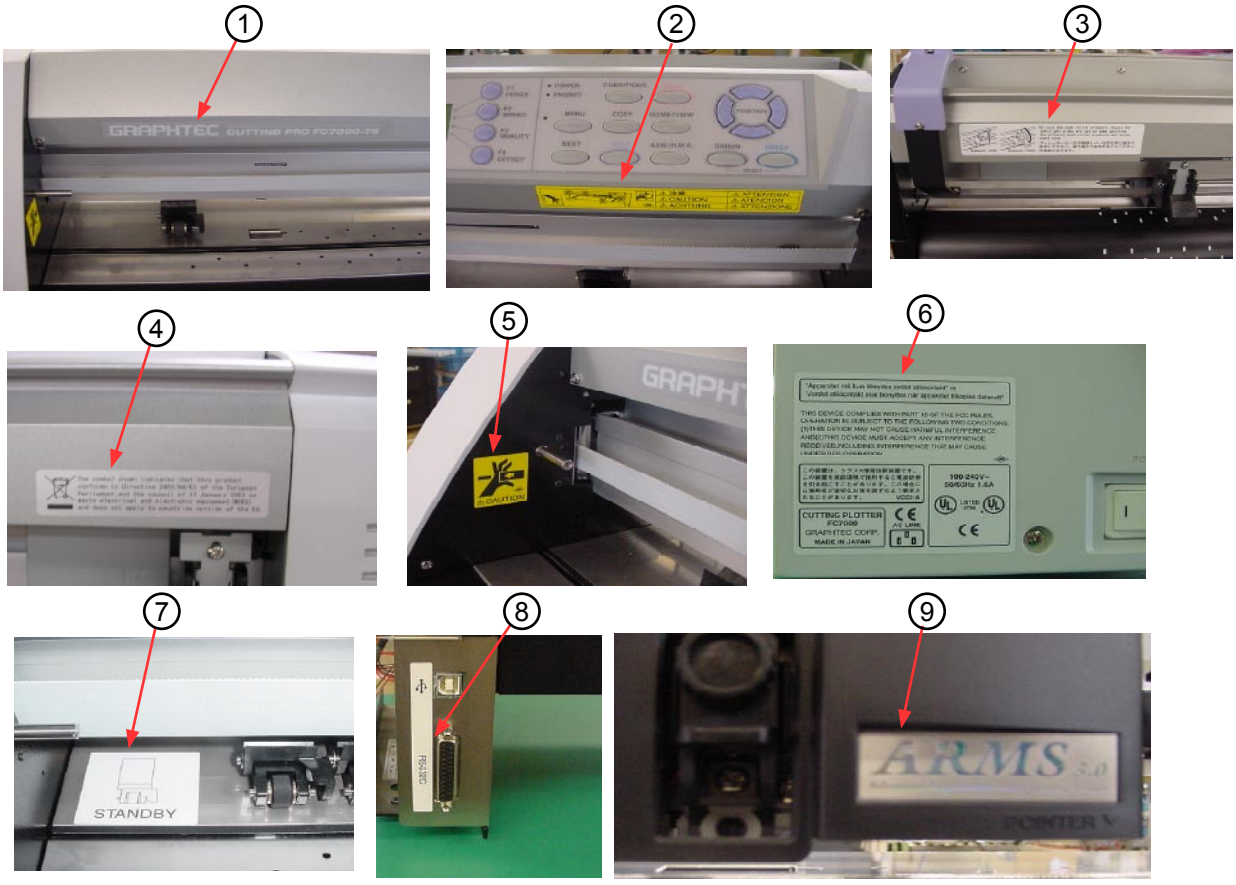
10.7 Wiring Harness

No.	Part No.	Description	Q'ty	Remarks
1	692126082	CA312208B (Media Sensor to Main Board)	1	
2	692123020	CA312209A (Fan to Main Board)	1	FC7000/MK2-75/60
	692126101	CA312210A (Fan to Main Board)	1	FC7000-100
	692126111	CA312211A (Fan to Main Board)	1	FC7000-130/160
3	692126012	CA312201B (Power Supply Switch to Main Board)	1	FC7000-75
	692126022	CA312202B (Power Supply Switch to Main Board)	1	FC7000-100
	692126032	CA312203B (Power Supply Switch to Main Board)	1	FC7000-130
	692126042	CA312204B (Power Supply Switch to Main Board)	1	FC7000-160
4	692126121	CA312212A (Main Board to Cam Sensor)	1	
5	692126170	CA312217 (Main Board to Control Panel Board)	1	

10.8 Labels

No.	Part No.	Description	Q'ty	Remarks
1	621394360	Emblem MK2-60	1	FC7000MK2-60
	621264300	Emblem MK2-75		FC7000MK2-75
	621274340	Emblem MK2-100		FC7000MK2-100
	621284340	Emblem MK2-130		FC7000MK2-130
	621294340	Emblem MK2-160		FC7000MK2-160
	621264350	Emblem 75	1	FC7000-75
	621274350	Emblem 100	1	FC7000-100
	621284350	Emblem 130	1	FC7000-130
	621294350	Emblem 160	1	FC7000-160
	621312210	Emblem 960	1	960
	621314210	Emblem 975	1	975
	621315210	Emblem 9100	1	9100
	621316210	Emblem 9130	1	9130
	621317210	Emblem 9160	1	9160
2	621264370	Warning Label	1	
3	621264430	Push Roller Label	1	
4	910990020	WEEE Label	1	
5	621264380	Caution Label	1	
6	621264310	Model Label	1	FC7000
	621314220	Model VE Label	1	9 series
7	621264390	Standby Label	1	
8	621264330	I/F Label	1	
9	621263290	ARMS Label	1	

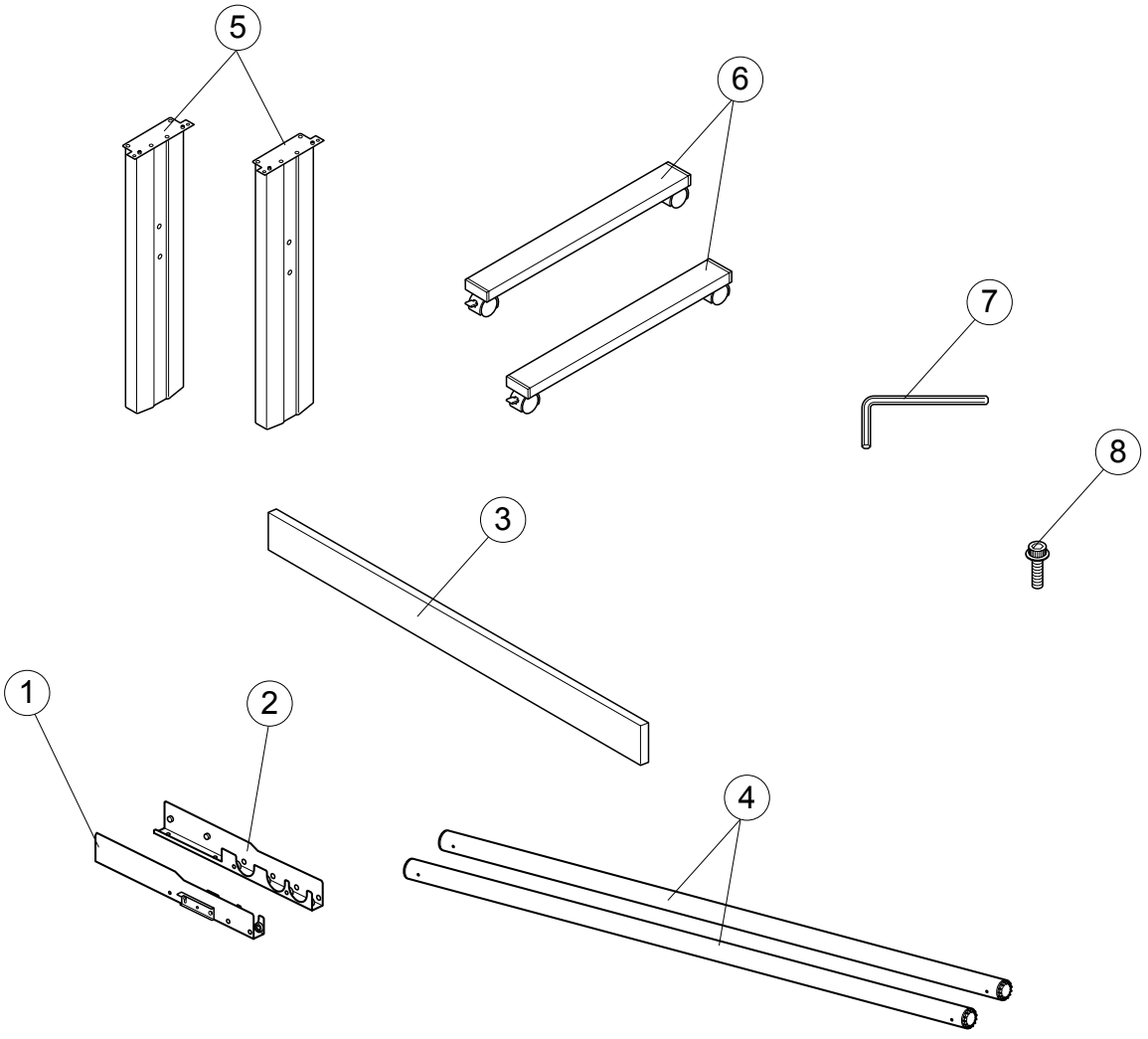
Labels



10.9 Media Stocker, Stand

No.	Part No.	Description	Q'ty	Remarks
1	621269215	Right Media Stocker Bracket	1	
2	621269225	Left Media Stocker Bracket	1	
3	621391170	Center Bar 60	1	FC7000MK2-60
	621261170	Center Bar 75	1	FC7000/MK2-75
	621271120	Center Bar 100	1	FC7000/MK2-100
	621281120	Center Bar 130	1	FC7000/MK2-130
	621291120	Center Bar 160	1	FC7000/MK2-160
4	621391330	Stock Roller 60	2	FC7000MK2-60
	621261332	Stock Roller 75	2	FC7000/MK2-75
	621271332	Stock Roller 100	2	FC7000/MK2-100
	621281332	Stock Roller 130	2	FC7000/MK2-130
	621291332	Stock Roller 160	2	FC7000/MK2-160
5	621261120	Side Stay Assembly	2	
6	621261151	Foot (Base Assembly)	2	
7		Hexagonal Wrench (M5)	1	
8		Socket Head Cap Screw	20	

