SADDLE FINISHER K3/K4 SERVICE MANUAL

REVISION 0

Canon

MAR.2001 **FY8-13H5-000**

Application

This material has been prepared by Canon Inc. for the purposes of making available the technical information needed for the technical training of technicians responsible for servicing the product, and to assist them in installation, maintenance and repair. This material contains information that is pertinent to all regions where the product is to be sold, and may contain information that is not applicable to individual regions.

Also, the information contained in this material may differ from 'actual machine specifications', 'machine specifications published in advertising literature' and 'other printed matter'. Queries regarding the specifications and content of this material should be directed to the Service Department of the competent sales company.

Revisions

Because of on-going revisions and modifications to the product, some of the details contained in this material may be inaccurate. For this reason, any revisions or changes in the information are published as technical information, as and when necessary.

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Warning

This manual is confidential and its content is to be handled with due care.
Failure to do so may result in prosecution.

1 Symbols Used

This documentation uses the following symbols to indicate special information:

Symbol	Description
	Indicates an item of a non-specific nature, possibly classified as Note, Caution, or Warning.
	Indicates an item requiring care to avoid electric shocks.
	Indicates an item requiring care to avoid combustion (fire).
	Indicates an item prohibiting disassembly to avoid electric shocks or problems.
	Indicates an item requiring disconnection of the power plug from the electric outlet.
 Memo	Indicates an item intended to provide notes assisting the understanding of the topic in question.
 REF.	Indicates an item of reference assisting the understanding of the topic in question.
	Provides a description of a service mode.
	Provides a description of the nature of an error indication.
	Refers to the Copier Basics Series for a better understanding of the contents.

2 Outline of the Sevice Manual

This Service Manual contains basic information needed to service the SADDLE FINISHER K3/K4 in the field, conducted for the purpose of maintaining its product quality and a specific level of performance.

This Service Manual consists of the following chapters:

Chapter 1 *General Description*, shows the features and specifications of the machine, as well as the names of parts and how to operate it.

Chapter 2 *Operations and Timing*, explains the mechanical and electrical systems of the machine by function in relation to the principles of operation and timing at which they are driven.

Chapter 3 *Mechanical Systems*, shows how to disassemble/assemble the machine and make adjustments.

Chapter 4 *Maintenance and Inspection*, provides tables of periodically replaced parts and consumables/durables and a scheduled servicing chart.

Chapter 5 *Troubleshooting*, contains troubleshooting tables and diagrams of electrical parts, lists of VRs, LEDs, and check pins by PCB, and an outline of self-diagnosis.
In addition, an appendix is added to offer a general timing chart, list of signals/abbreviations, general circuit diagrams, and PCB diagrams.

The machine comes with an Installation Procedure. Refer to the instructions in the booklet when installing the machine.

The following rules apply throughout this document:
As a rule, the descriptions in this documentation are based on the following:

1. As needed, the work of each function and its relationship with electrical and mechanical parts are explained; where applicable, the timing at which associated parts are driven are also outlined.
   In a diagram, the symbol ▮▮▮ indicates a path of mechanical drive; the symbol ⟶ accompanied by a notation indicates the flow of an electrical signal.
   The expression “power-on” means turning on the power switch, closing the front door, and closing the delivery door so that the parts of the machine are supplied with power.
2. In a digital circuit, the state of a signal is indicated by ‘1’ if its voltage level is high and by ‘0’ if low. The level of voltage, however, differs from circuit to circuit.
   The machine uses a CPU; however, since the internal functions of a CPU is outside the scope of a service person, detailed explanations are omitted from descriptions. In this document, a circuit diagram may cover from sensors to inputs of a controller PCB or from outputs of a controller PCB to loads, or it may be a functional diagram.

The descriptions of the machine are subject to change for product improvement, and major changes will be communicated in the form of Service Information bulletins.

All service persons are expected to be fully familiar with the contents of this Service Manual and Service Information bulletins to develop a good understanding of the machine, equipping themselves with the ability and skill to identify faults and to maintain the machine in good order.

Contents

CHAPTER 1 GENERAL DESCRIPTION

CHAPTER 2 OPERATION OVERVIEW

CHAPTER 3 MECHANICAL SYSTEMS

CHAPTER 4 MAINTENANCE AND INSPECTION

CHAPTER 5 TROUBLESHOOTING

APPENDIX

CHAPTER 1

GENERAL DESCRIPTION

1 GENERAL DESCRIPTION

1.1 Features

a. Two types of stacking trays

- The product features two different stacking trays, tray A and tray B, which are used for different purposes.

b. Large stacking capacity

- Tray A can accommodate a stack of paper up to a maximum height of 147mm, while tray B can .accommodate a stack of paper up to a maximum height of 285mm (small size) and 147mm (large size).

c. Wide range of paper types

- The product can accommodate a wide range of paper types, from 64 to 200mg/m^2.

d. Stack job offset function

- The stack job offset function is available for the sorting of non-stapled stacks.

e. Three types of auto-stapling

- There are three stapling positions (front-slanted, rear-slanted, two-point).

f. Buffer rollers for increased productivity

- The buffer rollers mean that the copier can keep feeding paper even while the finisher is stapling or off-setting.

g. Punch function

- The punch function allows holes to be punched in the paper before delivery, to allow the paper to be filed in binders. (Accommodates 64 to 200mg/m^2 paper. Does not accommodate tracing paper or OHP film.)

h. Saddle-stitch function

- Up to 15 sheets of paper can be centre-stapled and folded in half before delivery.

i. Inserter function (requires accessory Inserter B1)

- This function allows the paper to be fed separately from the cassette. (Accommodates 64 to 200mg/m^2 paper, B5 to A3/279.4 x 431.8mm paper, including coloured paper. Does not accommodate OHP film.)

j. Folding function (requires accessory paper folding unit C1)

- This function allows A3, B4 or 279.4mm x 431.8mm (11 x 17) size paper to be Z-folded. Accommodates 64 to 200mg/m^2 paper.

1.2 Specifications

1.2.1 Specifications

a. Saddle Finisher K3/K4

Finisher assembly

Item		Specification		Remarks
Lifting system		Tray A	up/down	
		Tray B	up/down	
Stacking		Tray A	same as copier delivery method	
		Tray B	face-down	
Stack paper size		Tray A	Postcard to A3/ 279.4 x 431.8mm	Postcards feed in the R direction only. A5/SMT feeds in the R direction only. B5/A4/LTR feed in the horizontal direction only.
		Tray B	A5/SMT to A3/279.4 x 431.8mm	
Paper weight		64 to 200g/m^2		
Modes		Staple stacking, non-staple stacking		Mixed stacking possible under certain conditions. Equivalent to 80g/m^2 paper
Stack height	Non-staple sorting	Tray A	Equivalent to 1,000 sheets (small/ large size) 147mm	
		Tray B	Equivalent to 2,000 sheets (small size) 285mm, or1,000 sheets (large size) 147mm	
	Staple sorting	Tray A	Equivalent to 1,000 sheets or 100 sets (small/ large size)	
		Tray B	Equivalent to 2,000 sheets or 100 sets (small size) 285mm, or1,000 sheets or 100 sets (large size) 147mm	
Mixed staple/ non-staple		Tray B	Stops when either of the following conditions is met. 2,000 sheets or 100 sets (small size)1,000 sheets or 100 sets or 30 folded sheets (large size)	Stacking ability not guaranteed. The whole stack is treated as large size if one large size sheet is included.
Stack thickness with folded paper mixed		Tray A	Max. 20 sheets of folded paper	Equivalent to 80g/m^2 paper
		Tray B	Max. 10 sheets of folded paper per set/ 30 sheets of folded paper per job (1 sheet of folded paper is counted the same as 5 sheets of plain paper.)	
Stacking condition		Tray A	Front/ rear stack offset	No offset stacking in Tray A for non-sort delivery
		Tray B	Staple (one): 20mm Staple (two): 30mm (one staple at 5/B4) Non-staple: 30mm (LTR/11 x 17:36mm)	

Note1: Small size refers to A4, A5, B5, postcards, LTR and STMT.
Large size refers to A3, B4, 279.4 x 431.8mm (11 x 17) and LGL.

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Item		Specification				Remarks
Paper detection		Tray A / Tray B	Yes			
Control panel		No				
Display		No				
Installation method		Latching with mount (height adjustable with casters)				
Measurements		Approx. 802mm (W) x 738mm (D) x 995 (H)				Note 2
Weight		Approx. 127kg/ approx. 192kg (incl. inserter approx. 16kg, feeder approx. 49kg)				
Power supply		100 to 120V/ 50, 60Hz, 230V/ 50Hz.				
Max. power consumption		60W				
Stapling method		Punching by rotating cam (Face-down stapling)				
Stapling position		See below				
Stapling thickness		Staple cartridge type A A4/ B5/ LTR 100 sheets (80g/m^2) or 98 sheets (80g/m^2) + 2 sheets (200g/m^2)and paper stack thickness max. 11mm				20 sheets for 200g/m^2) paper
		Staple cartridge type B A4R/ B4/ A3 B5/ B4/ LTR LTRR/ LGL 297.4 x 4342.8mm (11 x 17) 50 sheets (80g/m^2) or 48 sheets (80g/m^2) + 2 sheets (200g/m^2) and paper stack thickness max. 5.5mm				10 sheets for 200g/m^2) paper
Staple loading		Special cartridge (5,000 staples)				
Staples		Special staples				
Staple cartridge type detection		Yes				
Staple detection		Yes				
Automatic staple reposition		Up to 10 times				
Available stapling sizes	1-point stapling	Front/rear A3, A4, A4R, B4, B5, 279.4 x 431.8mm, (11 x 17) LGL, LTR, LTRR				
	2-point stapling	A3, A4, B4, B5, 279.4 x 431.8mm, (11 x 17) LTR				
Manual stapling		No				
Jogging accuracy		Non-sort	Tray A	Max. 100mm		
		Sort	Tray A/B	Left/right direction (X)	Max. 60mm	
				Front/rear direction (Y)	Within stack Max. 15mm	
					Between stacks Min. 15mm max. 60mm	
		Staple	Tray B	2.0mm max.		

Note 2: Width with folder connected is 986mm
Height with inserter connected is 1138mm (auxiliary tray open)

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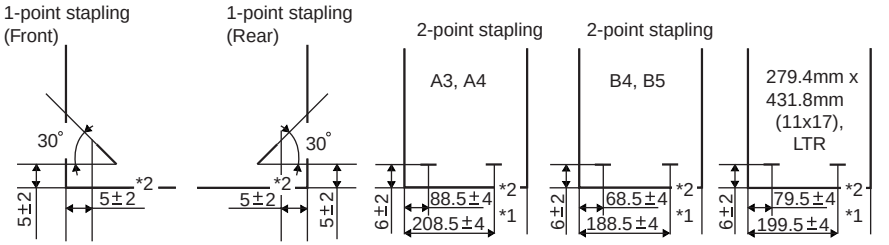
These specifications are subject to change for the purposes of product improvement.



Unit: mm

*1 Stapling interval may be adjusted in user mode.

*2 Stapling position may be adjusted by DIP switch.

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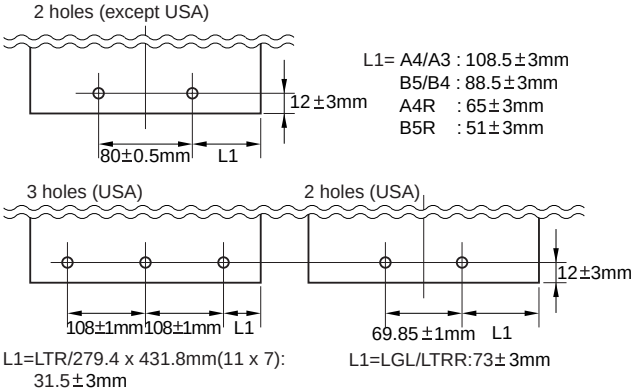
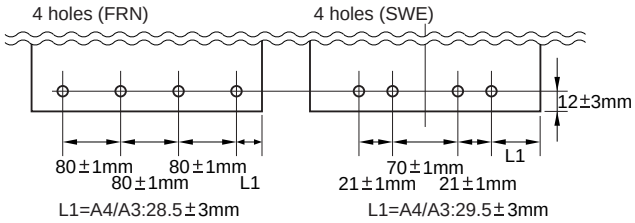
Punch related items

Item	Specifications
Punching method	Press-punch system (paper stops momentarily to be punched)
Paper type	64 to 200g/m² (OHP film, tracing paper not accommodated)
Paper size	2 holes: A3/ A4/ A4R/ B4/ B5/ B5R (100/ 230V) 3/2 holes: 279.4 x 431.8 (11 x 17) (280V) 2 holes LGL. LTRR 4 holes: A3, A4 (230V)
Hole diameter	2 holes: 6.5mm 3/2 holes: 8mm 4 holes: 6.5mm
Punch waste capacity	2 holes: 20,000 sheets or more (when using 80/m² paper) 3/2 holes: 10,000 sheets or more (when using 80/m² paper) 4 holes: 10,000 sheets or more (when using 80/m² paper)
Punch waste 'Full' display	Displayed on main unit control panel.
Punch mode selection	Selected on main unit control panel.
Punch position	

Item	Specifications
	

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These specifications are subject to change for the purposes of product improvement.

Saddle stitcher

Item	Specifications	
Stapling method	Middle staple then fold in half.	
Stapling position	See F01-201-01.	
Paper size	A3, B4, A4R, 279.4mm x 432.8mm (11 x 17), LTRR	
No. of sheets	Without stapling, 1 sheet. With stapling, 2 to 15 sheets (incl. 1 cover sheet)	
Average paper weight	64 to 80g/m^2 (1 cover sheet 64 to 200g/m^2) (special paper, OHP film not accommodated)	
No. of stacked sets	30 sets (special tray, leading edge stopper shift)	
Staple specifications	Staple position	Two (equidistant from centre, fixed interval)
	Staple capacity	2,000 staples
	Staple loading	Special cartridge
	Staples	Special staples (Staple D2)
Folding specifications	Folding method	Roller pressure folding
	Folding mode	Folding in two (1 unstapled sheet)
	Folding position	Centre of sheet
	Folding position adjustment	Yes
	Staple detection	Yes
Power supply	Power supplied from finisher.	
	24V, 2 systems	
Power consumption	160W max.	

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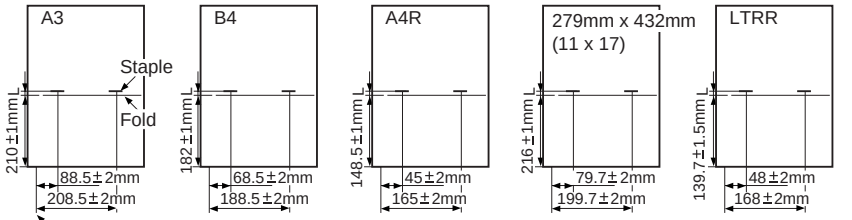
Stapling and folding accuracy (Saddle stitcher)



L (difference between folding position and stapling position) = ±0.5mm

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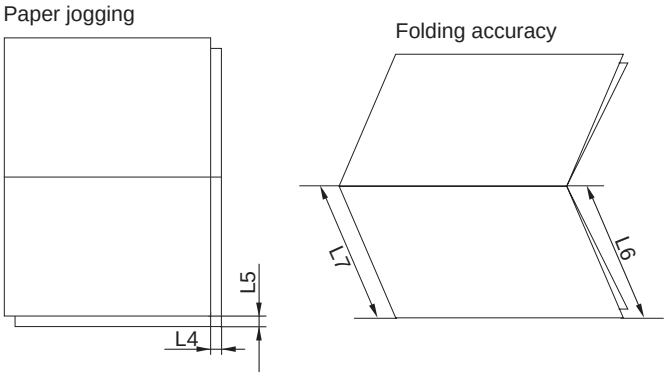
Jogging accuracy, folding position accuracy (Saddle stitcher)



L4, 15:1.5mm or less

L6-L7 : 0.75mm or less (1mm or less under conditions of high temperature and humidity or low temperature)

F01-102-03

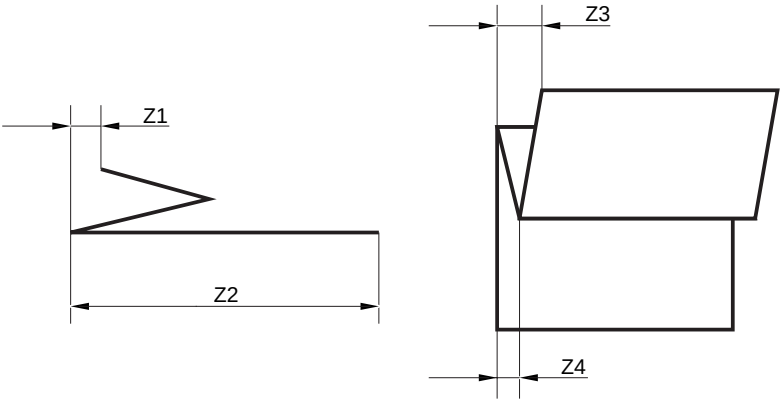
These specifications are subject to change for the purposes of product improvement.

b. Folder (Paper Folding Unit C1)

Item	Specifications	Remarks
Folding method	Roller pressure folding (sheets folded consecutively as they pass through)	
Paper weight	64 to 80g/m^2	
Paper size	A3, B4, 279.4mm x 432.8mm (11 x 17)	
Folding mode	Z-fold	
Dimensions	Approx. 184mm (W) x 675mm (D) x 995mm (H)	Including casters
Power consumption	75W max.	
Weight	Approx. 49kg	
Power supply	Supplied from finisher	

T01-102-05

Folding position



Within Z1:2±2/1

Within Z2: cover/2.....

Within Z3, 4.....

Within Z3, 4±2.0mm under conditions of high temperature and humidity, or low temperature.

F01-102-04

c. Inserter (Cover inserter B1)

Item	Specifications	Remarks
Stacking capacity	100 sheets (small size)/ 50 sheets (large size)	Face-up stacking, 80g/m^2 paper.
Paper weight	64 to 80g/m^2 (including colour copy cover)	OHP film not accommodated.
Paper size	B5 to A3/ 279.4mm x 432.8mm (11 x 17)	B5 for horizontal feeding only.
Mixed stacking	No	
Separation method	Belt upper separation	
Position reference	Centre reference	
Weight	Approx. 16kg	
Power consumption	100W max.	
Dimensions	Auxiliary tray openApprox. 561mm (W) x 584mm (D) x 132 (H) Auxiliary tray closedApprox. 402mm (W) x 584mm (D) x 132mm (H)	

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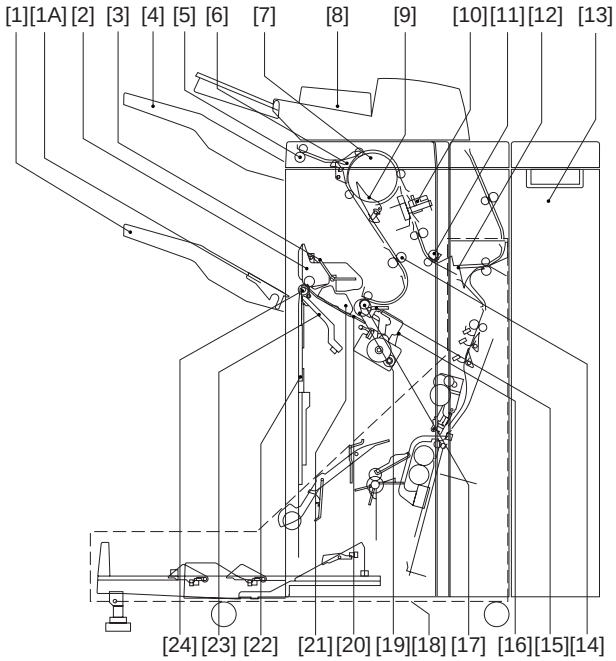
These specifications are subject to change for the purposes of product improvement.

1.2.2 Cross sections

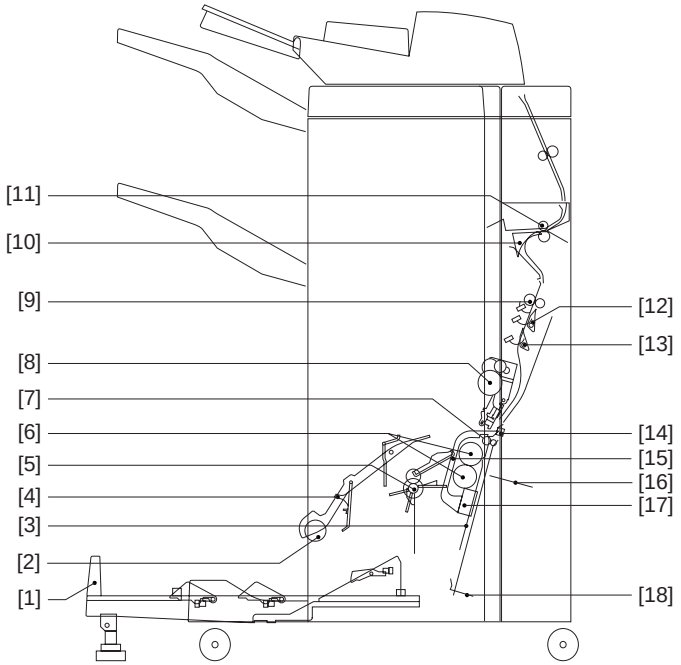
a. Finisher



[1]	Tray B	[12]	Saddle inlet paper deflector
[1A]	Sub-tray (activated when folder is mounted)	[13]	Folder (Paper Folding Unit C1)
[2]	Swing guide	[14]	Pre-delivery roller
[3]	Paddle	[15]	Movable roller
[4]	Tray A	[16]	Stapler
[5]	Non-sort delivery roller	[17]	Delivery roller
[6]	Upper path switching flapper	[18]	Saddle stitcher
[7]	Buffer roller	[19]	Knurled belt
[8]	Inserter (Cover inserter B1)	[20]	Processing tray
[9]	Buffer switching flapper	[21]	Jogging plate (front, rear)
[10]	Punch unit	[22]	Shutter
[11]	Inlet roller	[23]	Tray auxiliary plate
		[24]	Stack delivery roller

F01-102-05

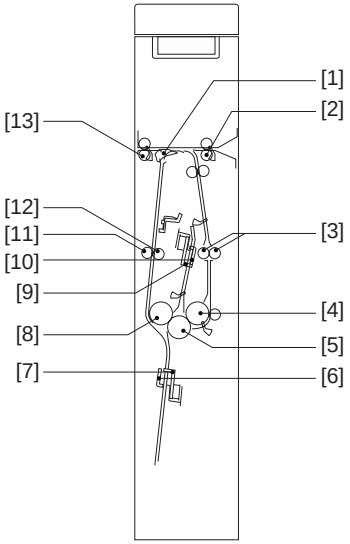
b. Saddle Stitcher



[1]	Saddle delivery tray	[10]	Saddle inlet paper deflector
[2]	Delivery guide roller	[11]	Saddle inlet roller
[3]	Guide plate	[12]	Paper deflector 1
[4]	Delivery guide	[13]	Paper deflector 2
[5]	Delivery roller	[14]	Stitch support
[6]	Folding roller (upper, lower)	[15]	Jogging plate (front, rear)
[7]	Intermediate roller 2	[16]	Paper retaining plate
[8]	Stitcher (front, rear)	[17]	Crescent roller
[9]	Intermediate roller 1	[18]	Paper positioning plate

F01-102-06

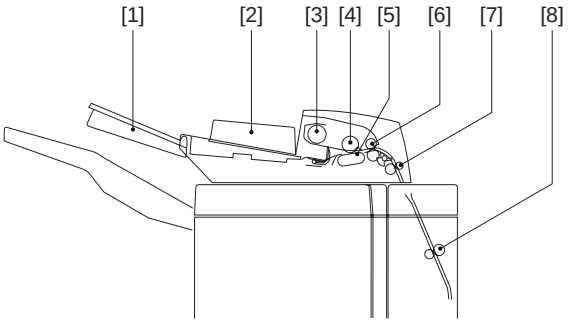
c. Folder



[1]	Folder inlet flapper	[8]	Folding roller B
[2]	Feed roller 1	[9]	Stopper 2 (B4)
[3]	Folding roller 2	[10]	Stopper 2 (A3/ 279.4mm x 431.1mm (11 x 17)
[4]	Folding roller C	[11]	Skew correction roller
[5]	Folding roller A	[12]	Pressure roller
[6]	Stopper 1 (A3/ 279.4mm x 431.8mm (11 x 17)	[13]	Feed roller 2
[7]	Stopper 1 (B4)		

F01-102-07

d. Inserter



[1]	Auxiliary tray	[5]	Separation belt
[2]	Side guide (front, rear)	[6]	Extraction belt
[3]	Pickup roller	[7]	Intermediate feed roller
[4]	Feed roller	[8]	Inserter lower feed roller

F01-102-08

1.3 Module isolation switch

If a particular error is displayed, the module separation switch on the finisher can be used to isolate the problem module and make copies or printouts from a different part of the machine.

Display and cause	Treatment
E590, E593, E594, E595 Punch unit is broken.	Use the module isolation switch to isolate the punch unit and make copies or printouts from a different part of the machine.Ref: Module isolation switch operation
E540 Tray A is broken.	Use the module isolation switch to secure tray A and make copies or printouts.
E515 The inserter is broken.	Use the module isolation switch to isolate the inserter and make copies or printouts from a different part of the machine.
E518 The folder is broken	Use the module isolation switch to isolate the Z-folding function and make copies or printouts from a different part of the machine.
E503, E5f0, E5f1, E5f2, E5f3, E5f4, E5f5, E5f6, E5f7, E5f8, E5f9 The saddle stitcher is broken.	Use the module isolation switch to isolate centre stitching function and make copies or printouts from a different part of the machine.

T01-103-01

1.4 Operation of the module isolation switch

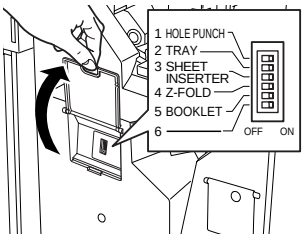
The module isolation switch is used when a particular service call is displayed. The module isolation switch is used to switch OFF the malfunctioning module, so that copying and printing can be performed from another module.

- The message shown on the right is displayed in the basic window.

F01-104-01a

F01-104-01b

1) Open the front cover.
2) Open the module isolation switch cover and turn the malfunctioning module OFF.



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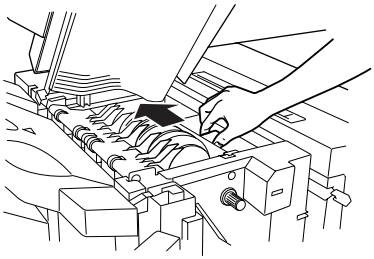
In the event of a malfunction in the punch unit or tray A, the following procedure should be carried out in addition to operating the isolation switch.

- If the saddle stitcher, paper folding unit or inserter are malfunctioning, the following procedures are not necessary. Proceed to step 3), after switching the problem module OFF.

a. Faulty punch unit

Push the punch unit lever around to the position '1111'.



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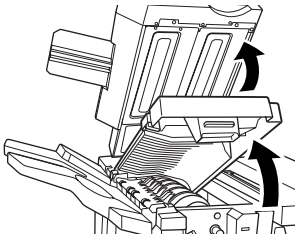
Open the inserter and then open the upper cover.



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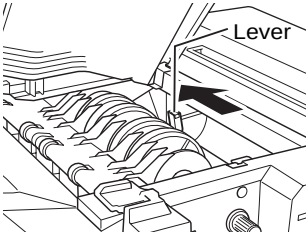
Push the lever all the way to the back.

- If the lever is already at the back, this operation is not necessary.



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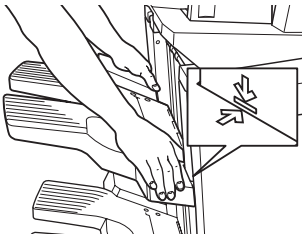
Close the upper cover and return the inserter to its original position.

b. Faulty tray A

Hold the tray at both sides and shift it until it is in the position indicated by the arrows.



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3) Close the front cover.

2 MAINTENANCE BY THE USER

As of February 2001

No.	Item	When
1	Replace staple cartridge (finisher)	indicator flashes (on copier control panel)
2	Replace staple cartridge (saddle stitcher)	indicator flashes (on copier control panel)
3	Remove punch waste paper	indicator flashes (on copier control panel)

T01-201-01

CHAPTER 2

OPERATION OVERVIEW

1 BASIC OPERATIONS

1.1 Specifications

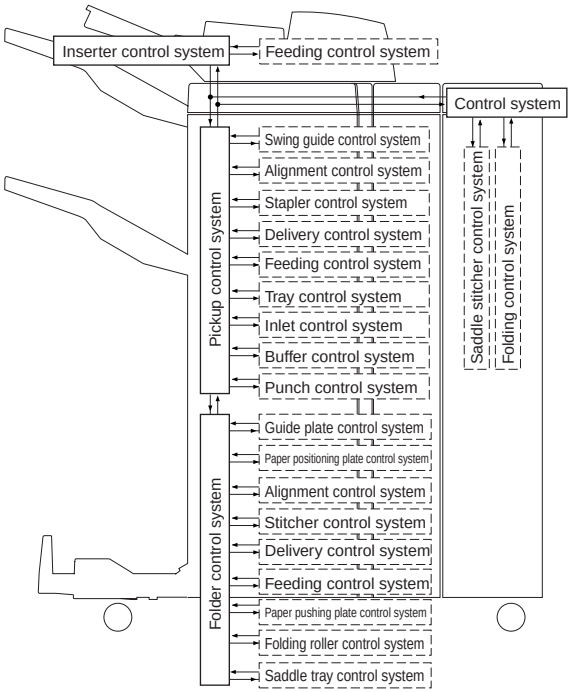
A finisher is designe to d receive the output of its host machine for extra processing before delivery; the mode of delivery may be non-sort stack, job offset*, or staple/punch.

The operations associated with these tasks are controlled by the finisher controller PCB and commands from the host machine.

The saddle stitcher assembly inside the finisher unit staples stacks of sheets from the finisher assembly, and folds the stacks in two for delivery. The saddle stitcher assembly is controlled by commands from the host machine by way of the finisher assembly.

The inserter is designed to send a sheet placed in the inserter tray to the finisher assembly. The sheet is then added to the stack of sheets set aside in the finisher assembly for delivery.

The folder serves to fold a sheet coming from the host machine into Z for delivery to the finisher assembly. The inserter and the folder are controlled by the finisher controller PCB.



F02-101-01

In job offset delivery, each stack of sheets is moved to the front or the rear to enable grouping of stacks.

1.2 Outline of Electrical Circuit

1.2.1 Finisher Assembly

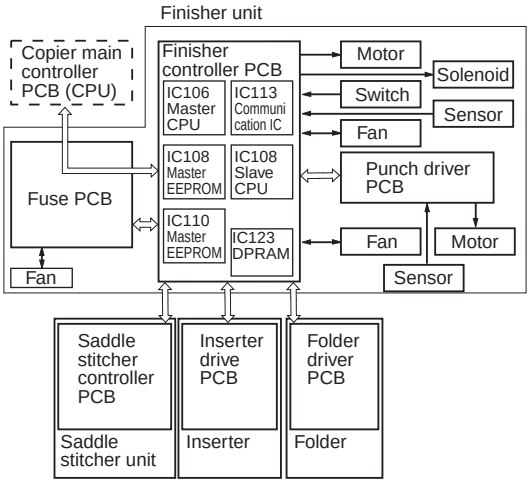
The sequence of operations of the finisher is controlled by the finisher controller PCB, which is a 16-bit microprocessor (CPU); in addition to controlling the sequence, it communicates with the host machine in serial.

In response to the various commands from the host machine through the serial communication line, the finisher controller PCB drives the solenoids and motors. It in turn sends information about the sensors and the switches to the host machine using the serial communication line.

The ICs mounted to the finisher controller PCB have the following major functions:

- IC106 (master CPU): controls sequence of operations.
- IC108 (master EEPROM): backs up adjustment values.
- IC110 (master EPROM): stores sequence programs.
  backs up initial settings data
- IC113 (communication IC): communicates with the copier and the saddle stitcher unit
- IC125 (slave CPU): controls sequence of operations.
- IC123 (DPRAM): controls communication between master CPU and slave CPU.

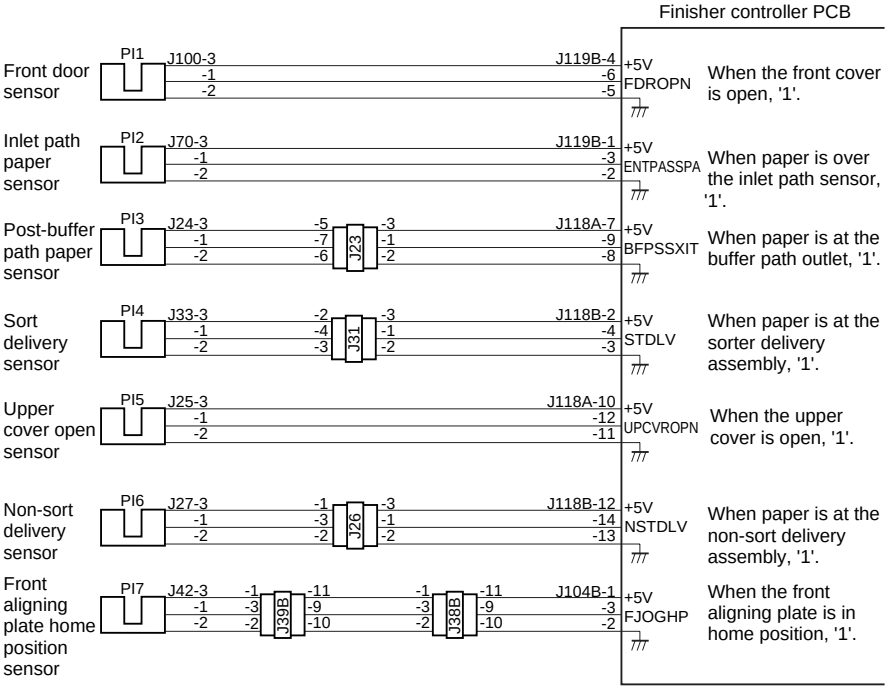
F02-102-01 shows the flow of signals between finisher and copier:



F02-102-01

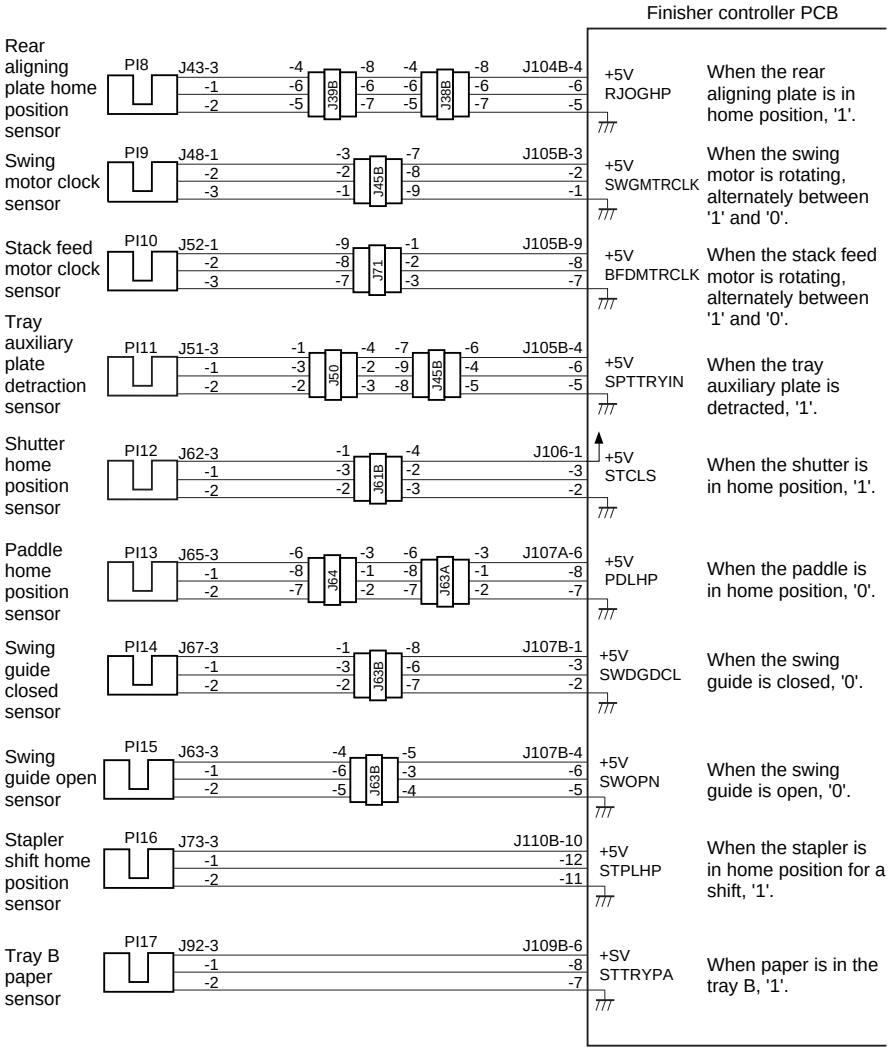
1.3 Inputs to and Outputs from the Finisher Controller PCB