Media Stocker, Stand

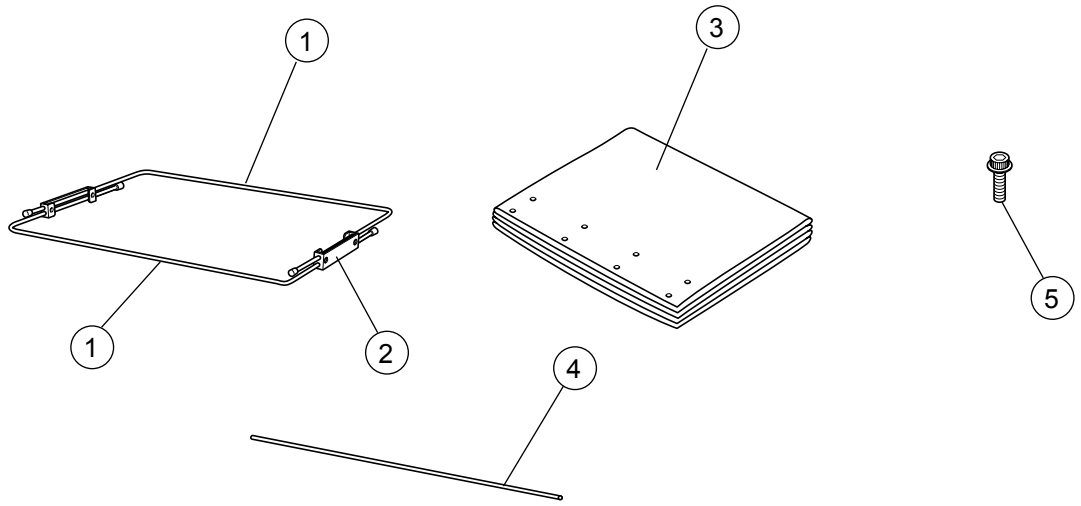


10.10 Option Basket

FC7000/MK2-75/100/130/160

No.	Part No.	Description	Q'ty	Remarks
1	621399430	Basket Pipe 7060	2	FC7000MK2-60
	621269430	Basket Pipe 7075	2	FC7000/MK2-75
	621279430	Basket Pipe 7100	2	FC7000/MK2-100
	621289430	Basket Pipe 7130	2	FC7000/MK2-130
	621299430	Basket Pipe 7160	2	FC7000/MK2-160
2	621179430	Basket Bracket	2	
3	621269450	Basket MK2 7060	1	FC7000MK2-60
	621269450	Basket MK2 7075	1	FC7000MK2-75
	621279450	Basket MK2 7100	1	FC7000MK2-100
	621289450	Basket MK2 7130	1	FC7000MK2-130
	621299450	Basket MK2 7160	1	FC7000MK2-160
	621269420	Basket 7075	1	FC7000-75
	621279420	Basket 7100	1	FC7000-100
	621289420	Basket 7130	1	FC7000-130
	621299420	Basket 7160	1	FC7000-160
4	621399440	Center Pipe 7060	1	FC7000MK2-60
	621269440	Center Pipe 7075	1	FC7000MK2-75
	621279440	Center Pipe 7100	1	FC7000MK2-100
	621289440	Center Pipe 7130	1	FC7000MK2-130
	621299440	Center Pipe 7160	1	FC7000MK2-160
5		M6L12 Socket Head Cap Screw	4	
6		End Cap KP-107	4	

Option Basket



10.11 Other Parts

Standard Accessories

No.	Part No.	Description	Q'ty	Remarks
1	500052533	USB Cable, CBL1112-3.0M	1	
2	621269311	CD-ROM (FC7000-CDM**M)	1	FC7000
	621399310	CD-ROM (FC7MK2-CDM01M)	1	FC7000MK2
3	621269321	Quick Start Manual	1	

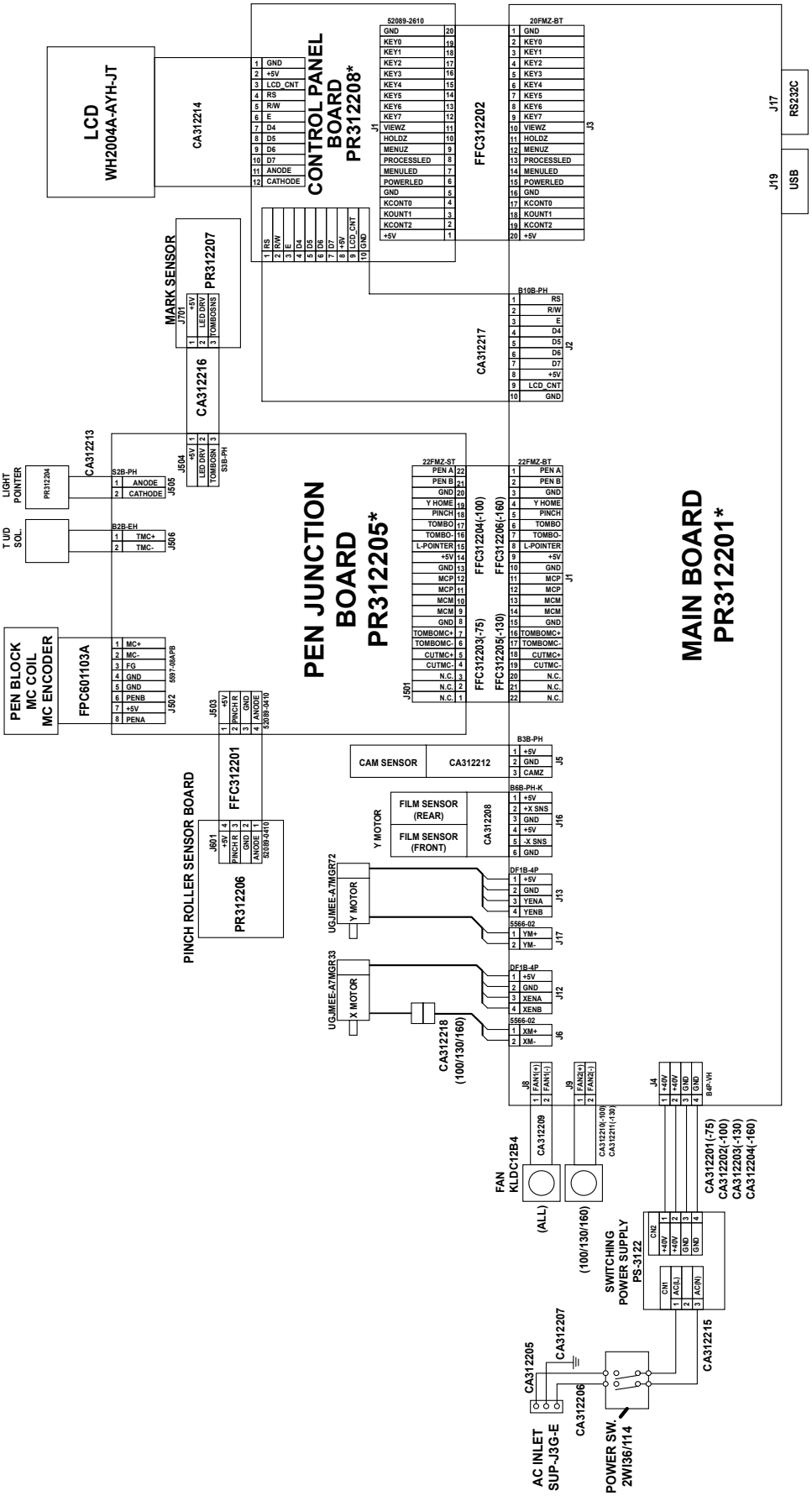
Packing Boxes

No.	Part No.	Description	Q'ty	Remarks
1	621269110	Packing Box for FC7000-75	1	
2	621279110	Packing Box for FC7000-100	1	
3	621289110	Packing Box for FC7000-130	1	
4	621299110	Packing Box for FC7000-160	1	
5	621399110	Packing Box for FC7000MK2-60	1	
6	621269140	Packing Box for FC7000MK2-75	1	
7	621279130	Packing Box for FC7000MK2-100	1	
8	621289130	Packing Box for FC7000MK2-130	1	
9	621299130	Packing Box for FC7000MK2-160	1	

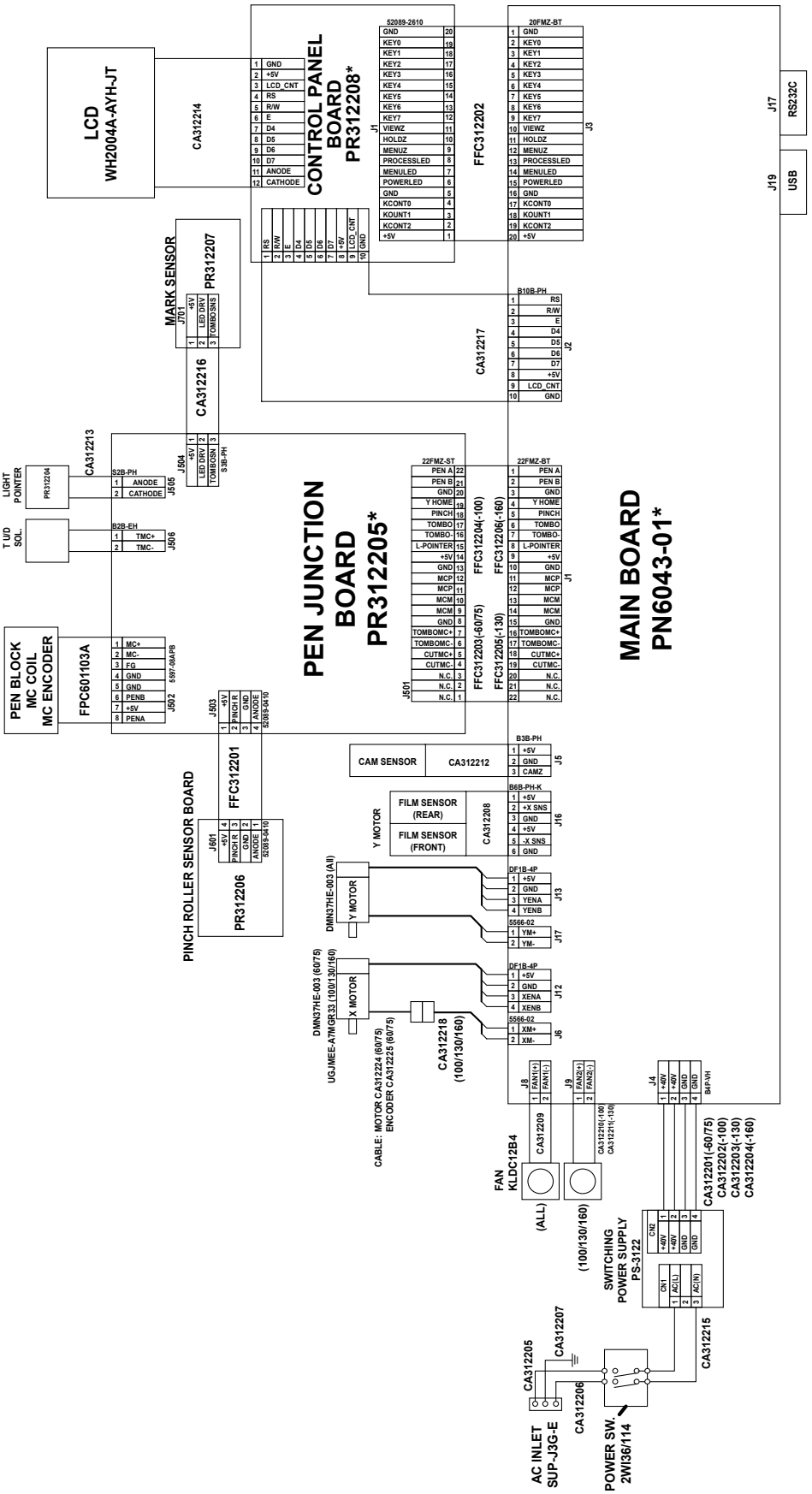
11. BLOCK DIAGRAMS AND CIRCUIT DIAGRAMS

11.1 Block Diagrams

11.1.1 Block Diagrams FC7000

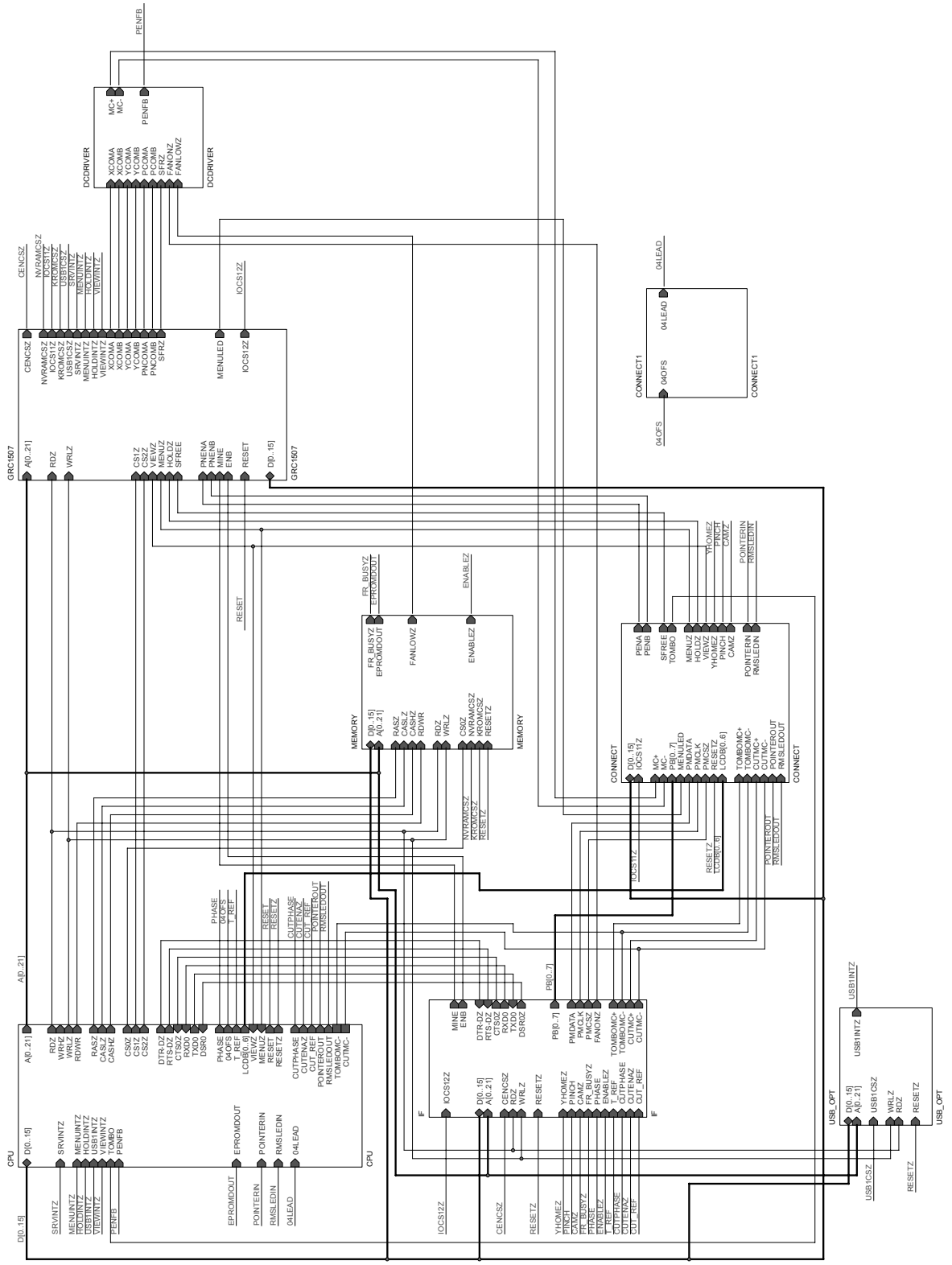


11.1.2 Block Diagrams FC7000MK2

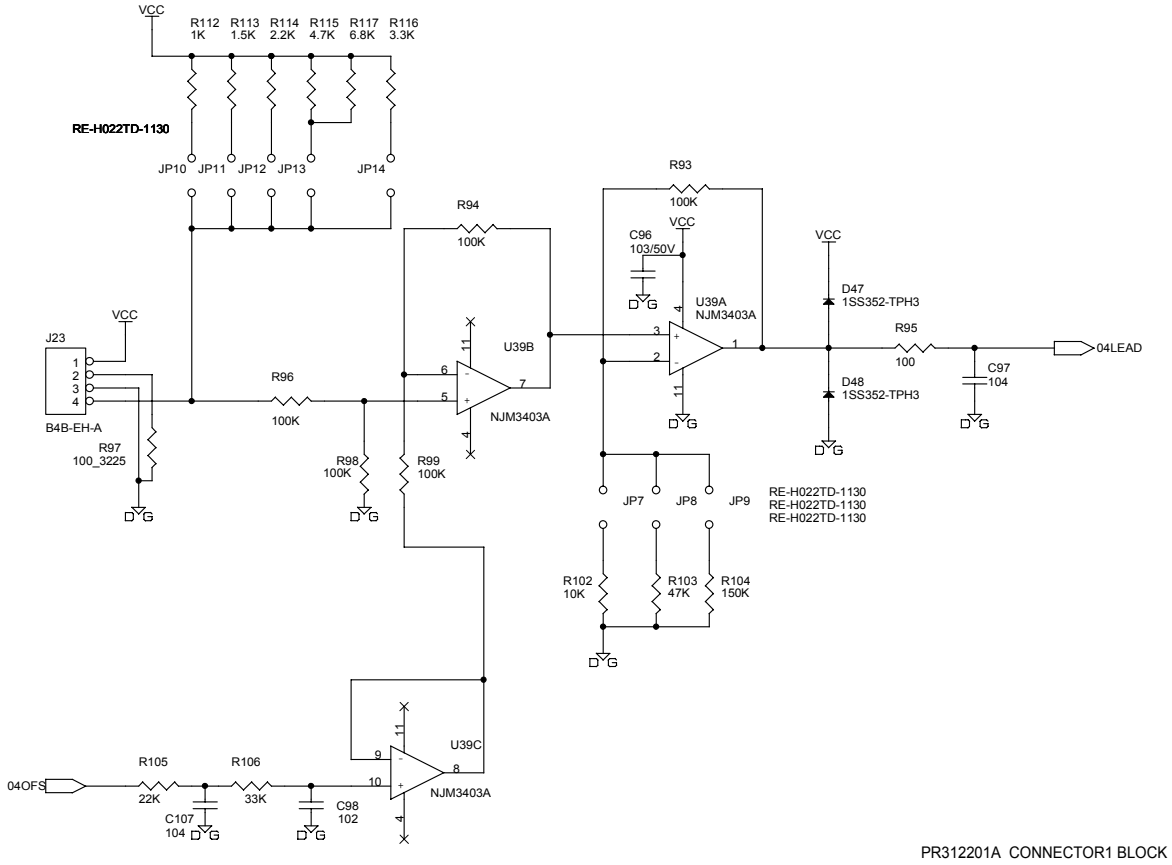