1.3.1 Inputs to the Finisher Controller PCB



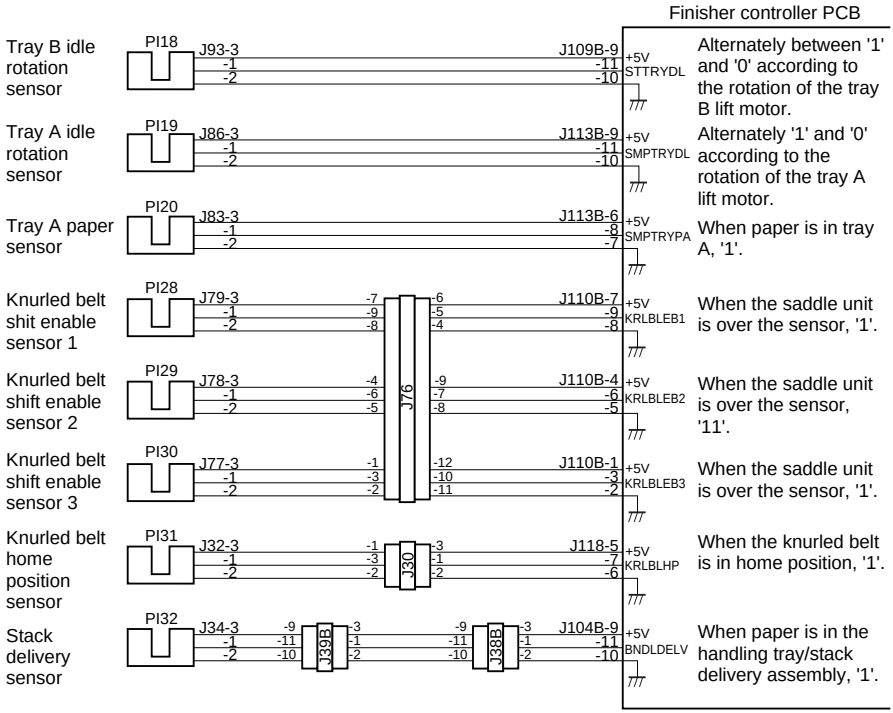
F02-103-01

1.3.2 Inputs to the Finisher Controller PCB



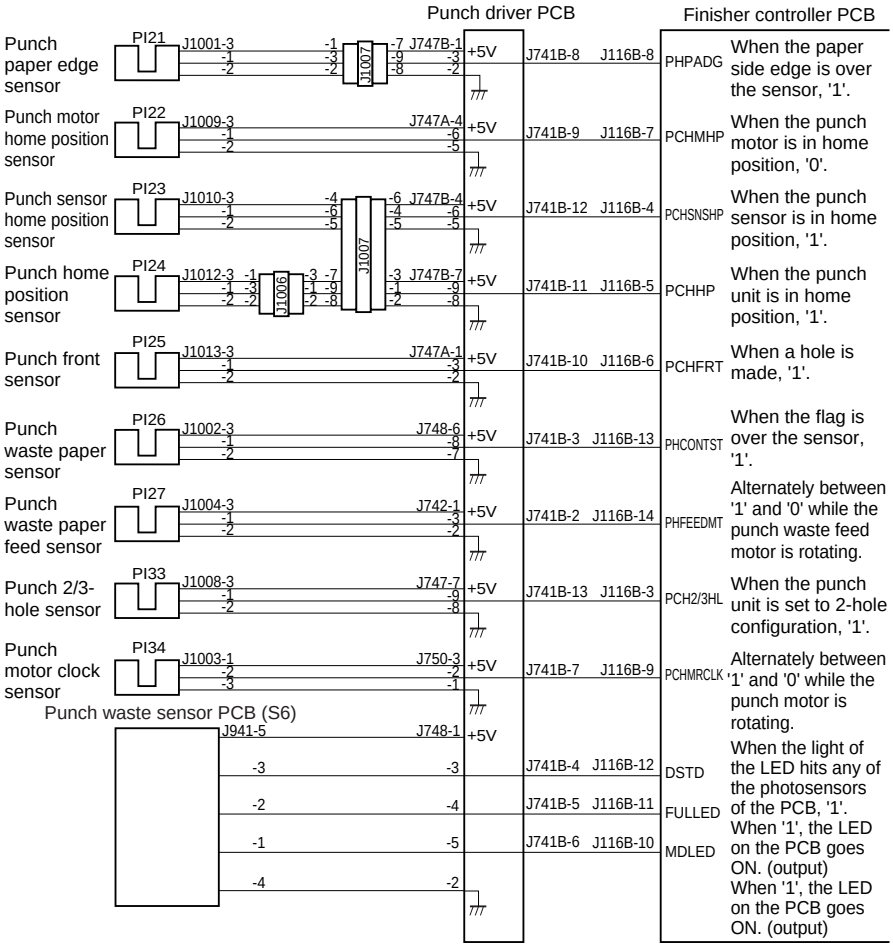
F02-103-02

1.3.3 Inputs to the Finisher Controller PCB



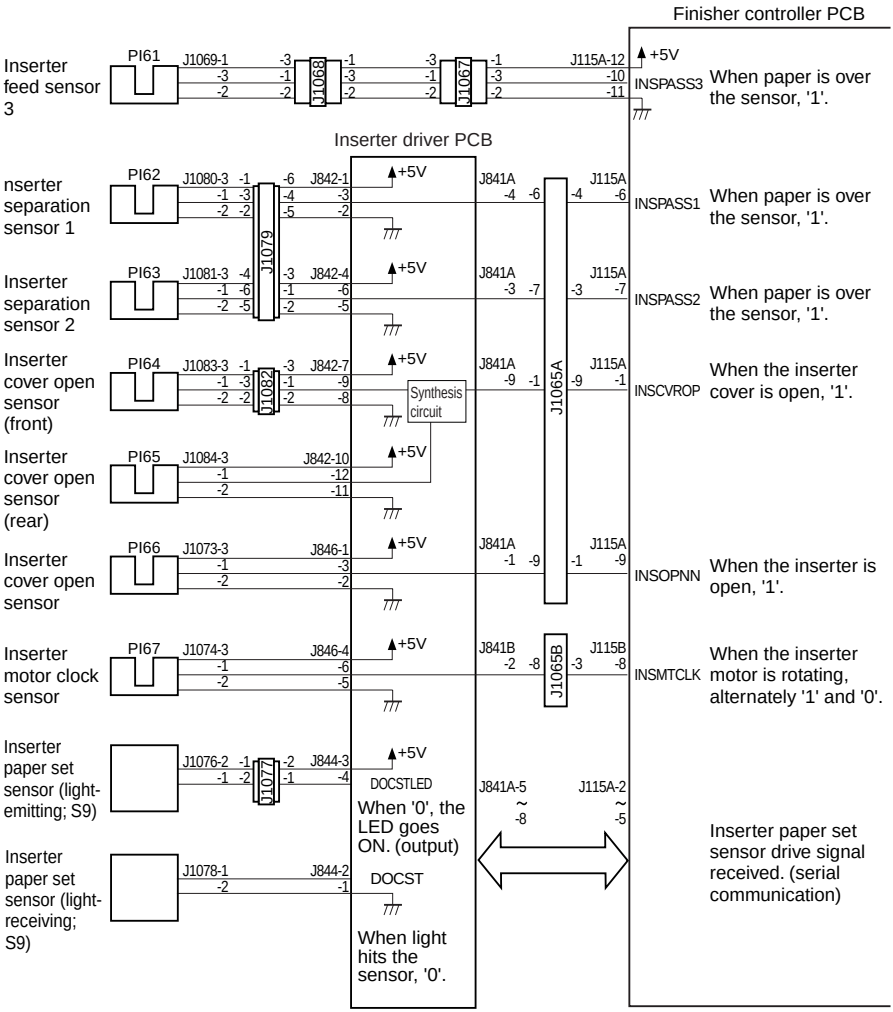
F02-103-03

1.3.4 Inputs to the Finisher Controller PCB (punch-related)



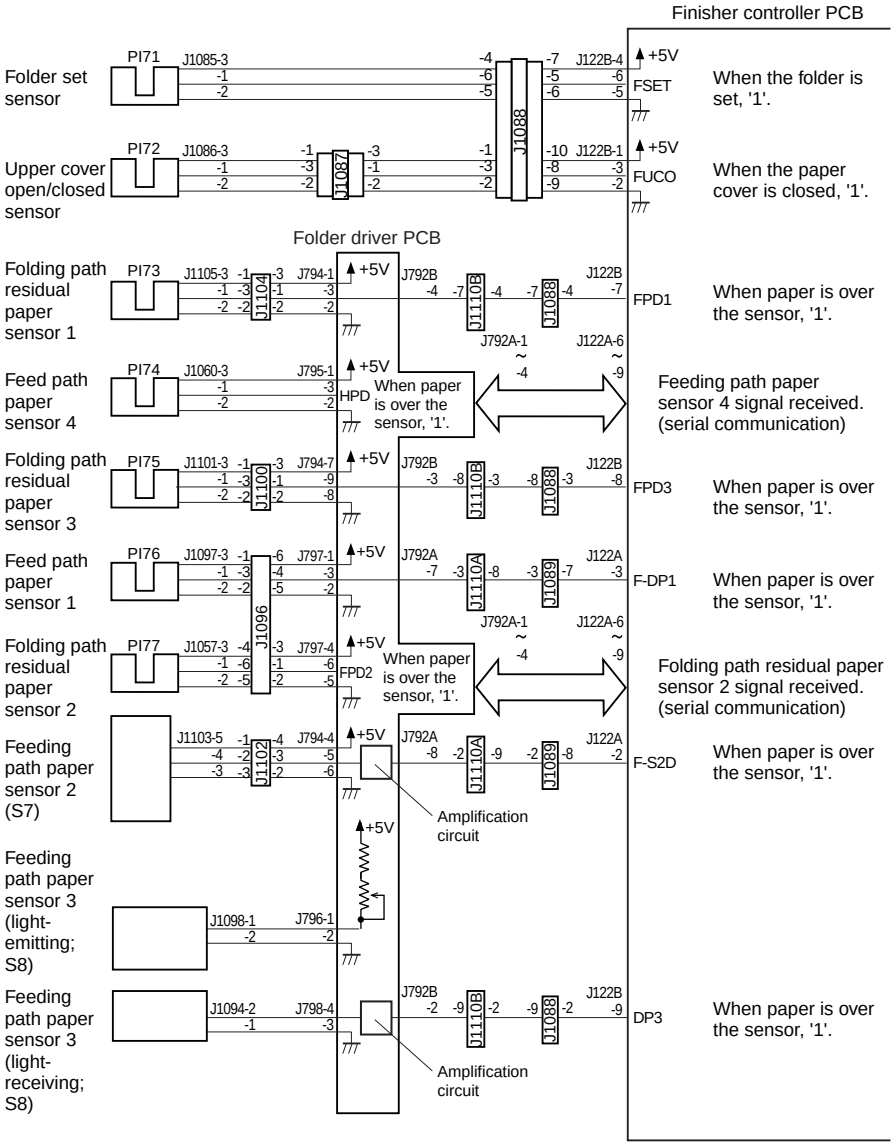
F02-103-04

1.3.5 Inputs to the Finisher Controller PCB (inserter-related)



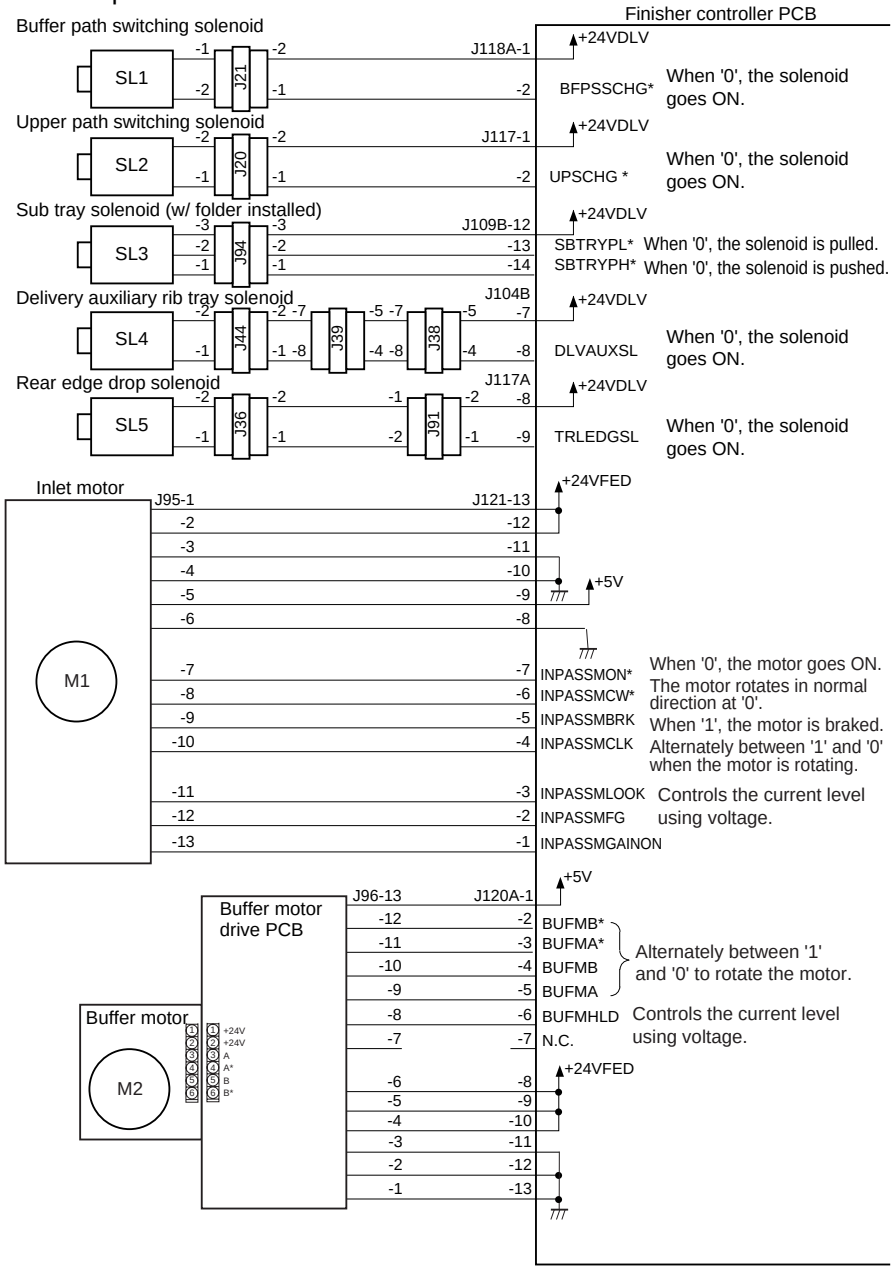
F02-103-05

1.3.6 Inputs to the Finisher Controller PCB (folder-related)



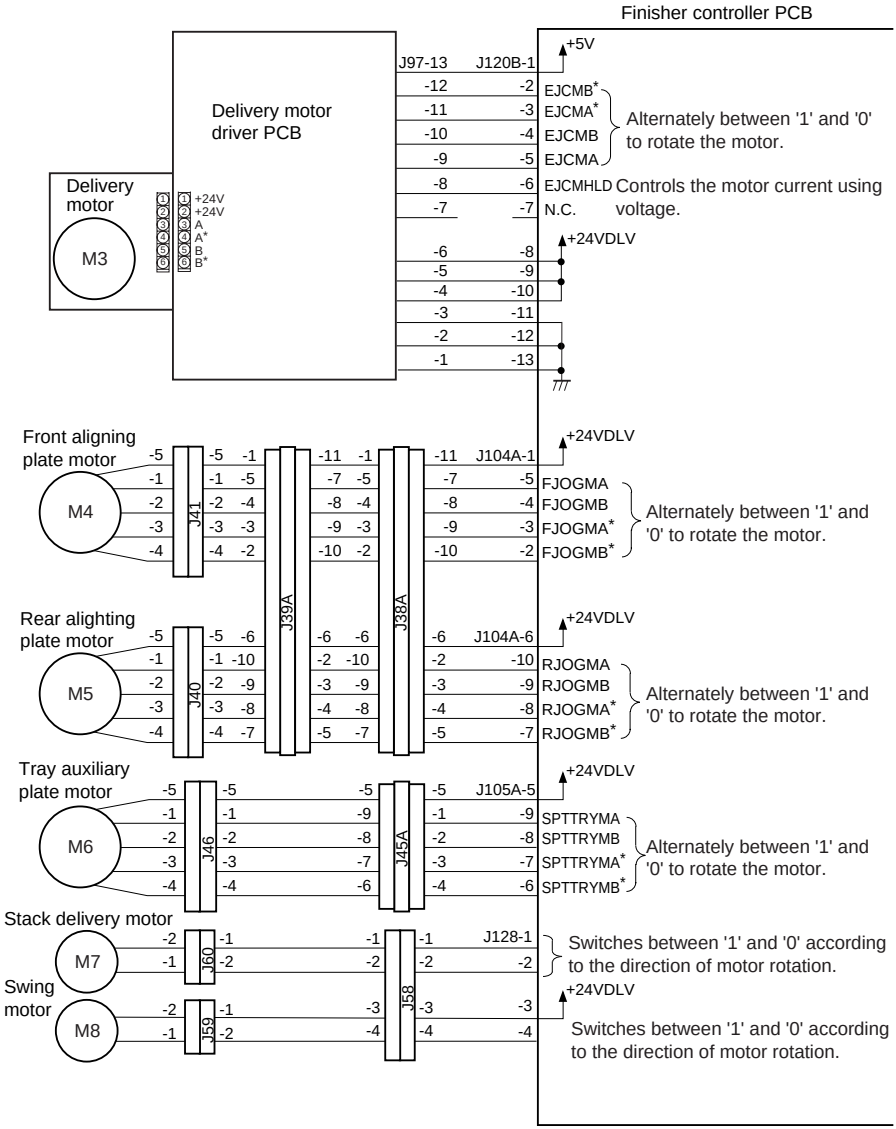
F02-103-06

1.3.7 Outputs to the Finisher Controller PCB



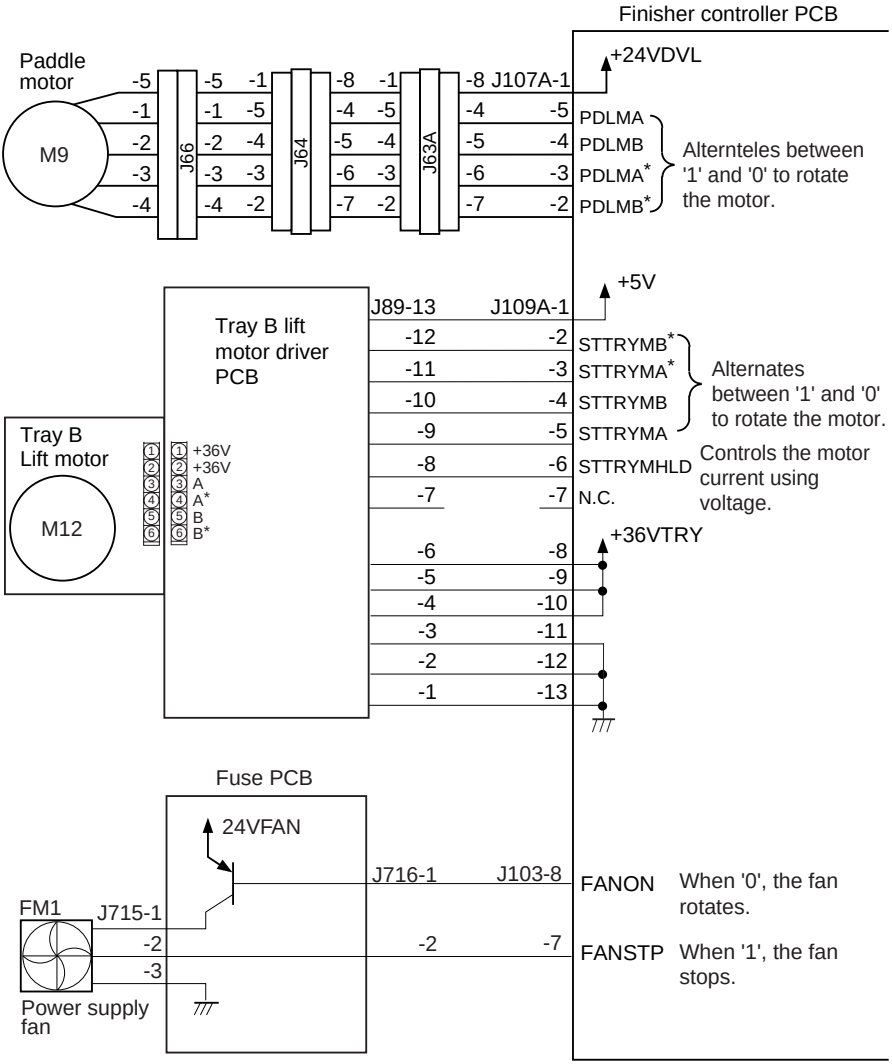
F02-103-07

1.3.8 Outputs from the Finisher Controller PCB



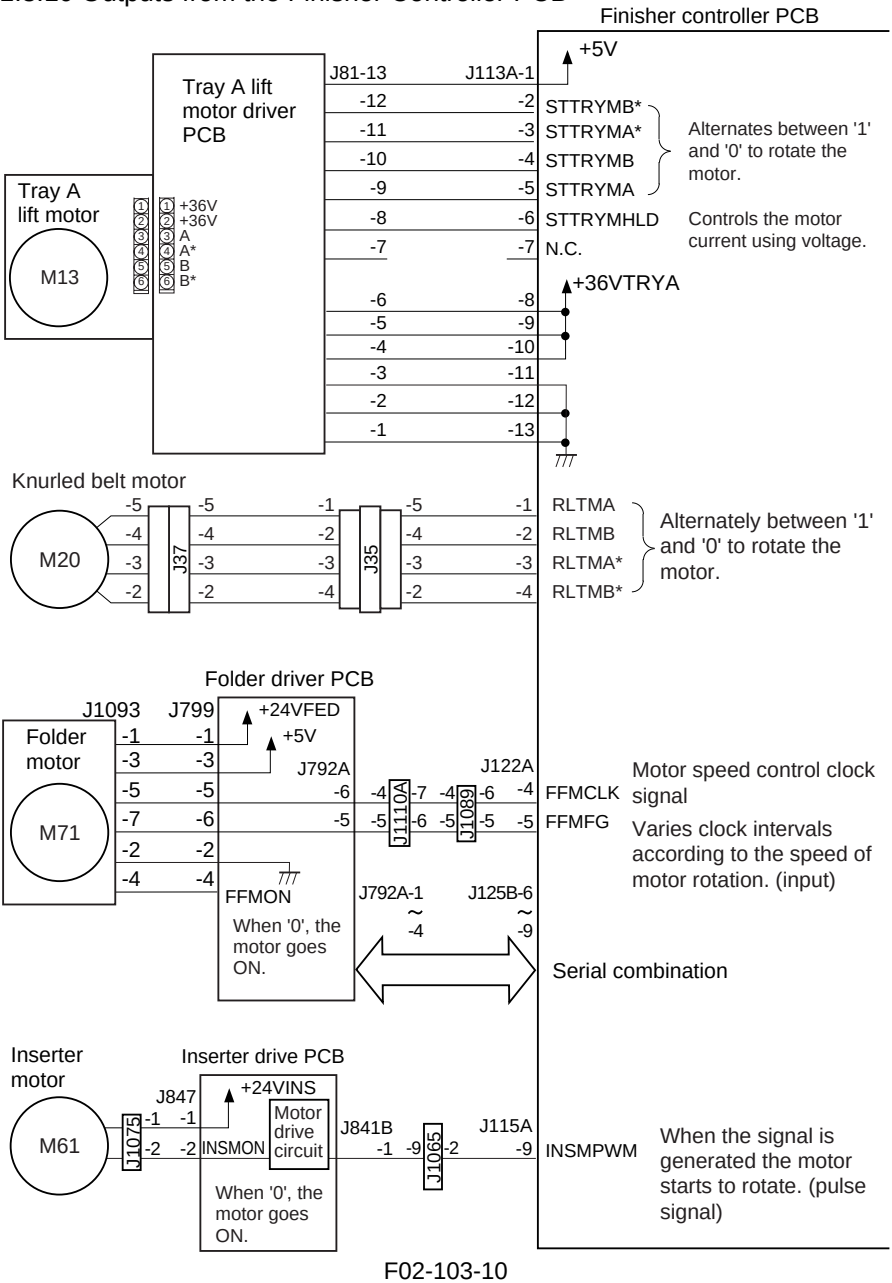
F02-103-08

1.3.9 Outputs from the Finisher Controller PCB



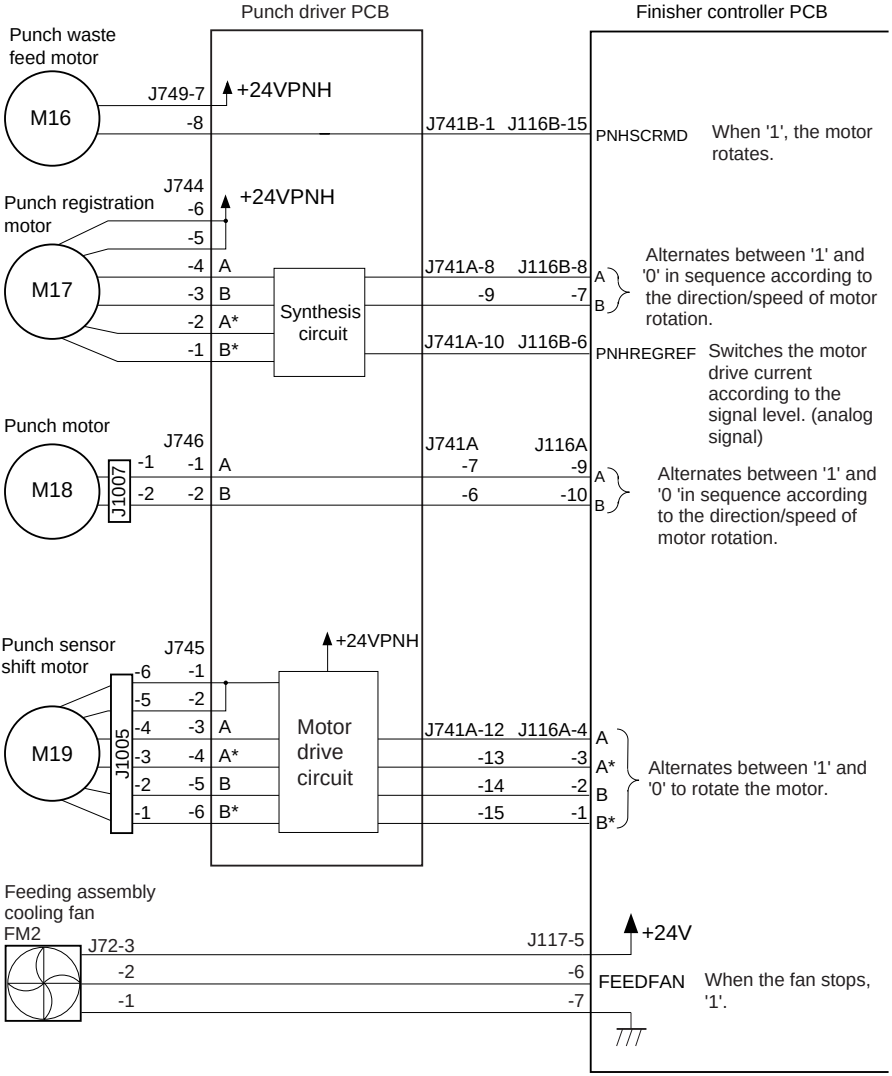
F02-103-09

1.3.10 Outputs from the Finisher Controller PCB



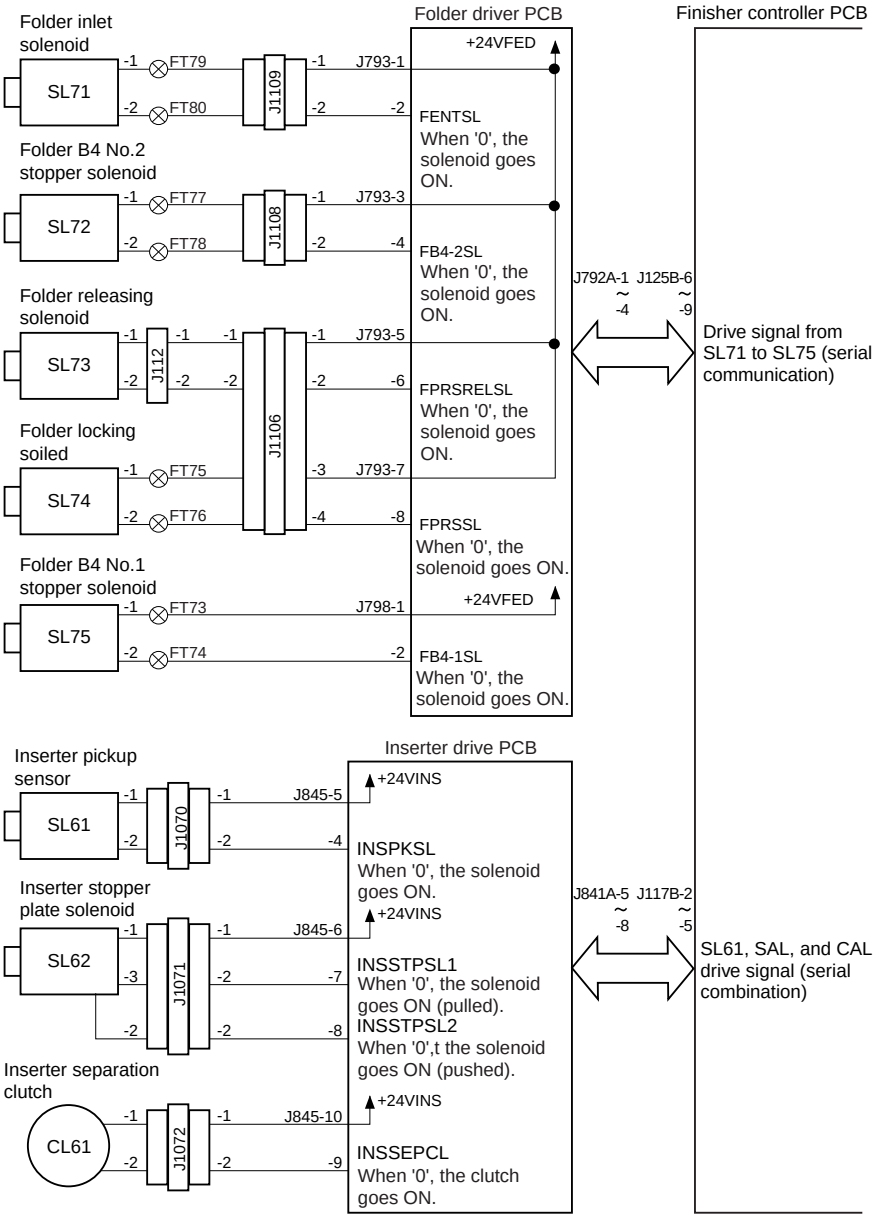
F02-103-10

1.3.11 Outputs from the Finisher Controller PCB (punch-related)



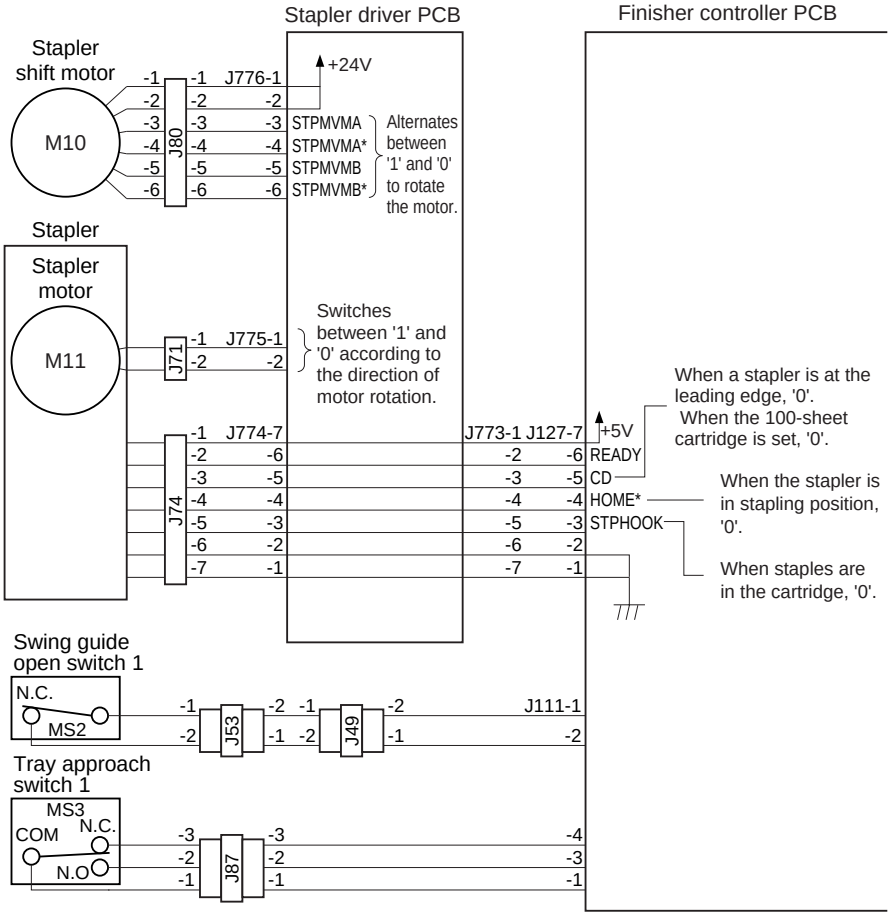
F02-103-11

1.3.12 Outputs of the Finisher Controller PCB (folder/inserter-related)



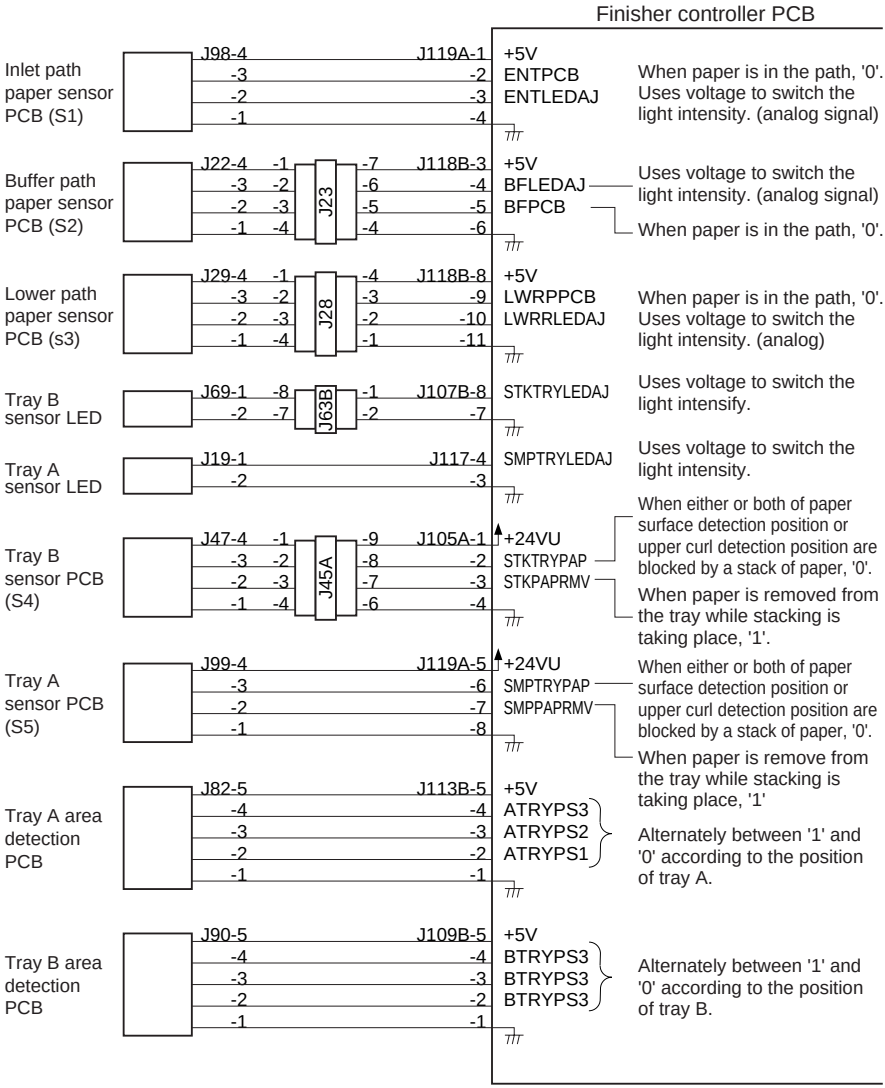
F02-103-12

1.3.13 Inputs to and Outputs from the Finisher Controller PCB



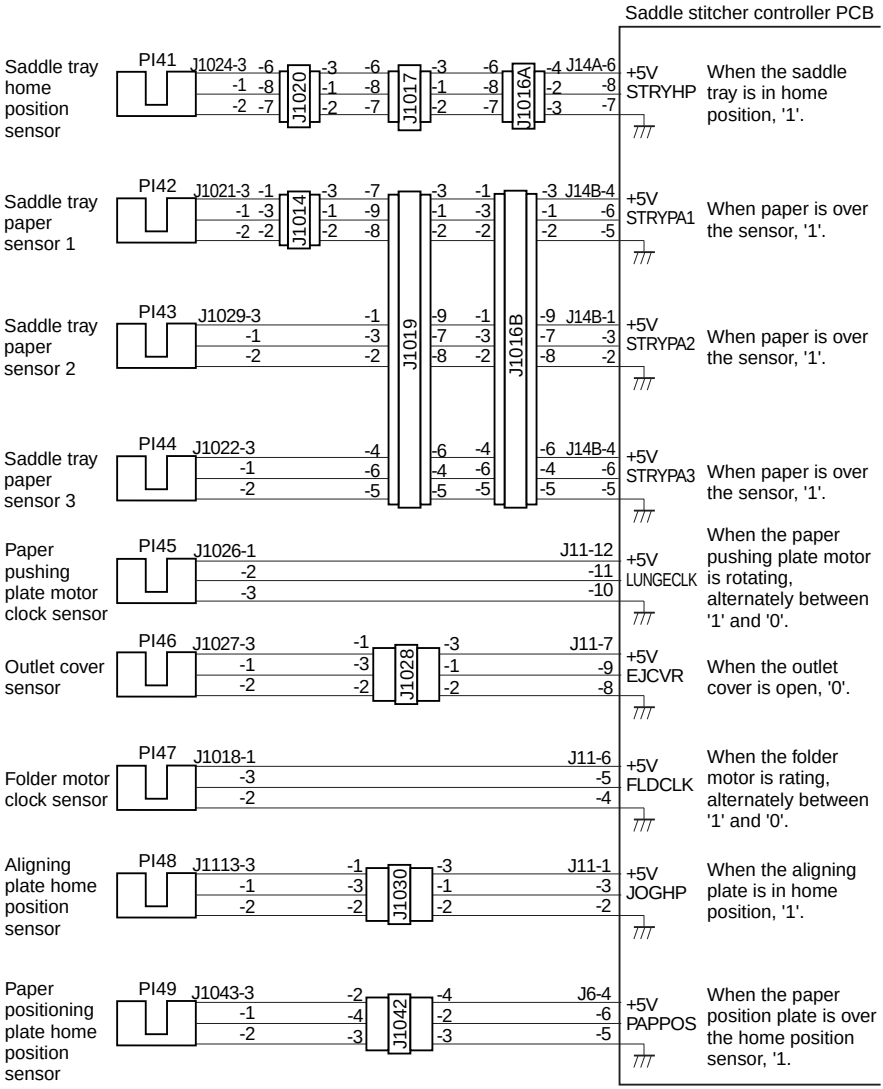
F02-103-13

1.3.14 Inputs to and Outputs from the Finisher Controller PCB



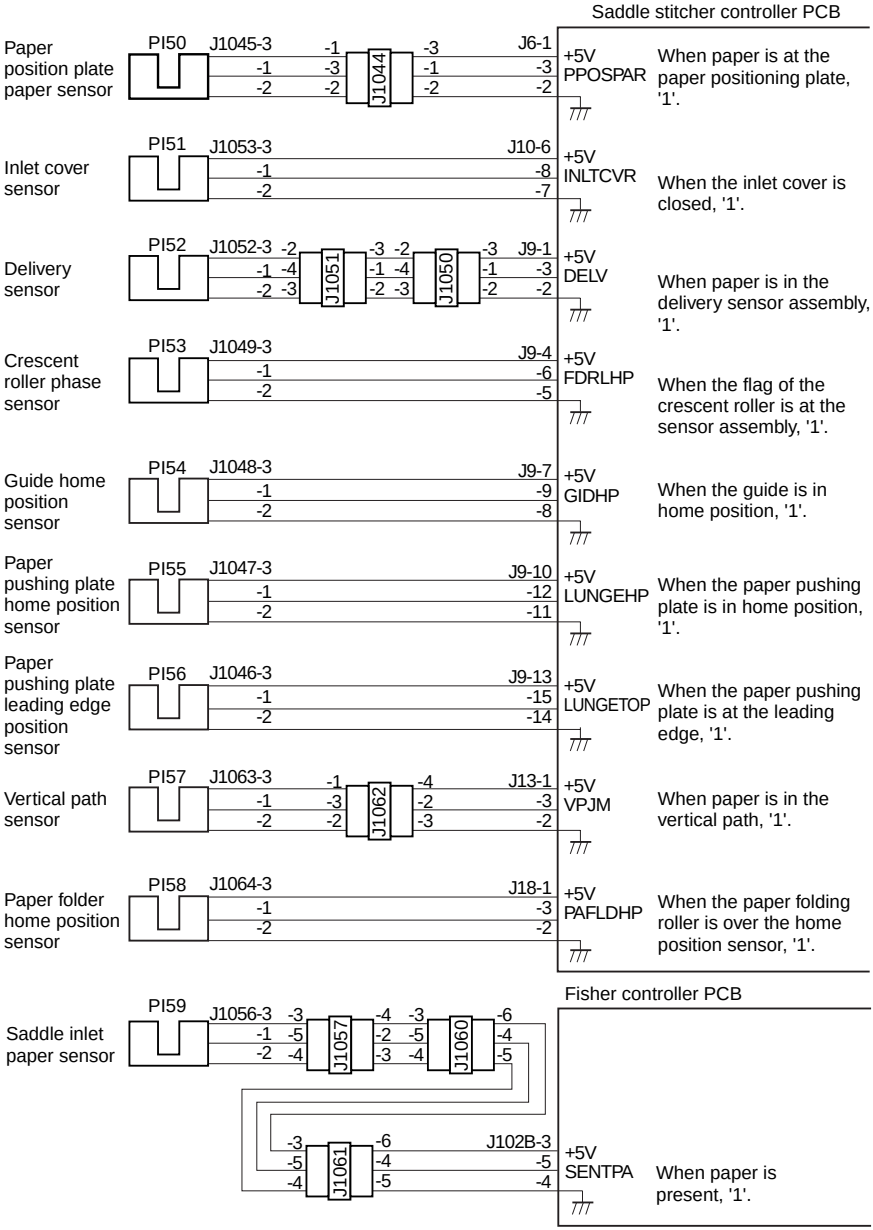
F02-103-14

1.3.15 Inputs to the Saddle Stitcher Controller PCB



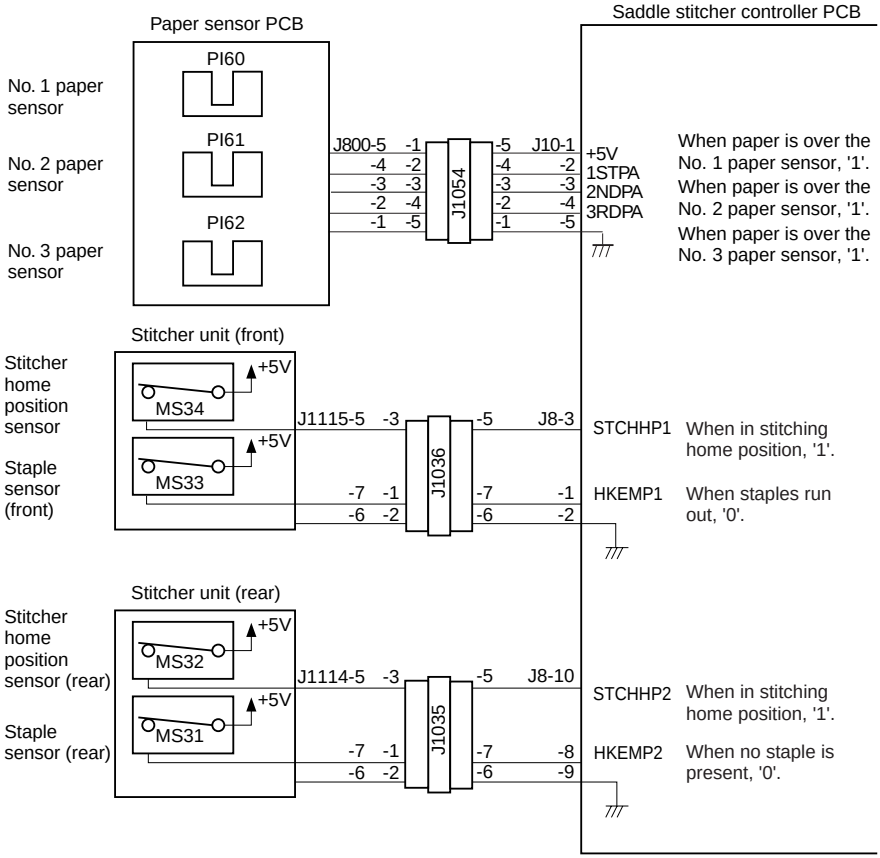
F02-103-15

1.3.16 Inputs to the Saddle Stitcher Controller PCB



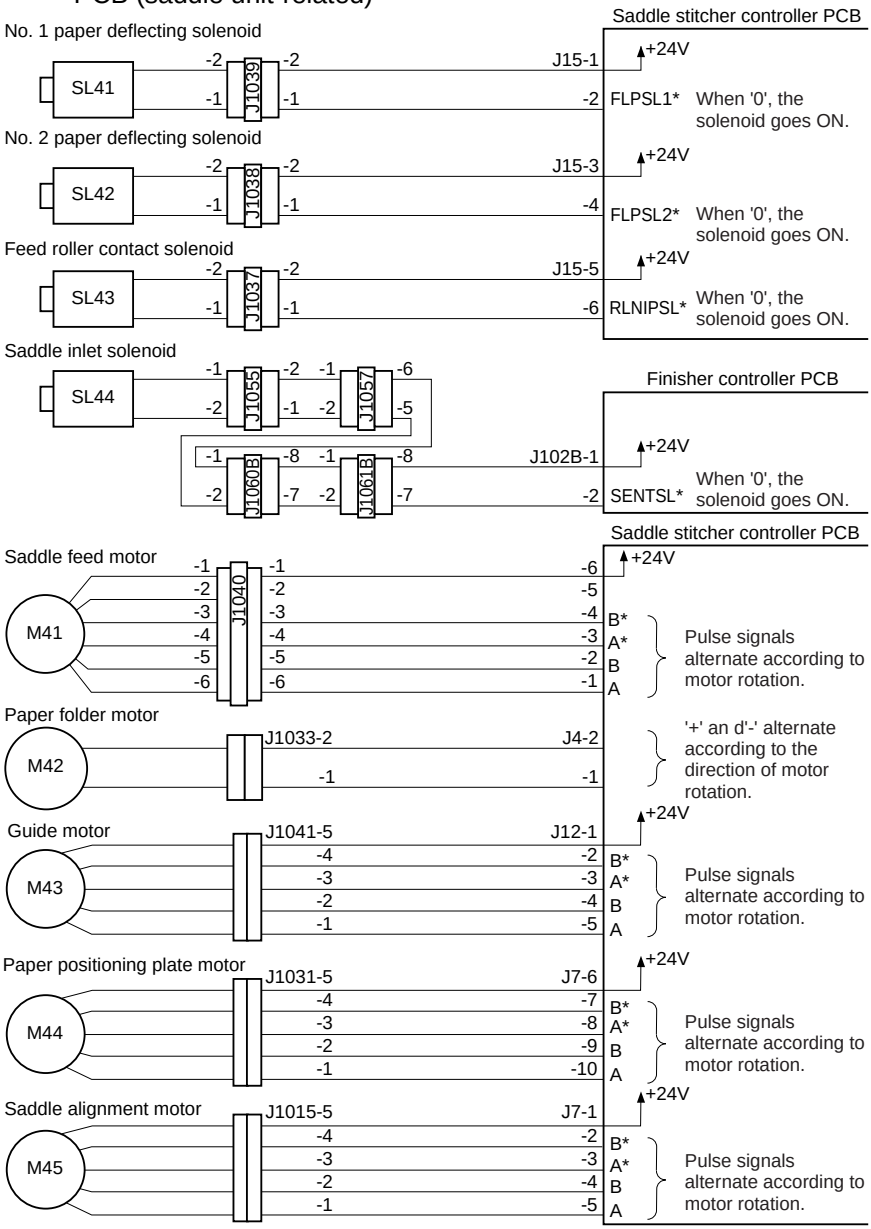
F02-103-16

1.3.17 Inputs to the Saddle Stitcher Controller PCB



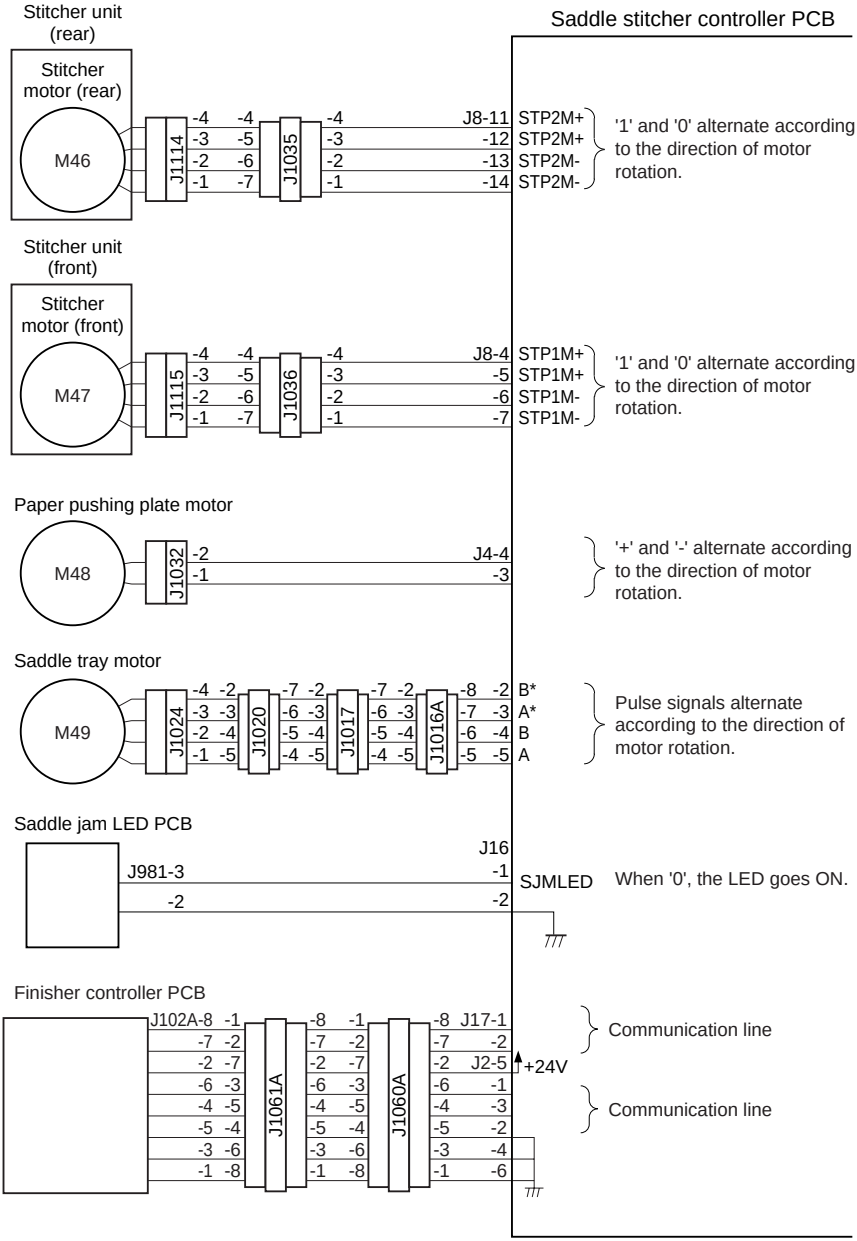
F02-103-17

1.3.18 Outputs from the Saddle Stitcher Controller PCB/Finisher Controller PCB (saddle unit-related)



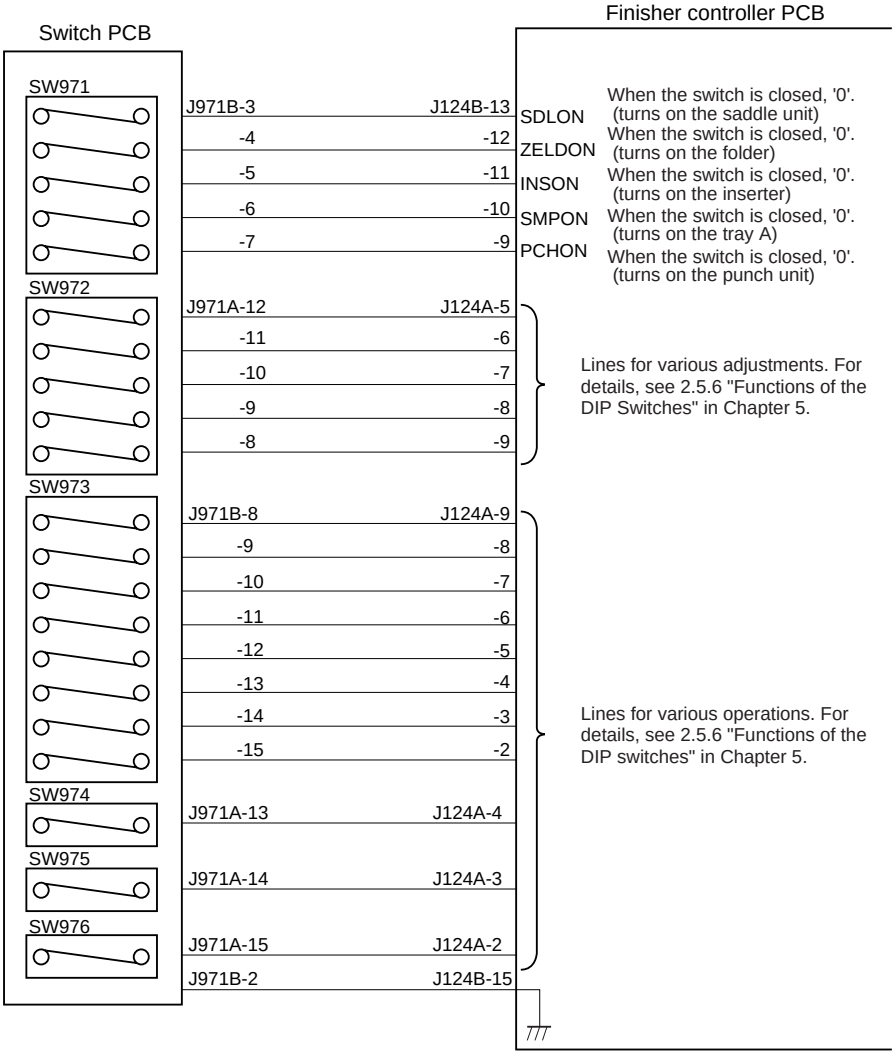
F02-103-18

1.3.19 Outputs from the Saddle Stitcher Controller PCB



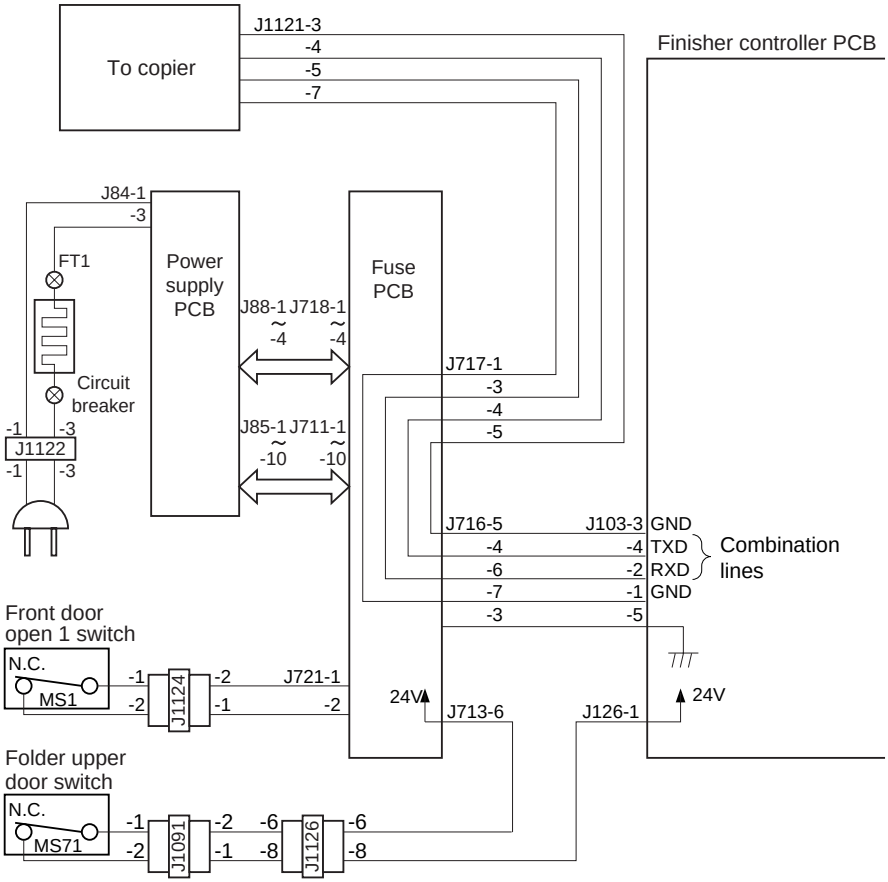
F02-103-19

1.3.20 Inputs to and Outputs from the Finisher Controller PCB



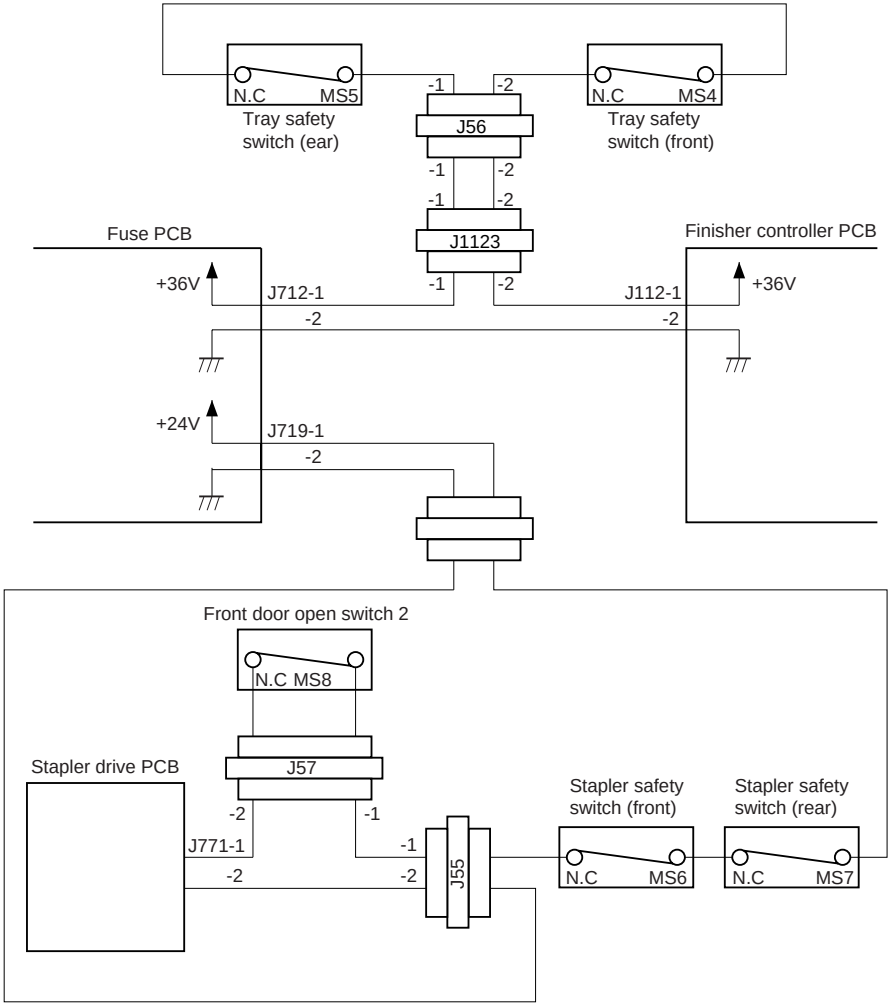
F02-103-20

1.3.21 Inputs to and Outputs from the Finisher Controller PCB



F02-103-21

1.3.22 Inputs to and Outputs from the Finisher Controller PCB



F02-103-22

2 FEEDING/DRIVE SYSTEM

2.1 Overview

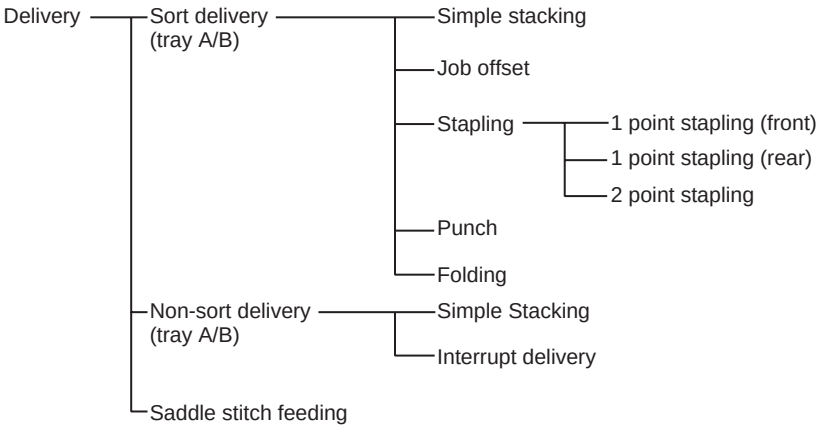
The machine operates in response to commands from its host copier to perform simple stacking, job offset, or stapling, and delivers the sheets to the delivery tray.

Z-shape folding is possible with a folder mounted. It is also possible to add covers to stacks received from the copier before delivering them with an inserter mounted.

There are two delivery trays in the finisher section. The upper one is tray A; it mainly stacks the paper sheets. The lower one is tray B; its role as a sorting tray (or tray B) is to receive sheets which undergo stapling, job-offset processing, or folding.

When tray B becomes filled up, tray A lowers to the position of tray B and performs the task of tray B. At that time, tray B moves to an even lower position.

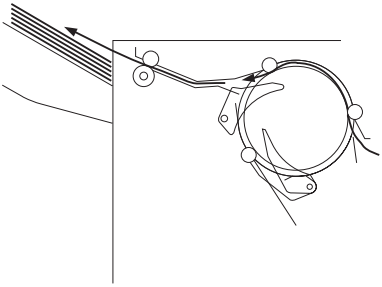
The function of the saddle stitcher is to perform saddle-stitching (center stapling), and double-folding, and then to deliver the sheets coming from the copier.



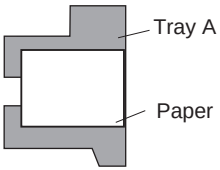
F02-201-01

2.1.1 Normal delivery

a. Simple stacking



Delivers sheets directly to tray A

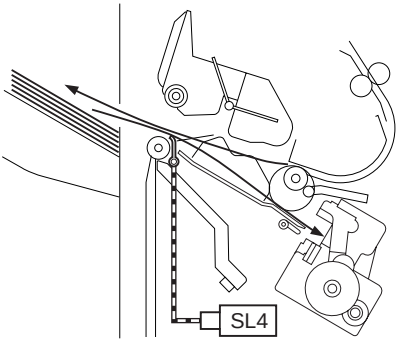


F02-201-02

b. Job offset

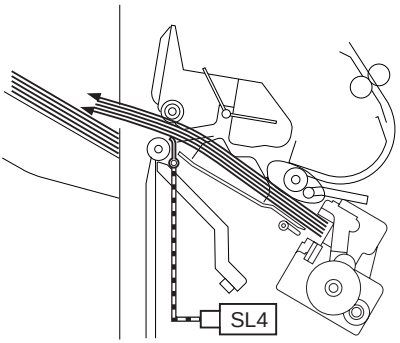
Before being delivered to tray B, a sheet is first drawn into the processing tray. The sheet is then moved to the front or rear by the jogging plate. The stack of sheets on the processing tray is delivered when it has collected a specific number of sheets.

Drawing in a sheet of paper



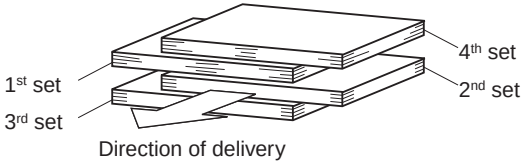
F02-201-03

Delivering a stack



F02-201-04

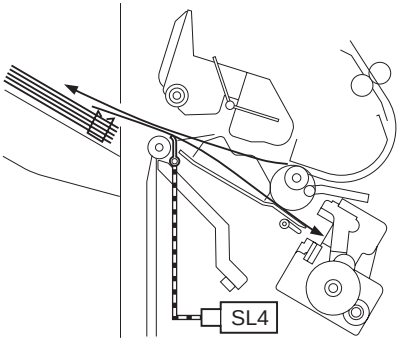
Results of delivery when handling 4 sets in job offset mode.



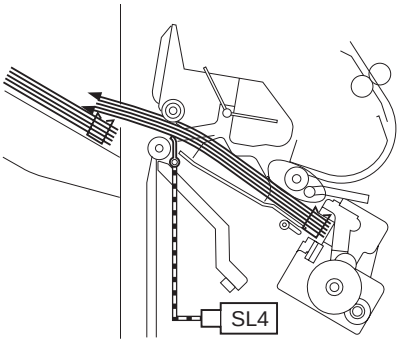
F02-201-05

c. Stapling

A sheet from the copier is deposited on the processing tray. When the stack has accumulated a specific number of sheets, the machine staples the stack and delivers it to the tray B.



F02-201-06

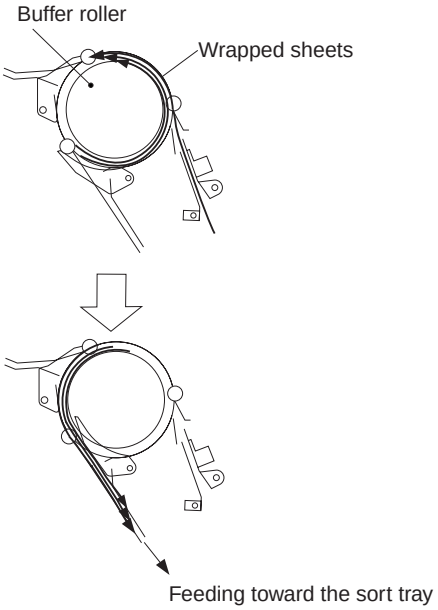


F02-201-07

d. Buffer path

The machine is designed to accept sheets from the copier while it is handling sheets on the processing tray, and so a buffer roller has been added.

The machine's buffer roller allows wrapping of a maximum of three sheets of paper, during which job offset and stapling are executed on the processing tray.



F02-201-08

2.2 Feeding/delivery

2.2.1 Overview

The machine sends sheets from the copier to tray A or tray B, according to the selected mode of delivery, and performs job offset, stapling or punching in accordance with commands from the copier.

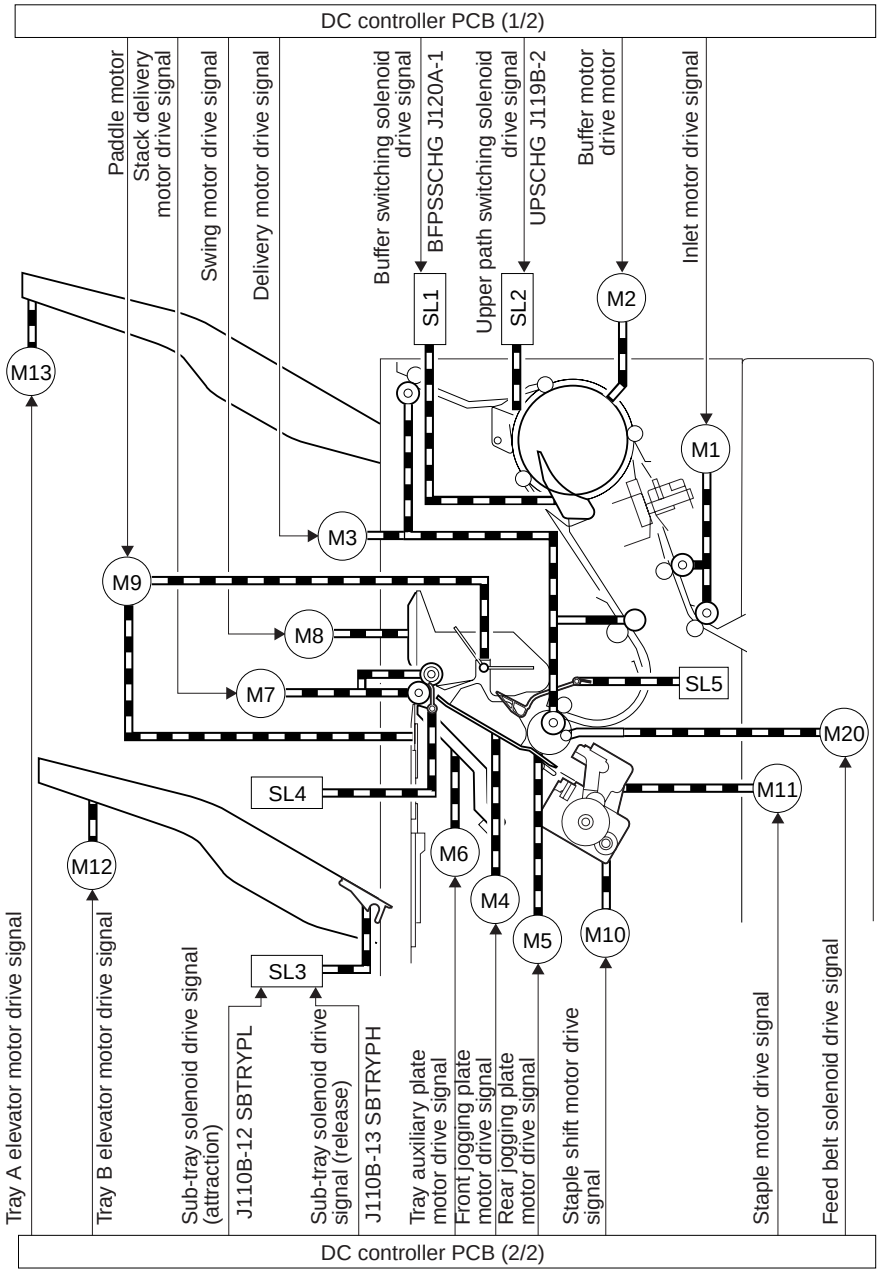
Table 2-201 shows the motors used to feed or align sheets. These motors are rotated forward or in reverse, as instructed by the finisher controller PCB.

The sensors shown in Table 2-202 monitor the arrival or passage of paper in the paper path.

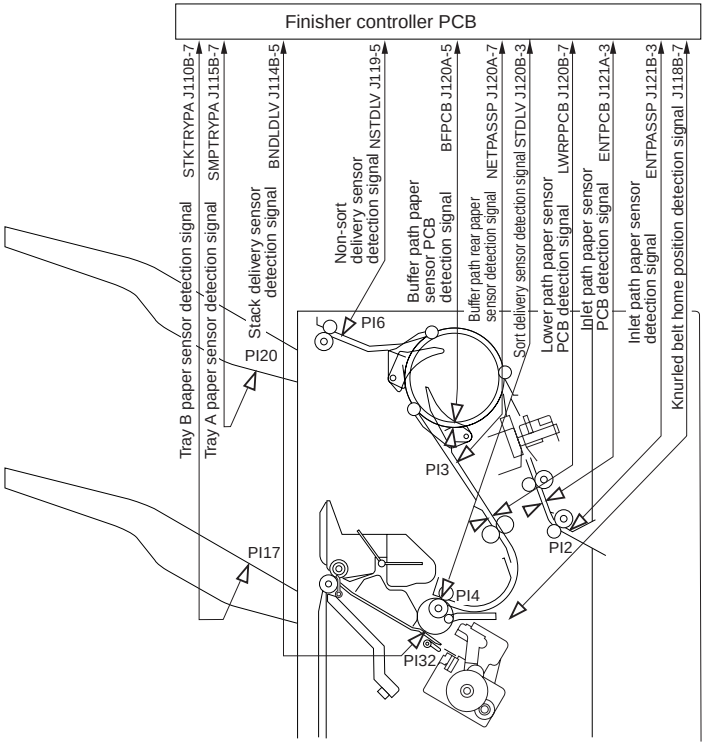
If paper fails to reach or clear a specific sensor within a specific period of time, the finisher controller PCB will identify the condition as a jam, stopping operation and informing the copier of the condition.

Notation	Name	Description	Connector on finisher controller PCB
M1	Inlet motor	DC brush-less motor	J121
M2	Buffer motor	4-phase stepping motor	J120A
M3	Delivery motor	4-phase stepping motor	J120B
M4	Front jog motor	4-phase stepping motor	J104A
M5	Rear jog motor	4-phase stepping motor	J104A
M6	Tray auxiliary plate motor	4-phase stepping motor	J105A
M7	Stack delivery motor	DC motor	J128
M8	Stack swing motor	DC motor	J128
M9	Paddle motor	4-phase stepping motor	J108B
M12	Tray B elevator motor	4-phase stepping motor	J109A
M13	Tray A elevator motor	4-phase stepping motor	J113A
M20	Knurled belt motor	4-phase stepping motor	J108

T02-202-01



F02-202-01



F02-202-02

Notation	Name	Description	Connector on finisher controller PCB
PI2	Inlet path sensor	Photo-interrupter	J199B-3
PI3	Buffer path rear sensor	Photo-interrupter	J118A-9
PI4	Sort delivery sensor	Photo-interrupter	J118B-4
PI6	Non-sort delivery sensor	Photo-interrupter	J118B-14
PI32	Stack delivery sensor	Photo-interrupter	J104B-11
PI17	Tray B paper present sensor	Photo-interrupter	J109B-8
PI20	Tray A paper present sensor	Photo-interrupter	J113B-8
PI31	Knurled belt home position sensor	Photo-interrupter	J118B-7
S1	Inlet path sensor	Reflector	J119A-3
S2	Buffer path sensor	Reflector	J118A-5
S3	Lower path paper sensor	Reflector	J118B-10

T02-202-02

2.3 Job offset

2.3.1 Overview

In job offset mode, stacks of sheets are moved to the front or rear for sorting purposes.

The stacks are moved to the front or rear by the front jogging plate and rear jogging plate. Sheets moving past the stack delivery roller are moved by the paddle in the direction of the stopper. The swing guide is in the up position while pulling a sheet into the processing tray or while the jogging plates are in operation; it is in the down position while the stack is being delivered.

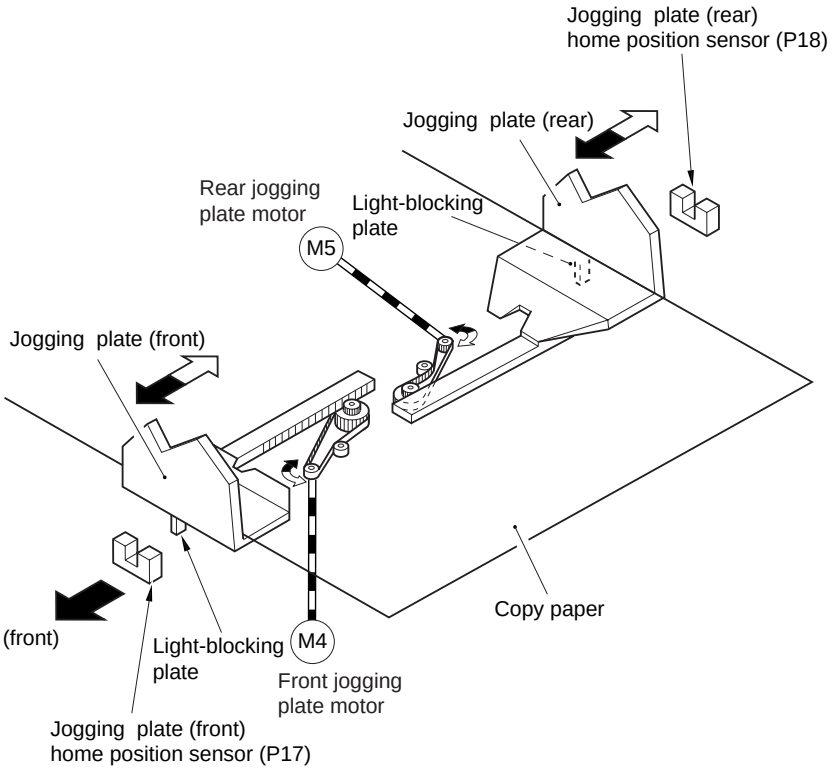
When the power is turned on, the finisher controller PCB drives the front jogging plate motor (M4) and the rear jogging plate motor (M5) to return the two jogging plates to their home positions.

Sensor	Notation	Connector
Front jogging plate home position sensor	P17	J104B-3
Rear jogging plate home position sensor	P18	J104B-6
Swing guide closed sensor	P114	J107B-2
Swing guide open sensor	P115	J107B-6
Paddle home position sensor	P113	J107A-8

T02-203-01

Function	Motor	Notation
Drives the front jogging plate	Front jogging plate motor	M4
Drives the rear jogging plate	Rear jogging plate motor	M5
Swing guide drive	Swing motor	M8
Drives the paddle (feeds paper)	Paddle motor	M9

T02-203-02


Jogging plate (rear)
home position sensor (P18)
Jogging plate (rear)
Rear jogging
plate motor
Light-blocking
plate
M5
Jogging plate (front)
(front)
Light-blocking
plate
M4
Front jogging
plate motor
Copy paper
Jogging plate (front)
home position sensor (P17)

F02-203-01

2.3.2 Stacking sheets on the processing tray

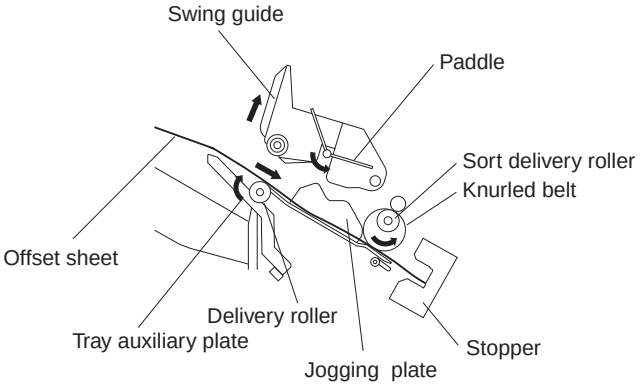
a. Handling the first sheet (other than A5R or Z-shape folding)

The tray auxiliary plate is outside the machine before the first sheet moves past the delivery roller. (It may, however, be inside the machine under certain conditions.)

The swing guide moves up when the trailing edge of the sheet moves past the sort delivery sensor (PI4), releasing the sheet from the stack delivery roller.

Then, the paddle taps on the top surface of the sheet, and butts the trailing edge of the sheet against the processing tray stopper. The paddle rotates in numbers determined by paper size, the number of sheets contained in the stack and the presence of staples. (Usually it rotates 0 to 2 times).

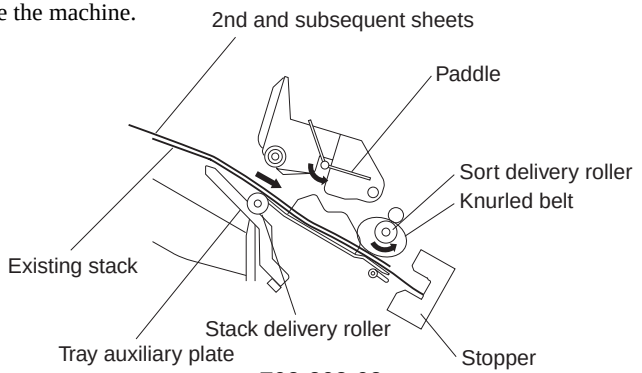
The stack delivery roller starts to rotate in reverse to assist butting the sheet against the stopper.



F02-203-02

b. Handling the second and subsequent sheets

When the trailing edge of the second and subsequent sheets moves past the delivery sensor, the paddle starts to tap the top surface of the sheet, butts its trailing edge against the processing tray stopper, and deposits it on top of the existing stack. The tray auxiliary plate remains outside the machine.



F02-203-03

c. Offset Operation

The front and rear jogging plates shift each sheet that arrives toward the front or rear. The direction will be:

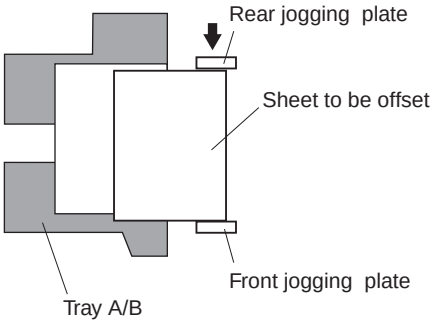
i. In the opposite direction of an existing stack in tray A/B.

ii. Different according to sheet size and mode when tray A/B is empty.

When offsetting to the front, the machine uses the front jogging plate as the reference for butting, while the rear jogging plate moves the sheet toward the front.

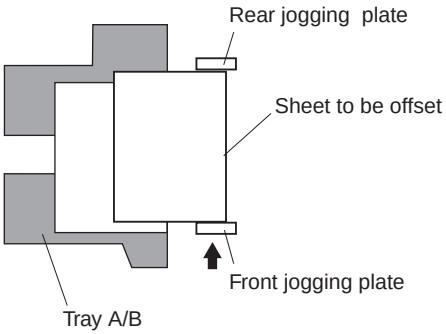
When offsetting to the rear, the machine uses the rear jogging plate as the reference for butting, while the front jogging plate moves the sheet toward the front.

The machine performs an offset operation each time a sheet is pulled onto the processing tray.



Shifting to the Front

F02-203-04



Shifting to the rear

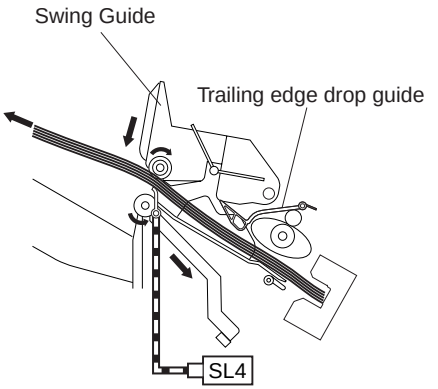
F02-203-05

d. Stack Delivery

A stack is delivered when as many as five sheets of paper (three in the case of large-size sheets) have been deposited on the processing tray.

The swing guide motor rotates to lower the swing guide. The upper and lower stack delivery rollers then hold the stack in between. When the stack delivery motor stars to rotate, the stack held between the delivery rollers is discharged; at the same time, the tray auxiliary plate is retracted inside the machine.

The following sheet coming from the copier to the finisher while the stack is being discharged is wrapped around the buffer roller. (The size of the following sheets is A4/B5/LTR.)



F02-203-06

2.3.3 Number of sheets for an offset job

A stack is discharged when it has collected five sheets or three sheets (large-size). If the number of sheets for a specific offset job cannot be divided by 5, the last stack falling short of the full count will be discharged. However, the final stack must not contain 1 sheet (e.g., if 5n+1, the last stack will contain one sheet.) In such a case, the second stack from the last will be discharged containing four sheets to avoid discharging a single sheet. In the example, the above stack will consist of two sheets.

E.g.

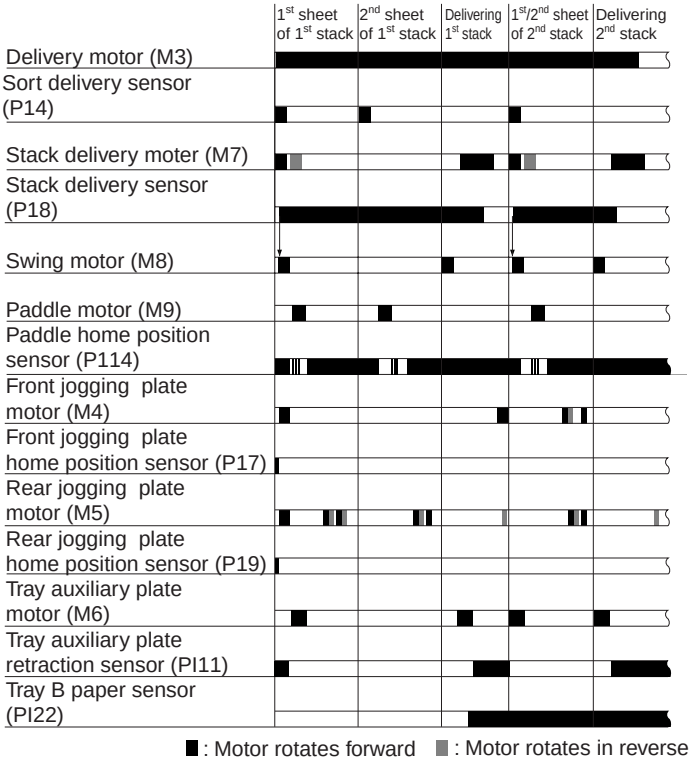
1. For eight small-size sheets, the combination will be a 5-sheet stack and a 3-sheet stack.
2. For ten small-size sheets, the combination will be a 5-sheet stack and a 5-sheet stack.
3. For 16 small-size sheets, the combination will be a 5-sheet stack, 5-sheet stack, 4-sheet stack, and a 2-sheet stack.


Memo

Why Avoid a Single-Sheet Stack?
A single sheet of paper will not follow a fixed trajectory from the stack delivery slot to the top of the existing stacks in the sort tray, resulting in cases where the stack jogging is disrupted. In order to prevent this from happening, stacks contain two or more sheets to stabilize the drop trajectory.

Large size sheets are delivered in stacks of three. If the last stack consists of 1 sheet, it will be combined with the previous stack, thus forming a 4-sheet stack.

Job offset sequences
Two 2-Sheet Stacks



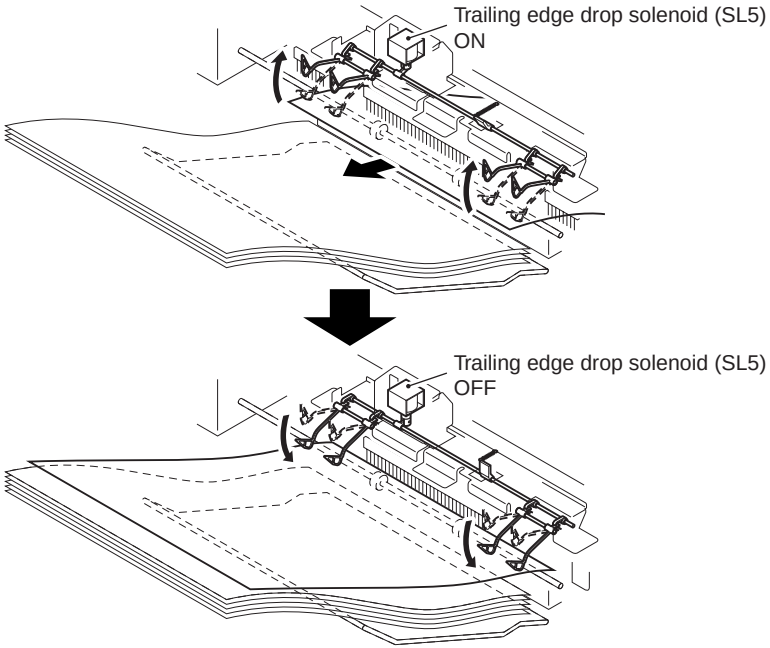
F02-203-07

2.4 Trailing edge drop function

2.4.1 Overview

The trailing edge drop restrains the trailing edge of the sheet delivered to the processing tray in order to bring it quickly to a resting state. The trailing edge drop is driven by the trailing edge drop solenoid (SL5).

When delivery to the processing tray begins, the trailing edge drop solenoid (S5) turns on, and the trailing edge drop moves above the sheet without touching it. The trailing edge drop solenoid (SL5) turns off just before the trailing edge of the sheet lands in the processing tray, restraining the trailing edge of the sheet.

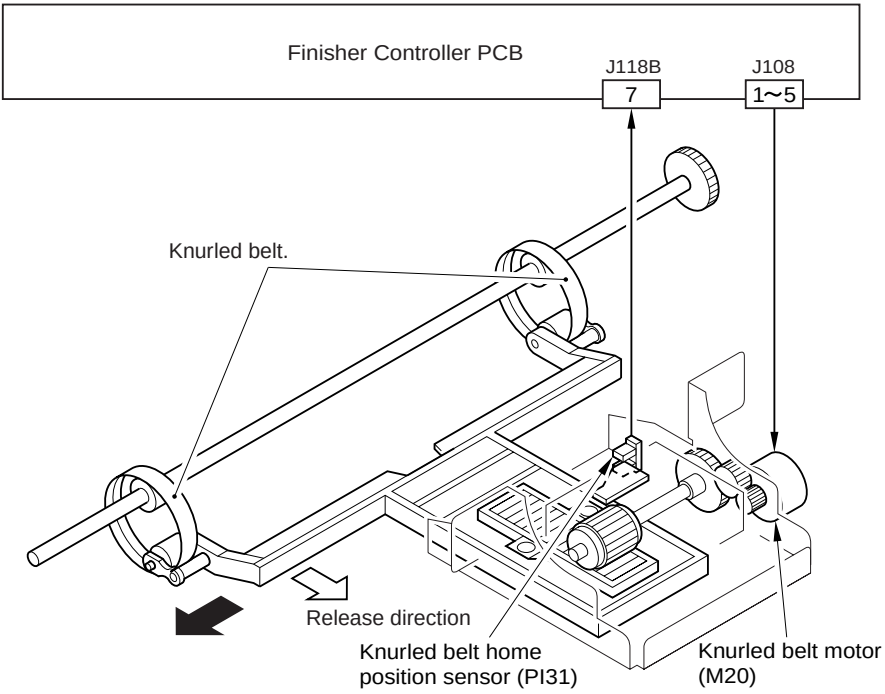


F02-204-01

2.5 Controlling the knurled belt

2.5.1 Overview

The primary function of the knurled belt is to ensure that sheets delivered to the processing tray are drawn all the way to the stopper. When the shape of the knurled belt is normal, the contact pressure the knurled belt applies to the stack varies according to the thickness of the stack in the processing tray. Changes in the contact pressure interfere with proper conveyance of the sheets. Therefore, in this machine, the contact pressure of the knurled belt does not affect the thickness of the stack, rather the normal pulling force on the belt alters the shape. The amount of pulling force on the belt is exerted by the pulse control of the knurled belt motor (M20).



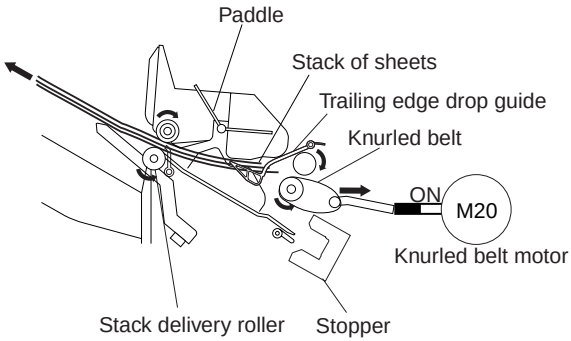
F02-205-01

2.5.2 Delivering three sheets

When three sheets have cleared the sort delivery roller from the buffer roller, the stack delivery roller will rotate in reverse to send the stack of three sheets in the direction of the processing tray.

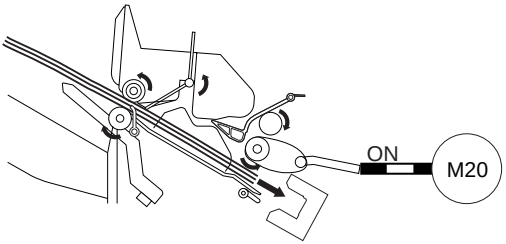
If the knurled belt moved the stack of three sheets at the same time, the feeding force would be too strong and the stack would bend against the stopper. To avoid such a problem, the knurled belt is released and the stack delivery roller and the paddle operate to move the 3-sheet stacks to the processing tray.

1) The stack moves past the sort delivery roller. At the same time, the knurled belt solenoid turns on to release the knurled belt.



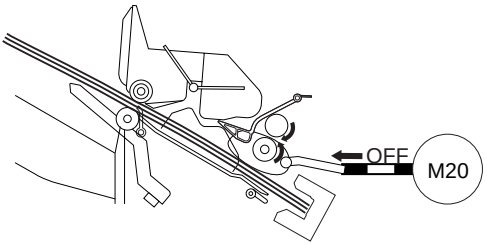
F02-205-02

2) The stack delivery roller starts to rotate in reverse and, at the same time, the paddle rotates to move the stack in the direction of the processing tray.



F02-205-03

3) The belt is locked once again as soon as the stack butts against the stopper.

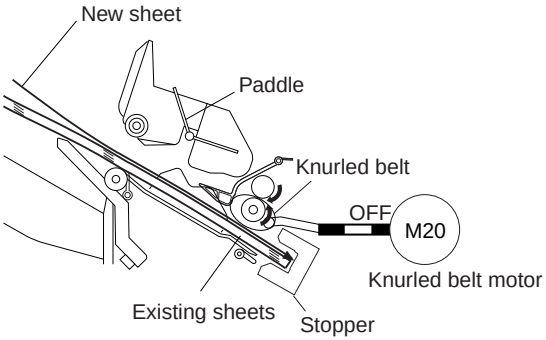


F02-205-04

2.5.3 Multiple sheets on the processing tray

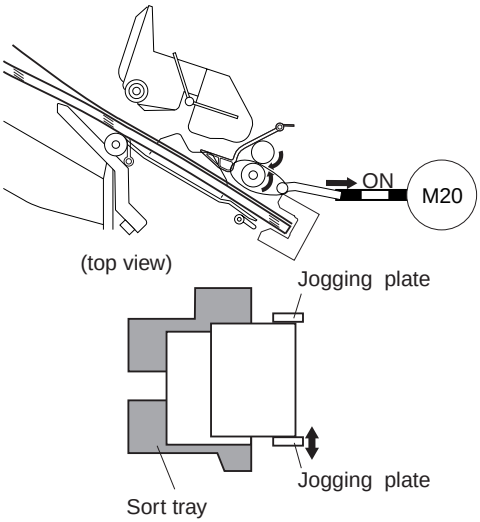
When the processing tray already holds multiple stacks, the knurled belt may inadvertently return the aligned sheets to their prior position. Excess sheets may also interfere with the rotation of the knurled belt. To avoid such a problem, the knurled belt is released if there are 40 or more sheets on the processing tray.

1) The trailing edge of the sheet moves past the delivery roller, and the sheet is butted against the stopper by the paddle and the knurled belt.



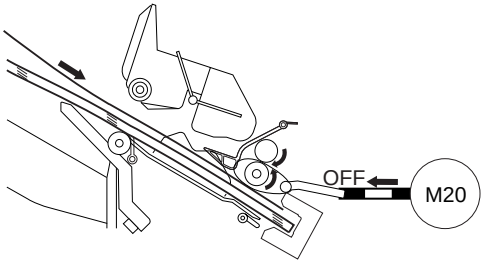
F02-205-05

2) The solenoid turns on in concert with the jogging of the sheet to release the knurled belt.



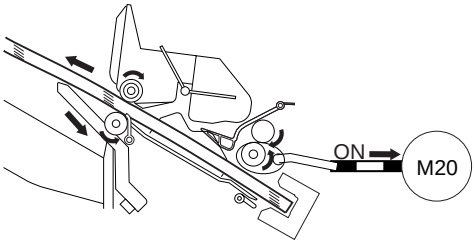
F02-205-06

3) After aligning the sheets, the solenoid turns off, and the knurled belt moves the sheet in the direction of the stopper.



F02-205-07

4) The solenoid turns on when delivery starts, moving the stack away from the knurled belt. The solenoid remains on if the next discharge is for a three-sheet stack.

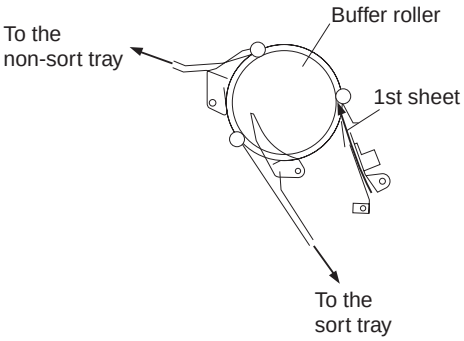


F02-205-08

2.6 Buffer path

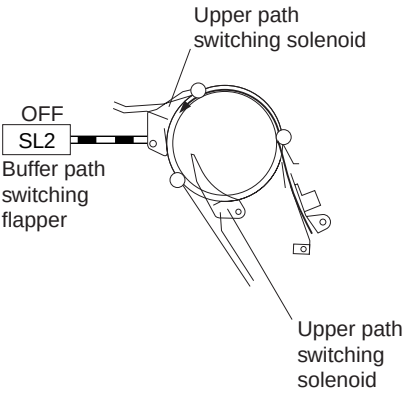
To accept sheets from the copier continuously while the machine handles sheets on the processing tray, the machine is equipped with a buffer roller, which operates as follows:

1) The first sheet is moved in the direction of the buffer roller.



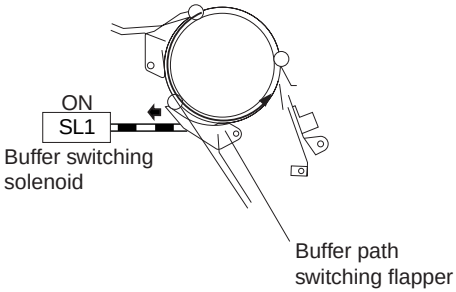
F02-206-01

2) Since the upper path switching flapper remains off, the leading edge of the sheet moves in the direction of the buffer path switching flapper.



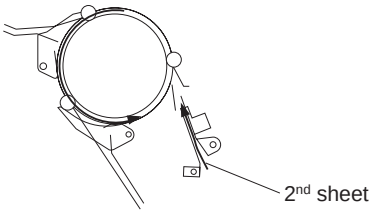
F02-206-02

3) The buffer path switching flapper operates, causing the leading edge of the sheet to wrap around the buffer roller.



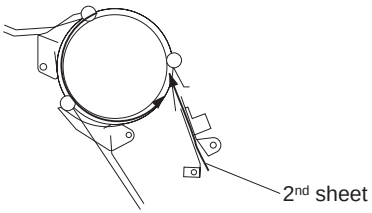
F02-206-03

4) The second sheet arrives from the copier.



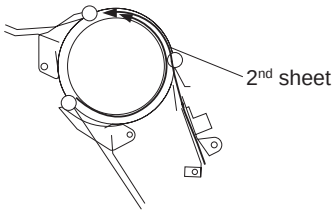
F02-206-04

5) The leading edge of the second sheet moves ahead of the leading edge of the 1st sheet.



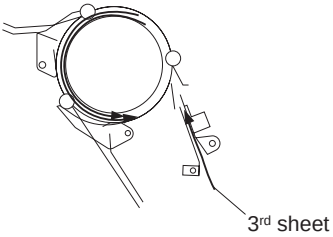
F02-206-05

6) The buffer roller continues to rotate, causing the second sheet to slide over the first sheet.



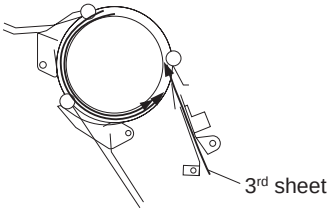
F02-206-06

7) The third sheet arrives from the copier.



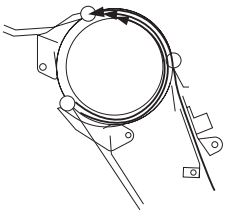
F02-206-07

8) The leading edge of the third sheet moves ahead of the leading edge of the second sheet.



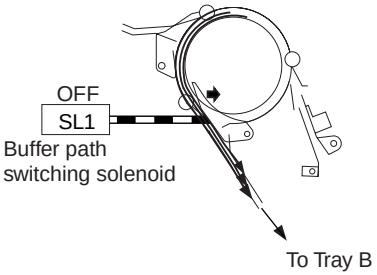
F02-206-08

9) The buffer roller continues to rotate, causing the third sheet to slide over the first and second sheets.



F02-206-09

10) The buffer path switching flapper turns off, causing the three sheets to move in the direction of the delivery roller together.



F02-206-10

3 CONTROLLING THE PADDLE

3.1.1 Overview

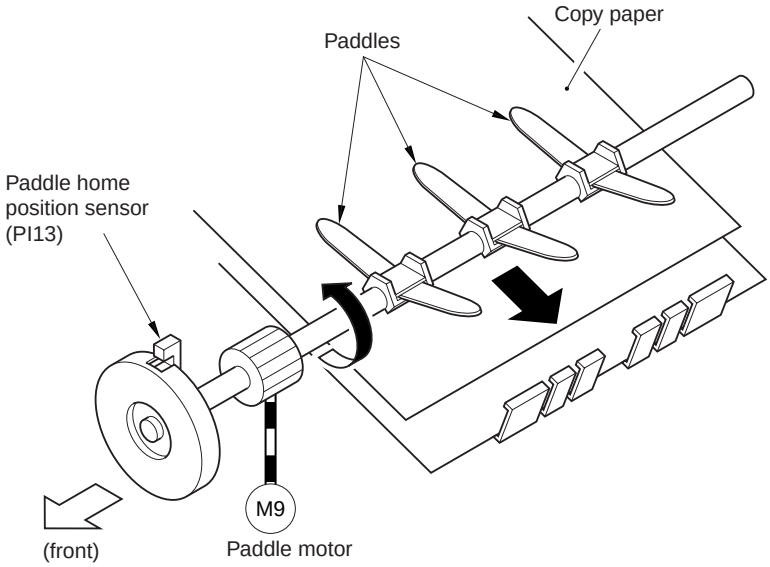
The paddle is provided to send sheets delivered to the processing tray toward the stopper.