11.2 Circuit Diagrams

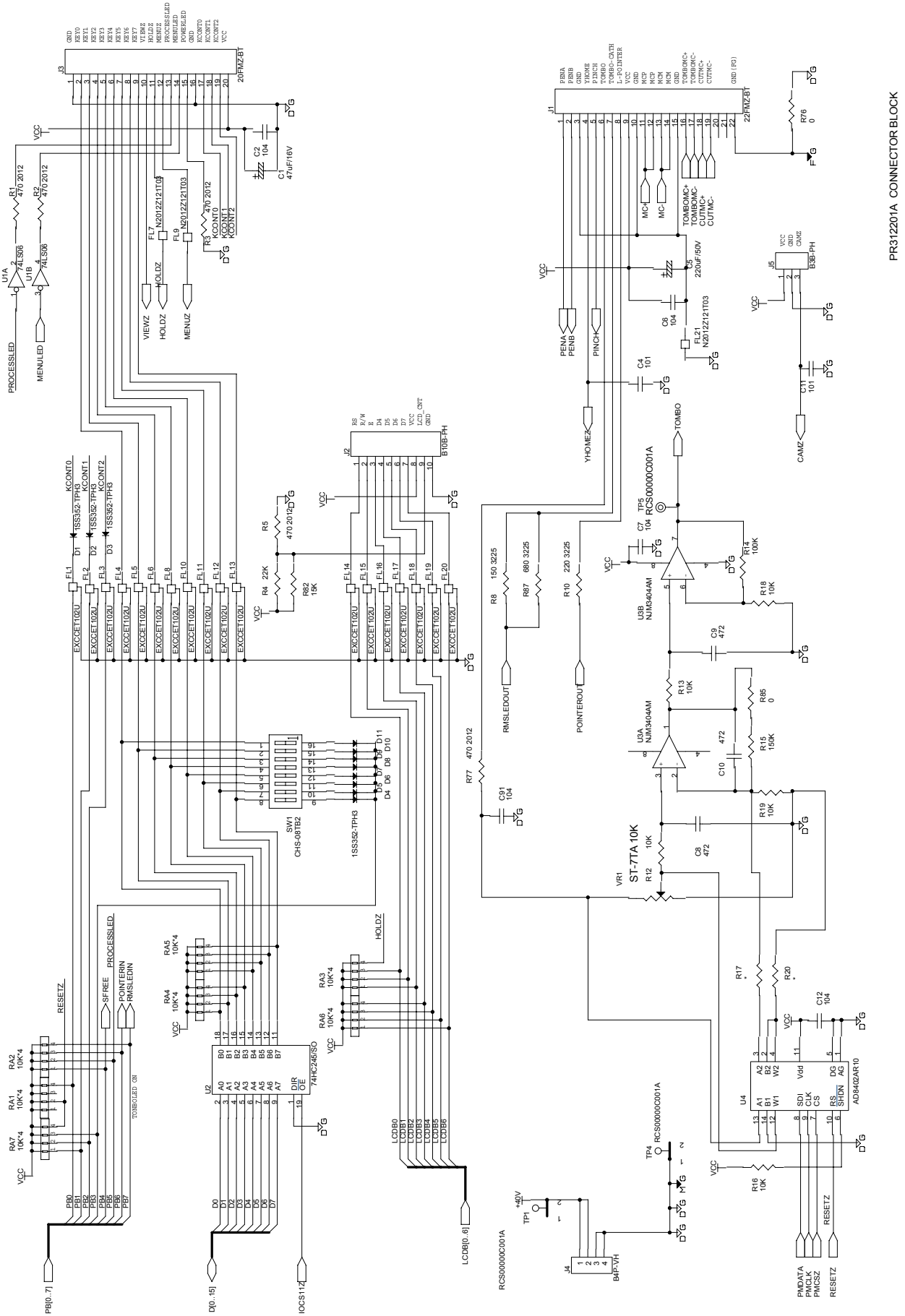
11.2.1 Main Board Top Section



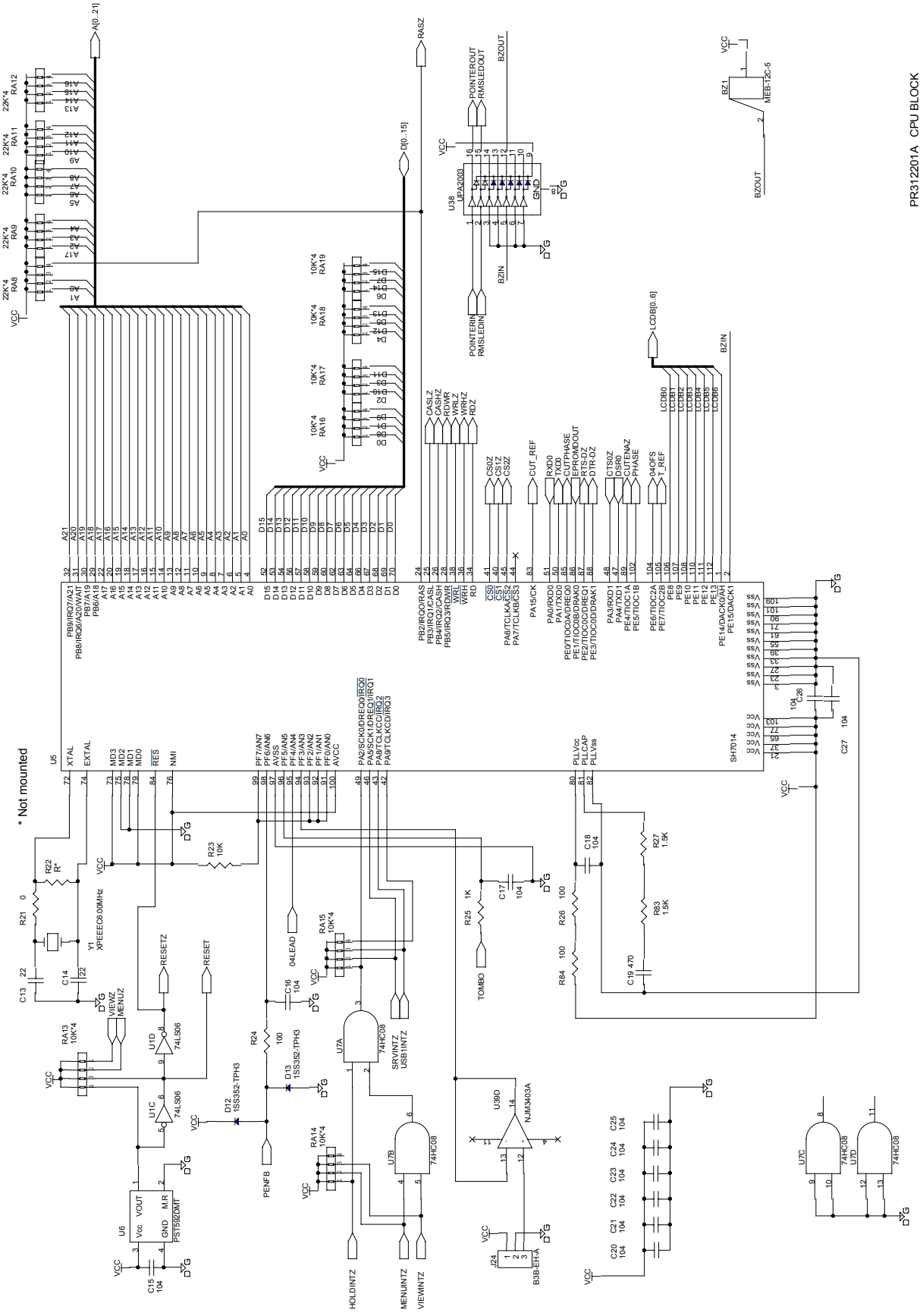
11.2.2 Main Board (CONNECTOR 1 BLOCK)



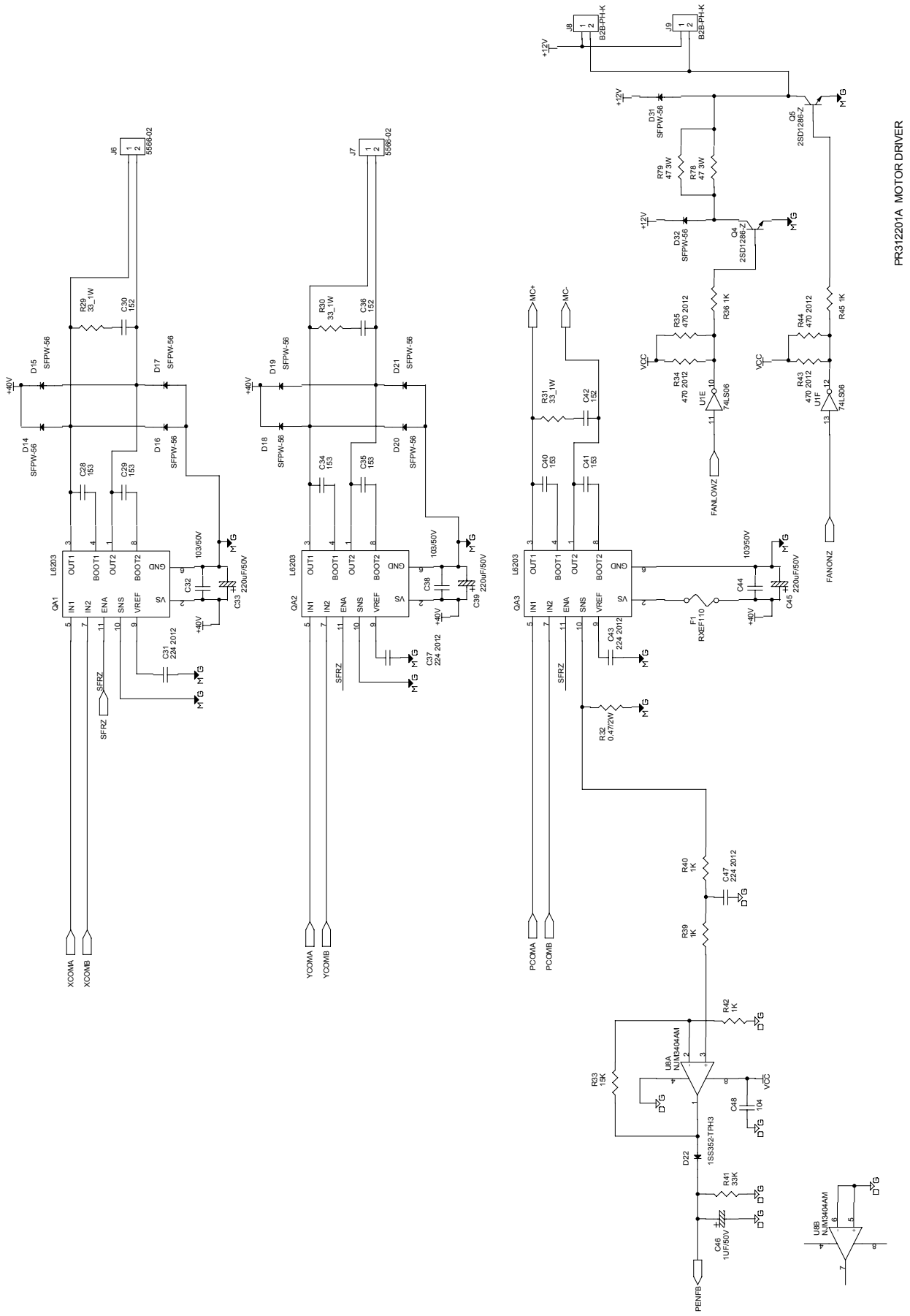
11.2.3 Main Board (CONNECTOR BLOCK)