Sensor	Notation	Connector
Paddle home position sensor	PI13	J107A-8

T02-301-01

Function	Motor	Notation
Drives the paddle	Paddle motor	M9

T02-301-02



F02-301-01

4 CONTROLLING THE TRAY AUXILIARY PLATE

4.1.1 Overview

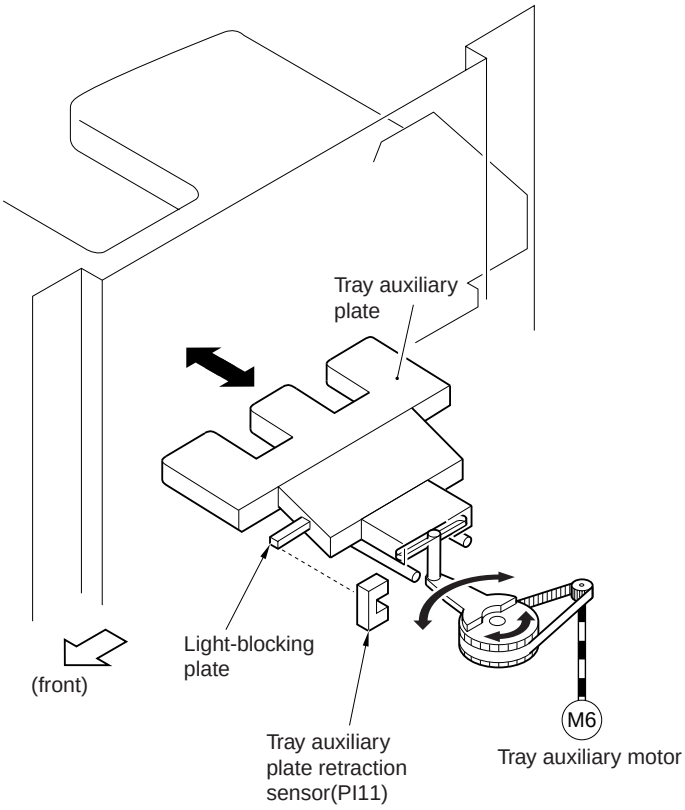
Half of sheets are pushed on to the sort tray before feeding when the machine performs stapling or offset operations at the processing tray. A tray auxiliary plate is provided to ensure the best placement of the leading edges of the sheets.

Sensor	Notation	Connector
Tray auxiliary plate retraction sensor	PI11	J105B-6

T02-401-01

Function	Motor	Notation
Drives the tray auxiliary plate	Tray auxiliary plate motor	M6

T02-401-02



F02-401-01

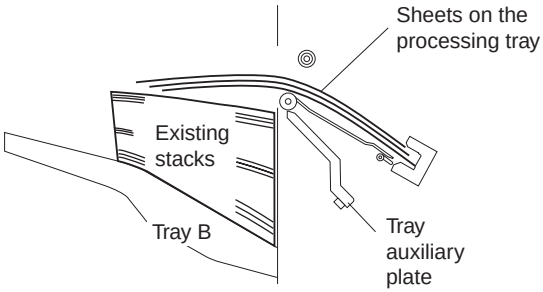
4.1.2 Operation

When multiple sheets are stacked on tray B, the leading edge of the stack tends to bend down. If the sheets were pushed out of the processing tray in this condition, the leading edge would sag. Therefore, even if the paddle strikes the face of the sheet, the sheet does not butt against the stopper, which results in the following:

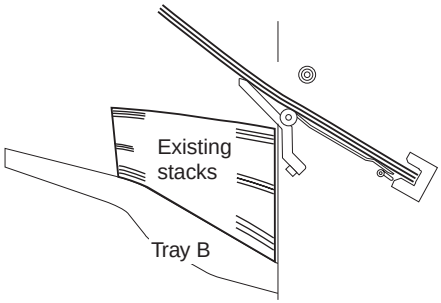
a. Poor alignment of the sheets in feeding direction when stapling.
b. Poor alignment of sheets in feeding direction during offset job processing (on tray B).

To prevent this from happening, the finisher controller PCB slides the tray auxiliary plate outside the machine while sheets are being placed on the processing tray. With the tray auxiliary plate support the sheets from below, the stack will lie straight, maintaining correct alignment.

Since the tray auxiliary plate is retracted when delivering stacks, it will not affect delivery. The plate is slid out again when the next sheet is placed on the processing tray (after detecting the paper surface to prevent interference with detection).



F02-401-02 (Tray Auxiliary Plate Retracted)



F02-401-03 (Tray Auxiliary Plate Out)

5 STAPLING

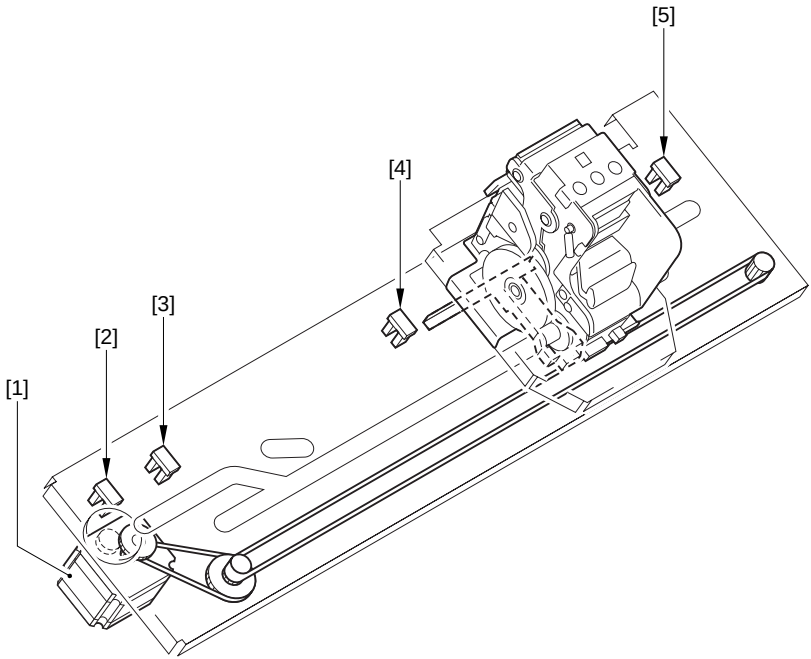
5.1.1 Overview

In the stapling operation, a specified number of sheets are stacked on the processing tray and then stapled and delivered.

The stapling position depends on the staple mode and the size of paper being used. When the operation starts after the power has been switched on, the finisher controller PCB drives the stapler drive motor (M10) to return the stapler to the home position. If the stapler is already in the home position, it is left as it is.

On the stapler's travel path, there are three sensors which indicate that the stapler's halt position is not obstructing the knurled belt's shunt action.

There are two types of staples, for 50 page stapling and for 100 page stapling. The stapler unit has a function for differentiating between the two types.



[1] Stapler shift motor (M10)
[2] Stapler shift home position sensor (PI16)
[3] Knurled belt shift permit sensor (PI28)
[4] Knurled belt shift permit sensor (PI29)
[5] Knurled belt shift permit sensor (PI30)

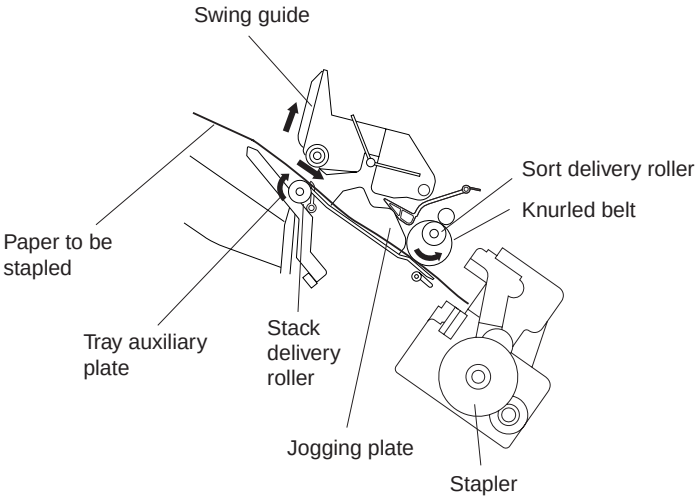
F02-501-01

5.1.2 Stapling of first sheet

As the trailing edge of the first sheet of paper passes the sort delivery roller, after it has been fed forward a specified distance, the stack delivery roller begins to rotate in reverse, moving forward a little more. Then, the swing guide rises and the stack delivery roller stops. The rising action of the swing guide is detected by the swing guide open sensor (PI16).

The sort delivery roller rotates the knurled belt, and feeds the paper into the processing tray. The swing guide remains elevated until the last sheet of paper has been stacked. The stack delivery sensor (PI18) detects the paper on the processing tray.

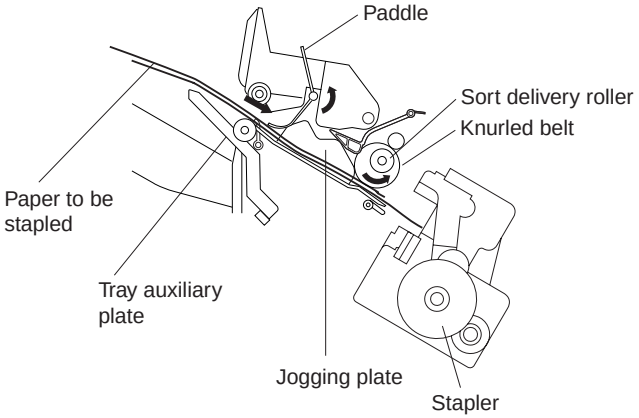
When the paper hits the processing tray stopper, the jogging plate moves to keep the edges of the paper flush. The front or rear jogging plate will be used, depending on which side the existing stack was aligned on.



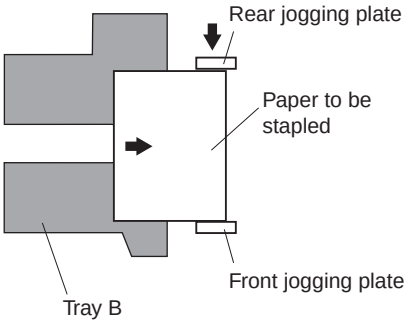
F02-501-02

5.1.3 Stapling of second and subsequent sheets

Once the second and subsequent sheet passes the sort delivery roller, the paddle motor comes ON and rotates the paddle. The paper is pushed down by the paddle and fed on to the processing tray. The paddle operation varies according to the size of the paper, but is usually between 0 and 2 times. When the paper enters the processing tray, it is aligned by the jogging plate. The direction of the alignment will be the same as the first stapled sheet.



F02-501-03



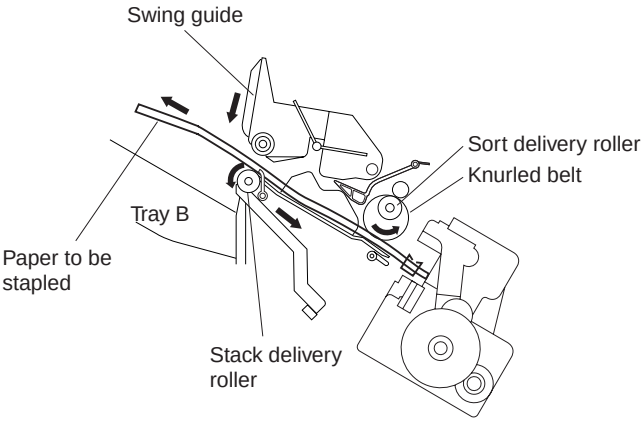
When closer to the front.

F02-501-04

5.1.4 Stapling of last sheet

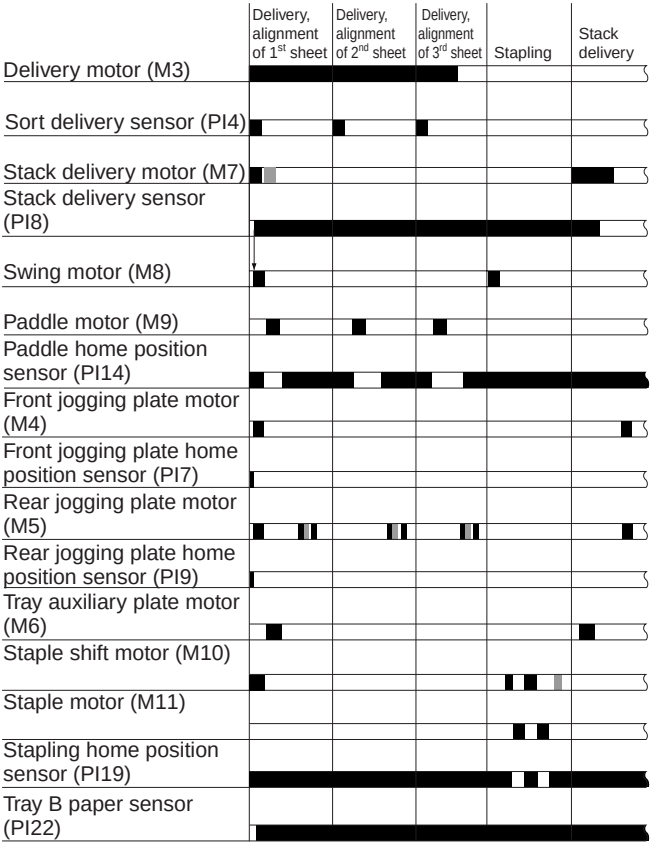
When the last sheet of paper has been aligned, the front and rear jogging plates move forward and hold the paper in place. Then, the swing guide motor begins to rotate to lower the swing guide. Now, the finisher controller PCB moves the stapler into the selected stapling position, and the paper is stapled.

Once the stapling is finished, the finisher controller PCB activates the jogging motor to move the jogging plates to a position 10mm behind the trailing edge of the paper. Then, the stack delivery motor (M7) rotates forward and the stack is ejected into tray B.



F02-501-05

Staple operation sequence
(for 2-point stapling of three sheets of paper)



F02-501-06

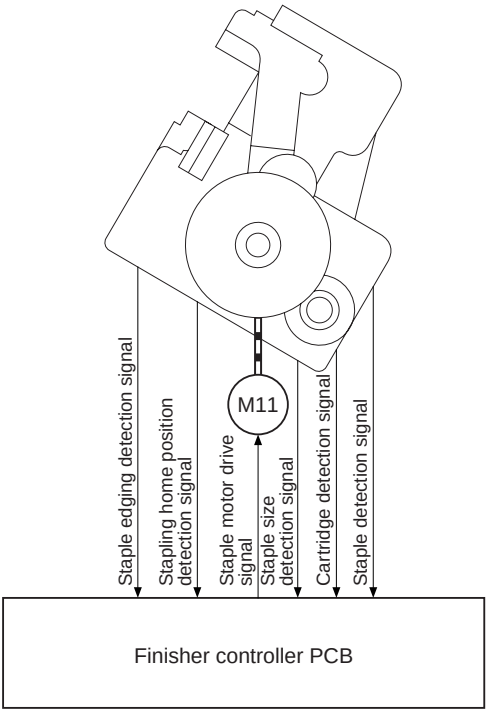
5.1.5 Stapler

Stapling is carried out by the staple motor (M11). Each time the motor rotates the cam, the cam's home position is detected by the stapling home position sensor (inside the stapling unit). The stapler motor rotates forward or in reverse, controlled by a microprocessor on the finisher controller PCB.

When the stapling home position sensor goes OFF, the finisher controller PCB makes the stapler motor rotate in reverse until the sensor comes ON again, and the staple cam returns to the initial position.

The presence of the staple cartridge is detected by the staple cartridge switch (inside the stapling unit). The presence of staples in the staple cartridge is detected by the staple cartridge switch (inside the stapling unit). The staple edging sensor (inside the stapling unit) detects whether the staples inside the staple cartridge have been pushed to the tip of the stapler.

The power supply line to the staple motor (M11) is connected and disconnected by the microswitches listed in Table 2-503. This function is used to guard against injuries, for example when an operator' fingers are inside the stapler.



F02-501-07

Microswitch	Notation	Status	Function
Front cover switch	MSW1	N.O.	Connects when front cover is closed.
Swing guide safety switch	MSW2	N.C.	Connects when swing guide is closed.
Staple safety switch (front)	MSW6	N.O.	Connects when the stacking wall (upper) is correctly mounted, and the stacking wall actuator is down.
Staple safety switch (rear)	MSW7	N.O.	

T02-501-01

5.1.6 Delivery auxiliary rib operation

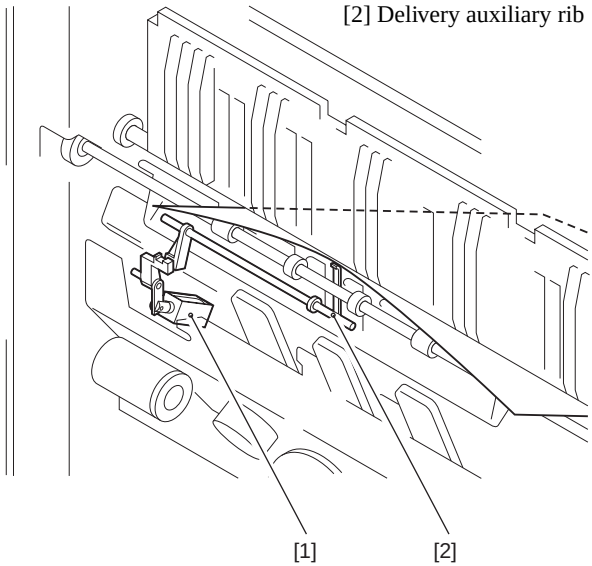
Whenever stapled paper (particularly, small amounts) is ejected into the delivery tray from the processing tray, the rigidity of the paper may affect how well the paper stacks. In order to lessen this effect, this machine is fitted with a delivery auxiliary rib.

The delivery auxiliary rib is driven by the delivery auxiliary rib solenoid (SL4). The delivery auxiliary rib solenoid comes ON just before a stack is ejected from the processing tray and bends the stack in order to give the paper rigidity.

The operation of the delivery auxiliary rib depends on the size and quantity of the ejected paper. The conditions under which the delivery auxiliary rib operates are described below.

Paper size	Ejected sheets
A3, B4, 279.4mm x 431.8mm (11 x 17), LGL, A4R, LTR	1 sheet/ stack
A5, A4, SMT, LTR (excl. B5)	5 sheets/ stacks or fewer

[1] Delivery auxiliary rib solenoid (SL4)
[2] Delivery auxiliary rib



F02-501-08

6 TRAY OPERATION

6.1.1 Overview

The finisher has two delivery trays. The upper tray is called tray A and the lower tray is called tray B. They are designed to be able to move up and down. There is a shutter which prevents paper stacked on the tray from entering the delivery assembly while tray A is passing through the swing unit. Tray B is equipped with a sub-tray to assist in the stacking of folded paper.

6.1.2 Trays

The sensors involved in driving trays A and B are as shown below.

Tray A

Sensor	Notation	Connector
Tray A idling sensor	PI19	J113B-11
Tray A paper sensor	PI20	J113B-8

T02-602-01

Function	Motor	Notation
Tray B lifting	Tray B lifting motor	M13

T02-602-02

Tray B

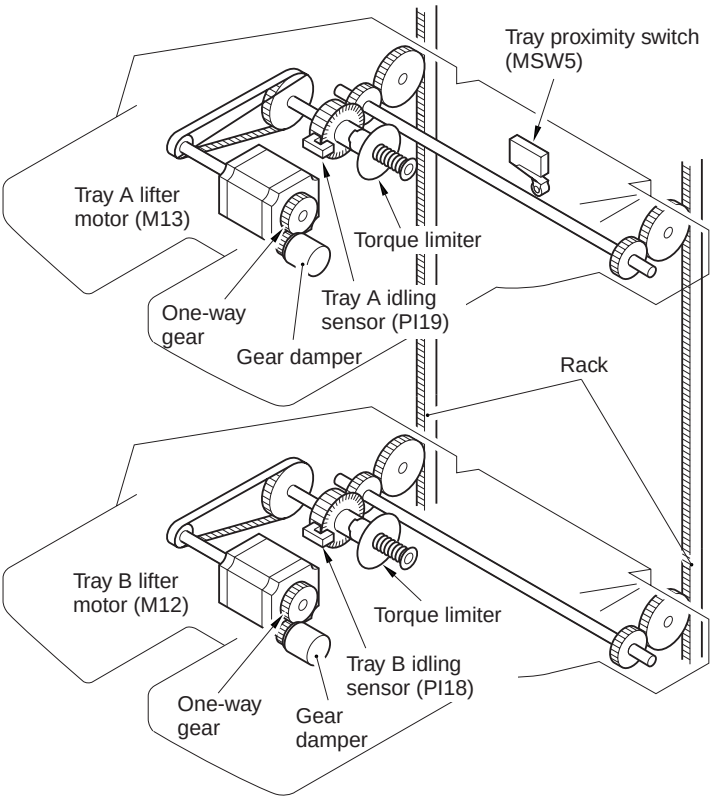
Sensor	Notation	Connector
Tray B idling sensor	PI18	J113B-11
Tray B paper sensor	PI17	J113B-8

T02-602-03

Function	Motor	Notation
Tray B lifting	Tray B lifting motor	M12
Sub-tray lifting	Sub-tray lifting motor	SL3

T02-602-04

If there is no change in the sensor status, despite drive signals having been sent to tray lifter motor A (M13) or tray lifter motor B (M12), due to motor being out of step, etc., the finisher controller PCB detects an abnormality and displays an error code on the copier's control panel.



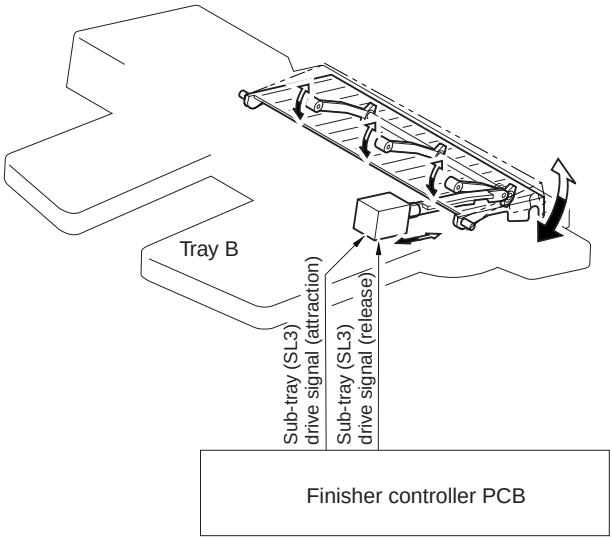
F02-601-01

6.1.3 Sub-tray control

Folder paper is sometimes output into tray B. The thickness of the folded paper is different in the leading edge feeding direction and the trailing edge feeding direction. As the pile of folded paper on the tray increases, incoming paper hits against the already stacked paper. To counteract this, when folded paper is being stacked, the sub-tray ascends to increase the bulk at the thinner trailing edge.

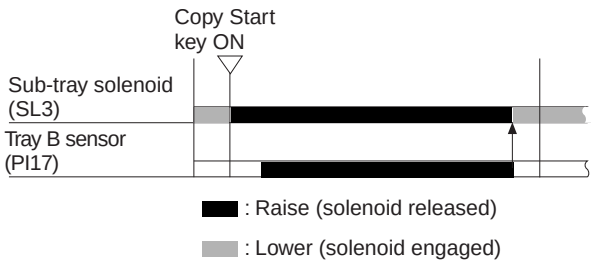
The sub-tray is raised and lowered by the sub-tray solenoid (SL3). The sub-tray solenoid is a latch solenoid.

The sub-tray is raised when folding is selected on the control panel, and the Start key is pressed. The tray is lowered when the copying is finished and the paper has been removed from the tray. However, if stapling has been selected and the stapled stack contains A3/LDR folded paper, the sub-tray is lowered once the first stack has been delivered.



F06-601-02

Sub-tray operating sequence

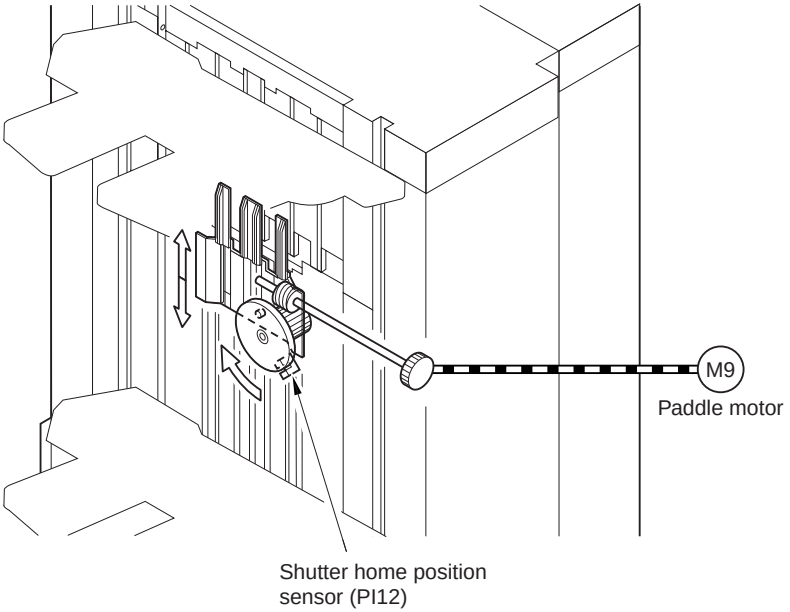


F02-601-03

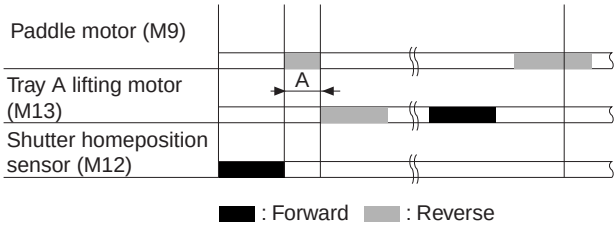
6.1.4 Shutter control

When there is paper stacked in tray A as it passes through the delivery assembly, the stacked paper may enter the delivery assembly. In order to prevent this, the delivery assembly is fitted with a shutter. The shutter closes when tray A passes through the delivery assembly. This action takes place even if there is no paper in the tray.

The shutter is driven by the paddle motor (M9). When the paddle motor rotates forward, it drives the paddle. When it rotates in reverse, it drives the shutter. The shutter open/close status is detected by the home position sensor (PI12).



F02-601-04

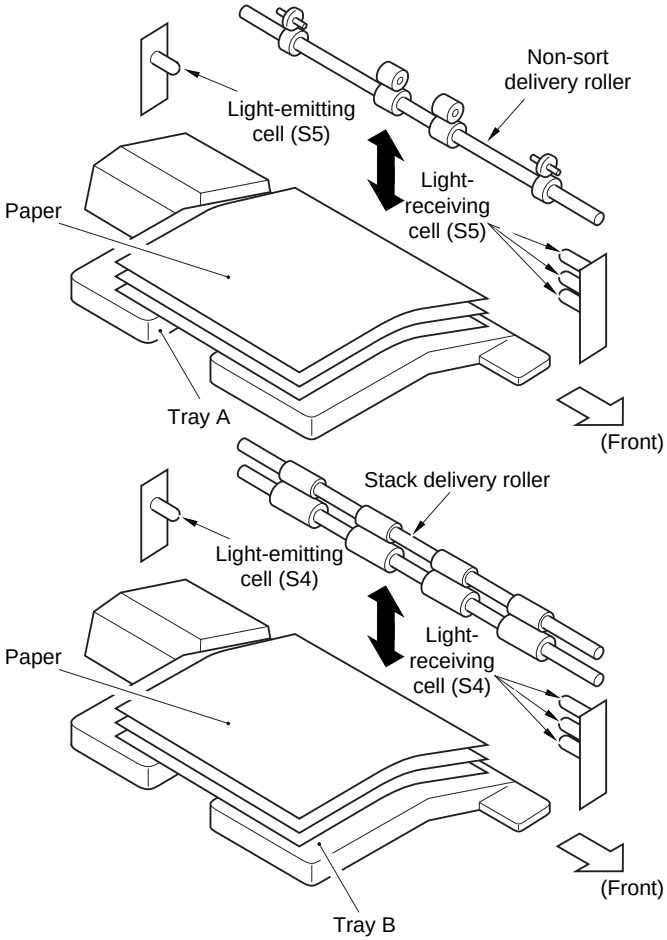


F02-601-05

6.1.5 Detecting topmost sheet of paper in tray

Tray A and tray B are equipped with sensors that detect the height of the topmost sheet of paper in the tray. The light-emitting sensors are tray paper sensor A and tray paper sensor B. The light-receiving sensors are tray A paper sensor A and tray B paper sensor B. The light-receiving sensors comprise three light-receiving cells.

The lowest cell is used to position the tray when there is no paper in it. The sensor output changes when either of the upper two cells is blocked. By detecting with either of these two cells, the tray can be held in the correct position, even if the trailing edge of the stacked paper is curled up, due to contact with the stacking wall.

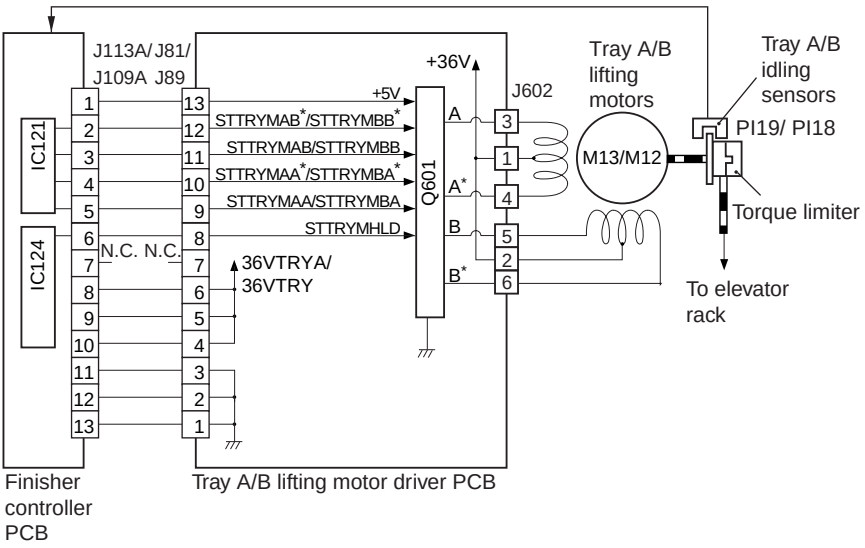


F02-601-06

6.1.6 Tray A/B lifting motor control

The diagram below illustrates how the tray A/B lifting motors (M12/M13) are driven. The tray A/B lifting motors are 4-phase stepping motors. The finisher controller PCB controls the output timing of the pulse signals A, B, A* and B*, to switch the motors ON/OFF and to switch the direction of rotation. In motor hold, the STTRYMHLD level is switch to a hold level.

The finisher control PCB monitors the status of the tray A/B idling sensors (PI19/ PI18) when generating pulse signals. If the sensors switch ON/OFF at the prescribed timing during pulse output, the motor rotation is judged normal. If the sensor output does not switch ON/OFF properly, a motor malfunction or drive mechanism malfunction is judged, and an error message is displayed on the copier control panel.

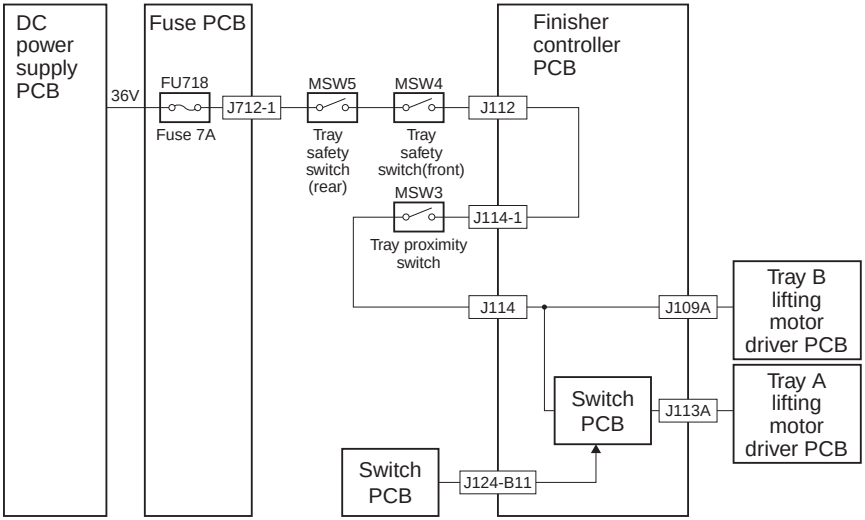


F02-601-07

6.1.7 Tray motor power supply

The power supply route for the tray motors is illustrated below.

Power is supplied from the tray A/B lifting motor PCB. 36VTRYA is switched ON/OFF by SW971-2. If the input is interrupted, the CPU judges tray A to be the fixed tray. Input can also be interrupted by the tray proximity switch (MSW3).



F02-601-08

7 PUNCH UNIT

7.1.1 Overview

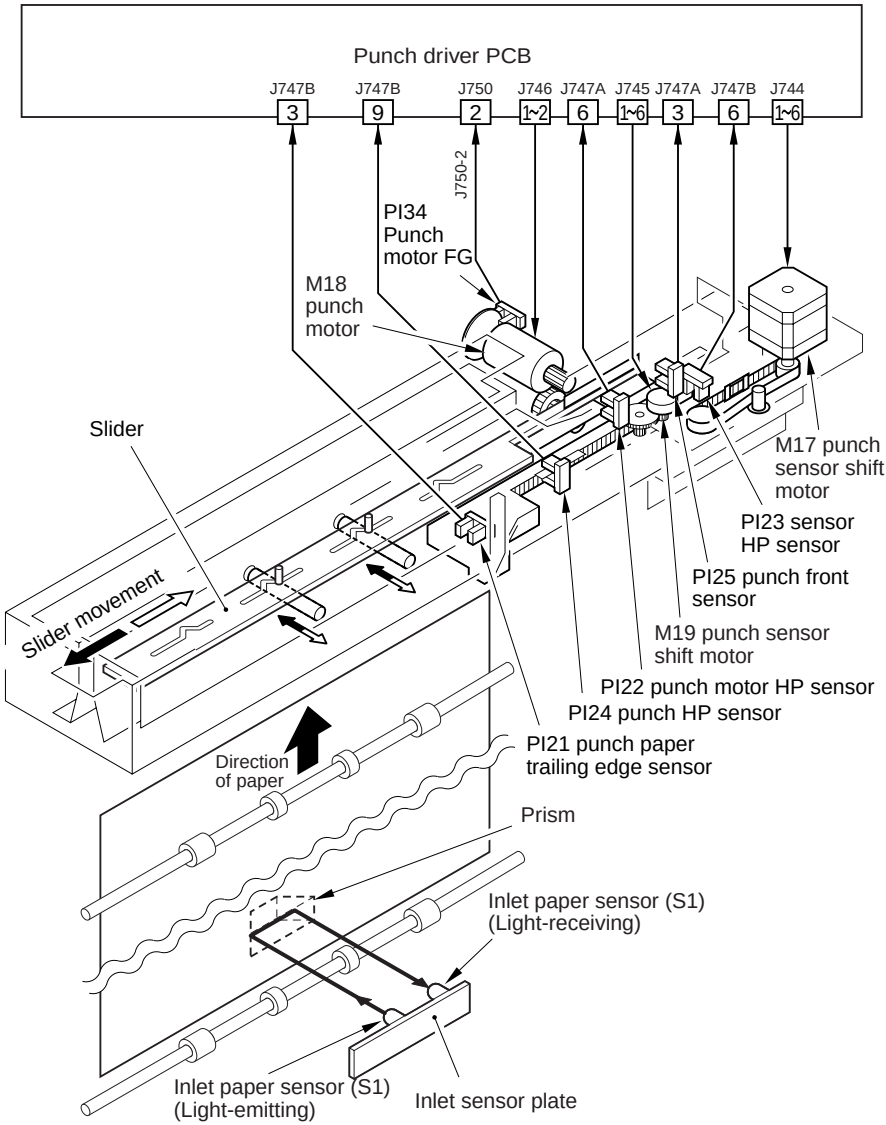
The punch unit is located in the paper feed path. Paper feed is momentarily stopped so that the paper can be punched. The punch motor (M18) drives a slider and the punch operation is carried out in alignment with the slits in the slider. Punching stops when the slider has travelled a certain distance. Lateral registration of the punch holes is adjusted every time the size of the paper being fed changes.

Waste paper generated by the punch is fed into the waste container by the punch waste feedscrew.

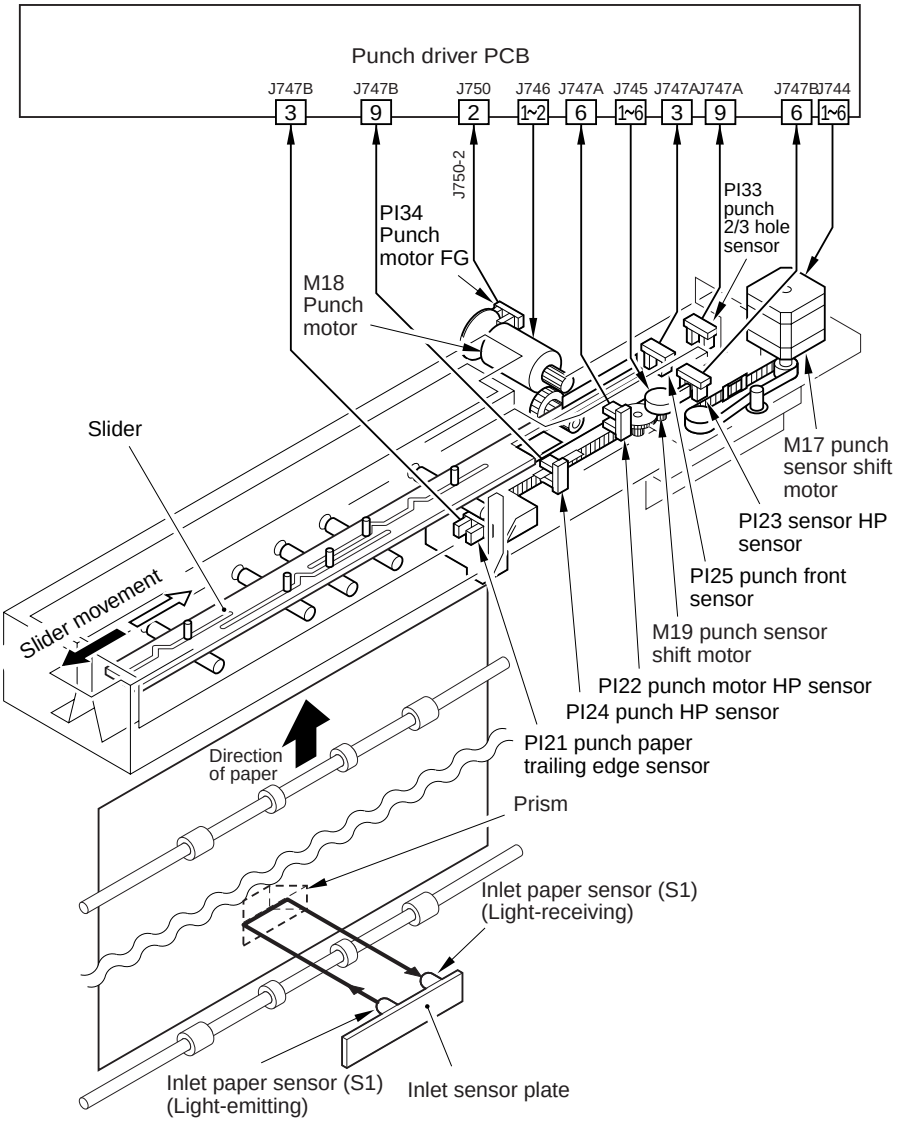
7.1.2 Punching Operation

The punch drive slider is powered by the punch motor (M18). Detection of the punch slider position is carried out by the slider home position sensor (PI22).

The drive-timing of the punch motor is calculated using the inlet paper sensor (S1). Once the inlet paper sensor (S1) detects the trailing edge of the paper, it stops the paper after it has travelled a certain distance. Then, the puncher activates and punches the paper.



F02-701-01a (Two-hole type)

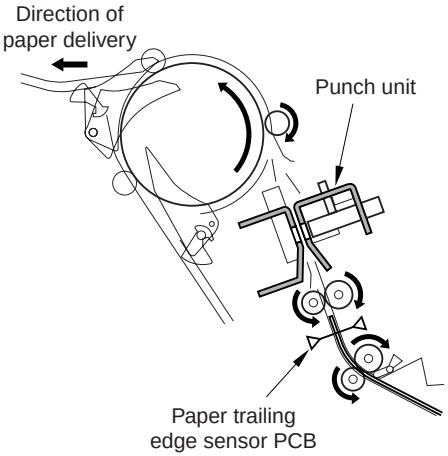


F02-701-02b (2/3-hole type)

7.1.3 Overview of Punching Operation

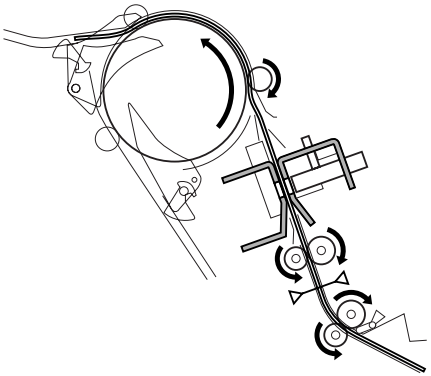
The sequence of the punching operation is shown below.

1) The paper is fed in by the copier or inserter. At this time the punch slider is on standby in the home position



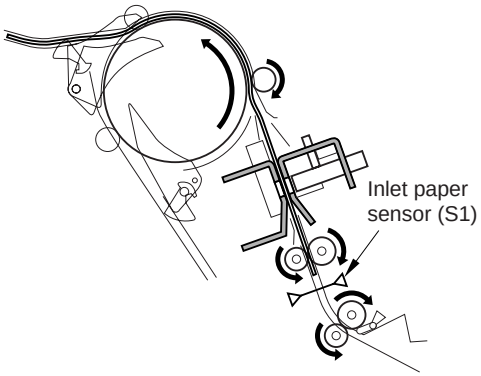
F02-701-02

2) The leading edge of the paper enters the punch unit. The slider is still stationary. The paper is fed in by the rollers at the front and rear of the punch unit.



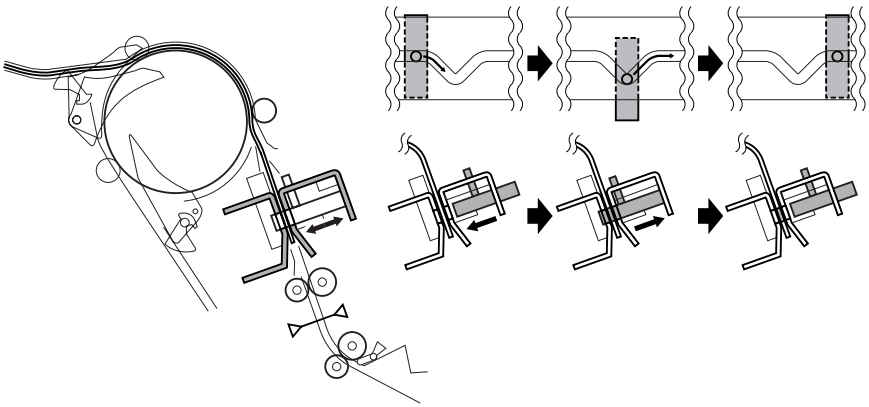
F02-701-03

3) When a fixed time has elapsed after the trailing edge of the paper has passed the inlet paper sensor (S1), the paper feed is stopped at a prescribed distance.



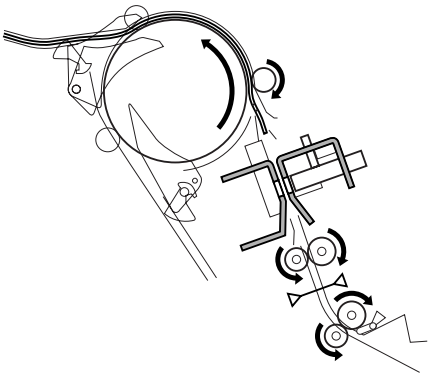
F02-701-04

4) As soon as the paper stops, the slider moves (one direction), driven by the punch motor, and the holes are punch in the paper.



F02-701-05

5) The punch slider stops and waits for the next punching operation. The buffer roller resumes feeding the punched paper.

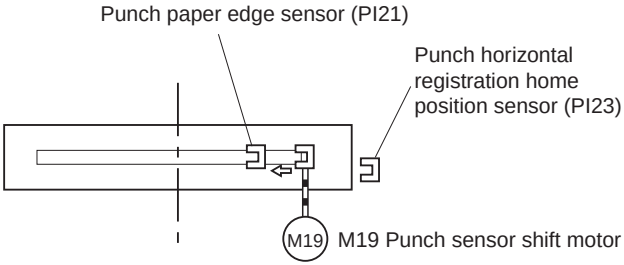


F02-701-06

7.1.4 Horizontal registration operation

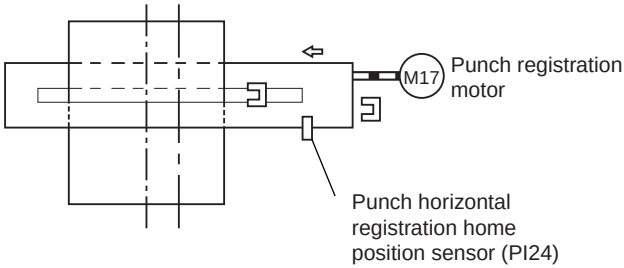
Side registration of the punch unit is driven by the punch registration motor (M17). The side registration home position of the punch unit is detected by the punch home position sensor (PI24). The punch unit shifts into position according to the edge of the paper that has been detected by the punch paper edge sensor (PI21) and punch paper edge sensor home position sensor (PI23).

1) A paper size signal is sent from the copier. The punch paper edge sensor moves into position according to the size of the paper.



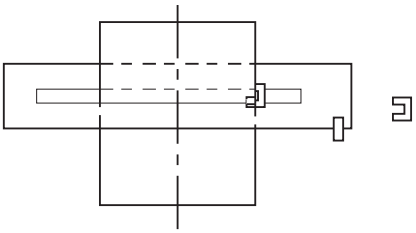
F02-701-07

2) The paper is fed into the punch unit. When the remaining length of paper from the punch unit is equivalent to size B5 (182mm), the punch registration motor starts to rotate forward.



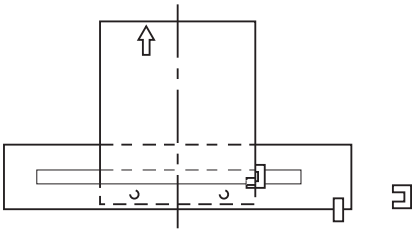
F02-701-08

3) When the punch paper edge sensor comes ON, the punch registration motor stops. This aligns the center of the punch unit with the center of the paper (horizontal registration direction).



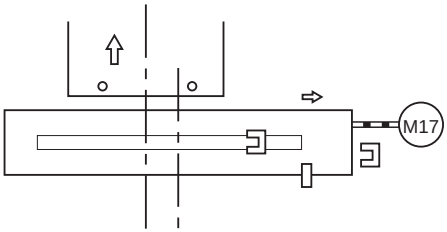
F02-701-09

4) Holes are punched in the paper by the punch motor (M18).



F02-701-10

5) When the punching completed sensor goes OFF, the punch registration motor rotates in reverse and the punch unit returns to its home position.



F02-701-11

6) If paper is fed in continuously for punching, steps 2 to 5 are repeated. Even when the last sheet of paper is punched, the punch paper edge sensor waits in the standby position.

7.1.5 Paper trailing edge detection control

The trailing edge of the paper is detected by the inlet path sensor (S1). The sensor consists of a light-emitting cell and a light-receiving cell. The light from the light-emitting cell is refracted by a prism and returned to the light-receiving cell. As paper passes the sensor, light from the light-emitting cell does not reach the light-receiving cell, so the finisher controller PCB judges that paper is present.

With paper that is highly transparent, such as OHP film, light from the light-emitting cell reaches the light-receiving cell even while the paper is passing the sensor and the sensor cannot judge that paper is present. Therefore, even if punching mode has been selected on the control panel, paper that is highly transparent will not be punched.

The voltage level of the light-receiving cell may be reduced by paper dust becoming attached to the cell. However, even at a reduced level, the light emission is sufficient for paper detection.

7.1.6 Punch Waste Feed Control

Punch waste is fed by rotation of the punch screw, which is powered by the punch waste feed motor (M16). The punch waste feed sensor (PI27) monitors the rotation of the punch screw. Feed timing is from when the registration signal for the first punched sheet is sent from the copier, until delivery of the last punched sheet. The encoder for the punch waste feed sensor (PI27) rotates while the punch waste feed motor (M16) is running. If there is no change in the status of the sensor within a fixed time period, while the motor is rotating, the finisher controller PCB assumes faulty punch waste feeding and displays an error code (E595) on the copier's control panel.

7.1.7 Punch waste "Full" sensor

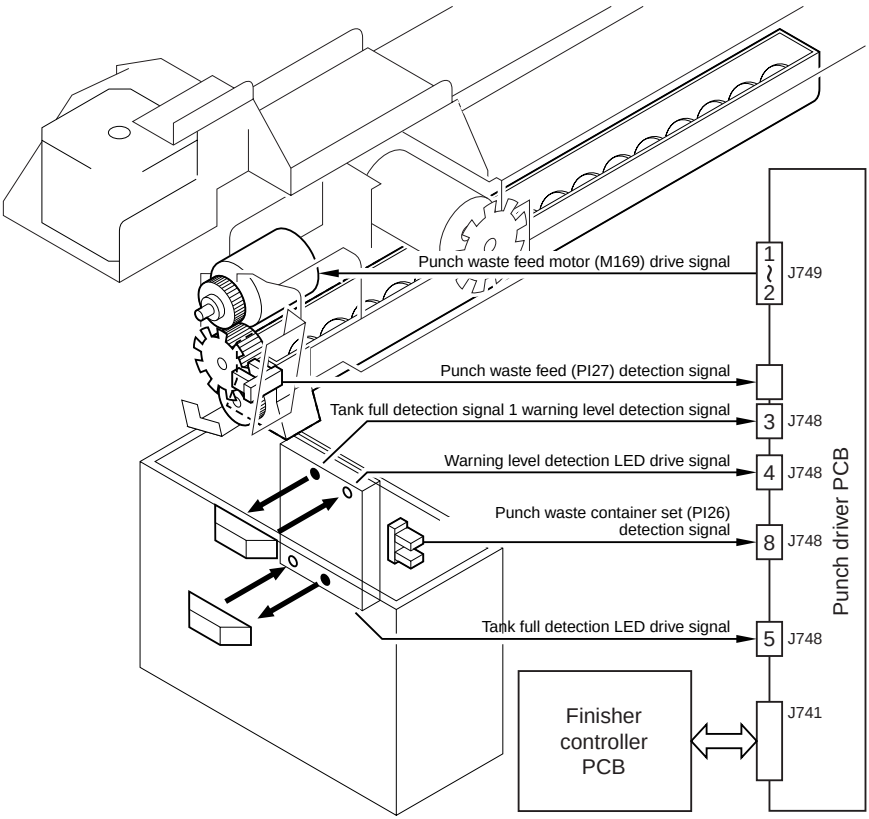
The punch waste "full" detection mechanism consists of a punch waste sensor located on the side of the punch waste container and prisms mounted inside the punch waste container. The punch waste container set sensor (PI53) detects when the punch waste container has been set by the finisher.

The punch waste sensor PCB (S6) consists of two light-emitting cells and two light-receiving cells for warning level detection and full level detection. When the punch waste set sensor (PI26) detects the container, the LED for warning level detection emits light. If the punch waste has not reached the warning level, the output from the light-receiving cell is ON and the finisher controller PCB judges that the warning level has not been reached. If waste has accumulated in the container and has reached the warning level, the light from the warning level detection LED for is interrupted and the finisher controller PCB judges that the warning level has been reached.

When the warning level has been reached, the full level detection LED comes on instead. If light emitted from the full level detection LED reaches the light-receiving cell, the finisher controller PCB judges that the full level has not been reached. If waste has accumulated in the container and has reached the full level, the light from the LED for full level detection is interrupted and the finisher controller PCB judges that the full level has been reached.

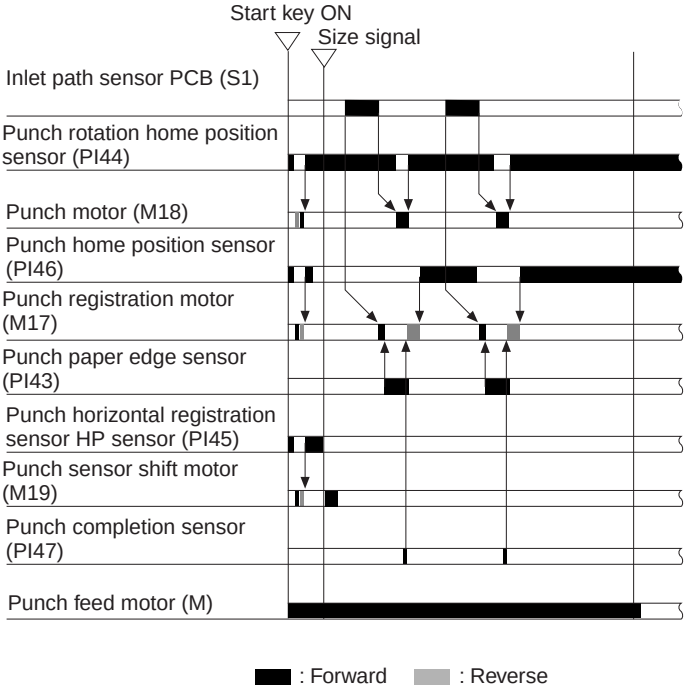
Warning level : The punch continues operation until completion, or until the full level is detected. New punching operation cannot be commenced.

Full level : The punch suspends activity mid-operation. Punching can be restarted when the punch waste has been disposed of and the waste container has been set in place.



F02-701-12

Operation sequence for punch rotation / side/ horizontal/ registration (2 sheets)



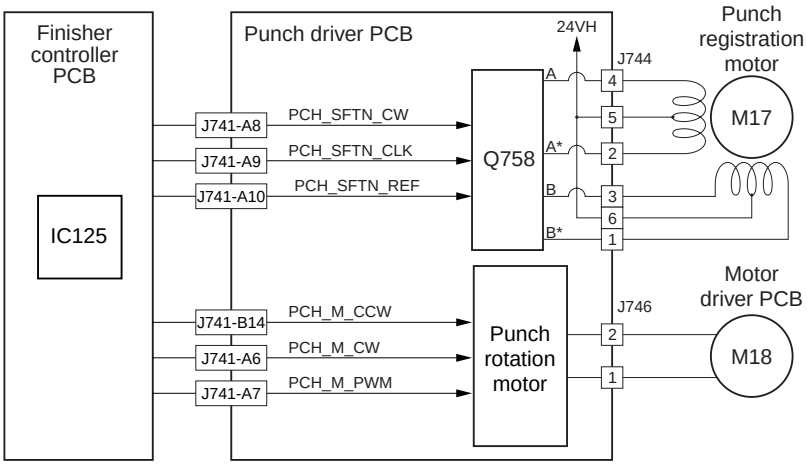
F02-701-13

7.1.8 Punch Registration Motor (M17) / Punch Motor (M18) Drive Control

An outline of the punch registration motor (M17) and punch rotating motor (M18) drive circuit is shown in the diagram below. M17 is a 4-phase stepping motor. Drive pulses are sent from IC121 on the finisher controller PCB.

M18 is a DC motor. IC125 sends signals which control the motor's rotation direction and speed.

The punch registration motor's PNHREGREF outputs signals to control the electrical current level switching while the motors are running and also while they are in hold mode. Each motor has three current levels for operating mode and one for hold mode.

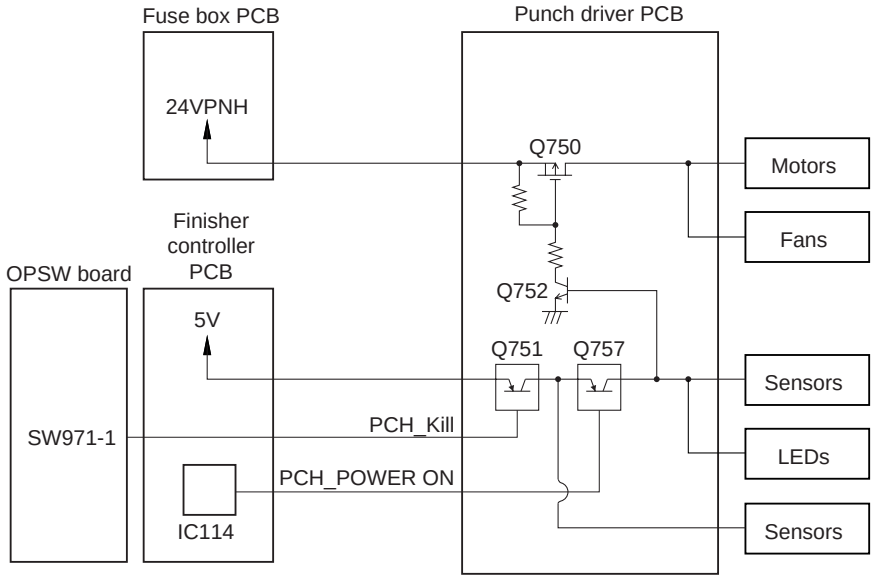


F02-701-14

7.1.9 Punch power supply

The power supply route for the punch is illustrated below. 36VPNH and 24VPNH, supplied by the punch driver PCB, are turned ON/OFF by the PC_POWER_ON signal and the PFANON signal from the finisher controller PCB. The PNHON signal can be turned ON/OFF by the user, using SW971-1 on the switch PCB.

The 5V power supply for sensor drive is turned ON/OFF by the PNHON signal PC_POWER_ON. 36VPNH, 24VPNH and 5V are supplied from the punch driver PCB to each load.



F02-701-15

8 FANS

8.1.1 Overview

The finisher is equipped with the two fans described in Table 2-801.

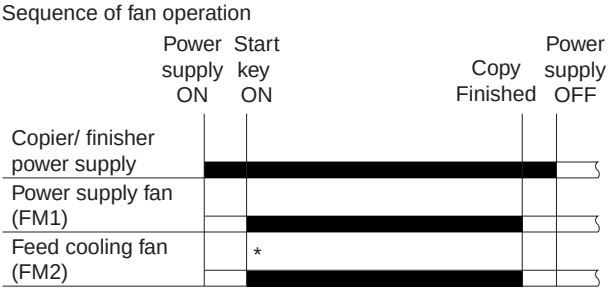
The power supply fan rotates when the drive signal (FANON) from the finisher controller PCB is "0". While rotating, the power supply fan sends the FANSTP signal to the finisher controller PCB. When the fan is not rotating, the signal changes to "1", causing the finisher controller PCB to judge that the fan has stopped and to display an error code on the copier's control panel.

The feed cooling fan rotates when the drive signal (PFANON) from the finisher controller PCB is "0". While rotating, the feed cooling fan sends the PFANSTP signal to the finisher controller PCB. When the fan is not rotating, the signal changes to "1", causing the finisher controller PCB to judge that the feed cooling fan has stopped and to display an error code on the copier's control panel. (E551, 01: power supply fan, 02: feed cooling fan)

Figure 2-802 shows the location of the fans and the flow of air. Figure 2-801 shows the timing with which the fans turn ON.

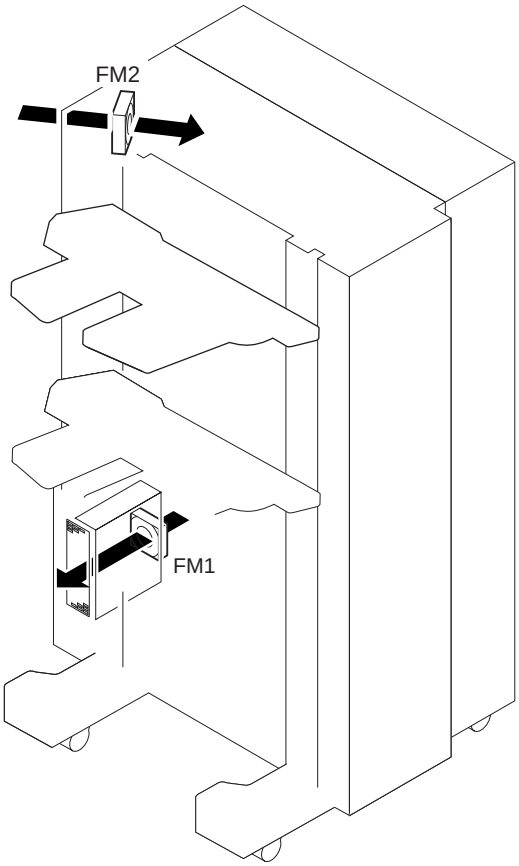
No.	Name	Direction	Filter	Purpose
FM1	Power supply fan	Blowing	None	Cools the switching regulator
FM2	Feed cooling fan	Blowing	None	Cools the feed path

T02-801-01



*: The feed cooling fan only operates when paper is being fed.

F02-801-01



F02-801-02

9 POWER SUPPLY

9.1.1 AC Power supply

AC power comes from an external power supply through the machine's AC fuse PCB to reach the switching regulator (SWR1). The switching regulator is turned ON/OFF by the drive signal (REMTSWH) from the copier. When the switching regulator is ON, it supplies the fuse PCB with 36V, 24V and 5V D power.

9.1.2 DC Power Supply

The 36V, 24V and 5V power supplies are supplied from the switching regulator to the finisher controller PCB, saddle stitcher controller PCB and punch driver PCB, via the fuse PCB (PCB6).

i. Finisher controller PCB
The switching regulator supplies power to the finisher controller PCB via the following two micro-switches.

Notation	Switch name
MSW4	Tray safety switch (front)
MSW5	Tray safety switch (rear)

T02-901-01

Power is supplied to tray A lifter motor (M13) via the tray proximity switch (MSW5).

ii. Punch driver PCB
The 36V power supply for the punch rotating motor (M18) is supplied from the switching regulator to the punch driver PCB via the fuse PCB.

a. 24V Power Supply

i. Finisher controller PCB
The power supply for the stapler motor (M11) and stapler shift motor (M10) is supplied to the finisher controller PCB from the switching regulator via the four micro-switches described below.
Also, if a folding unit is mounted, power is supplied to the inlet motor (M1) and buffer motor (M2) via the door switch (MSW10) on the folding unit.

Notation	Switch name
MSW1	Front cover switch
MSW7	Stapler safety switch (rear)
MSW2	Swing guide safety switch
MSW6	Stapler safety switch (rear)

T02-901-02

b. 5V Power Supply

Power is supplied directly by the switching regulator.


Memo

The output accuracy of the DC power supplies are as follows:
36V power supply → +11%, -5.5%
24V power supply → ±5%
5V power supply → 5.2V ±5%
Note that these figures apply when the AC input is between 85 and 132V (100/115V regions) or 187 and 264V (230V regions).

9.1.3 Protective functions

a. AC fuse PCB

The AC fuse PCB is equipped with two fuses (FU731, FU733), which shut off the circuit in the event of over-current.

The PCB is also equipped with a spare fuse (FU732).

b. Switching regulator

The switching regulator is equipped with a fuse (F001) which shorts in the event of over-current.

c. Fuse PCB

The fuse PCB and DC controller PCB are equipped with the fuses described in the table below, which short in the event of over-current in either power supply system. These fuses cannot be replaced in the field.

Power supply system	Fuse PCB	Finisher controller PCB
24VDLV	FU711	-
24VINS	FU711	FU103
24VZFLD	FU714, FU717	FU101
24VSTP	FU714	-
24VF	FU718	-
24VPNH	FU713	-
36VPNH	FU712	-
36VTRYA	-	FU105
36VTRYB	-	FU104
5V	FU716	-

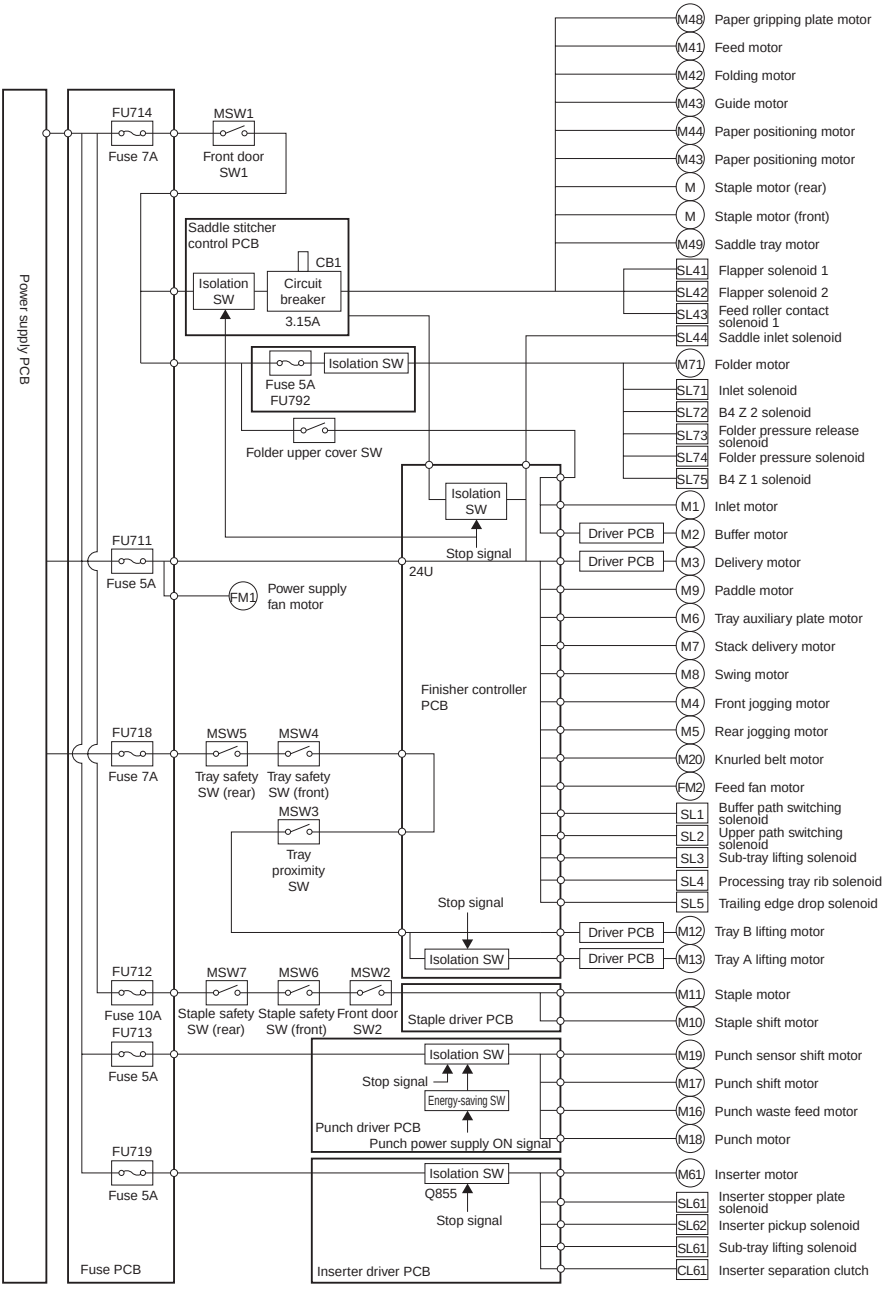
T02-901-03

9.1.4 Low Power Switch

The finisher controller PCB is equipped with a power-saving switch (Q185) which cuts off the 24VDLV and 24VU power supplies at a specified timing. Power is shut off when the power-saving key on the copier is pressed and when the copier is in low power mode.

9.1.5 Fan Interlocking Switch

The fuse PCB and punch driver PCB are equipped with fan interlocking switches (Q715/ Q759) that are linked to the fan drive signal and cut off the power supply whenever the fans are not operating.


Power supply PCB
FU714
Fuse 7A
MSW1
Front door SW1
Saddle stitcher control PCB
CB1
Isolation SW
Circuit breaker
3.15A
Isolation SW
Fuse 5A
FU792
Folder upper cover SW
FU711
Fuse 5A
FM1
Power supply fan motor
FU718
Fuse 7A
MSW5
Tray safety SW (rear)
MSW4
Tray safety SW (front)
MSW3
Tray proximity SW
FU712
Fuse 10A
MSW7
Staple safety SW (rear)
MSW6
Staple safety SW (front)
MSW2
Front door SW2
FU713
Fuse 5A
FU719
Fuse 5A
Fuse PCB
Isolation SW
Stop signal
24U
Finisher controller PCB
Stop signal
Isolation SW
Isolation SW
Stop signal
Energy-saving SW
Punch driver PCB
Punch power supply ON signal
Isolation SW
Q855
Stop signal
Inserter driver PCB
M48 Paper gripping plate motor
M41 Feed motor
M42 Folding motor
M43 Guide motor
M44 Paper positioning motor
M43 Paper positioning motor
M Staple motor (rear)
M Staple motor (front)
M49 Saddle tray motor
SL41 Flapper solenoid 1
SL42 Flapper solenoid 2
SL43 Feed roller contact solenoid 1
SL44 Saddle inlet solenoid
M71 Folder motor
SL71 Inlet solenoid
SL72 B4 Z 2 solenoid
SL73 Folder pressure release solenoid
SL74 Folder pressure solenoid
SL75 B4 Z 1 solenoid
M1 Inlet motor
Driver PCB
M2 Buffer motor
Driver PCB
M3 Delivery motor
M9 Paddle motor
M6 Tray auxiliary plate motor
M7 Stack delivery motor
M8 Swing motor
M4 Front jogging motor
M5 Rear jogging motor
M20 Knurled belt motor
FM2 Feed fan motor
SL1 Buffer path switching solenoid
SL2 Upper path switching solenoid
SL3 Sub-tray lifting solenoid
SL4 Processing tray rib solenoid
SL5 Trailing edge drop solenoid
Driver PCB
M12 Tray B lifting motor
Driver PCB
M13 Tray A lifting motor
M11 Staple motor
Staple driver PCB
M10 Staple shift motor
M19 Punch sensor shift motor
M17 Punch shift motor
M16 Punch waste feed motor
M18 Punch motor
M61 Inserter motor
SL61 Inserter stopper plate solenoid
SL62 Inserter pickup solenoid
SL61 Sub-tray lifting solenoid
CL61 Inserter separation clutch

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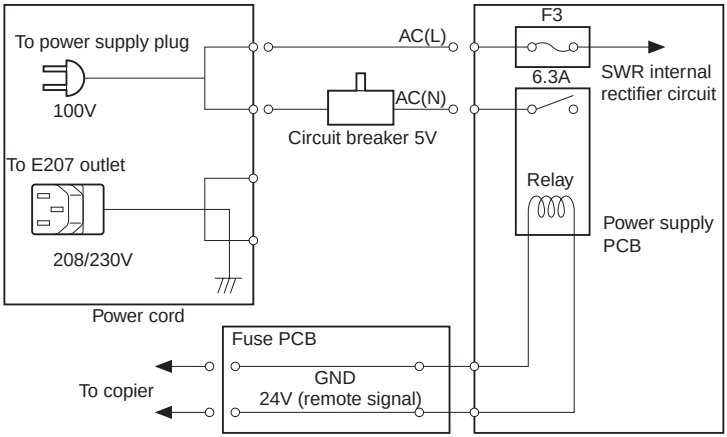

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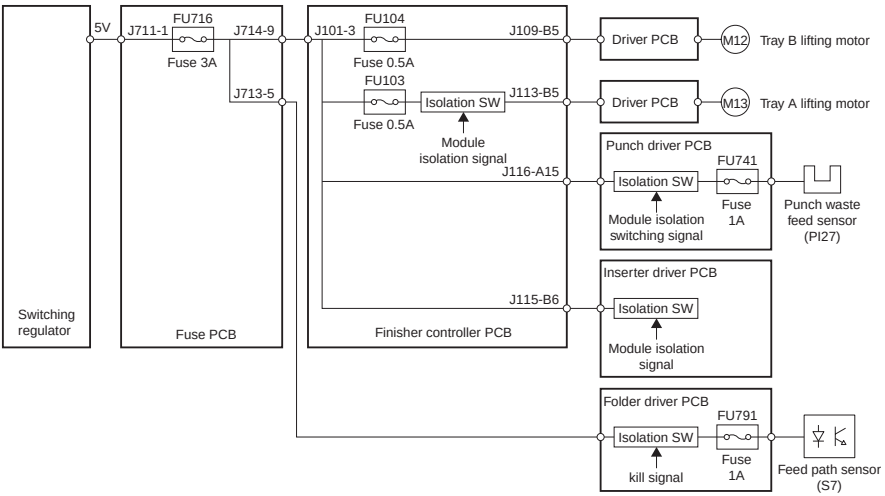
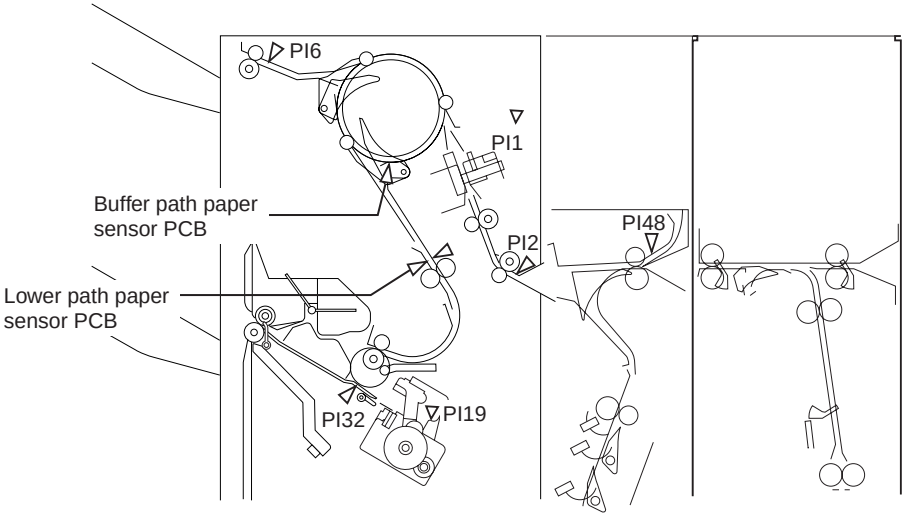


F02-901-03

10 DETECTION JAMS (FINISHER)

10.1.1 Overview

Check timing detects jams in the finisher section. It is stored in the ROM memory of the finisher controller PCB and uses timing to determine whether or not a jam has occurred through the presence or absence of a sheet in a sensor section. When a jam occurs, the finisher controller PCB informs the host copier of the details by code. The code can be confirmed in service mode in this machine. Also, the jam code may be confirmed with the LED101 on the finisher controller PCB.



PI1: Front door open sensor
PI2: Inlet path sensor
PI16: Non-sort delivery sensor
(S2): Buffer path paper sensor PCB
(S3): Lower path paper sensor PCB
P18: Stack sensor
PI19: Stapling home position sensor
PI48: Saddle inlet sensor

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Type of Jam	Sensor	Condition of Jam	Code
Inlet delay	PI2	The inlet path sensor fails to turn on within a specified time after delivery signal comes on or the horizontal residual paper sensor (PI33) comes on.	0016
Inlet stationary	PI2	The paper has not cleared the sensor after feeding equivalent to (length of sheet+60) mm from the time the sensor detects paper.	0026
Buffer path delay	Buffer path paper sensor (S2)	Buffer path paper sensor does not detect the sheet after feeding equivalent to (438+150) mm from the time the inlet path sensor turns on.	0017
Buffer path stationary	Buffer path paper sensor (S2)	The paper has not cleared the sensor after feeding equivalent to (length of sheet + 60) mm from the time the sensor detects paper.	0027
Non-sort delay	PI6	The non-sort paper sensor fails to detect paper after feeding equivalent to (348 + 150) mm from the time the inlet path sensor turns on.	0018
Non-sort stationary	PI6	The paper has not cleared the sensor after feeding equivalent to (length of sheet + 60) mm from the time the sensor detected it.	0028
Lower path delay	Lower path paper sensor (S3)	The lower path sensor fails to detect the sheet after feeding equivalent to (540 + 150) mm from the time the inlet path sensor detected paper.	0019
Lower path stationary	Lower path paper sensor (S3)	The sheet has not cleared the sensor after feeding the equivalent of (length of sheet + 60) mm from the time the sensor detected paper.	0029
Door open	PI1	Open door is detected while paper is being fed.	0008
Power on	PI2, PI6, buffer path paper sensor (S2), lower path paper sensor (S3)	Either of the sensors described at left detects paper when the power is turned on.	0007
Staple	Stapler home position sensor (inside stapler unit)	The sensor fails to come on 0.5 sec after going off when the stapler motor is rotating forward, and the sensor comes on within 0.5 sec when the motor is rotating in reverse. If the sensor remains off 0.5 seconds after a reverse rotation, an error is judged.	0006

Type of Jam	Sensor	Condition of Jam	Code
Saddle inlet delay	PI59	This occurs when the saddle inlet paper sensor (PI59) fails to turn on within 1.5 sec of the sensor coming ON, on the pick-up side of the saddle inlet paper sensor coming on.	0015
Saddle inlet stationary	PI59	This occurs when the saddle inlet sensor (PI59) fails to turn off after feeding for a specified time (equivalent to length of paper + 100). This jam is detected by the finisher controller PCB.	0025
Processing tray stationary	PI8 PI31	When the the stack delivery sensor (P18) detects a stack in the processing tray when the knurled belt motor (M20) fails operate for any reason.	0026

(Note) The sensor or signal on the pick-up side differs depending on the optional accessories used and pick up position.

Case 1: For inserter pickup, the inserter feed No. 3 sensor (PI36).

Case 2: If a folder is installed, the horizontal path residual paper sensor (PI33).

Case 3: If no folder is installed, or if the folder is disconnected (as a module), the copier delivery signal.

11 MODULE ISOLATION

11.1.1 Overview

If an error occurs in one of the modules, the finisher system enables the module concerned to be isolated and another to be operated. If an error related to a certain module occurs, the module concerned can be isolated by turning off the corresponding DIPswitch bit on the switch PCB provided in the saddle stitcher. The table below shows the units where the module isolation applies and the conditions when the module is isolated.

Units where module isolation applies

SW971 No.	Unit	Condition when cut off
SW971-1	Punch Unit	Power flow is stopped. Connection is detected, but operation is prohibited. The position of the punch unit must be initialized by the user.
-2	Tray A	Power flow is stopped. Position of tray A must be adjusted by user. Tray A is used as a fixed tray.
-3	Inserter	Power flow is stopped. Connection is detected, but operation is prohibited.
-4	Folder	Power flow is stopped. Connection is detected, but operation is prohibited.
-5	Saddle stitcher unit	Power flow is stopped. Connection is detected, but operation is prohibited.
-6	Not used	

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This table shows the errors for which the module can be isolated in each unit.

Unit	Error
Punch unit	E590, E593, E594
Tray A	E540
Inserter	E515
Folder	E518
Saddle stitcher	E5F0, E5F1, E5F2, E5F3, E5F4, E5F5, E5F6, E5F7, E5F8, E5F9

T02-1101-02

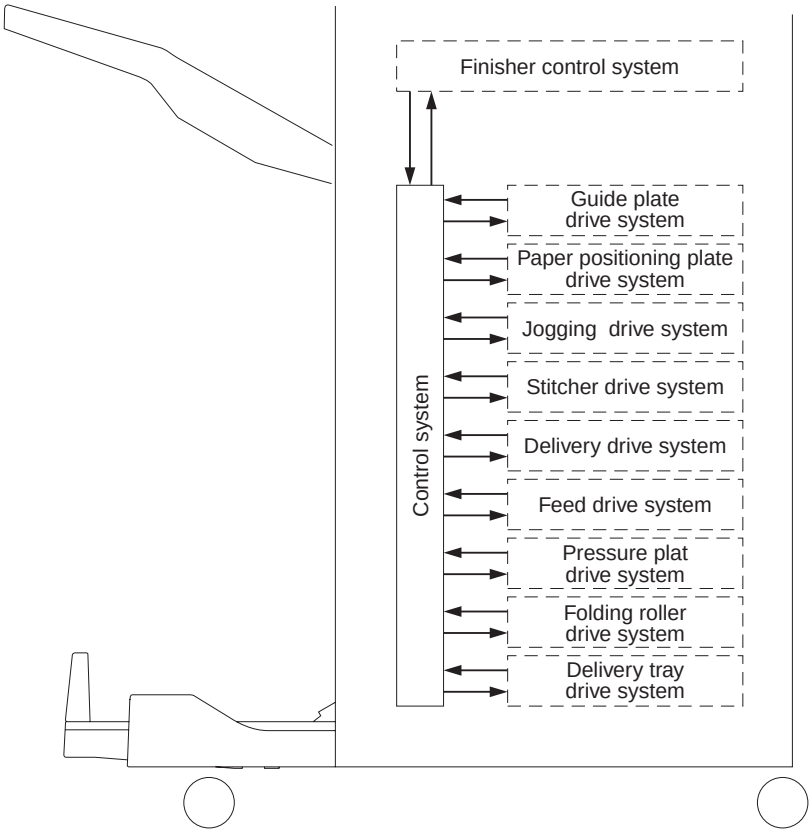
12 SADDLE STITCHER

12.1 Basic operation

12.1.1 Overview

After the stack is sent from the finisher has been stitched (2-point stapling), it is folded in two and delivered. This operation is controlled by the saddle stitcher controller PCB.

Control accords with commands sent from the copier by way of the finisher.



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12.1.2 Overview of electrical circuit

The saddle stitcher sequence is controlled by the saddle stitcher controller PCB. A microcomputer is used for the saddle stitcher controller PCB, and serial communication takes place between the programmable controller and the finisher controller PCB.

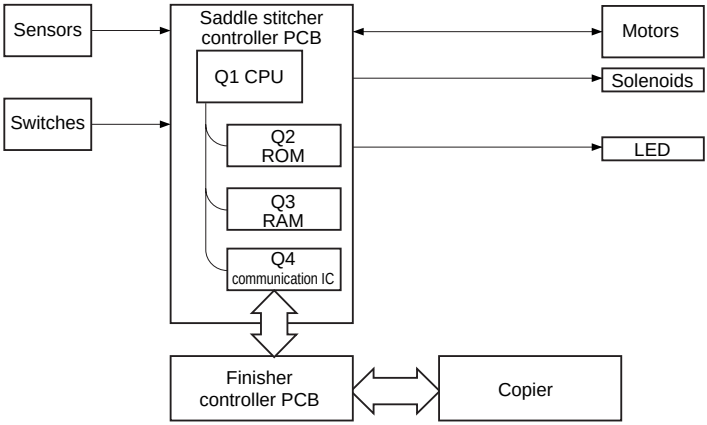
The saddle stitcher controller PCB drives the solenoid and motor according to commands sent from the finisher controller PCB.

The saddle stitcher controller PCB communicates information concerning the sensors and switches to the finisher controller PCB by serial communication.

The roles of the main ICs mounted on the saddle stitcher controller are as follows.

- Q1
  Sequence control
- Q2
  Built-in sequence programme
- Q3
  Sequence control
- Q4
  IPC communication

Electrical circuit block diagram



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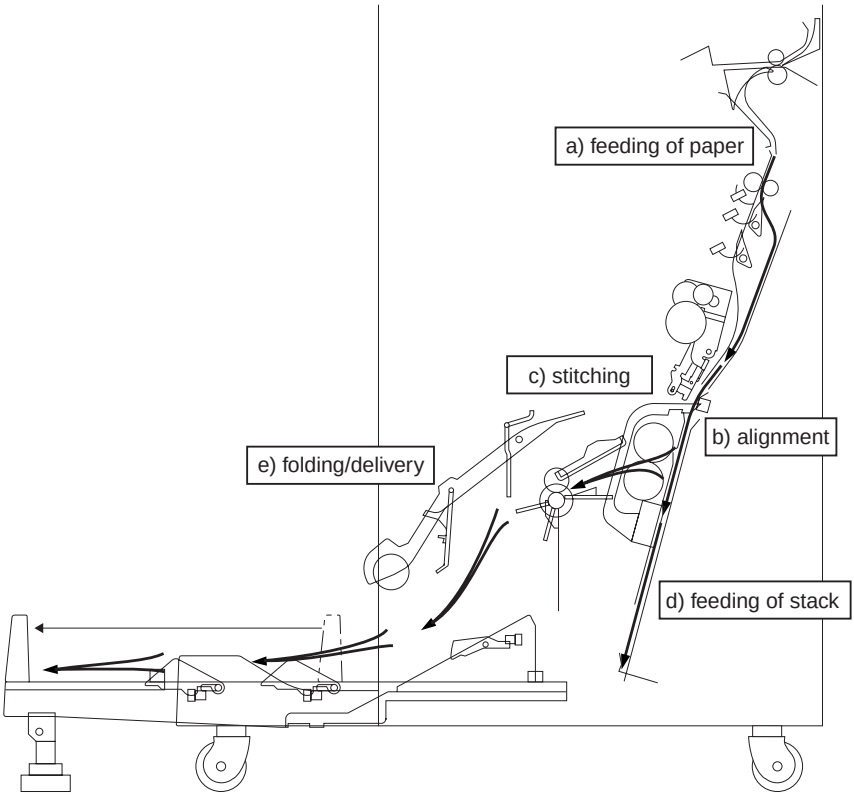
12.2 Feed and drive system

12.2.1 Overview

After alignment and stitching of the paper sent from the finisher have been carried out in accordance with commands sent through the finisher controller PCB, the stack is folded and delivered to the saddle stitcher delivery tray.

The main operations are as follows:

a) feeding of paper
b) alignment
c) stitching
d) feeding of stack
e) folding/delivery



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a. Collecting of paper

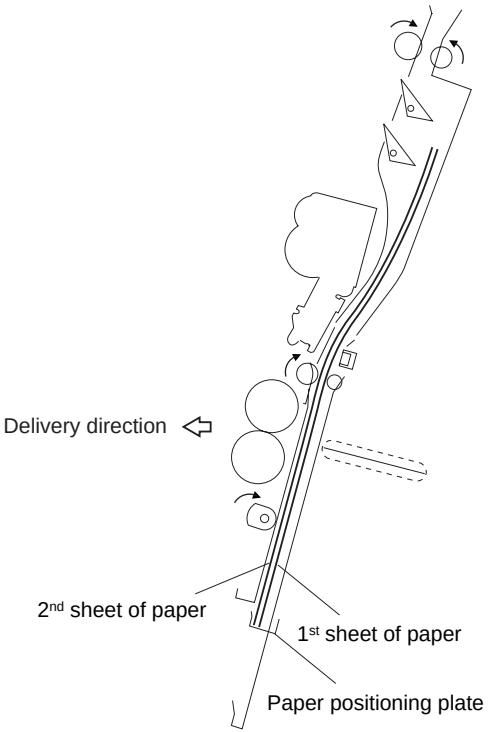
Successive sheets of paper from the finisher are collected almost vertically in the paper path.

The paper path for collecting the paper is decided according to the size of the paper by the movement of the two paper deflectors.

The position of the paper is determined by the paper positioning plate, so that the center of the paper is in the correct positions for stapling and folding.

The sheets are collected with each successive sheet coming on the delivery side of the previous sheet. The number of sheets that can be collected is shown below.

Up to 15 sheets (max: 14 sheets of 80 g/m^2 paper + 1 sheet of 200 g/m^2 paper).



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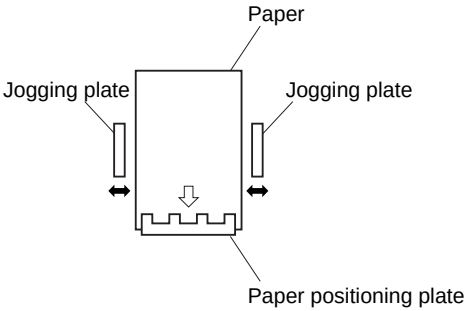
b. Alignment

Each time a sheet of paper is collected in the vertical path, it is aligned by the jogging plate provided at the end of the vertical path.

After stapling is finished, alignment is performed again before folding and delivery.



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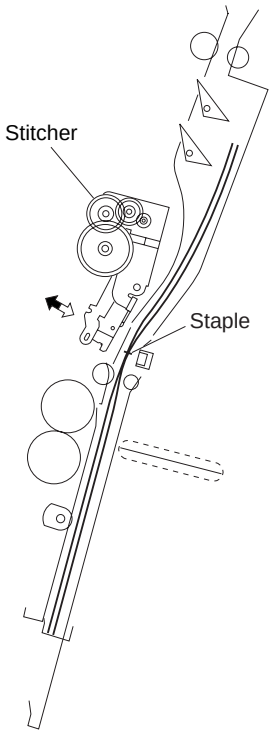
c. Stitching

When all the paper has been collected, it is stitched by the two stitchers, one after the other, positioned in the center of the paper.

The two stitchers do not operate simultaneously, to avoid creasing the paper between the staples.

If only one sheet of paper is sent from the copier, no stitching is performed and the stack feeding operation in the next step takes place.



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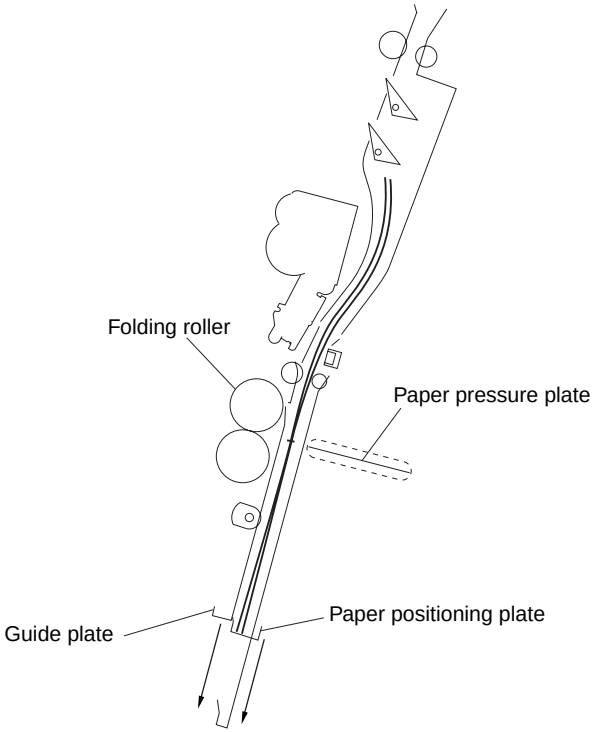
d. Feeding of stack

After the paper has been stitched, it is moved to the folding and delivery position. This is the position at which the center of the paper (stitching position) matches the height of the pressure plate and folding roller nip.

The paper is moved by the paper positioning plate. At the same time, the guide plate covering the folding rollers descends so that the folding rollers and paper are facing each other.



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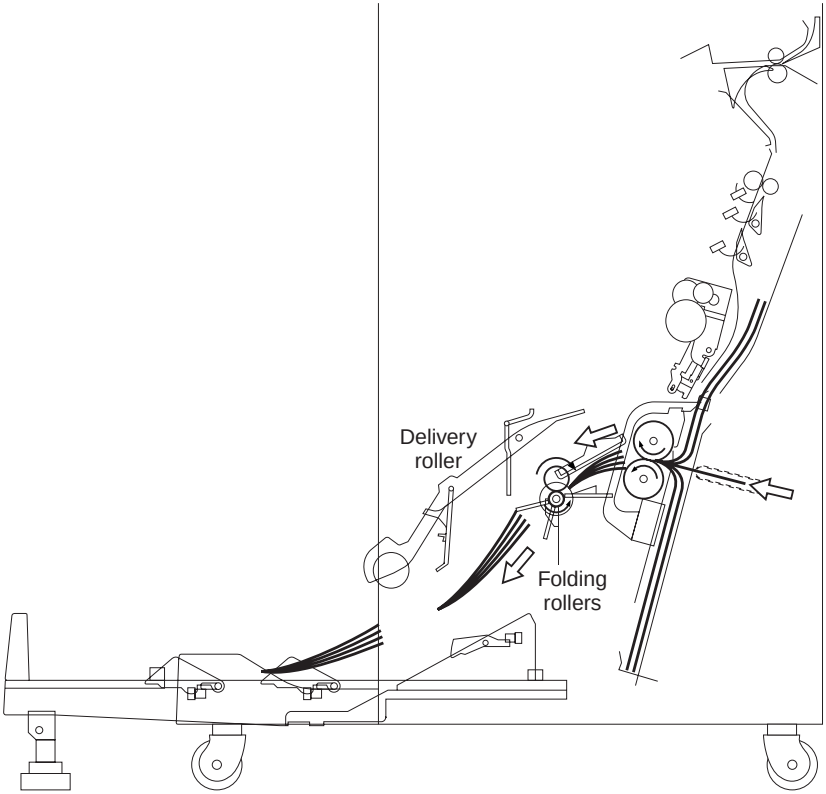
e. Folding/delivery

The pressure plate presses the center of the paper in the direction of the folding rollers. The paper is drawn in between the folding rollers, which fold it in two. It is then delivered to the delivery tray by the folding rollers and delivery roller.