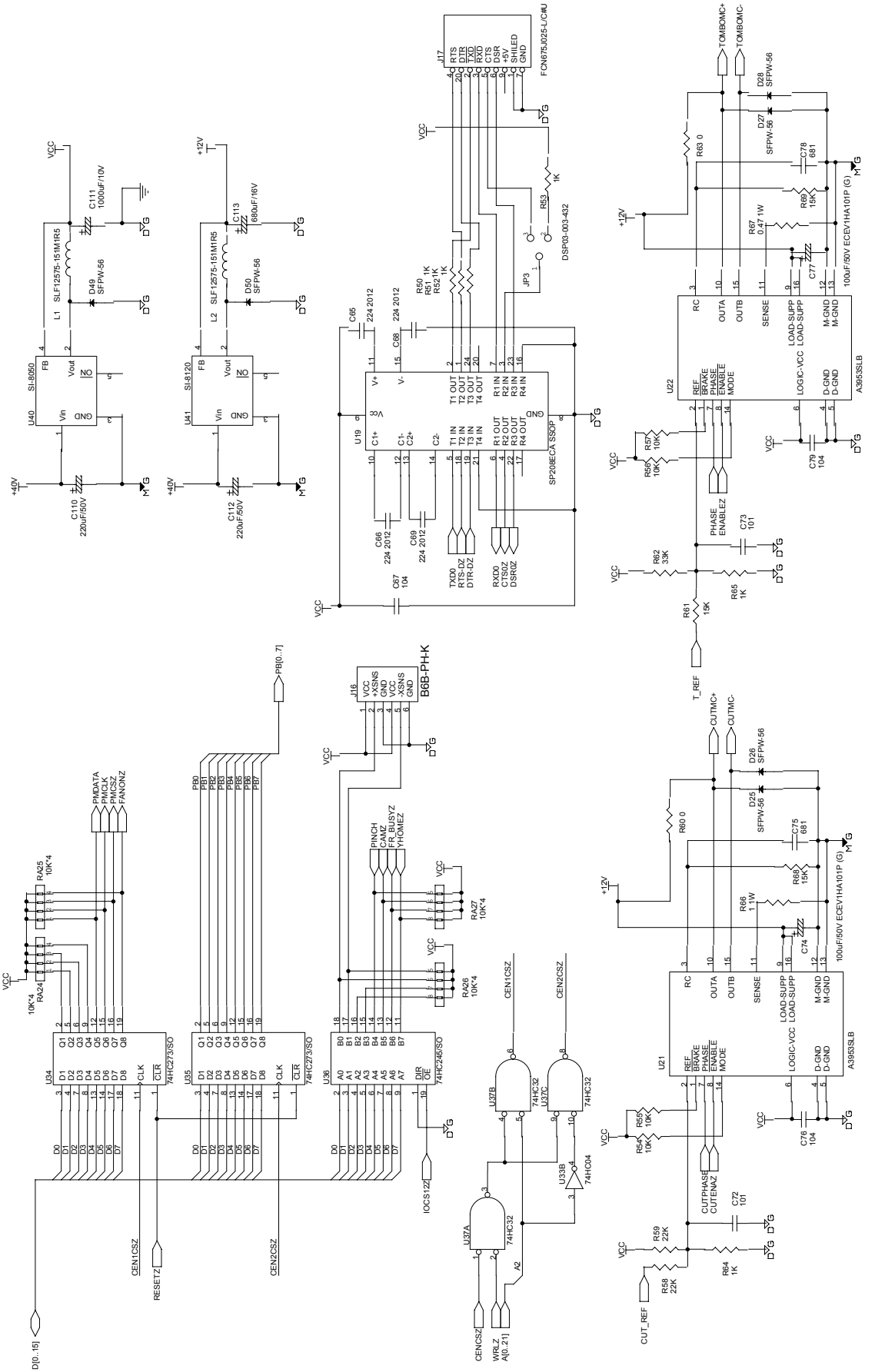
11.2.4 Main Board (CPU BLOCK)



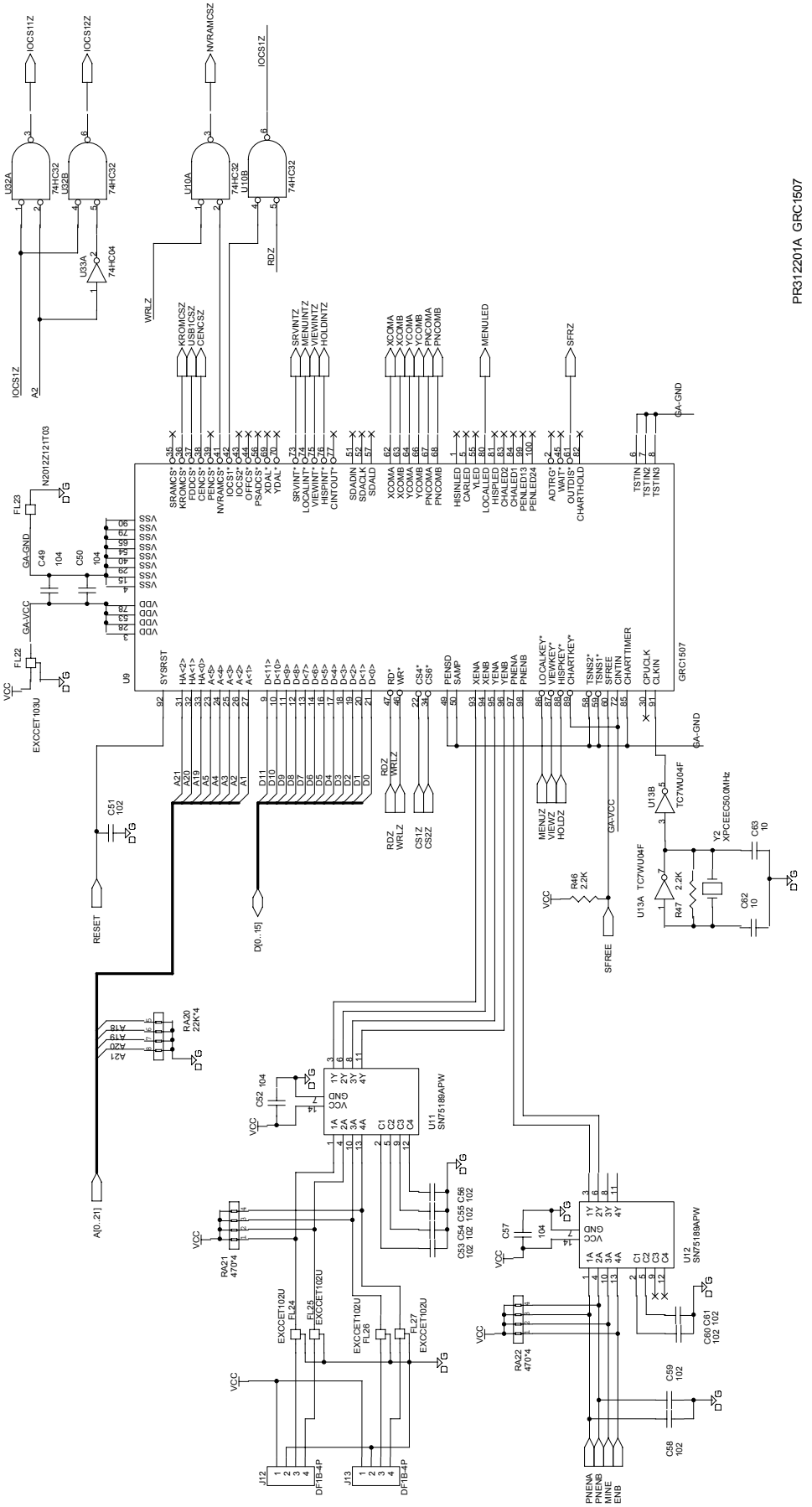
11.2.5 Main Board (DC DRIVER)



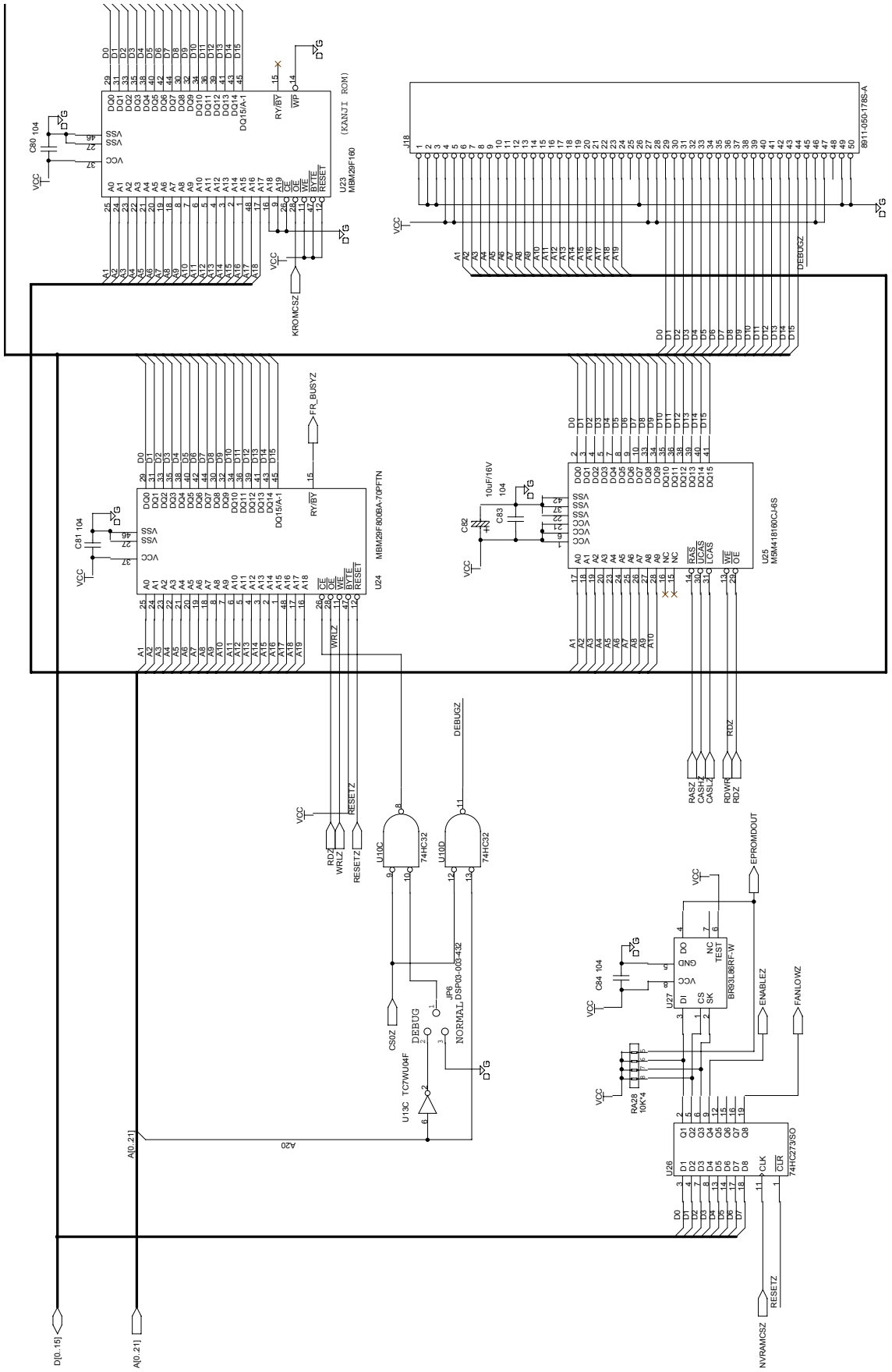
11.2.6 Main Board (I/F BLOCK)



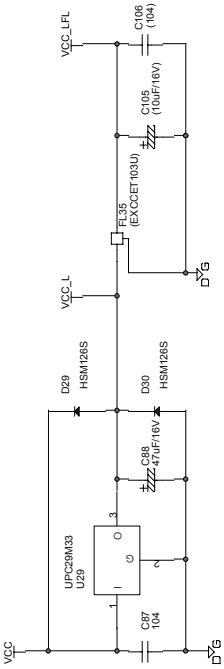
11.2.7 Main Board (GRC SERVO BLOCK)