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12.3 Paper collection system

12.3.1 Overview

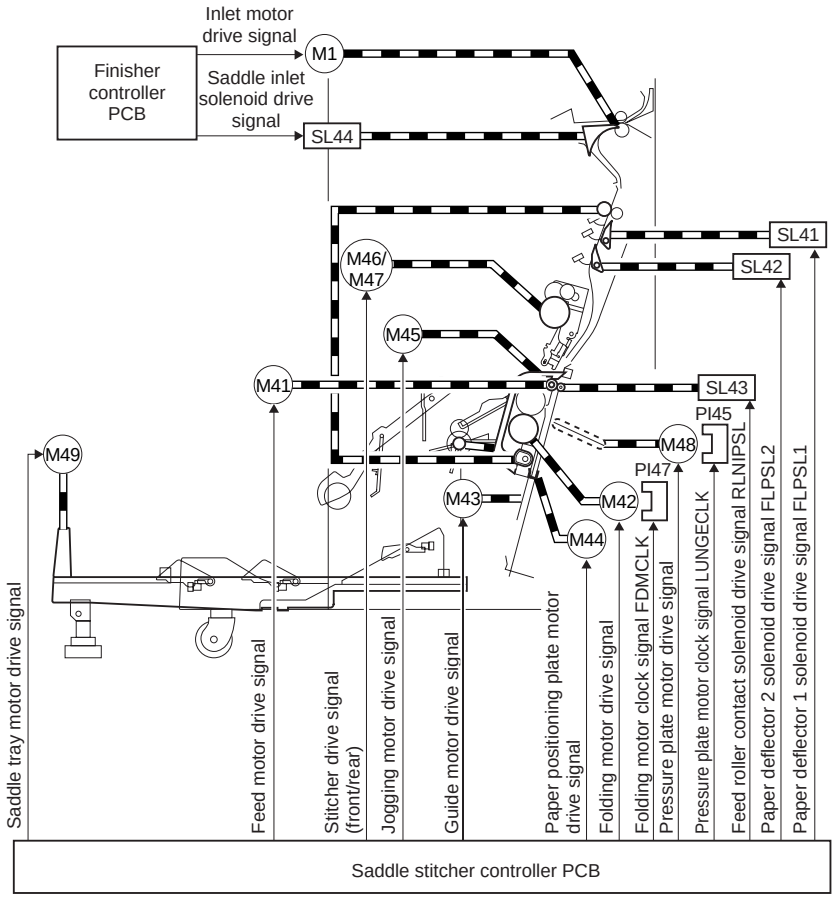
The paper collection system collects the paper from the finisher in the paper path, in preparation for stapling and folding in the next process.

Paper inlet flappers 1 and 2 switch the route in which the paper is sent according to size. The paper positioning plate waits at a position determined in advance according to the size of the paper. The paper positioning plate is driven by the paper positioning plate motor (M44) and its position is detected by the number of motor pulses from the paper positioning plate home position sensor (PI49). The paper sent by the inlet rollers is collected in the specified position by the feed rollers and crescent roller. The feed rollers contact and release according to the collection and feeding status.

Each time a sheet of paper is collected, it is aligned by the jogging plate. The jogging plate is driven by the jogging motor (M45), and the position of the plate is detected by the number of motor pulses from the jogging plate home position sensor (PI54).

The guide plate covers the folding rollers, preventing interference with the paper during collection. The guide plate is lowered and does not cover the rollers during the folding.

The paper is detected according to size by the paper sensors 1, 2 and 3 (PI1A, PI2A, PI3A) in the inlet area, and the paper positioning plate paper sensor (PI68) in the paper positioning plate area.



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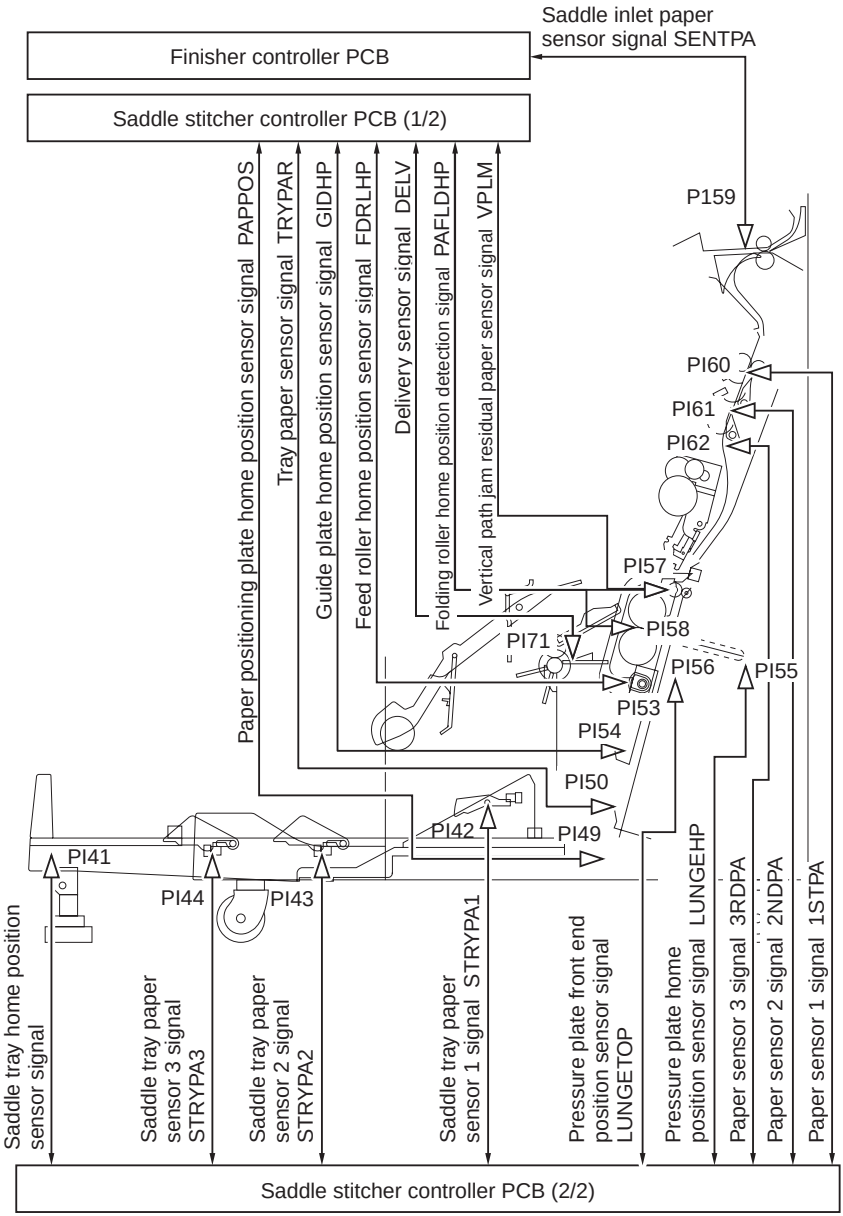
Saddle inlet paper sensor signal SENTPA
Finisher controller PCB
Saddle stitcher controller PCB (1/2)
Paper positioning plate home position sensor signal PAPPOS
Tray paper sensor signal TRYPAR
Guide plate home position sensor signal GIDHP
Feed roller home position sensor signal FDRLHP
Delivery sensor signal DELV
Folding roller home position detection signal PAFLDHP
Vertical path jam residual paper sensor signal VPLM
P159
PI60
PI61
PI62
PI57
PI58
PI71
PI56
PI55
PI53
PI54
PI50
PI42
PI49
PI41
PI44
PI43
Saddle tray home position sensor signal
Saddle tray paper sensor 3 signal STRYPA3
Saddle tray paper sensor 2 signal STRYPA2
Saddle tray paper sensor 1 signal STRYPA1
Pressure plate front end position sensor signal LUNGETOP
Pressure plate home position sensor signal LUNGEHP
Paper sensor 3 signal 3RDPA
Paper sensor 2 signal 2NDPA
Paper sensor 1 signal 1STPA
Saddle stitcher controller PCB (2/2)

F02-1203-02

12.3.2 Inlet flapper control

a. Overview

The feed route is switched according to the size of the paper by movement of the two flappers at the paper inlet. This has the following two purposes:

1) Detection by the sensor of the passing of the trailing edge of the paper according to size.
2) Prevention of the next sheet of paper from hitting the top of the existing stack.

The table below shows which sensors are used for which size paper.

Sensor	A3/279mmx432mm (11x17)	B4	A4R/LTRR
Paper sensor 1 (PI60)	Used	Used	Used
Paper sensor 2 (PI61)	Not used	Used	Used
Paper sensor 3 (PI62)	Not used	Not Used	Used

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The flappers are driven by their respective solenoids according to paper size as shown below.

Solenoid	A3/279mmx432mm (11x17)	B4	A4R/LTRR
Paper deflector 1 solenoid (SL41)	OFF	ON	ON
Paper deflector 2 solenoid (SL42)	OFF	OFF	ON

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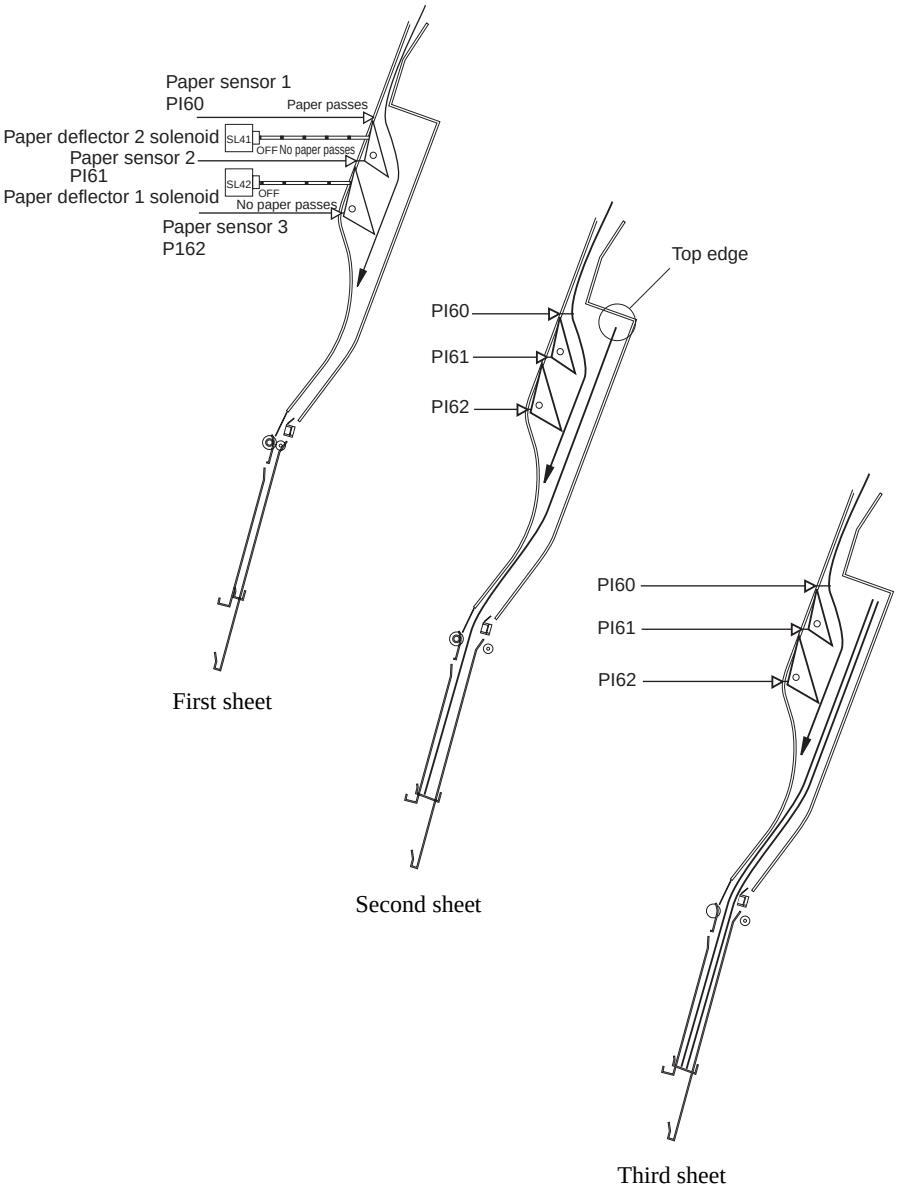
b. Feed route of size A3/279mmx432mm (11x17) paper

In the case of 3 sheets.



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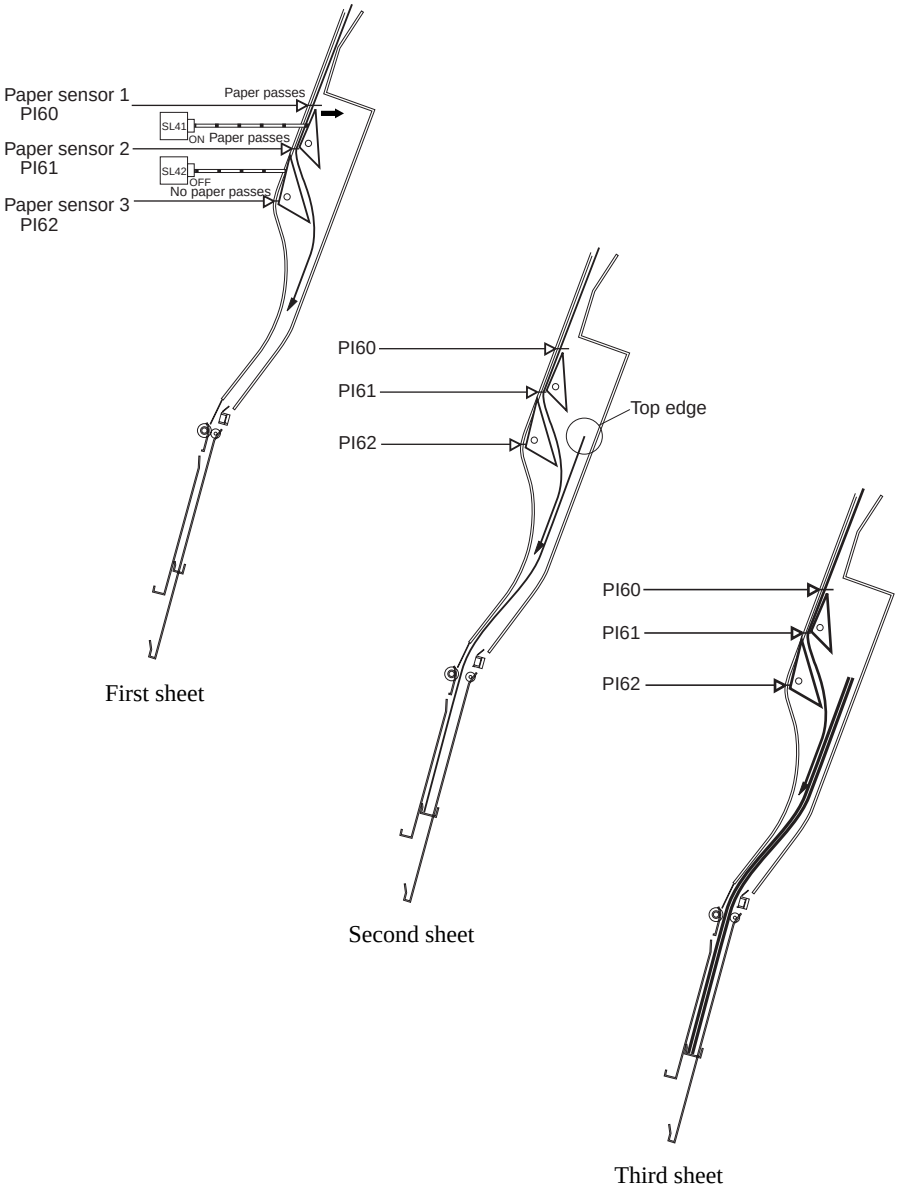
c. Feed route for B4 size

In the case of 3 sheets



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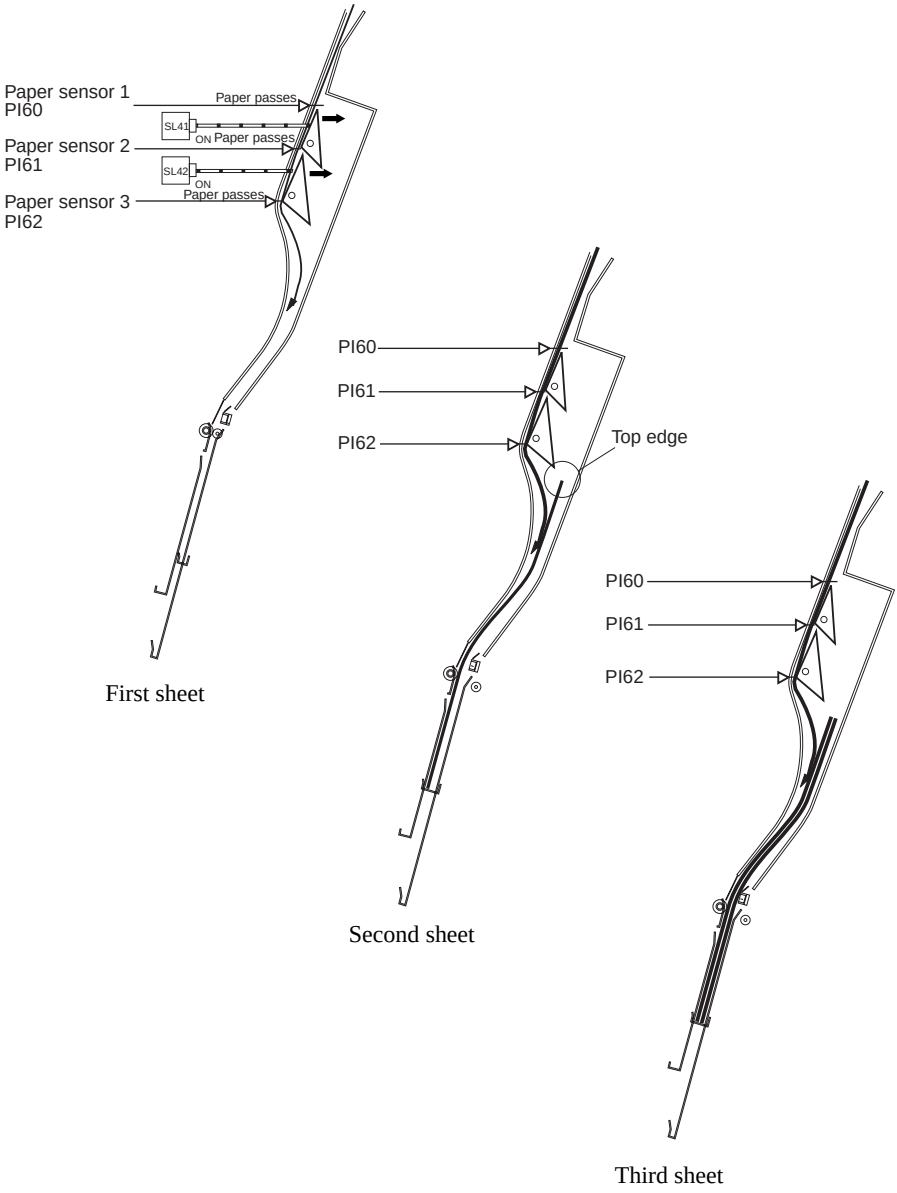
d. Feed route of size A4R/LTRR paper

In the case of 3 sheets.



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12.3.3 Paper feed control

After the leading edge of the paper passes the inlet flapper, it is conveyed by the intermediate feed rollers and crescent roller.

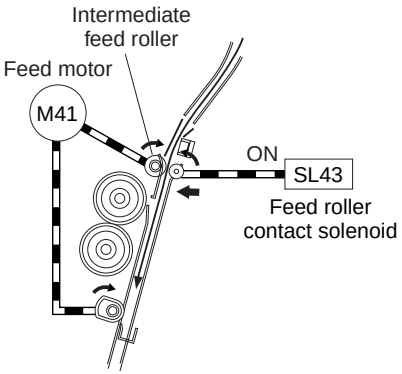
The intermediate feed rollers are normally out of contact. When the leading edge of the paper reaches the intermediate feed roller contact area, the rollers are closed by the feed roller contact solenoid (SL43) to feed the paper. The rollers open when the leading edge of the paper strikes the paper positioning plate. This is repeated for each sheet of paper.

When the leading edge of the first sheet of paper reaches the paper positioning plate, the paper positioning plate paper sensor (PI50) detects the paper. However, as the first sheet continues to be detected by the sensor, the arrival of the second sheet is not detected.

The crescent roller continues to rotate while the paper is being collected. This results in the leading edge of each sheet striking the paper positioning plate, ensuring that the leading edges of the stack are aligned.

The paper jogging motor (M35) drives the jogging plate each time paper is collected, aligning the left and right edges of the paper.

1) The solenoid is on while the paper is being fed, and the rollers are in contact.



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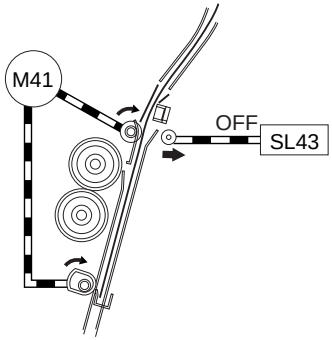
2) When the paper strikes the paper positioning plate, the solenoid is turned off. The feed motor continues rotating.



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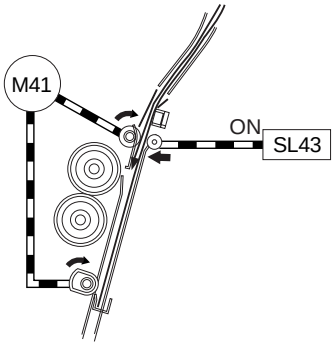
3) When the next sheet of paper comes, the solenoid is turned on and the rollers come in contact.



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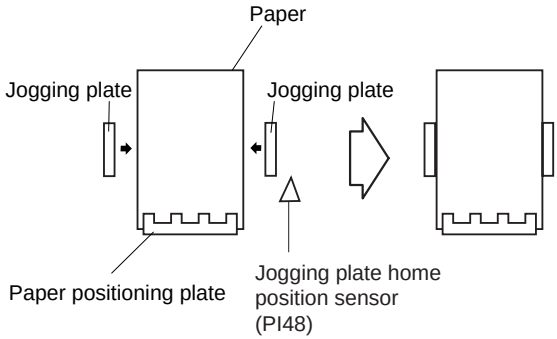
12.3.4 Alignment control

Each time paper is collected, the jogging plate motor (M35) drives the jogging plates which align the left and right edges of the paper. The jogging plate motor is a 4-phase stepping motor. The position of the jogging plates is detected by the number of motor pulses from the jogging plate home position sensor (PI48).

An example of an operation of the saddle stitcher in the case of two sheets of paper is shown below.

1) When the first sheet of paper is collected, the jogging plates strike the left and right edges of the paper. (First alignment) The jogging plates leave the home position in advance and wait at a position 10 mm from the edge of the paper.



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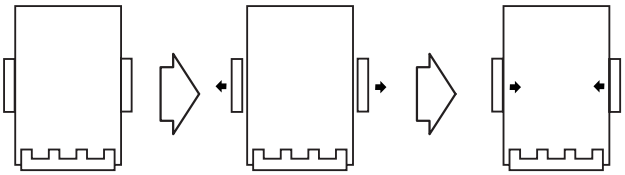
2) The jogging plates move slightly away from the edge of the paper, then strike the edge again. (Second alignment)



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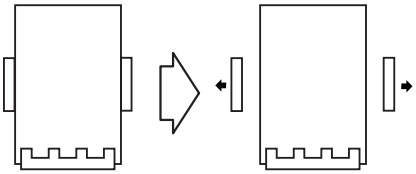
3) The jogging plates wait at a position 10 mm from the edge of the paper.



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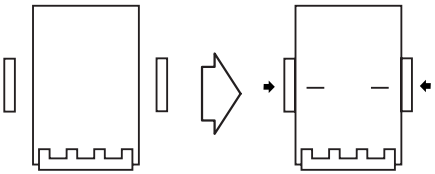
4) When the next sheet of paper comes, steps 1) through 3) described above are repeated.
5) The paper is held for stitching. (Stitching is performed during this time.)



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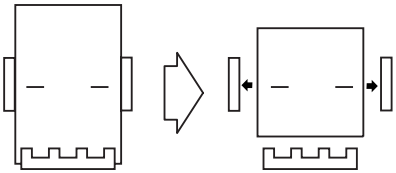
6) The jogging plates wait at a position 10 mm from the edge of the paper. (The stack is then folded and delivered.)



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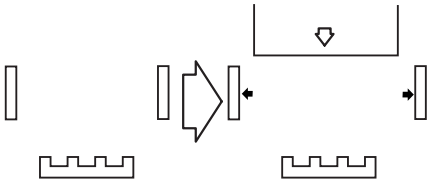
7) When the first sheet of paper of the next stack reaches the paper sensor 1, the guides move to a position 10 mm from the edge of the paper ready for the next alignment operation.



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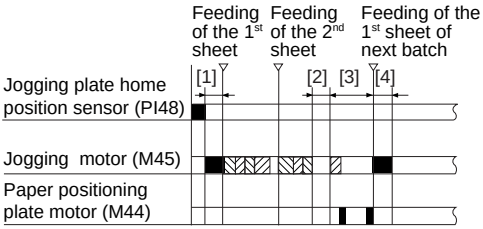
In the case of 2 sheets of paper



: Alignment : Standby

[1] : Moves to standby position
[2] : Stitching section
[3] : Paper folding and delivery section
[4] : Moves to standby position for next batch size

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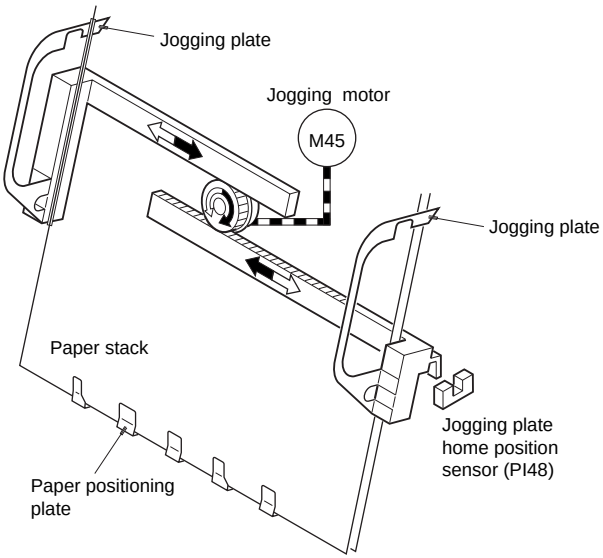

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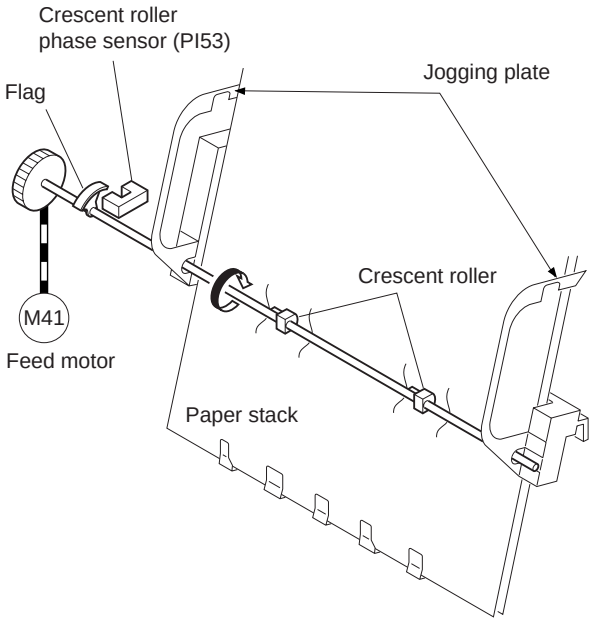
12.3.5 Crescent roller phase control

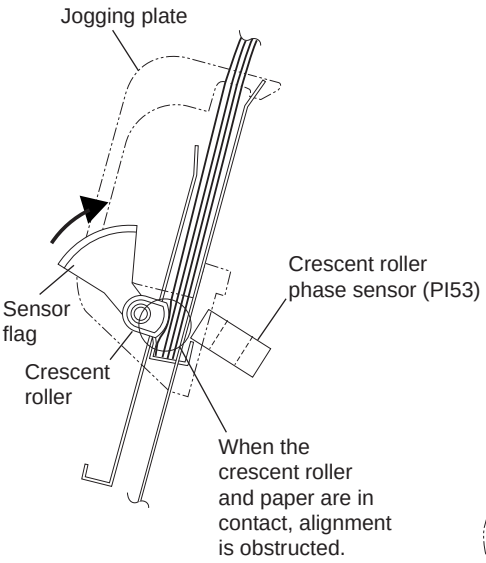
a. Overview

If alignment is carried out while the crescent roller is in contact with the stacked paper, movement of the paper may be obstructed by friction of the roller and alignment will not be performed properly (Figure F03-103-16). To prevent this, the alignment timing is decided by detecting the roller phase.

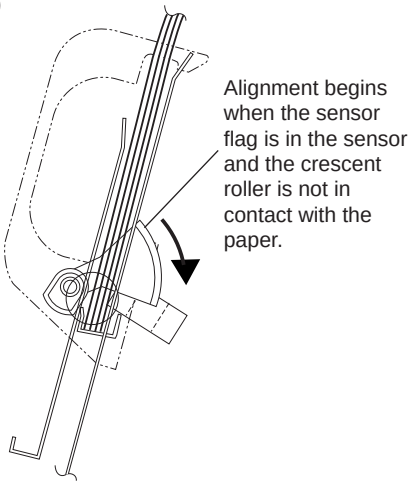
The crescent roller phase is detected by the crescent roller phase sensor (PI72). The flag for the crescent roller phase sensor is attached to the crescent roller shaft. The sensor flag disengages from the sensor while the roller shaft is rotating, and when the sensor goes from ON to OFF the crescent roller is in the opposite direction to the paper stack. (Figure F02-1203-17) The jogging plates start the paper alignment operation when the sensor status changes.



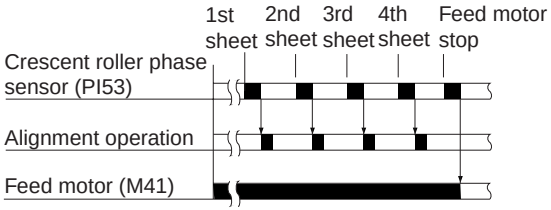
F02-1203-17



F02-1203-18



F02-1203-19



F02-1203-20

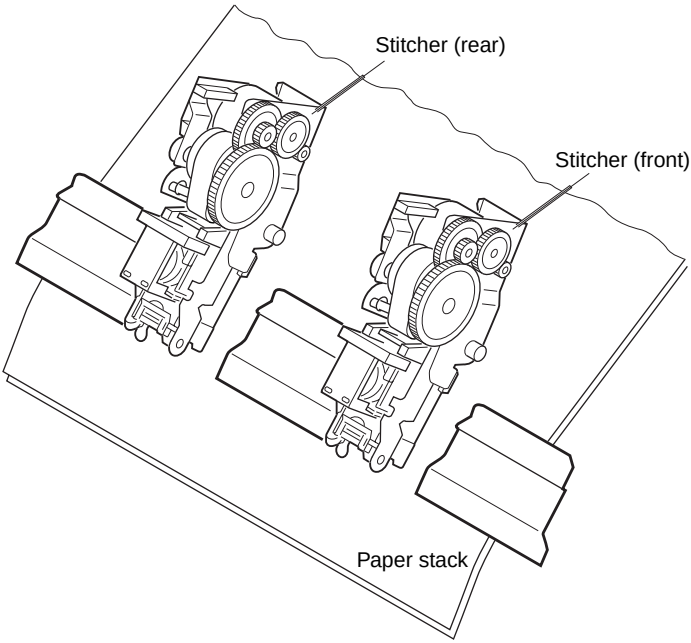
12.4 Stitcher System

12.4.1 Overview

The stitcher stitches the middle of the collected paper with staples. As the paper is stitched in two places, the copier is equipped with two stitcher units, one at the front and one at the rear. The stitcher units are driven by stitcher motors (M46, M47). Both stitcher units are equipped with stitcher home position sensors (MS34, MS32) for detecting the position of the stitcher, and staple sensors (MS33, MS31) for detecting the presence/absence of staples.

The stitcher mount can be pulled out forward from the main unit, in order to allow the staple cartridge to be replaced, or staple jams to be cleared.

To ensure that the operator's hands are not caught in the stitcher, there are no safety switches in the vicinity of the stitcher unit (front, rear).

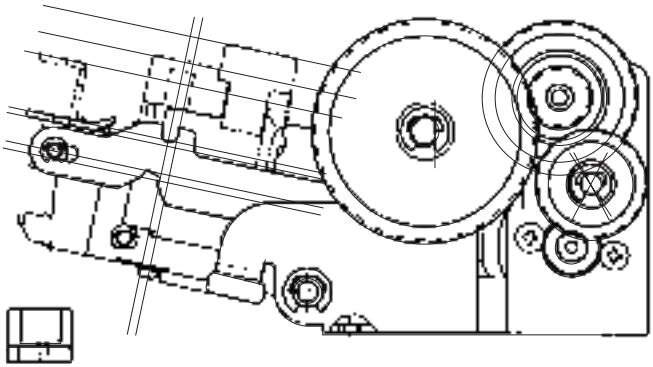


F02-1204-01

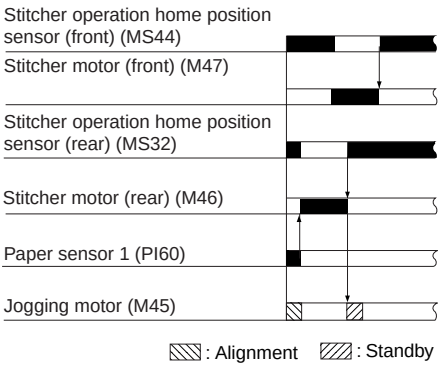
12.4.2 Stitcher unit operation

The stitcher mount unit consists of two stitchers and stitcher mounts on a unit mount. The position of the stitchers are fixed and there is no sliding movement involved. Stitching is controlled by the rotary cams, which are driven by the stitcher motors (M37, M36). There is a time lag between operation of the front and rear stitcher units. This is to prevent creasing of the paper between the staples and to reduce the power load by staggering generation of the current for starting the stitcher motors.

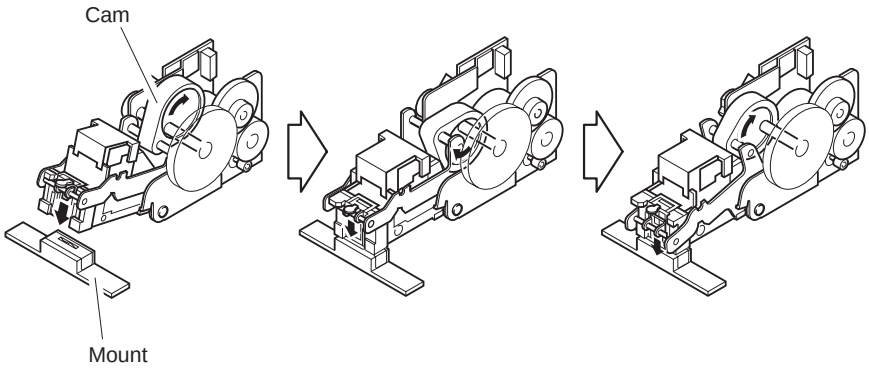
The stitcher operation home position sensors (MS34, MS32) monitor the movement of the rotary cams and detect whether one stitching operation has been performed. The staple sensors (MS33, MS31) detect whether there are any staples in the staple cartridge loaded in the stitcher. The jogging plates hold the edges of the paper in place during stitching.



F02-1204-02



F02-1204-03



F02-1204-04

12.5 Folding and Delivery System

12.5.1 Overview

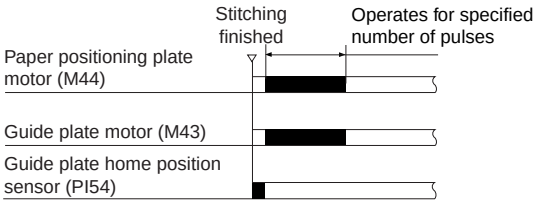
The folding mechanism is composed of a guide plate, folding rollers, paper retaining plate and paper positioning plate.

The guide plate covers the folding rollers while the paper is being collected and prevents the paper from coming into contact with the rollers. The guide plate is lowered during the folding operation, to allow folding to take place.

The folding rollers are driven by the folding motor (M42). The folding motor clock sensor (PI67) monitors the running of the motor. The paper folding home position sensor (PI58) is used to detect the position of the paper folding rollers. The paper retaining plate is driven by the paper retaining plate motor (M48) which is monitored by the paper retaining plate motor clock sensor (PI45). The paper retaining plate home position sensor (PI55) and paper retaining plate front edge position sensor (PI56) detect the position of the paper retaining plate. After being folded in two by the folding rollers, the paper is stack delivered by the delivery rollers. The delivery rollers are driven by the folding motor. A delivery sensor (PI52) detects delivery of the paper into the delivery area. . The vertical path jam clear sensor (PI57) detects whether any paper has been left behind after a jam has been cleared.

12.5.2 Stack feed control

Feeding is performed by the leading edge positioning plate. When 2-point stitching is finished, the paper positioning plate is lowered so that the center of the paper (stapling position) is in the folding roller contact position and paper retaining plate position. The position of the paper positioning plate is controlled by the number of motor pulses from the paper positioning plate home position sensor (PI49). The guide plate is lowered at the same time as the operation of the paper positioning plate, enabling folding to take place.

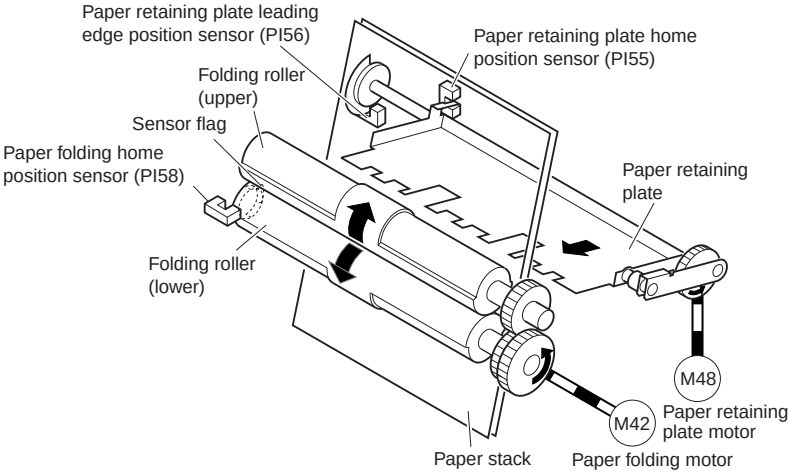


F02-1205-01

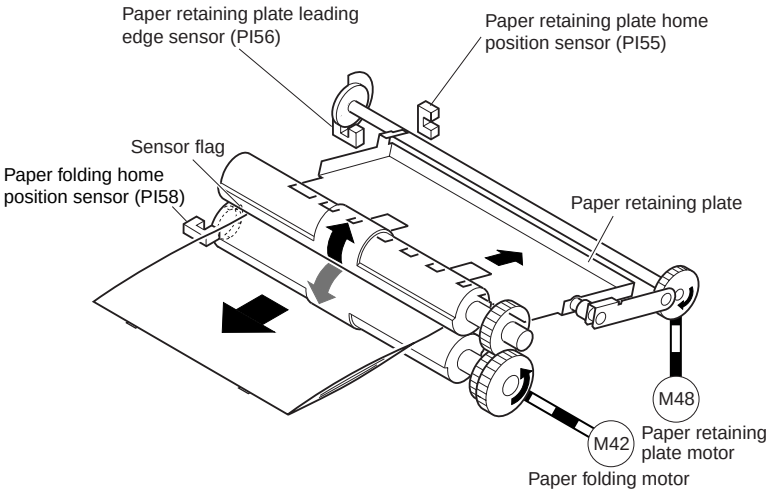
12.5.3 Folding

The paper is folded by the folding rollers and paper retaining plate.

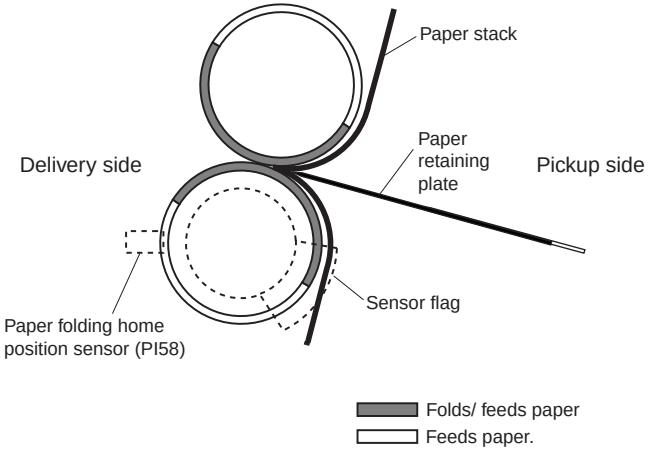
The paper retaining plate pushes the center of the paper stack into the folding roller contact position. At this time, the paper retaining plate begins the operation from the home position and waits at the leading edge position until the paper stack has been drawn 10mm into the folding rollers. The paper retaining plate motor then rotates in reverse and the paper retaining plate returns to the home position. The folded paper is then delivered to the tray by the folding rollers and delivery rollers. Except for the centre portion, one side of each paper folding roller is inset from the rest, in order to prevent wrinkling of the paper. On the inset side, only the middle portions of the upper and lower paper folding rollers will come into contact with each other, on the non-inset side, the entire surfaces of both rollers will come into contact with each other. Bending of the paper starts from the non-inset sides, and the paper is fed forward while being folded. In addition, the paper folding rollers are stopped at the non-inset sides. The paper folding rollers' starting and stopping positions are controlled by the number of clock pulses from the home position sensor (PI58).



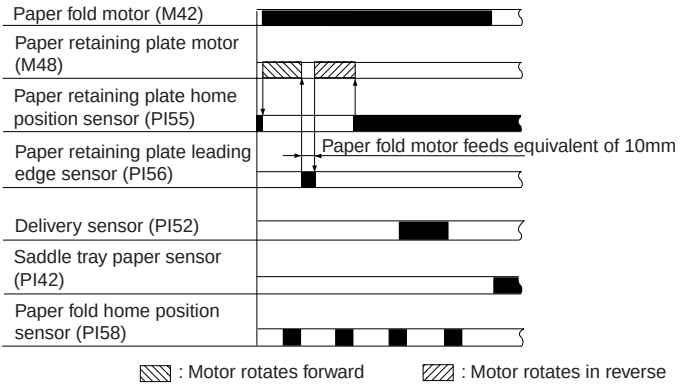
F02-1205-02



F02-1205-03



F02-1205-03A



F02-1205-04

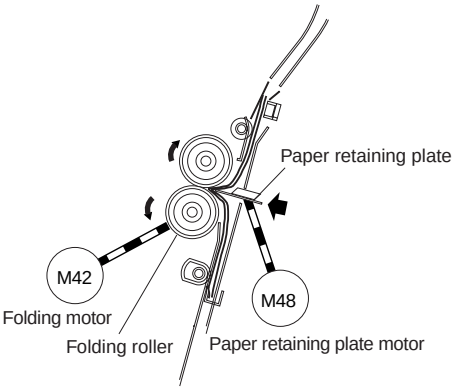
12.5.4 Double Folding Operation

When 10 or more sheets of A4R or LTR-R size paper are to be folded, the paper is folded by double folding.

After the paper stack has been drawn in about 20mm, the folding rollers rotate in reverse for 20mm. This enables greater nipping force to be applied to the fold by the folding rollers. The folding rollers then rotate forward to deliver the paper stack and the paper retaining plate returns to the home position.

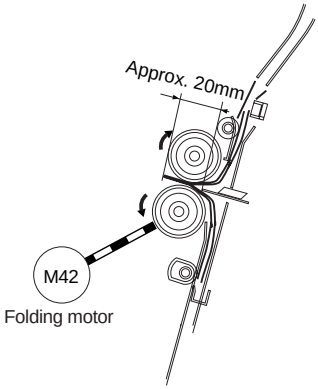
This operation ensures that several sheets of paper of a size that requires a strong folding force can be folded properly.

1) The paper retaining plate pushes the paper in the direction of the folding rollers.



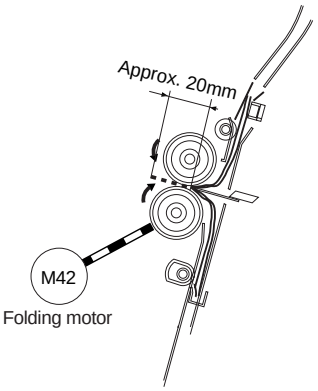
F02-1205-05

2) The folding rollers pull in the paper for approximately 20mm.



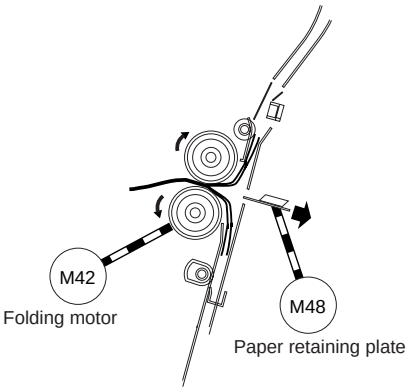
F02-1205-06

3) The folding rollers rotate in reverse, pushing the paper stack back about 20mm. (Reverse feeding)

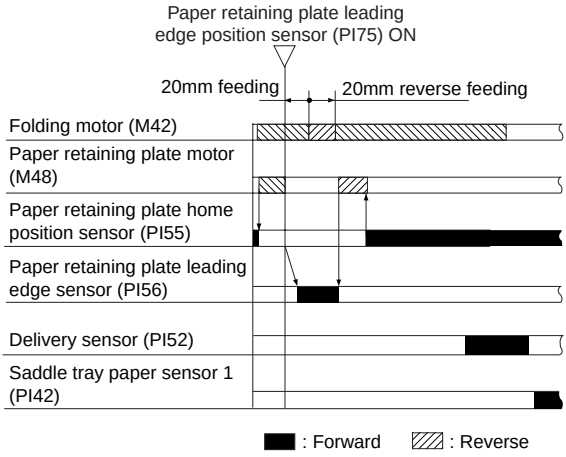


F02-1205-07

4) The folding rollers rotate forward once more to deliver the paper stack. The pressure plate returns to its home position.



F02-1205-08

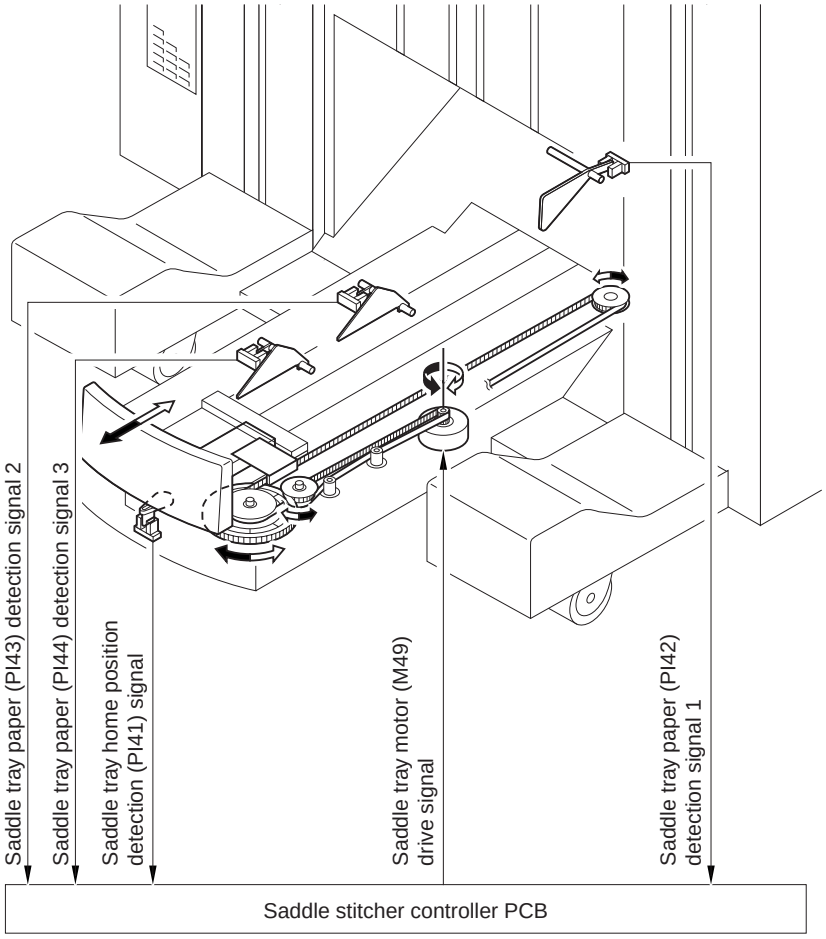


F02-1205-09

12.5.5 Delivery Tray Control

a. Overview

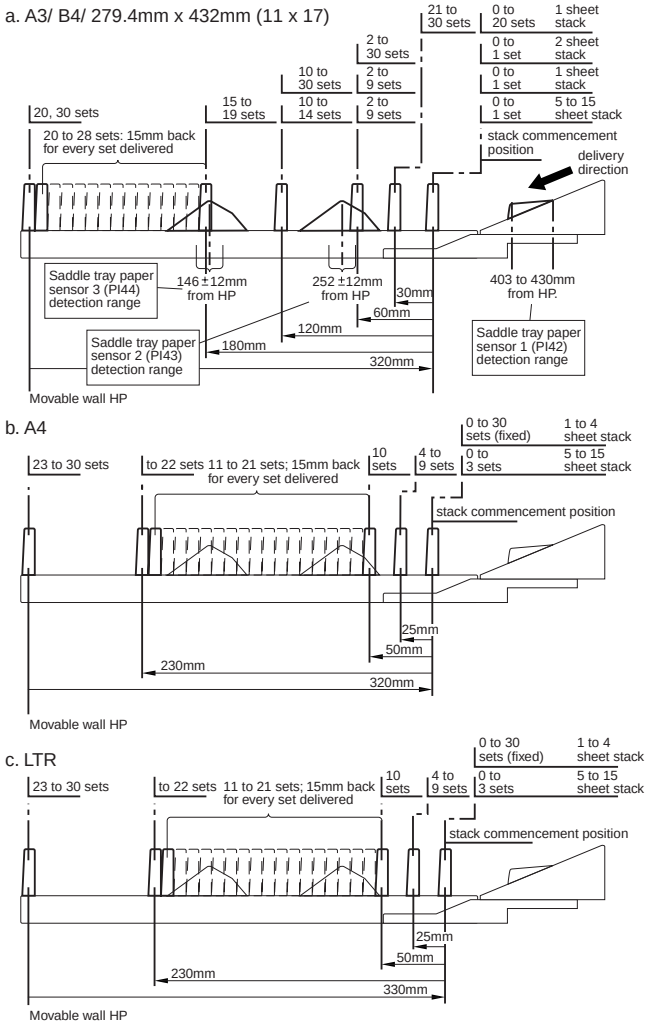
After the paper stack has been folded in two by the folding rollers, it is delivered to the saddle delivery tray. The delivery tray is equipped with an adjustable wall to assist stacking. The adjustable wall is driven by the saddle tray motor (M49). A saddle tray home position sensor (PI41) is provided to detect the home position of the adjustable wall. The saddle tray is equipped with three paper sensors.



F02-1205-10

b. Adjustable wall control

The adjustable wall moves from the home position to a position corresponding to the size of the stack and number of sheets before saddle stitching starts. When delivery starts, it moves in the direction of the home position, in accordance with the number of sets in the stack. Control of the adjustable wall does not depend on detection by the three paper sensors on the delivery tray. The diagram below shows the positions of the adjustable wall according to the size of the paper, number of sheets and number of sets in the stack.

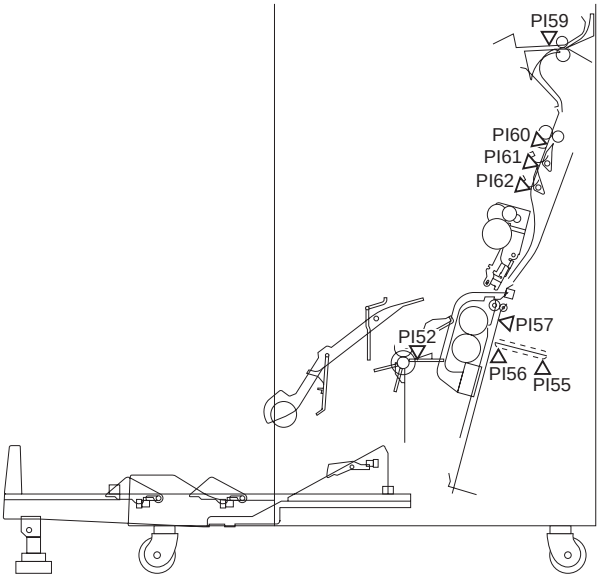


F02-1205-11

12.6 Jam Detection

12.6.1 Overview

If any of the states below arises, the saddle stitcher judges that a jam has occurred and sends a jam signal to the copier. As a result, the copier may stop copying and the jam message will be displayed on the copier's control panel.



F02-1206-01

No.	Sensor name
PI59	Saddle inlet sensor
PI52	Delivery sensor
PI55	Paper retaining plate home position sensor
PI56	Paper retaining plate leading edge sensor
PI57	Vertical path paper sensor
PI60	No. 1 paper sensor
PI61	No. 2 paper sensor
PI62	No.3 paper sensor

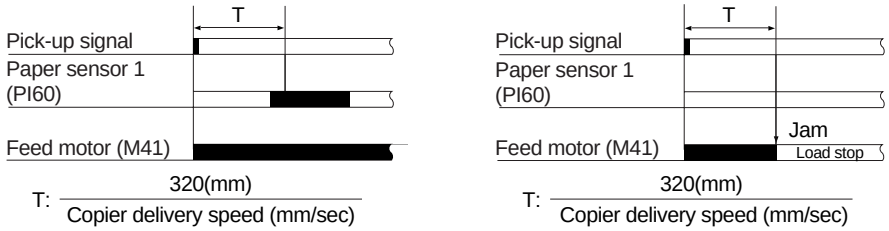
T02-1206-01

Jam	Sensor	Code
Inlet delay	PI60	0091
Inlet stationary	PI60/ PI61/ PI62	00A1
Delivery delay	PI52/ PI57	0092
Delivery stationary	PI52	00A2
Power ON	PI60/ PI52	0087
Door open	PI46/ PI51	0088
Stitcher staples	MS34/ MS32	0086
Saddle inlet delay	PI59	0015
Saddle stationary	PI59	0025

T02-1206-01A

12.6.2 Inlet delay jam (0091)

This occurs when the paper sensor 1 (PI77) on the paper sensor PCB fails to turn on after the time specified by the pick-up signal from the finisher has elapsed.

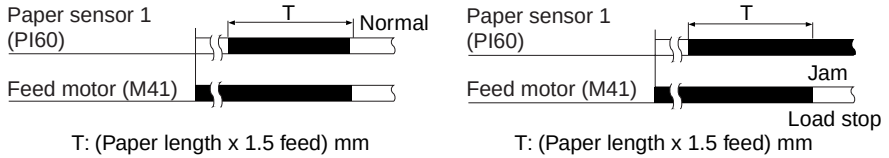


F02-1206-02

12.6.3 Inlet stationary jam (00A1)

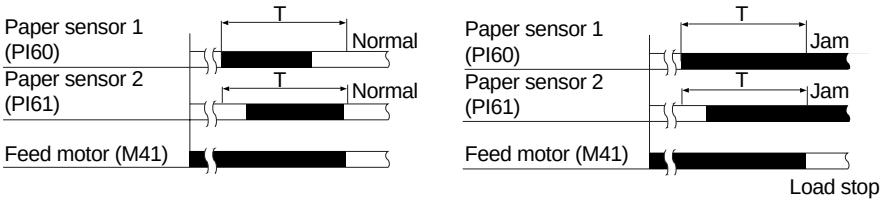
If the sensors on the paper sensor PCB (paper sensor 1 (PI60), paper sensor 2 (PI61) and paper sensor 3 (PI62)) do not turn OFF after feeding has taken place for the specified time after the sensors turned ON, the sensors used will depend on the size of the paper.

a. In the case of A3/279mm x 432mm (11 x 17) size



F02-1206-03

b. In the case of B4 size



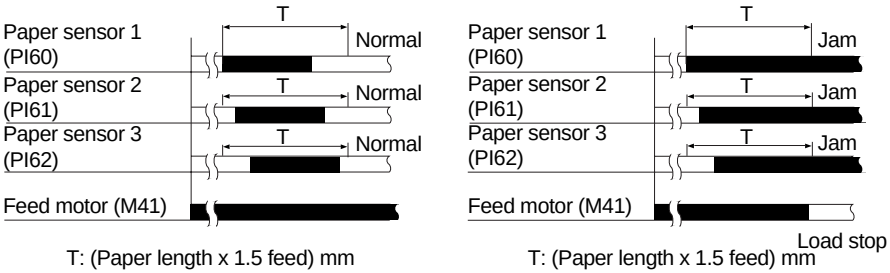
T: (Paper length x 1.5 feed) mm

T: (Paper length x 1.5 feed) mm

Note: In the figure jamming has been detected by two sensors, but one jam is detected by one sensor.

F02-1206-04

c. In the case of A4R/LTRR size



T: (Paper length x 1.5 feed) mm

T: (Paper length x 1.5 feed) mm

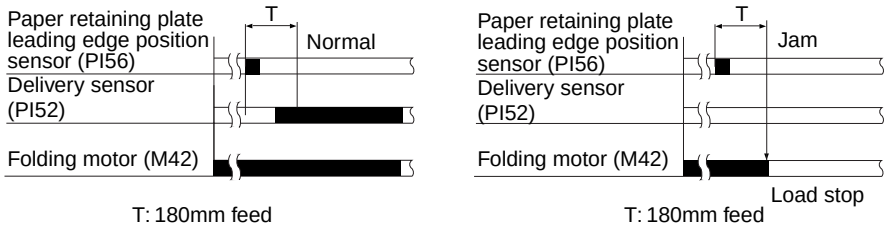
Note: In the figure jamming has been detected by three sensors, but one jam is detected by one sensor.

F02-1206-05

12.6.4 Delivery Delay Jam (0092)

a. Detection by delivery sensor

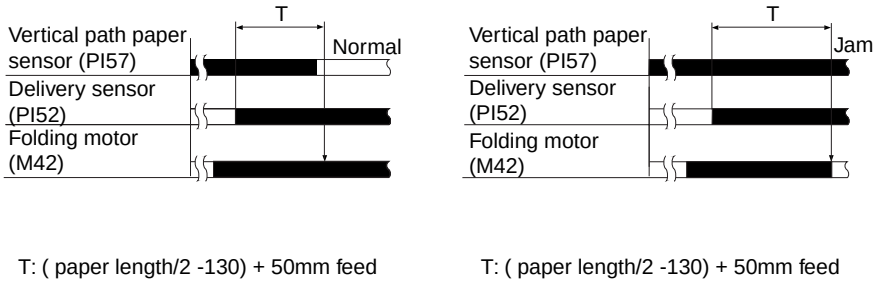
This occurs when the delivery sensor (PI52) fails to turn ON within the specified time after the paper retaining plate leading edge position sensor (PI56) has come ON.



F02-1206-06

b. Detection by vertical path paper sensor

This occurs when the vertical path paper sensor (PI76) fails to turn OFF despite feeding for the specified time after the delivery sensor (PI71) came on. (When the trailing edge of the paper stack does not clear the vertical path paper sensor.)

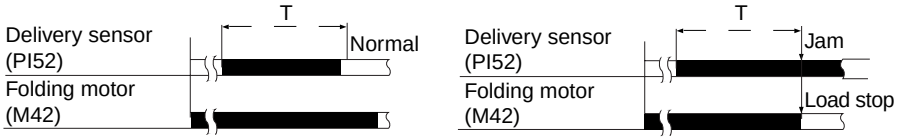


Note: 130mm is the length of the feed PATH from the vertical path paper sensor to the delivery sensor, and 50mm is the margin.

F02-1206-07

12.6.5 Delivery stationary jam (00A2)

This type of jam occurs when the delivery sensor (PI52) fails to turn OFF after feeding for a specified time.

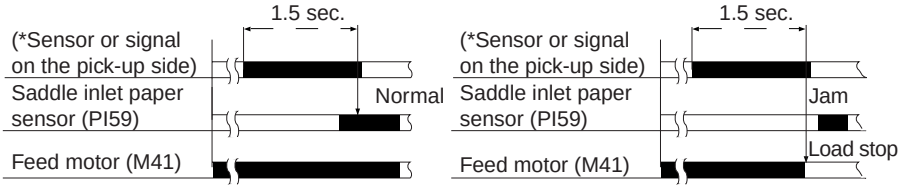


T: (paper length/ 2 x 1.5) mm feed Paper length T: (paper length/ 2 x 1.5) mm feed Paper length

F02-1206-08

12.6.6 Saddle Inlet Paper Sensor Delay Jam (0015)

This type of jam occurs when the saddle inlet paper sensor (PI59) fails to turn ON within 1.5 sec of the sensor or signal on the pick-up side of the saddle inlet paper sensor coming ON. The jam is detected by the finisher controller PCB.

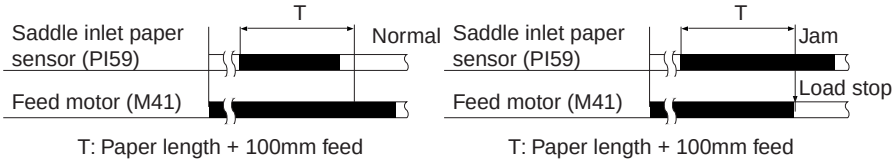


* The sensor or signal on the pick-up side differs, depending on the optional accessories used and the paper pick-up position.
Case 1: Inserter pick-up
Inserter feed No. 3 sensor (PI61)
Case 2: With folder installed
Feed path paper sensor (PI75)
Case 3: Without folder installed, or with folder module isolated.
Copier delivery signal

F02-1206-09

12.6.7 Saddle inlet paper sensor stationary jam (0025)

This occurs when the saddle inlet paper sensor (PI59) fails to turn off after feeding for a specific time (equivalent to paper length + 100mm). The jam is detected by the finisher controller PCB.



F02-1206-10

12.6.8 Power-on jam (0087)

This occurs when the three sensors on the paper sensor PCB, the delivery sensor (PI52) or the vertical path paper sensor (PI60) detect paper when the power is turned on.

12.6.9 Door open jam (0088)

This occurs when the outlet cover sensor (PI46) or the inlet cover sensor (PI51) detects that the cover is open during operation.

12.6.10 Stitcher staple jam (0086)

This occurs when the stitcher home position sensor (MS34/MS32) fails to come ON again within 0.5 sec of going OFF when the stitcher motors (M37, M36) are rotating forward, and the when sensor comes ON within 0.5 sec when the motors are rotating in reverse

Memo

When all the doors are closed after the jam has been removed by the user, the saddle stitcher checks whether the sensors in Table 2-1204 have detected any paper. If the sensors detect any paper, removal of the jam is judged to be incomplete and a jam message is again sent to the copier.

No.	Sensor
PI60	Paper sensor 1
PI61	Paper sensor 2
PI62	Paper sensor 3
PI52	Delivery sensor
PI60	Vertical path paper sensor
PI59	Saddle inlet sensor

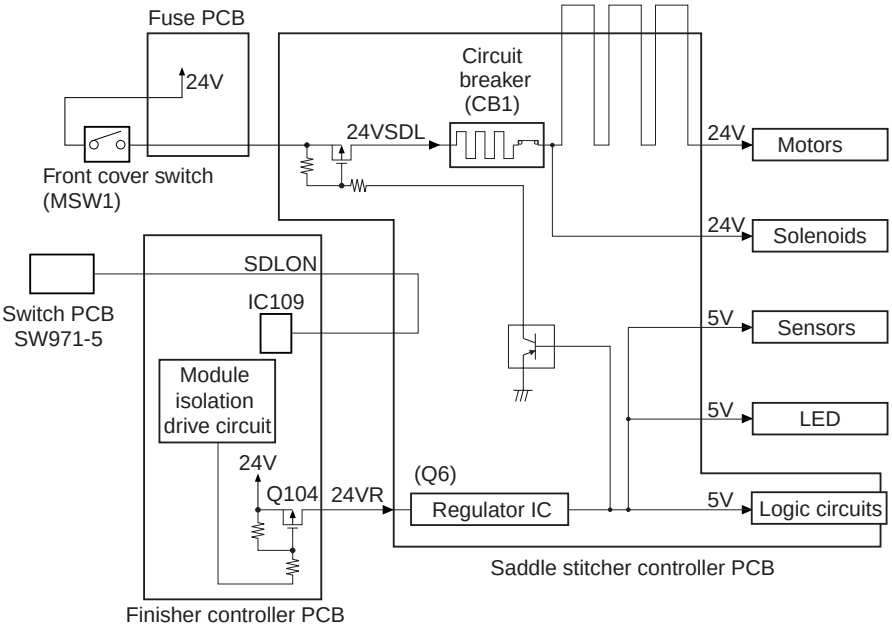
T02-1206-02

12.7 Power supply

12.7.1 Overview

When the power supply to the copier is turned ON, 24VSDL is supplied from the fuse PCB of the finisher and 24VR is supplied from the finisher controller PCB to the saddle stitcher controller PCB. 24VSDL is used to drive the motors and solenoids. 24VR is regenerated as 5V by the saddle stitcher controller PCB regulator IC (Q6) and used for the sensors, logic circuits and LEDs.

The 24VSDL and 24VR supplied to the saddle stitcher controller PCB are turned ON/OFF by SW971-6 on the switch PCB. Supply of 24VSDL is interrupted if the front cover of the finisher is open.



F02-1207-01

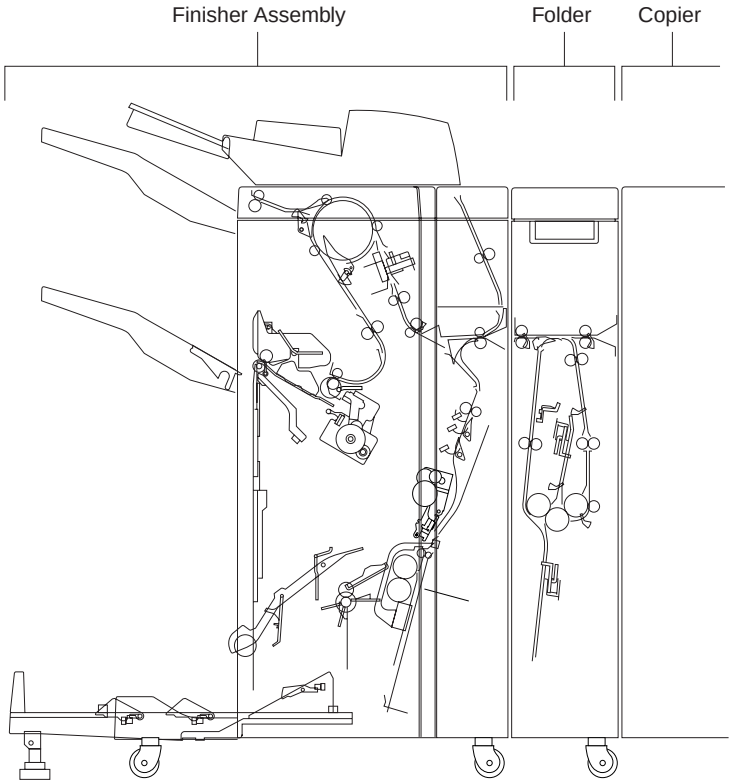
12.7.2 Protective function

The 24VSDL driving the motors and solenoids incorporates a circuit breaker (CB1) as protection against over-current. The 24V driving the feed motor (M41), jogging motor (M43), paper positioning plate motor (M44) and saddle tray motor (M49) incorporates a fuse which shorts in the event of over-current.0

13 PAPER FOLDING UNIT C1

13.1 Overview

Use of the paper folder enables paper sized A3, B4 or 279.4 x 431.8mm (11" x 17") to be folded in Z-shape and fed to the finisher, according to the mode set on the copier.

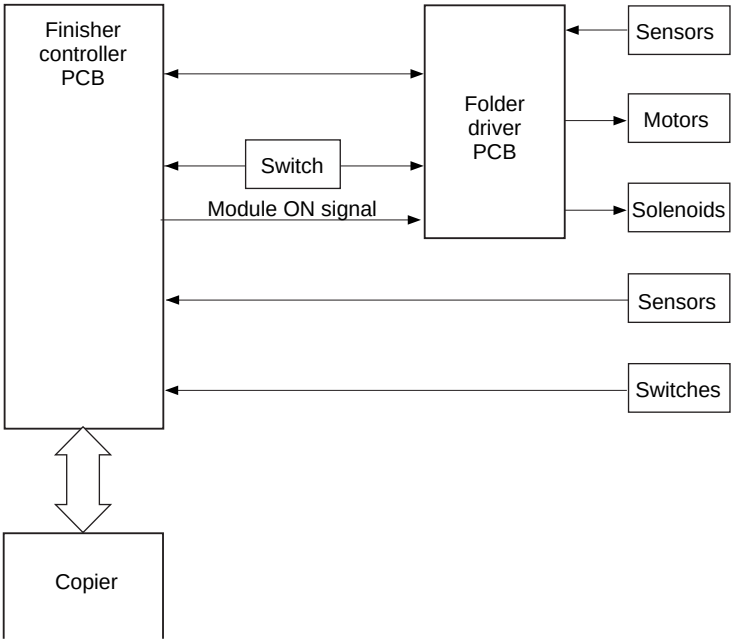


F02-1301-01

13.2 Electrical circuit diagram

The folder is controlled by the finisher controller PCB, so there is no controller PCB in the folder itself. The folder driver PCB receives signals from the finisher and drives the motor and solenoids.

Power is supplied to each folder load by the module ON signal from the finisher controller PCB.



F01-1302-01

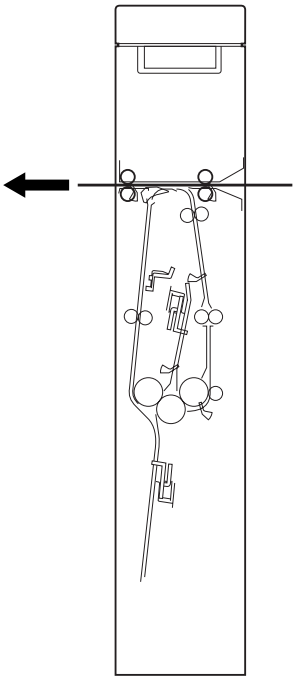
13.3 Basic Operation

The finisher folds the paper in Z-shape, according to the mode set on the copier.

13.3.1 Non-folding mode

1) Press the Copy Start key on the copier.

2) The paper is fed along the horizontal path to the finisher.

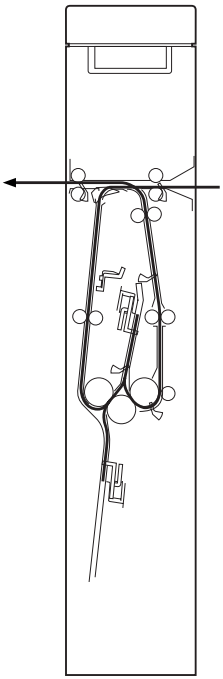


F02-1303-01

13.3.2 Z-folding Mode

1) Press the Copy Start key on the copier.

2) Paper of a size capable of being folded is fed into the paper folding unit, as shown in the figure below. and Z-folded. (For details, refer to page 2-137.)



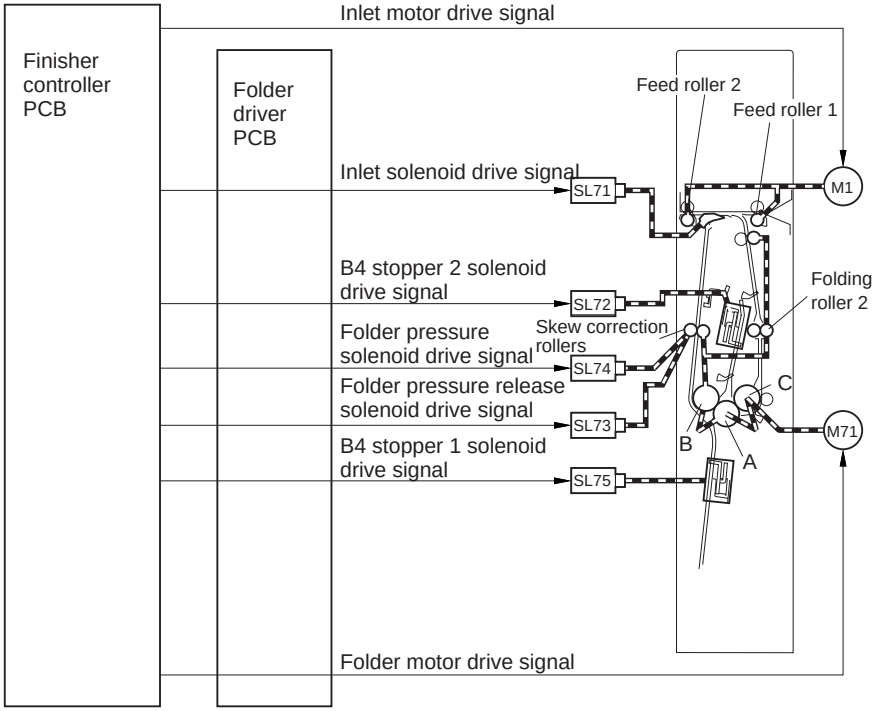
F02-1303-02

3) After Z-folding, the paper is sent on to the finisher.

13.4 Feed drive system

13.4.1 Overview

Paper from the copier is sent to the finisher by the feed rollers. Feed rollers 1 and 2 are driven by the finisher inlet motor (M1). The skew correction rollers, folding rollers A, B and C, and folding roller 2 are driven by the folder motor (M71). The feed route of the paper is changed by the ON/OFF switching of the inlet solenoid (SL5), according to the mode set on the copier.

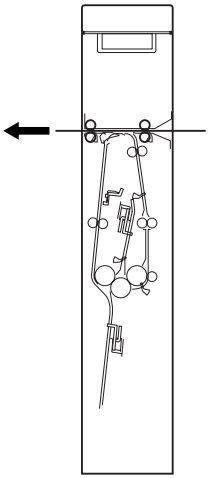


F02-1304-01

13.4.2 Feed path

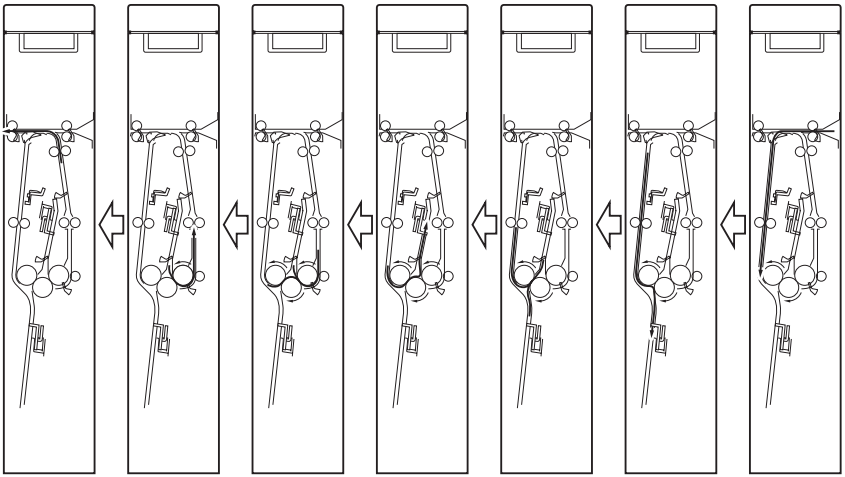
The feed paths for each mode are shown below.

a. Non-folding mode



F02-1304-02

b. Z-folding mode



F02-1304-03

13.4.3 Feed speed control

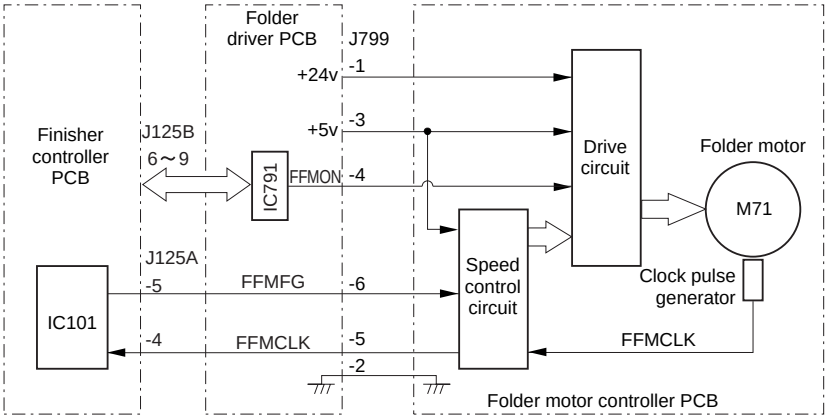
The feed speed in folding mode is controlled by the folder motor (M71) and finisher inlet motor (M1). The feed speed is the process speed only, and paper is fed at the same speed as the process speed of the copier (speed control range: 314 to 607 mm/sec).

The feed speed in non-folding mode is controlled by the finisher inlet motor (M1).

13.4.4 Folder Motor Control

The folder motor (M71) is a DC brush-less motor. The CPU (IC101) on the finisher controller PCB sends a reference pulse (FFMFG) to the folder motor controller PCB. The motor drive signal (FFMON) is sent to the folder driver PCB by serial communication.

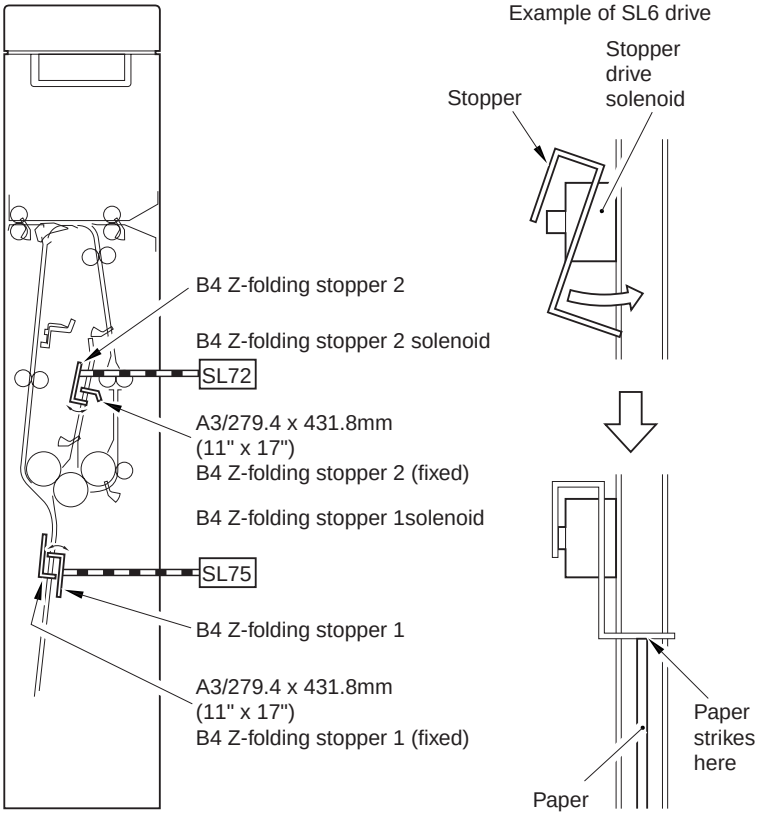
When the folder motor (M71) rotates, the clock pulse (FFMCLK) is sent to the speed control circuit by the encoder. The speed control circuit compares the reference pulse (FFMG) and the clock pulse from the encoder, and adjusts the drive circuits so that they match. The clock pulse signal (FFMCLK) is also sent to the finisher controller PCB and is synchronized with the finisher inlet motor (M1). The CPU (IC101) monitors the clock pulse signal, and if the number of pulses per second does not reach the specified value, it judges that there is a fault in the folder motor. The motor is then stopped and error code E518 is displayed on the control panel of the copier.



F02-1304-04

13.4.5 Folding stopper drive

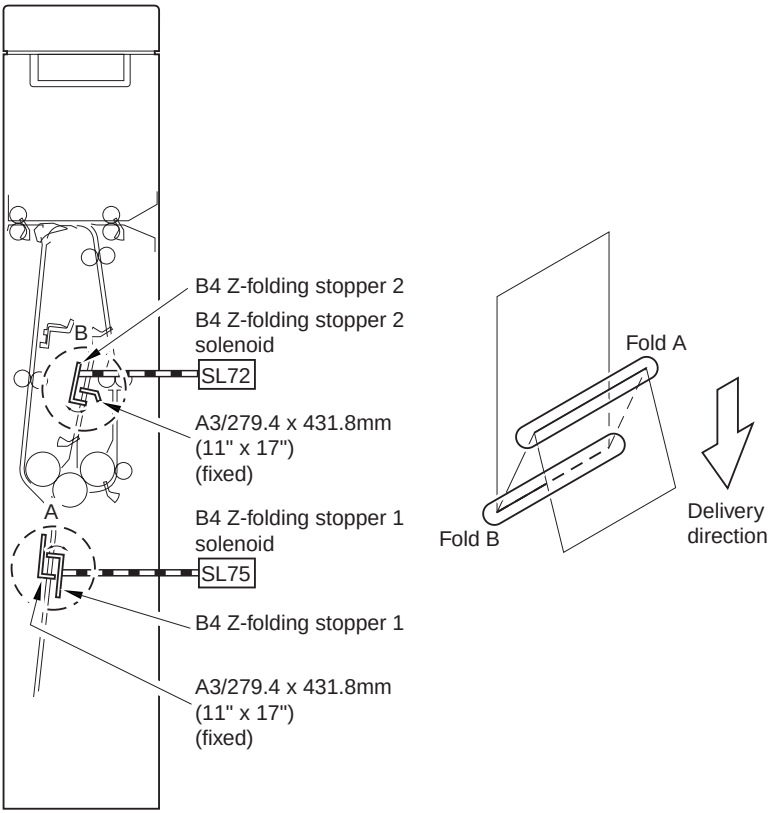
Each stopper operates according to the size of the paper to stop the feeding of the paper. The stoppers move as shown in Figure 2-1309 below when the solenoids are ON.



F02-1304-05

13.4.6 Folding Position

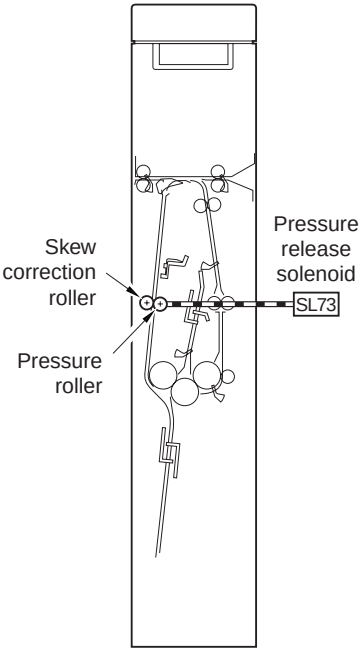
Positions A and B, where the paper is folded by the stoppers, are shown below.



F02-1304-06

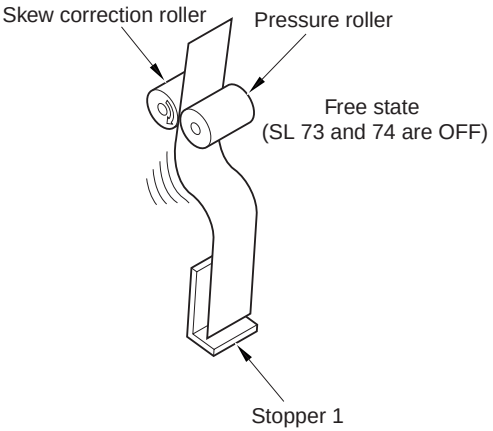
13.4.7 Skew correction

Skews in the paper are corrected by the skew correction roller and pressure roller, before the paper is folded.



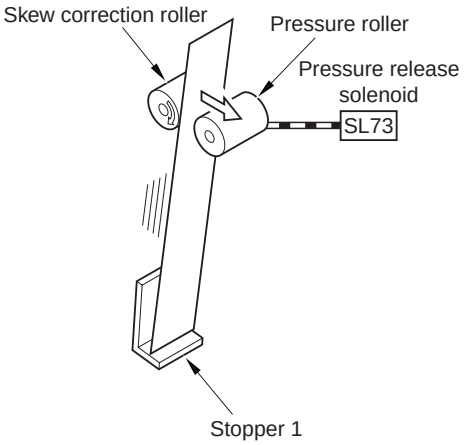
F02-1304-07

1) The paper strikes stopper 1.
2) The paper continues to be fed by the skew correction roller and strikes stopper 1 to form an arch.



F02-1304-08

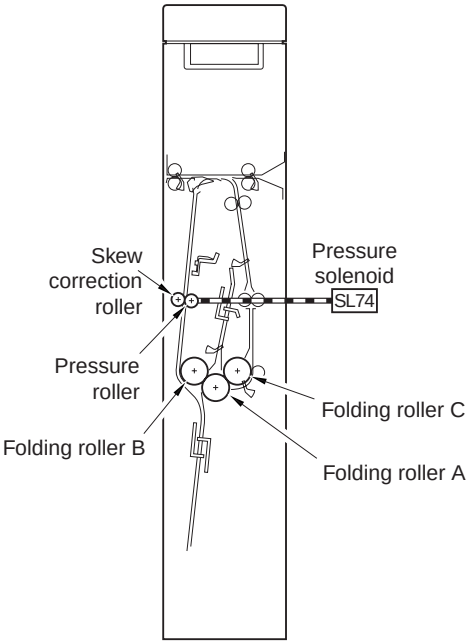
3) The pressure release solenoid (SL73) comes ON, and the pressure roller disengages the paper and the skew is corrected.



F02-1304-09

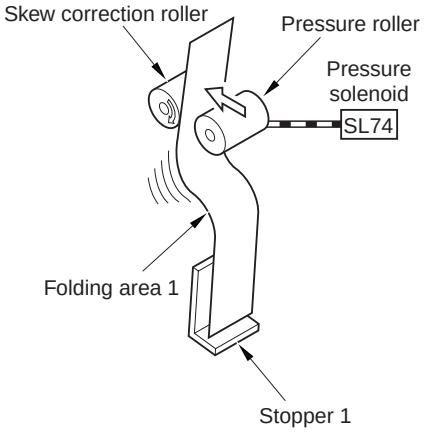
13.4.8 Folding operation

When the skew has been corrected, the paper is folded in Z-shape by the folding rollers A, B and C.



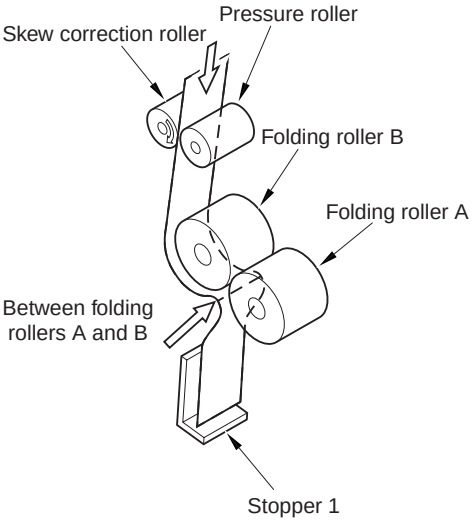
F02-1304-10

1) When the skew has been corrected, the pressure solenoid (SL74) comes ON. As a result, the pressure roller is pressed against the skew correction roller and the paper is fed again to form an arch.



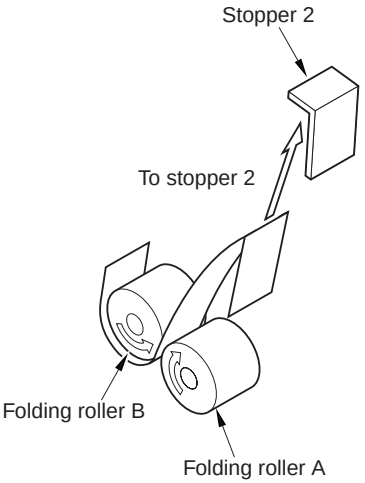
F02-1304-11

2) As the arch in the paper gets bigger, it is drawn between the folding rollers A and B and folded.



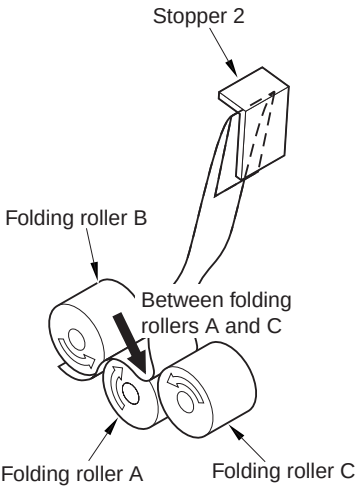
F02-1304-12

3) The paper is fed by the folding rollers A and B, and strikes stopper 2.



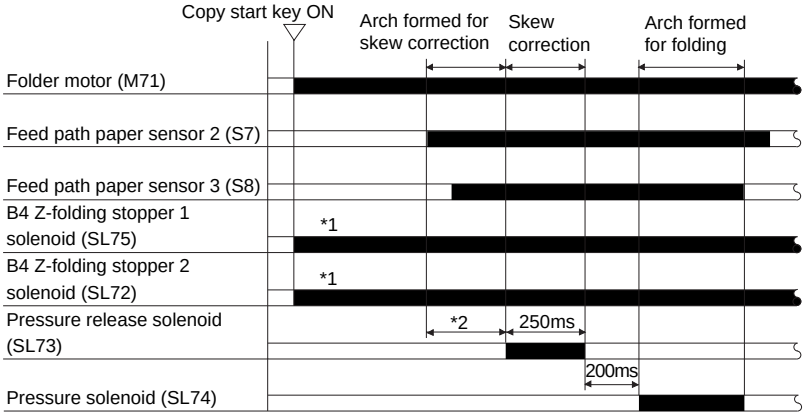
F02-1304-13

4) The paper continues to be fed by the folding rollers A and B and forms an arch.
5) As the arch in the paper gets bigger, it is drawn between the folding rollers A and C and folded.



F02-1304-14

13.4.9 Drive Sequence



*1: ON only for B4
*2: Differs depending on size of paper

F02-1304-15

13.5 Jam Detection

13.5.1 Overview

The folder is equipped with seven sensors as shown in Figure F02-1305-01 to detect whether the paper is being fed properly. Jamming is judged by reading the signals from the sensors at times pre-programmed in the CPU of the finisher controller PCB. If the CPU judges that jamming has occurred, the finisher controller PCB sends a jam signal to the copier. As a result, the copier stops copying and the error message 'Check paper feed' is displayed on the copier's control panel.

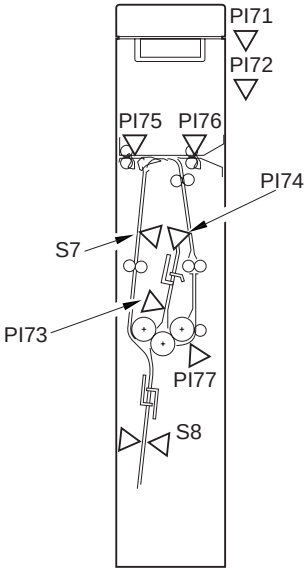
The CPU judges that jamming has occurred in the following cases:

a. when paper is detected by a sensor when the power supply is turned on, when warming up is completed, or during standby (power-on jam)
b. when the paper does not reach the sensors within the specified time (delay jam)
c. when the paper does not pass the sensors within the specified time (stationary jam)
d. when the top cover is opened while the folder is in operation (door open jam).

If any of the jams described above occurs, the jam should be cleared first. Then, the remaining number of copies can be copied automatically by pressing the Copy Start key again.