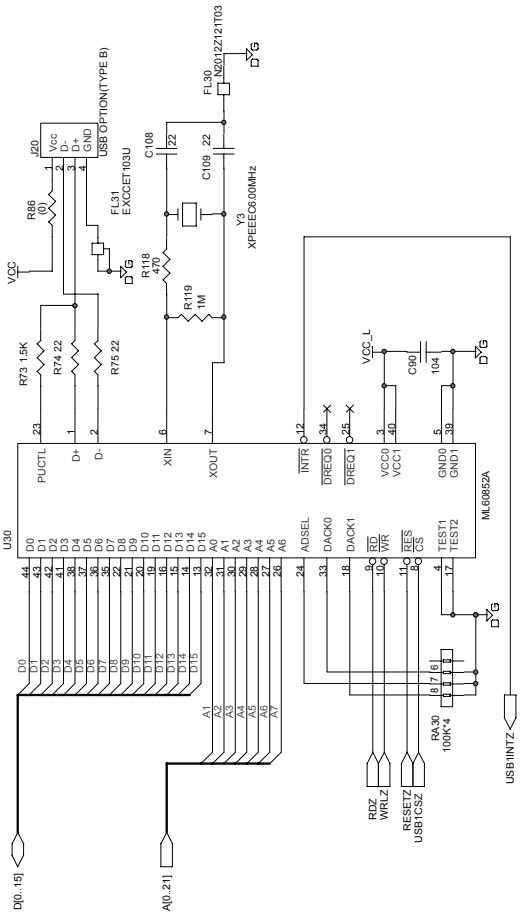


11.2.8 Main Board (MEMORY BLOCK)



11.2.9 Main Board (USB BLOCK)

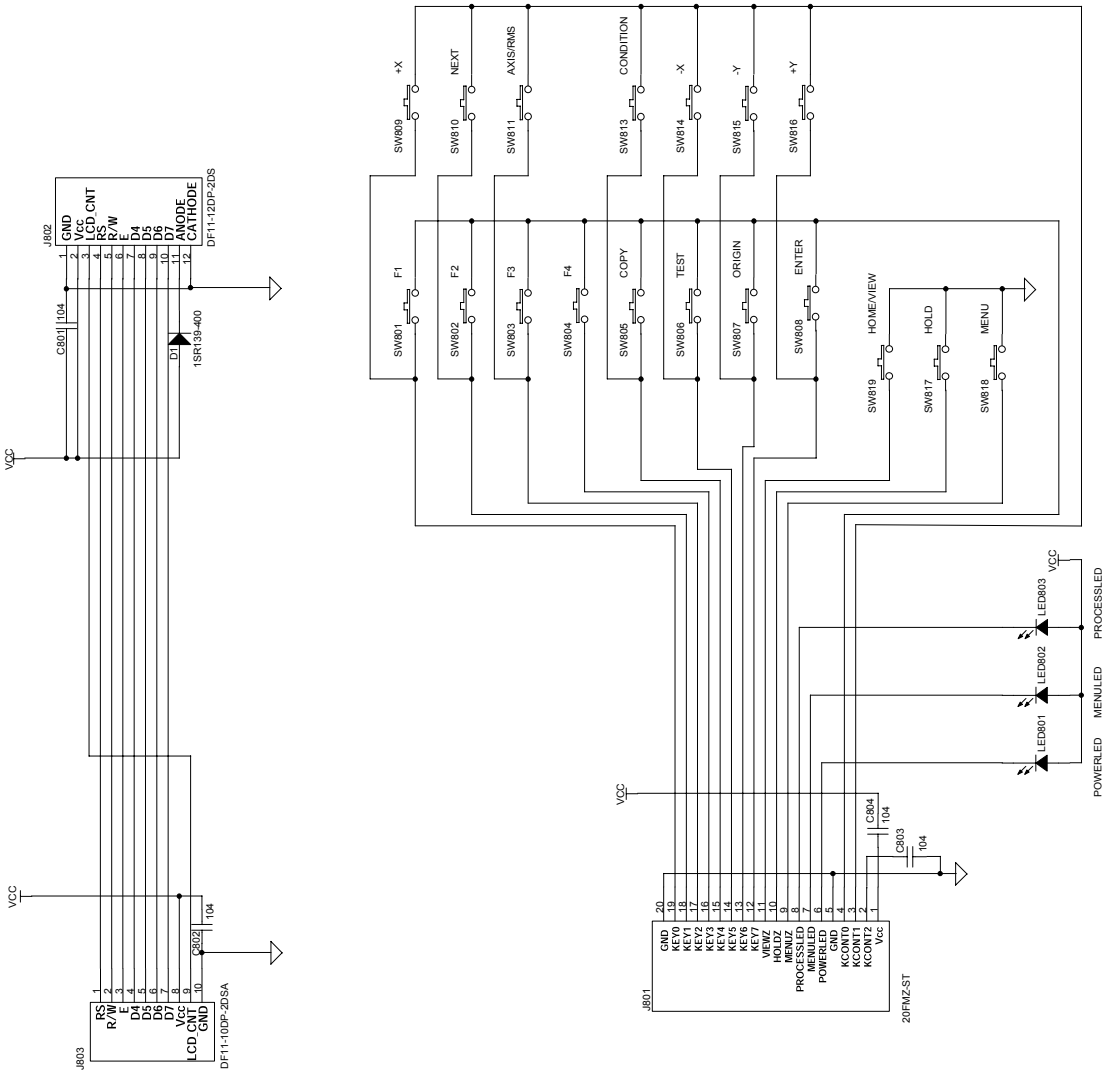




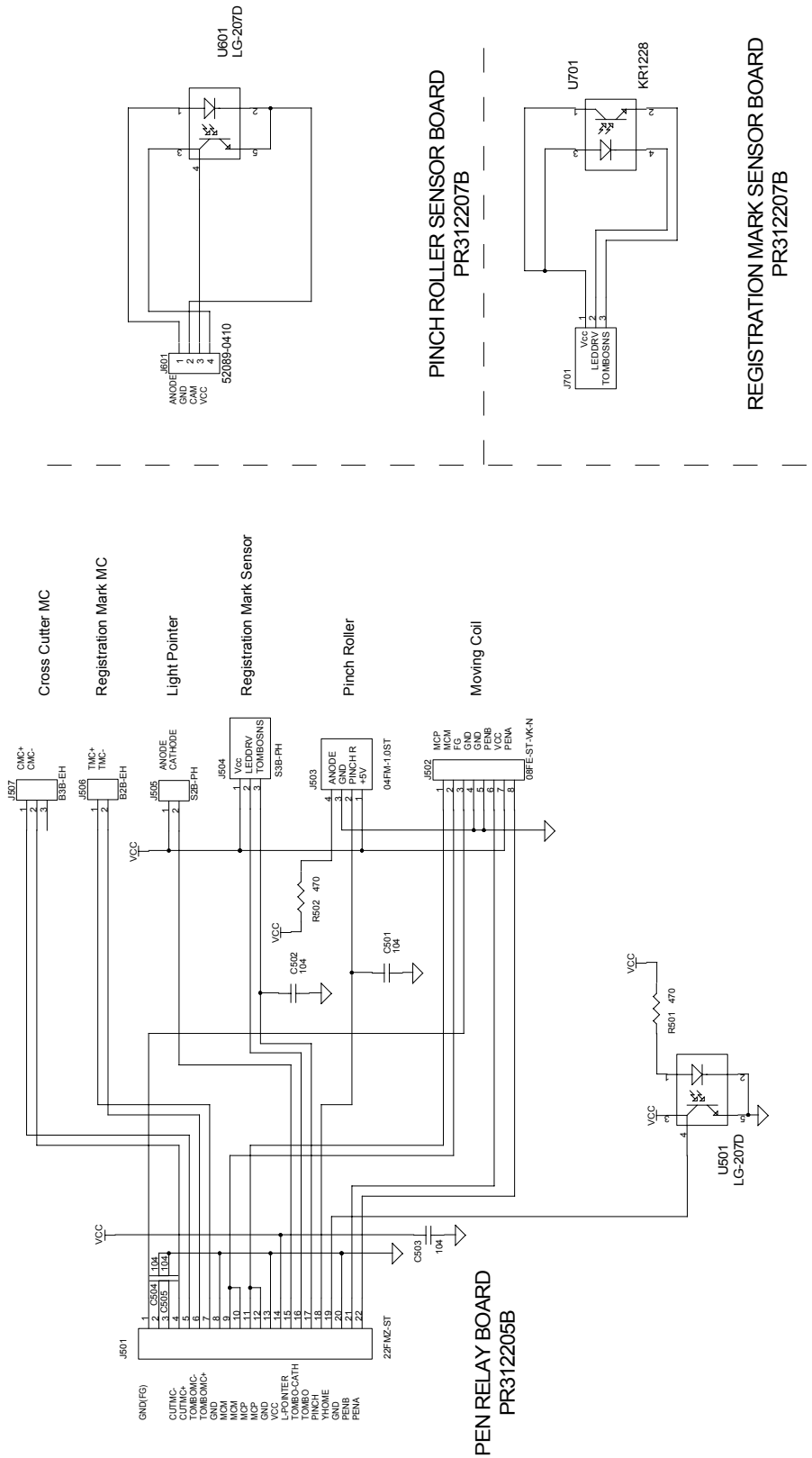
11.2.10 Control Board

KCONT0	KCONT1
SW801(F1)	SW809(+X)
SW802(F2)	SW810(NEXT)
SW803(F3)	SW811(AXIS/RMS)
SW804(F4)	————
SW805(COPY)	SW813(CONDITION)
SW806(TEST)	SW814(-X)
SW807(ORIGIN)	SW815(-Y)
SW808(ENTER)	SW816(+Y)

PR312208

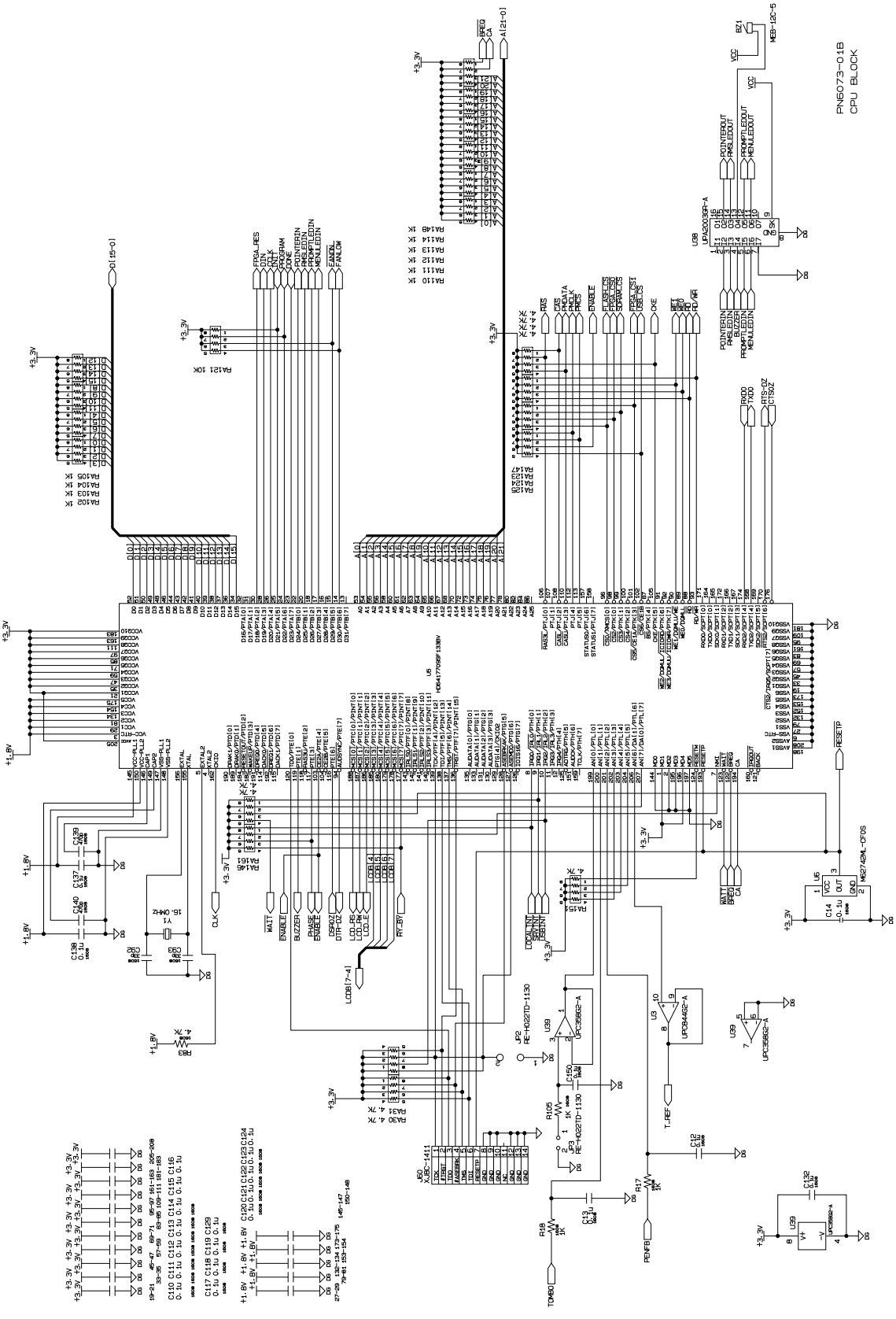


11.2.11 Relay Board, Pinch Roller Sensor Board, RMS Board

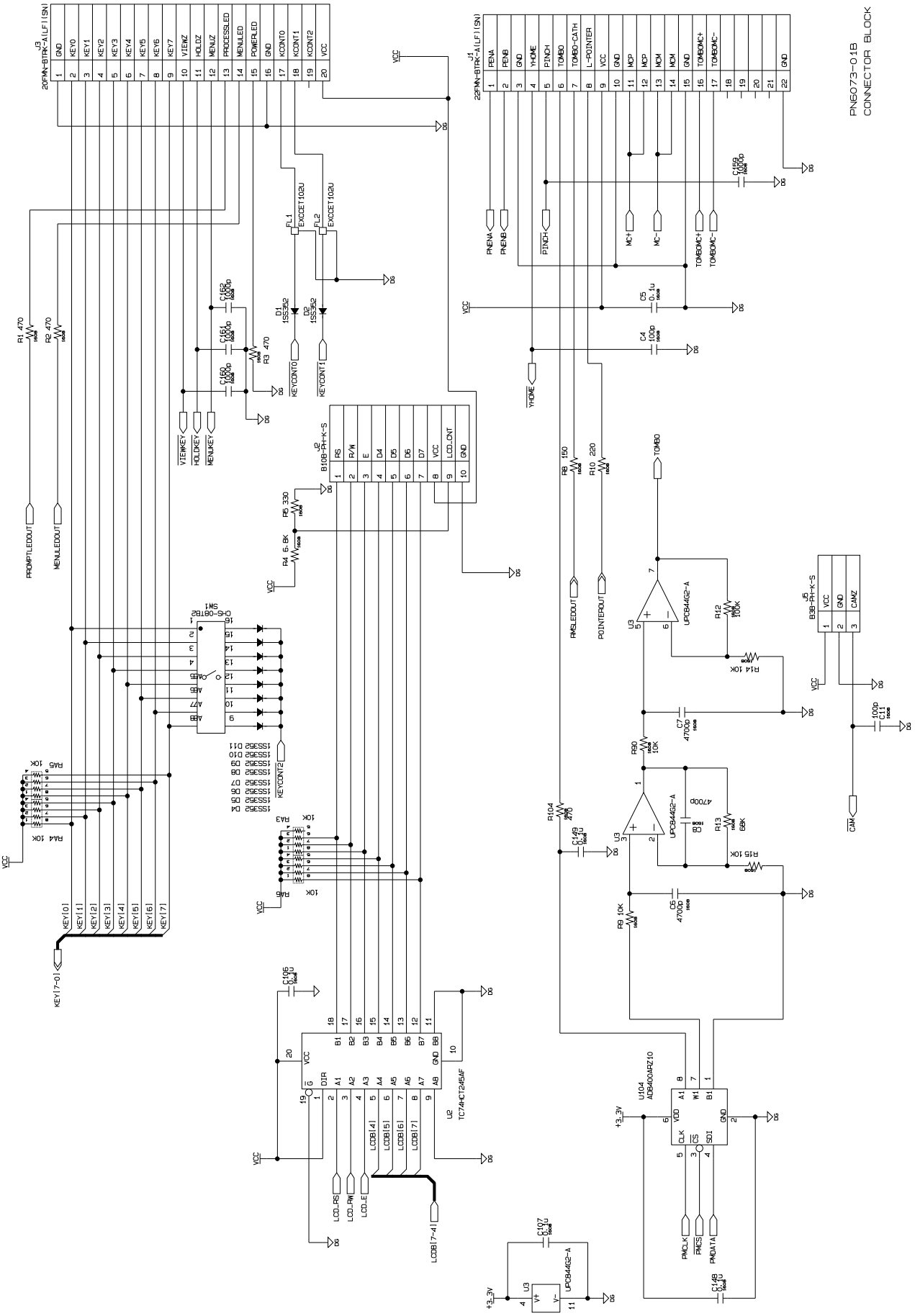


11.3 Circuit Diagrams (FC7000MK2 Main Board)

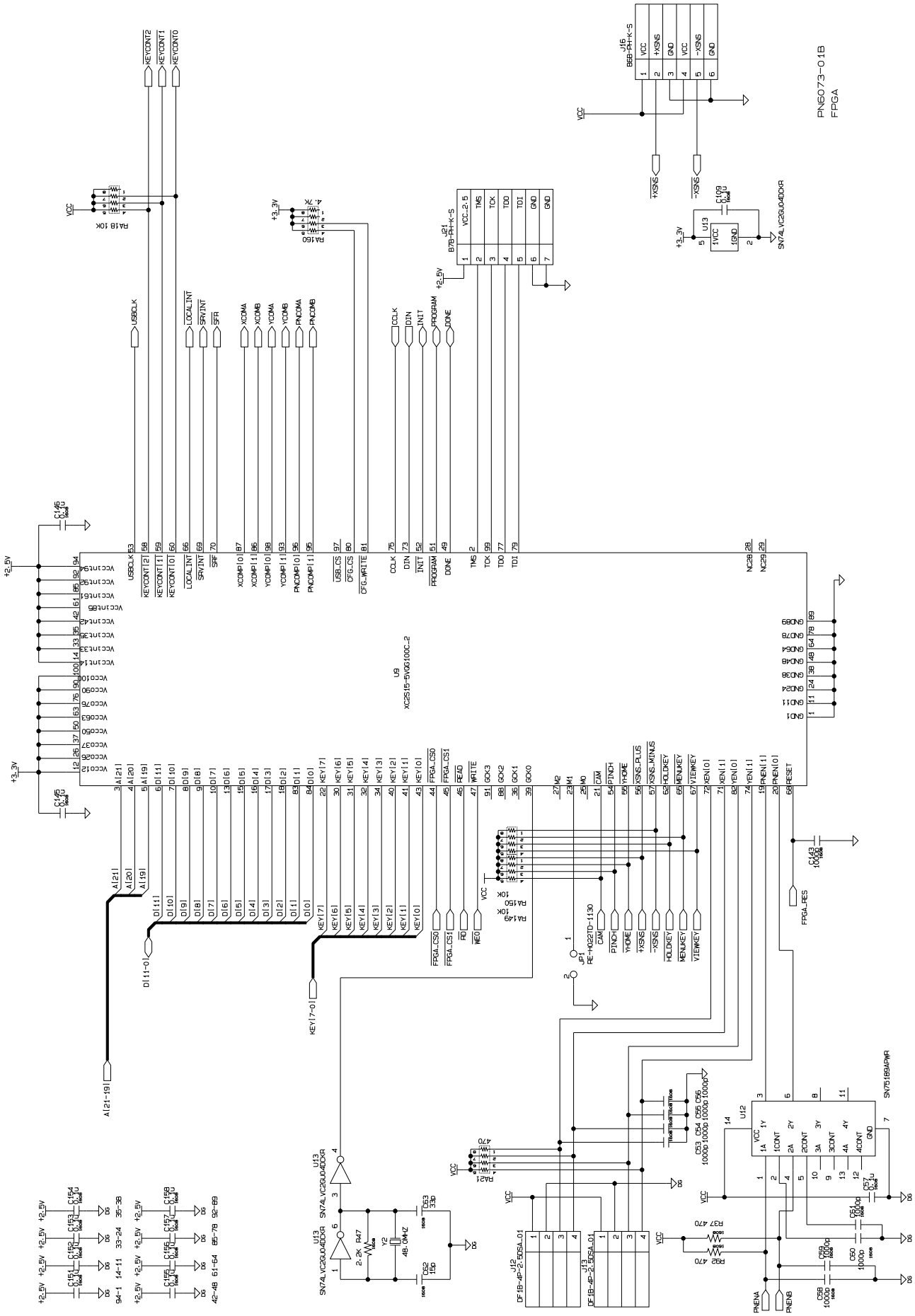
11.3.1 Main Board (CPU)



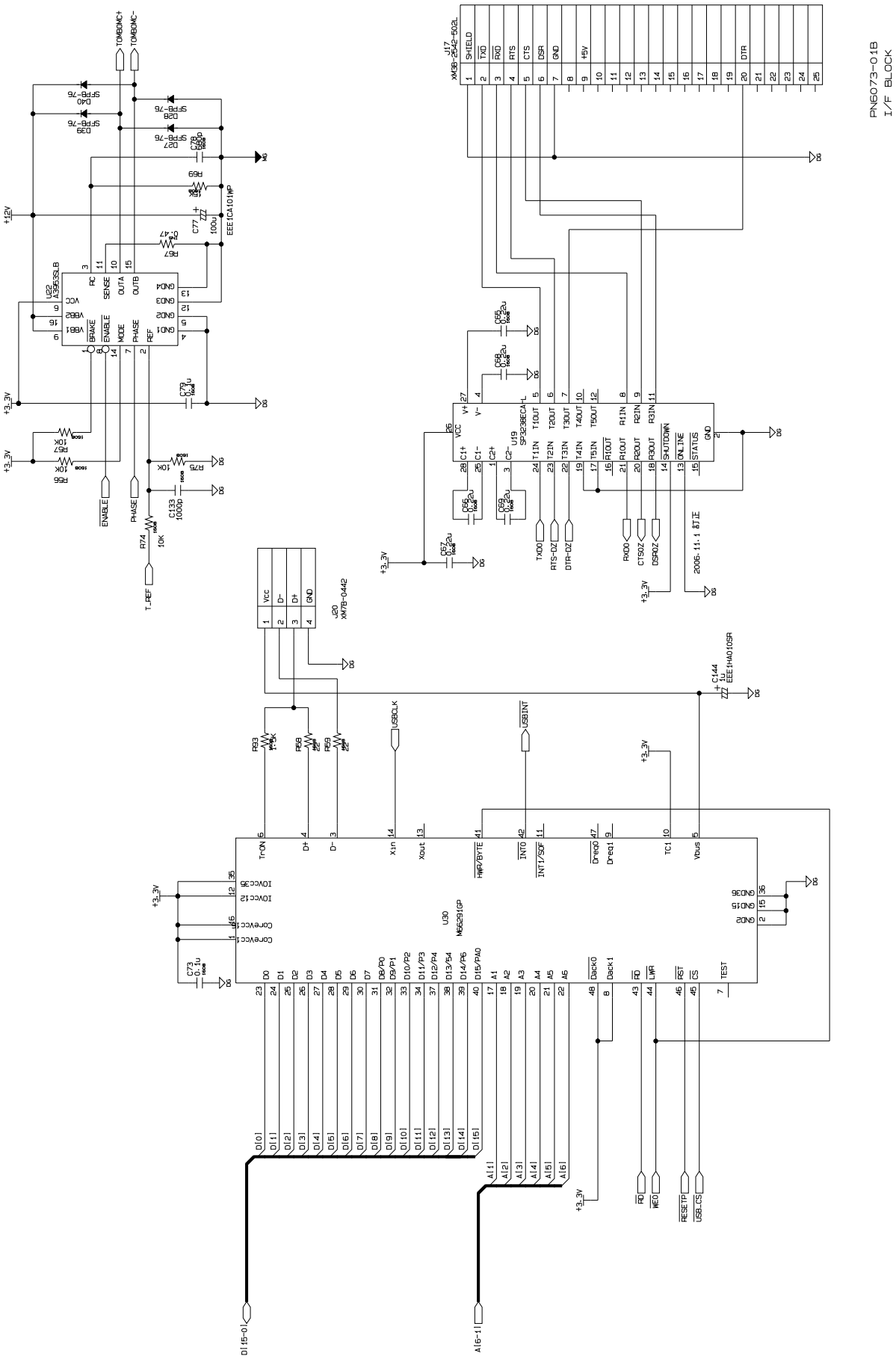
11.3.2 Main Board (CPU)



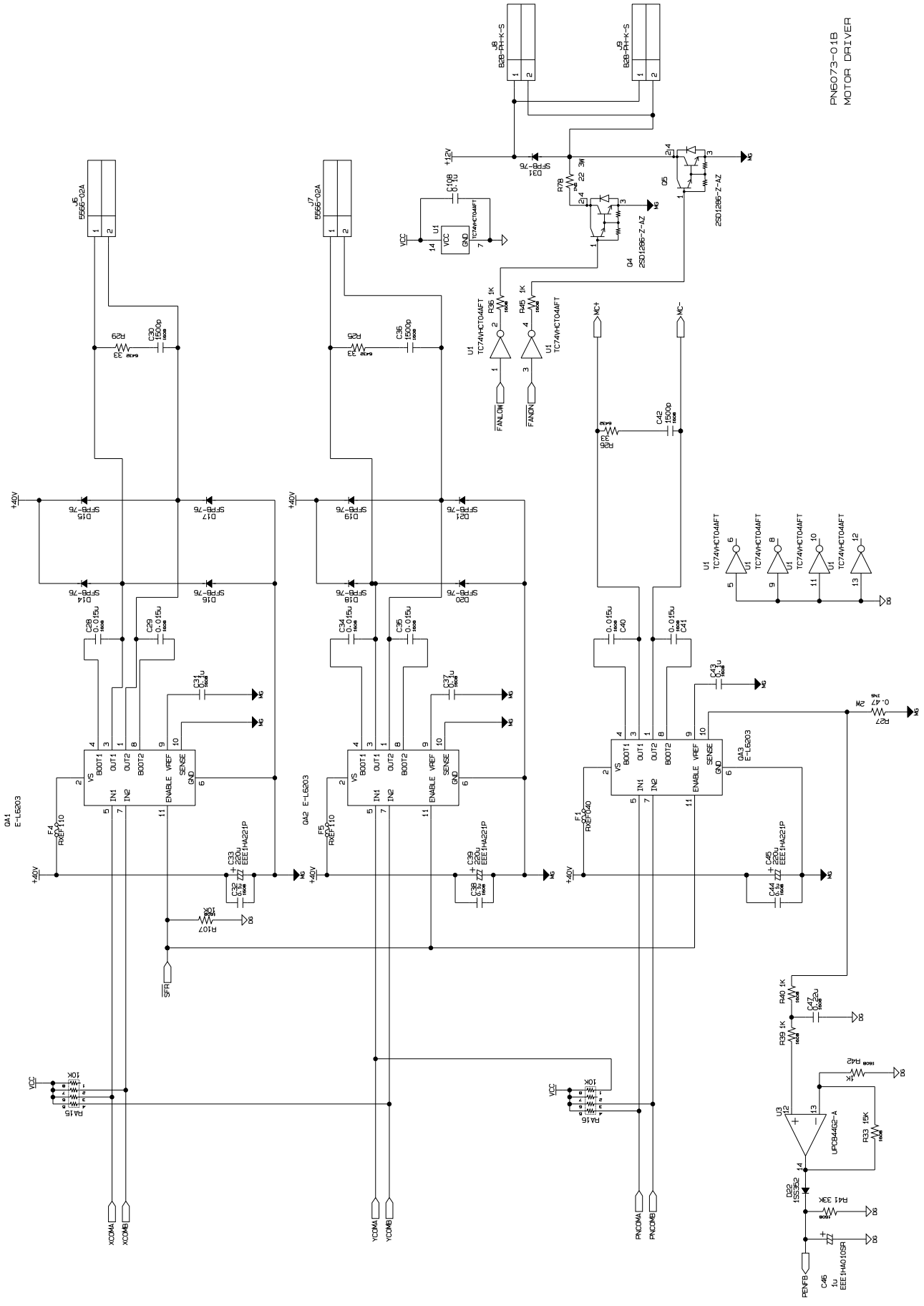
11.3.3 Main Board (FPGA)



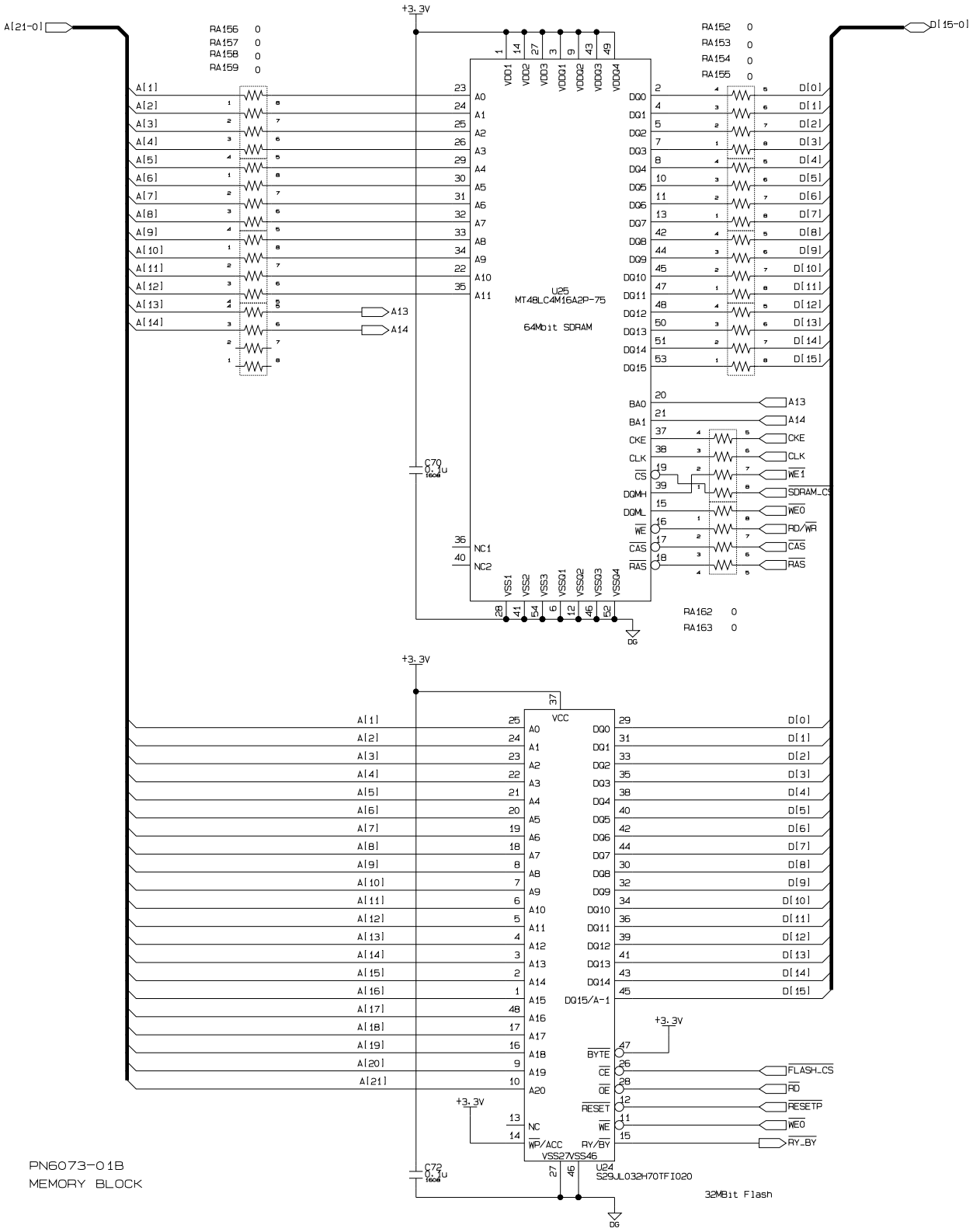
11.3.4 Main Board (I/F)



11.3.5 Main Board (Motor Drive)



11.3.6 Main Board (Memory)



11.3.7 Main Board (Power Supply)