Notation	Sensor	Detection details	Code
PI76	Feed path paper sensor 1	Delay/Stationary	0011/0021
S7	Feed path paper sensor 2	Jam detection	0012/0022
S8	Feed path paper sensor 3 (light-emitting)	Power-on	0013/0023
S8	Feed path paper sensor 3 (light-receiving)	Jam detection	
PI75	Feed path paper sensor 4		0014/0024
PI73	Folding path residual paper sensor 1	Power-on	
PI77	Folding path residual paper sensor 2	Jam detection	0007
PI74	Folding path residual paper sensor 3		
PI71	Folder set sensor	Door open	0008
PI72	Upper cover open sensor	Jam	

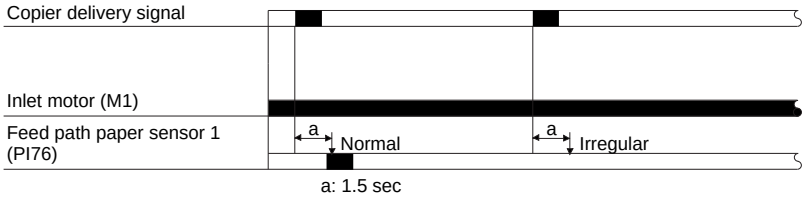
T02-1305-01



F02-1305-01

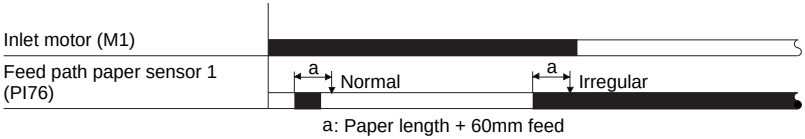
13.5.2 Jam detection timing

a. Feed path paper sensor 1 delay jam (0011)



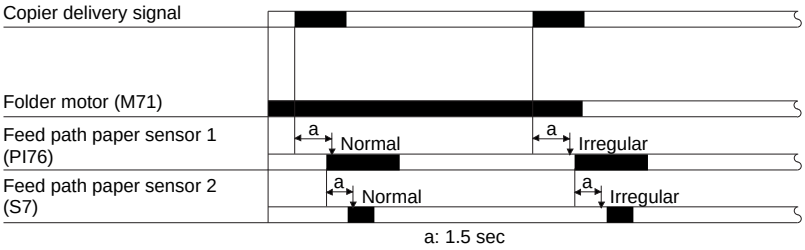
F02-1305-02

b. Feed path paper sensor 1 stationary jam (0021)



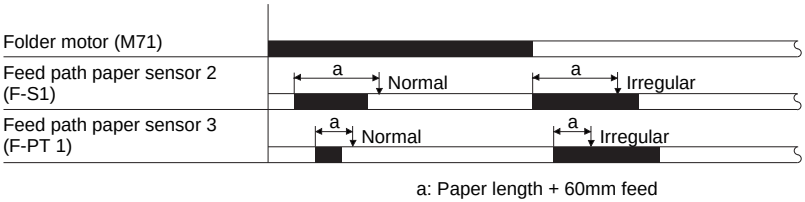
F02-1305-03

c. Feed path paper sensor 2 delay jam (0012)



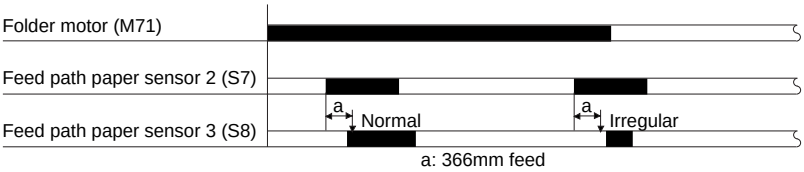
F02-1305-04

d. Feed path paper sensor 2 stationary jam (0022)



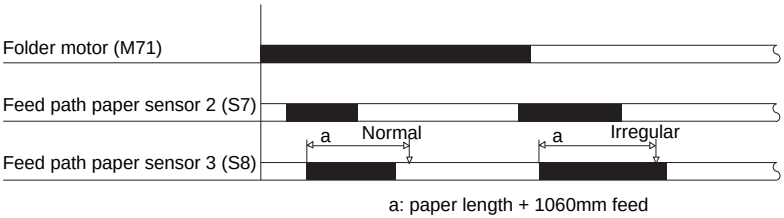
F02-1305-05

e. Feed path paper sensor 3 delay jam (0013)



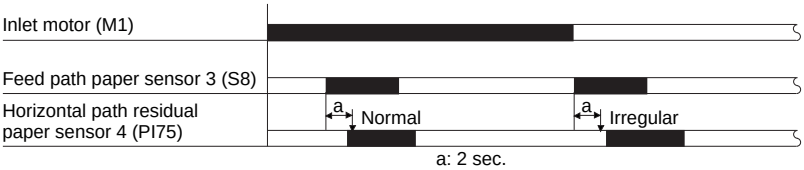
F02-1305-06

f. Feed path paper sensor 3 stationary jam (0023)



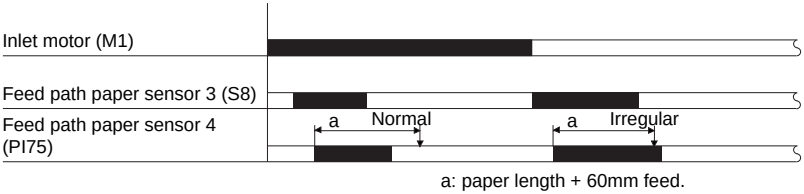
F02-1305-07

g. Feed path paper sensor 4 delay jam (0014)



F02-1305-08

h. Feed path paper sensor 4 stationary jam (0024)

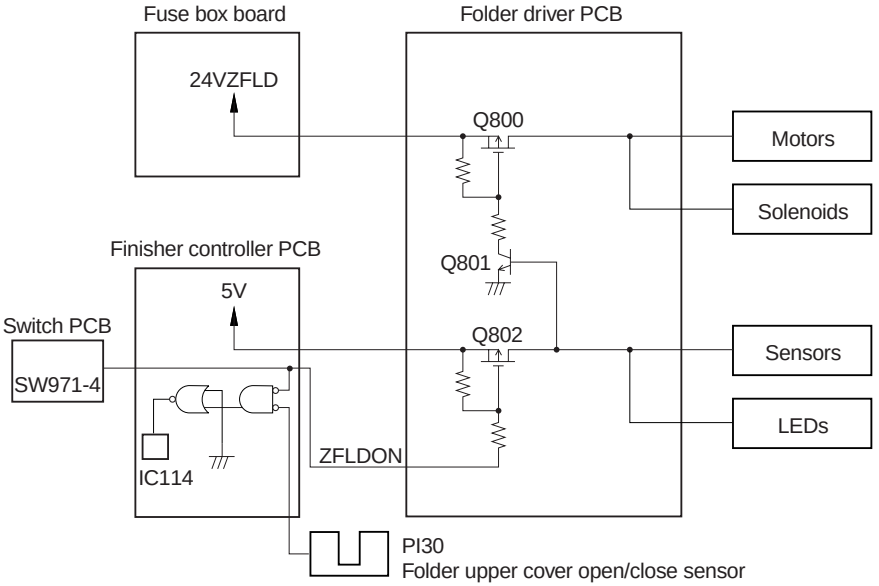


F02-1305-09

13.6 Power Supply

The figure below illustrates the route of the power supply to the folder. Refer to the finisher power supply for information regarding the power supply from the finisher controller PCB to the folder driver PCB.

The 24VZFLD and 5V supplied to the folder driver PCB are turned ON/ OFF by the ZFLDON signal from the finisher controller PCB. The ZFLDON signal is turned ON/ OFF by operation of SW971-5 on the switch PCB, by the user. The 24VFLD and 5V are supplied to the loads from the folder driver PCB.

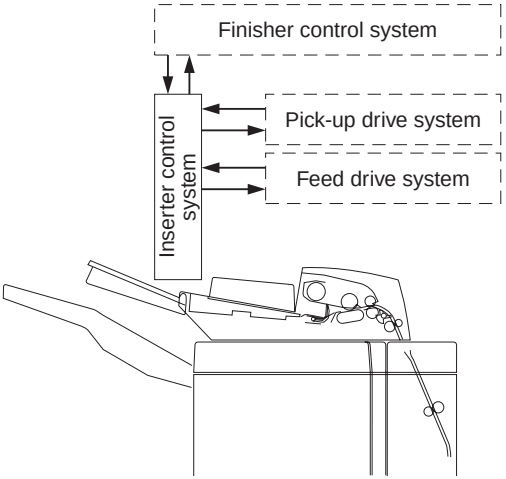


F02-1306-01

14 INSERTER (COVER INSERTION UNIT-B1)

14.1 Overview

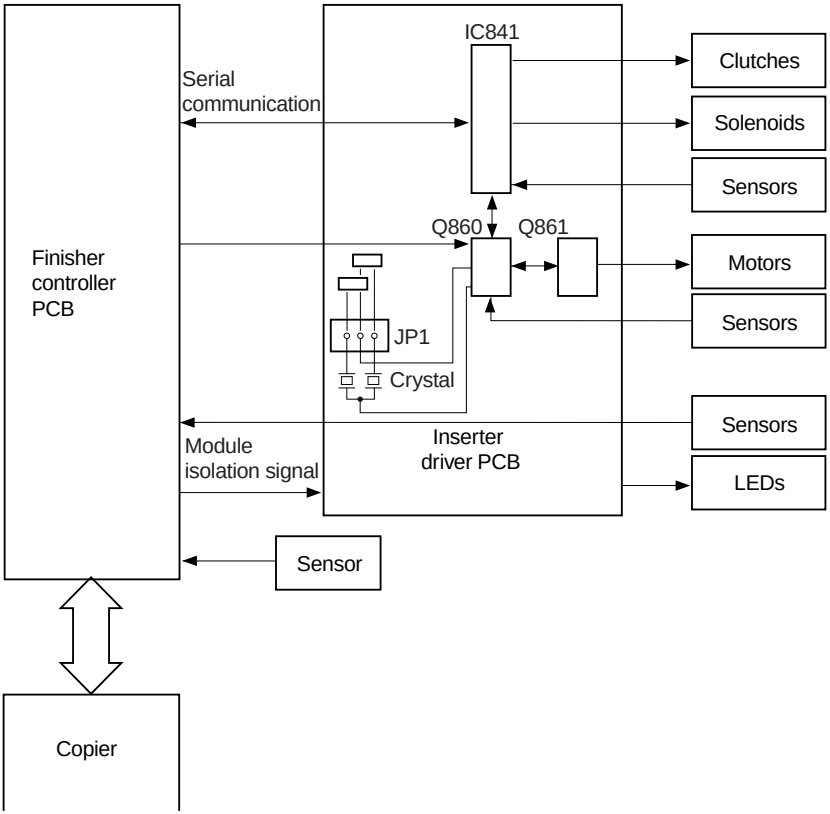
Use of the inserter (Cover Insertion Unit-B1) enables a cover to be added to the sheets sent from the copier. The cover is set in advance in the inserter pick-up assembly.



F02-1401-01

14.2 Electrical circuitry

The inserter is controlled by the finisher controller PCB, so there is no controller board inside the inserter. The control signals sent from the finisher controller PCB are received by the inserter driver PCB and drive the motors, clutches and solenoids. When the module ON signal from the finisher controller PCB comes ON, power is supplied to the inserter loads.



F02-1402-01

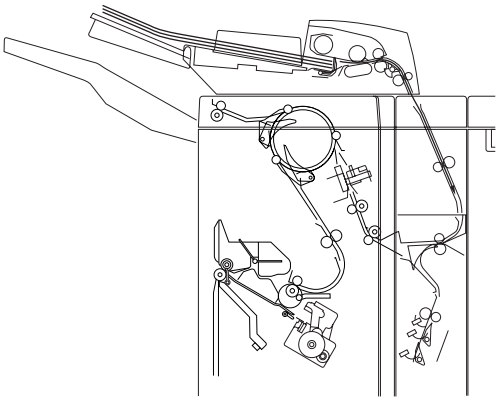
14.3 Basic operation

The inserter adds the cover or interleaf to the paper stack sent from the copier, according to the mode set on the copier.

14.3.1 Finisher mode

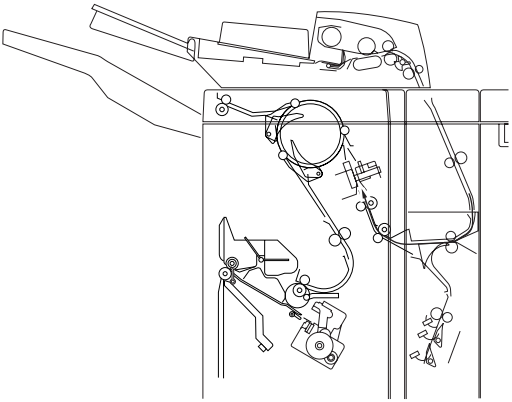
1) The delivery signal from the copier is detected.

2) The sheet is picked up from the inserter tray.



F02-1403-01

3) The sheet is fed in the direction of the finisher buffer roller.

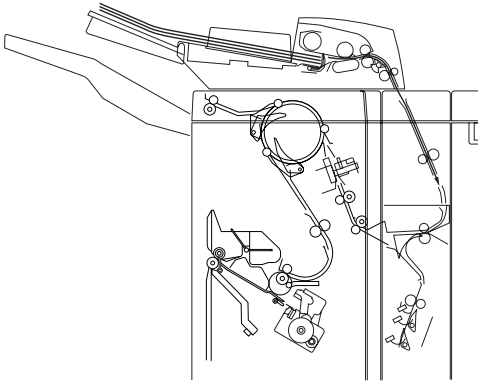


F02-1403-02

14.3.2 Saddle stitcher mode

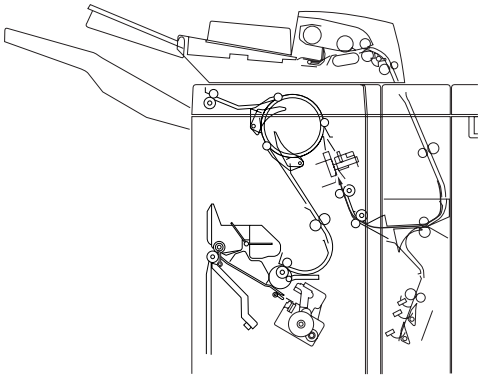
1) The delivery signal from the copier is detected.

2) The sheet is picked up from the inserter tray.



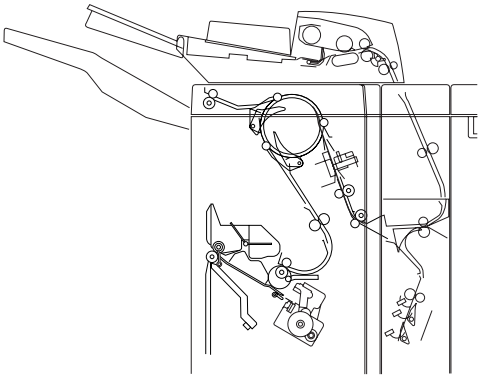
F02-1403-03

3) The sheet is fed in the direction of the finisher buffer roller.



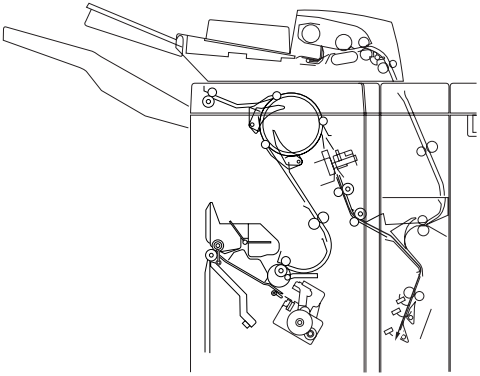
F02-1403-04

4) The trailing edge of the sheet stops temporarily before clearing the finisher inlet rollers.



F02-1403-05

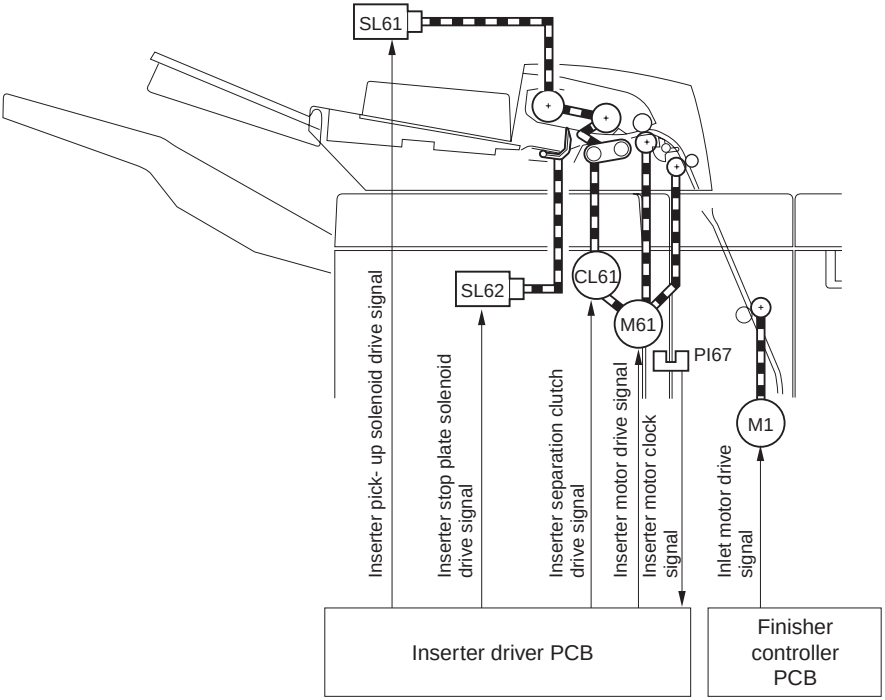
5) The rollers rotate in reverse and the sheet is fed in the direction of the saddle stitcher.



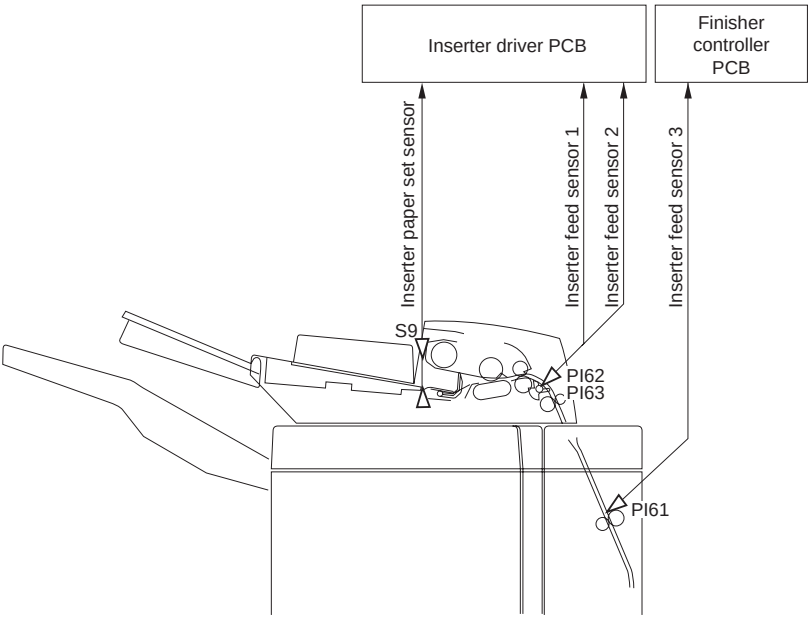
F02-1403-06

14.4 Feed drive system

Use of the inserter (Cover insertion unit-A1) enables a cover to be added to the sheets sent from the copier. The cover is set in advance in the inserter pick-up assembly.



F02-1404-01


Inserter driver PCB
Finisher controller PCB
Inserter paper set sensor
Inserter feed sensor 1
Inserter feed sensor 2
Inserter feed sensor 3
S9
PI62
PI63
PI61

F02-1404-02

14.5 Inserter pick-up

14.5.1 Overview

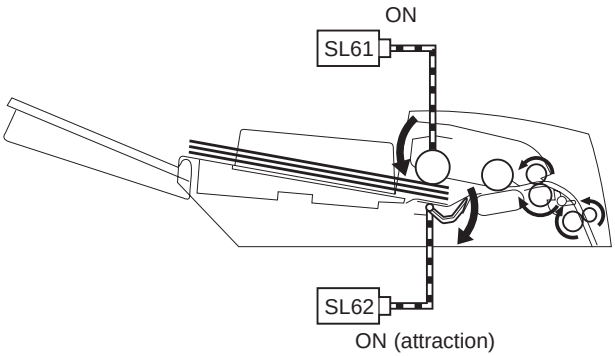
The pick-up roller unit contacts the surface of the paper and the rollers are rotated. The pick-up rollers are raised and lowered by the inserter pick-up solenoid (SL61). The pick-up rollers are driven by the inserter motor (M15) and inserter separation clutch (CL61). Separation is carried out by the separation roller, separation belt and separation clutch (CL61).

The stopper plate is lowered by the inserter stopper plate solenoid (SL62).

The inserter separation sensor 1 (PI62) and inserter separation sensor 2 (PI63) are located in the separation assembly to monitor the document feeding.

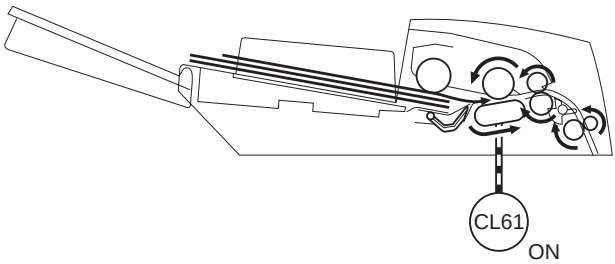
14.5.2 Operation

1) When the inserter pick-up signal is received, the inserter stopper plate is lowered and the pick-up roller unit contacts the surface of the paper.



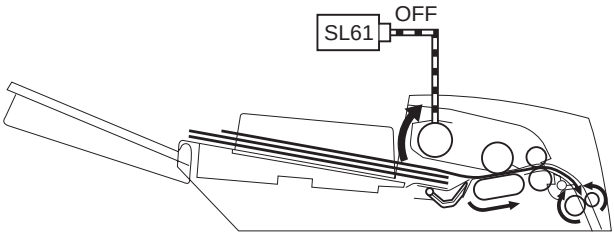
F02-1405-01

2) When the separation clutch is turned ON, the pick-up rollers rotate and begin to draw in the top sheet of paper.

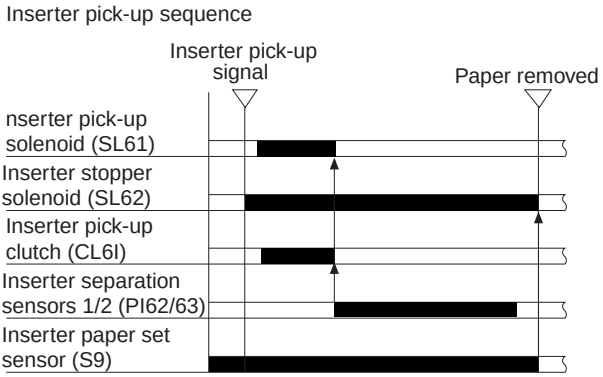


F02-1405-02

3) When the leading edge of the paper reaches inserter feed sensors 1 and 2, the separation clutch turns OFF and the pick-up roller unit ascends. The stopper plate waits in the lowered position until the inserter paper set sensor is turned OFF.



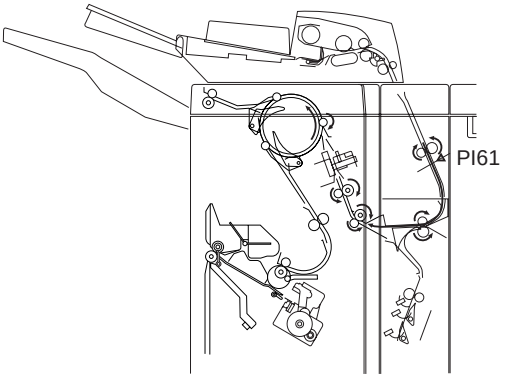
F02-1405-03



F02-1405-04

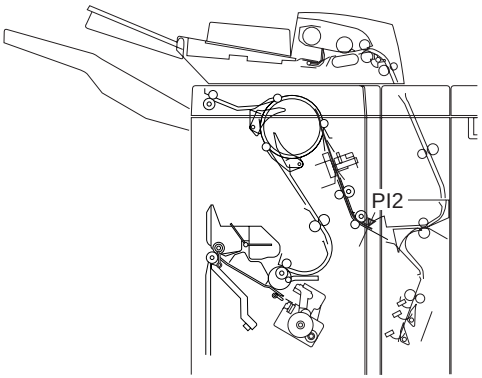
14.6 Saddle stitcher mode feeding

1) The trailing edge of the paper clears the inserter feed sensor 3 (PI61).



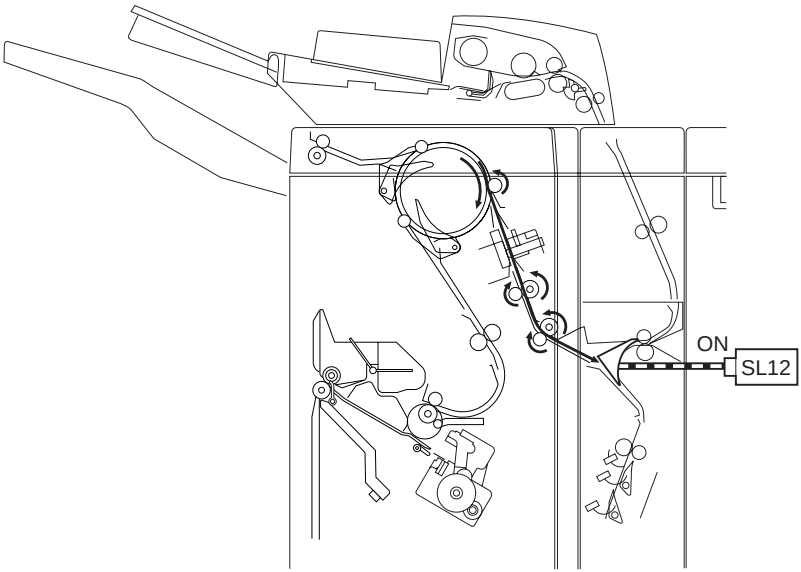
F02-1406-01

2) The inlet motor (M1) stops immediately before the trailing edge of the paper clears the inlet path sensor (PI2) of the finisher assembly.



F02-1406-02

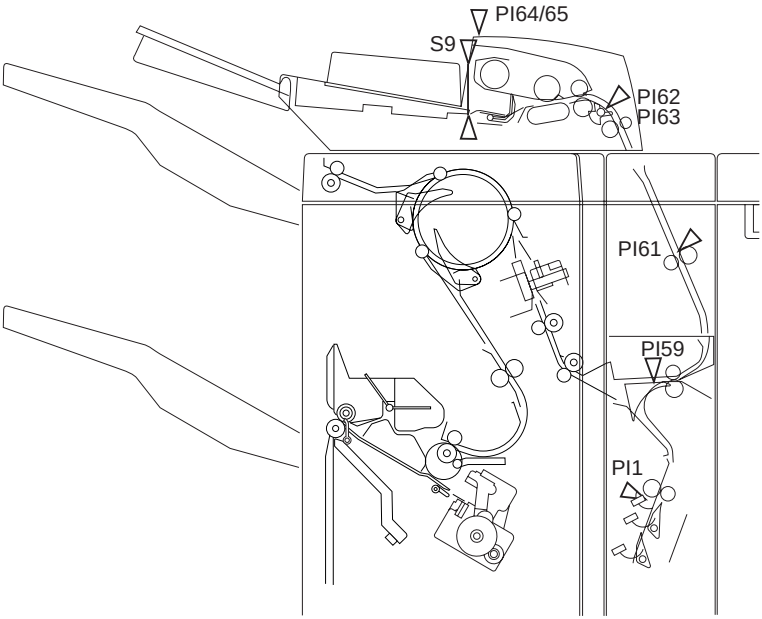
3) The inlet motor and buffer motor (M2) rotate in reverse and the inserter paper is fed in the direction of the saddle stitcher.



F02-1406-03

14.7 Jam detection

Jam detection checks are carried out at intervals pre-programmed in the ROM of the finisher controller PCB. A jam is detected in relation to the presence or absence of paper at a specific sensor. When a jam is detected, the finisher controller PCB communicates the nature of the jam to the copier in the form of a code. The code can be checked in the copier's service mode, or by reference to LED101 on the finisher controller PCB.



S9 : Inserter paper set sensor
PI62 : Inserter feed sensor 1
PI63 : Inserter feed sensor 2
PI61 : Inserter feed sensor 3
PI59 : Saddle inlet paper sensor
PI1 : Saddle paper sensor 1
PI64 : Inserter cover open sensor (front)
PI65 : Inserter cover open sensor (rear)

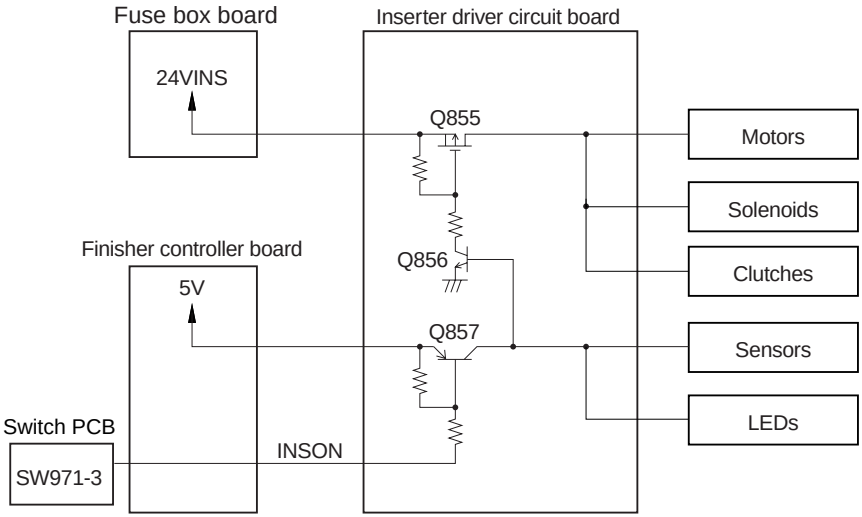
F02-1407-01

Jam type	Sensor	Description	Code
No pick-up paper	S9	S9 The inserter paper set sensor did not detect any paper during inserter pick-up.	0031
Feed skew	PI62/63	There was a difference of more than 9mm in the timing at which the inserter feed sensors 1 and 2 (PI37/38) came ON.	0033
Feed delay A	PI62/63	The inserter feed sensors 1 and 2 were not turned on within 263mm of the inserter pick-up motor being turned on.	001A
Feed stationary A		The inserter feed sensor 1/2 were not turned OFF 492mm after being turned ON.	002A
Feed delay B	PI61	The inserter feed sensor 3 was not turned ON within 323mm after the inserter feed sensors 1/2 were turned ON.	001B
Feed stationary B		The inserter feed sensor 3 was not turned OFF 492mm after being turned on.	002B
Inserter cover open	PI64 / 56	The inserter cover open sensors (front/rear) turned OFF while the inserter was operating. (Not regarded as a jam when the inserter is not in use.)	0008
Inserter open	PI66	The inserter open sensor was turned OFF while the inserter was operating. (Not regarded as a jam when the inserter is not in use.)	0008

T02-1407-01

14.8 Power Supply

The figure below shows the power supply route of the inserter. 24VINS and 5V supplied to the inserter driver PCB are turned ON/OFF by the INSON signal from the finisher controller PCB. The INSON signal is turned ON/OFF by operation of SW971-4 on the switch PCB, by the user. 24VINS and 5V are supplied to each load from the inserter driver PCB.



F02-1408-01

CHAPTER 3

MECHANICAL SYSTEMS

1 Finisher Unit

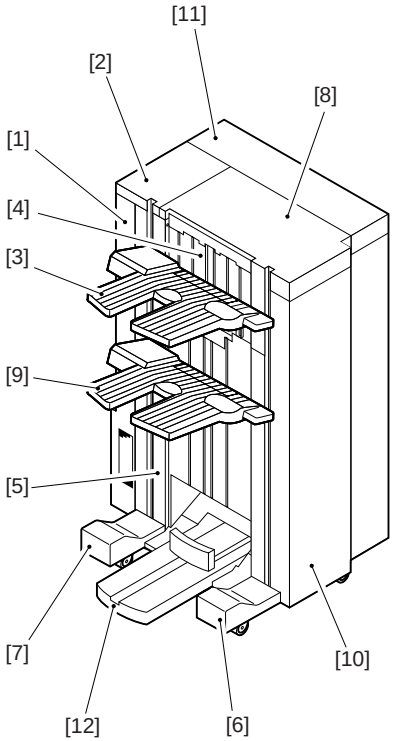
1.1 Externals and Controls

1.1.1 External Covers

Remove the covers as follows when cleaning, checking, or repairing the inside of the machine.

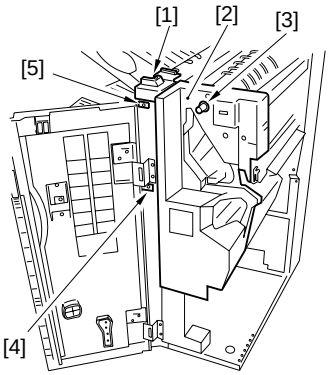
Those covers that can be detached by mere removal of their mounting screws are omitted from the discussions.

[1] Rear cover (8)
[2] Rear upper cover (2)
[3] Tray A (4)
[4] Stack wall (upper; 4)
[5] Stack wall (lower, 4)
[6] Foot cover (front; 2)
[7] Foot cover (rear; 2)
[8] Upper cover unit
[9] Tray B (4; also connector if folder is installed)
[10] Front door (0)
[11] Right upper cover (1)
[12] Saddle delivery tray



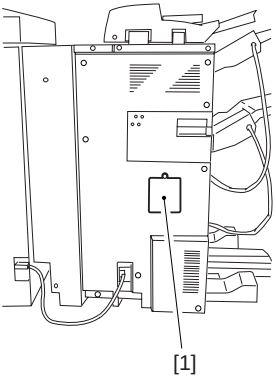
F03-101-01

[1] Support pole cover (1)
[2] Inside cover (4)
[3] Buffer roller knob (0)
[4] Stopper (lower; 1)
[5] Stopper (upper; 1)



F03-101-02

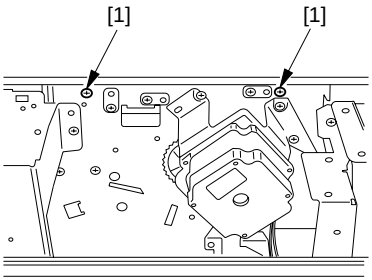
[1] PCB cover (1)



F03-101-03

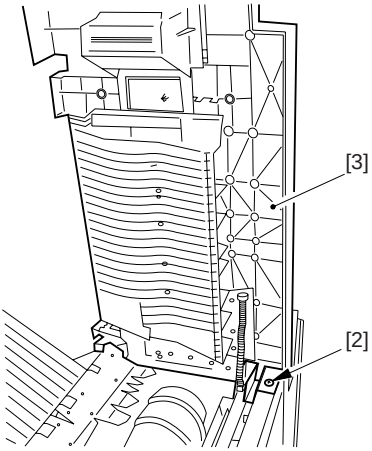
1.1.2 Removing the Upper Cover Unit

1) Remove the rear upper cover.
2) Remove the two screws [1] of the side plate.



F03-101-04

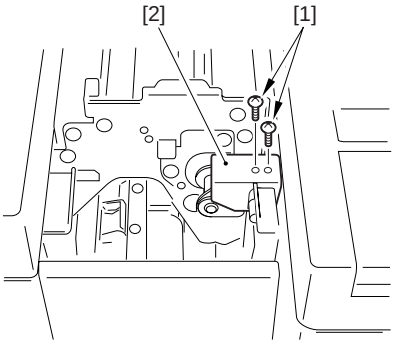
3) Remove the screw [2], and detach the paper cover unit [3].



F03-101-05

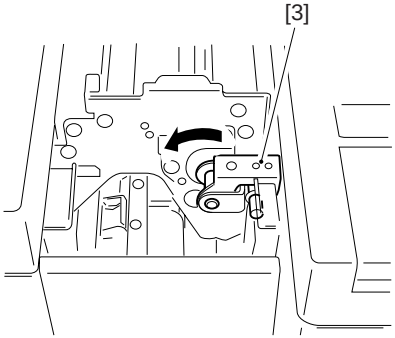
1.1.3 Disconnecting from the Copier (folder)

1) Remove the right upper cover.
2) Remove the two screws [1], and detach the latch fixing plate (front; [2]).



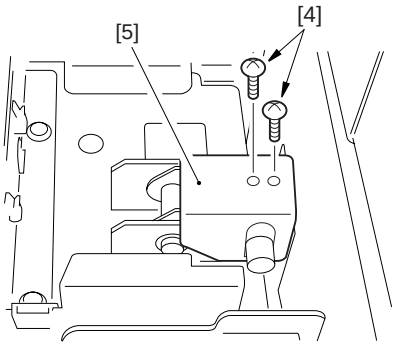
F03-101-06

3) Shift up the latch claw (front; [3]).



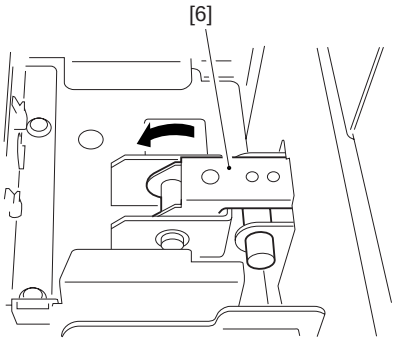
F03-101-07

4) Remove the two screws [4], and detach the latch fixing plate (rear; [5]).



F03-101-08

5) Shift up the latch claw (rear; [6]).



F03-101-09

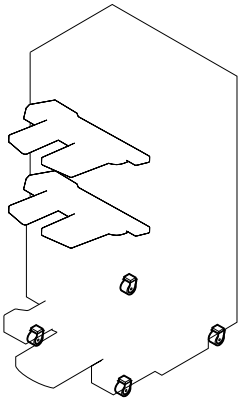
6) Disconnect the finisher from the copier.

1.1.4 Adjusting the Height

If the floor of the site of installation causes a discrepancy in terms of machine height, adjust the height of the machine as follows:

1.1.4-1 Checking the Height and Making Preparations

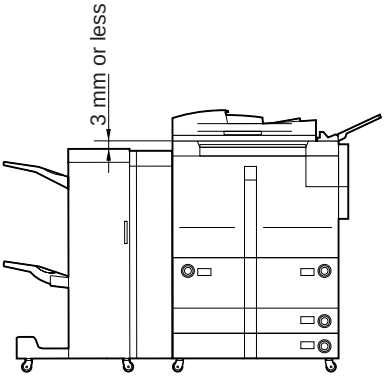
1) Compare the height of the top face of the finisher top cover or the folder front cover/rear cover and the top face of the copier left cover. If the difference in height is not as indicated in F03-101-11/12, make adjustments. If jams occur frequently in the finisher inlet, check to find out if the height must be adjusted. Change the height of the machine using the casters shown in F03-101-10.



F03-101-10

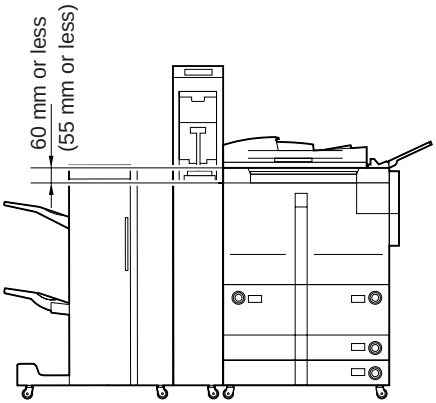
a. If the Top Face of the Copier Left Cover is Higher (3 mm or less)

- If the folding unit is not installed,
  If the difference is not as indicated, go to 4-2.



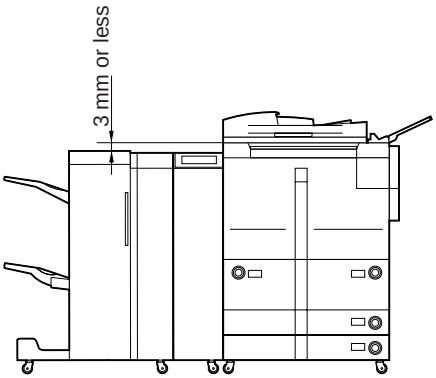
F03-101-11a

- If the paper folding unit is installed,
  front: 60 mm or less (55 mm or more)
  If the difference is not as indicated, go to 4-2.



F03-101-11b

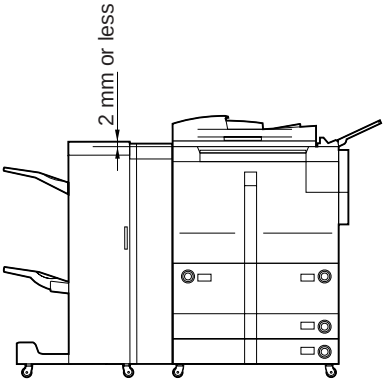
Rear: 3 mm or less
If not as indicated, go to 4-2.



F03-101-11c

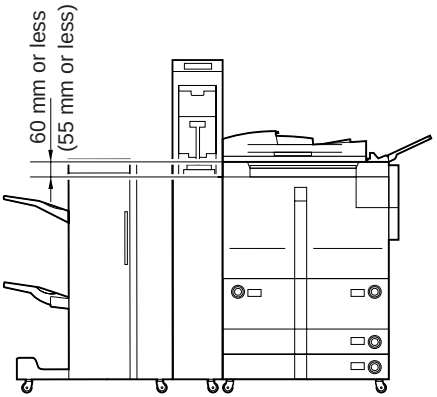
b. Top Face of the Finisher Upper Cover or the Folder Front Cover/Rear Cover

- If the paper folding unit is not as installed,
  2 mm or less
  If not as indicated, go to 4-3.



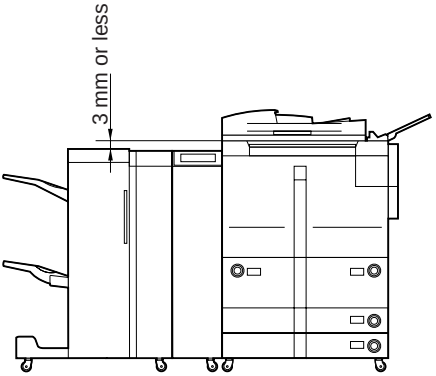
F03-101-12a

- If the paper folding unit is installed,
  Front: 55 mm or less (60 mm or less)
  If not as indicated, go to 4-3.



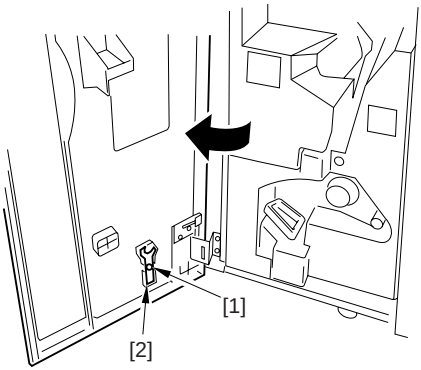
F03-101-12b

Rear: 3 mm or less
If not as indicated, go to 4-3.



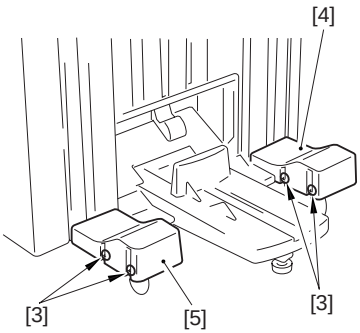
F03-101-12c

2) Open the front cover. Remove the screw [1], and detach the spanner [2] from behind the front cover.



F03-101-13

3) Remove the four screws [3], and detach the foot cover (front; [4]) and the foot cover (rear; [5]).

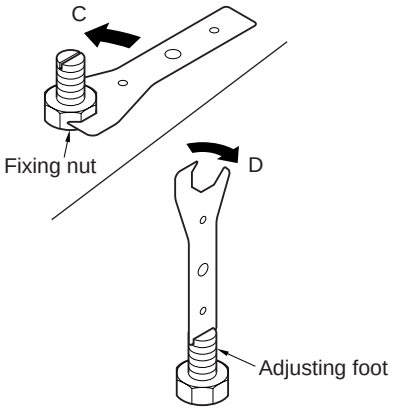


F03-101-14

4) Disconnect the finisher from the copier. (See 1.1.3/3.2.1.)

1.1.4-2 If the Copier Is Higher

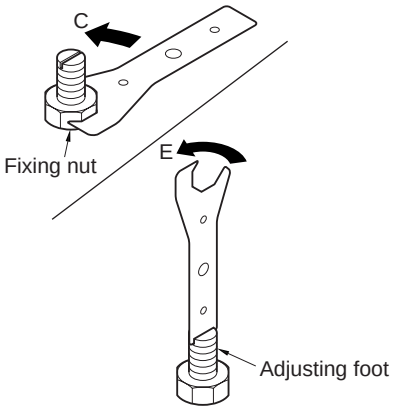
Loosen the fixing nut in the direction of arrow C in the figure. Turn the caster adjusting foot in the direction of arrow D. A full turn of the adjusting foot changes the height by about 1.75 mm. Turn the foot as many time as necessary. Perform this to the four feet.



F03-101-15

1.1.4-3 If the Finisher or the Folder Is Higher

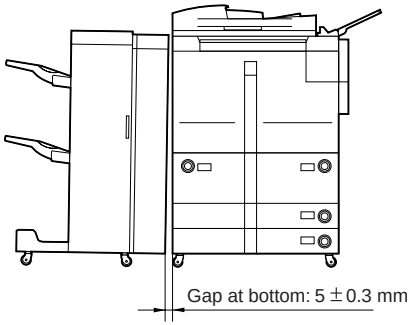
Loosen the fixing nut in the direction of arrow C. Turn the caster adjusting foot in the direction of arrow D. A full turn changes the height by about 1.75 mm. Turn the foot as many times as necessary. Perform this for the four feet.



F03-101-16

1.1.4-4 Checking the Height

Connect the finisher to the copier, and check the height. If the height is not as indicated, make adjustments once again. If appropriate, tighten all fixing nuts, and fit the foot covers (front, rear).



F03-101-17a

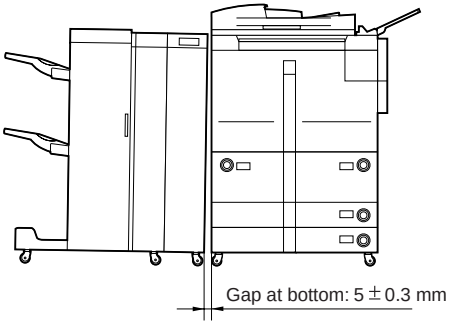
1.1.5 Correcting the Slope

If the floor tilts the finisher, correct the slope as follows; be sure to adjust the height of the machine before starting the work:

1.1.5-1 Checking the Slope and Making Preparations

1) Check to find out which way the machine tilts.

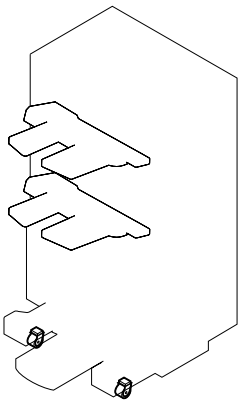
- The gap between the finisher and the copier is 5 ± 0.3 mm. If the gap is larger than this, assume slope A and perform step 5-2; if it is smaller, assume slope B and perform step 5-3.



F03-101-17b

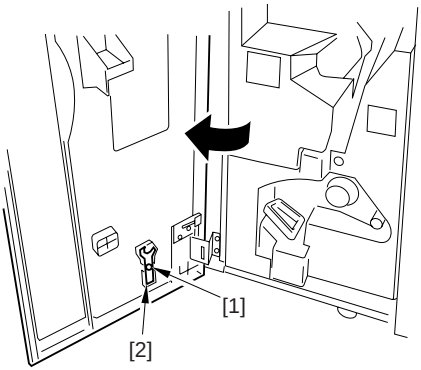
Memo

To adjust, turn the two casters shown in F03-101-18.



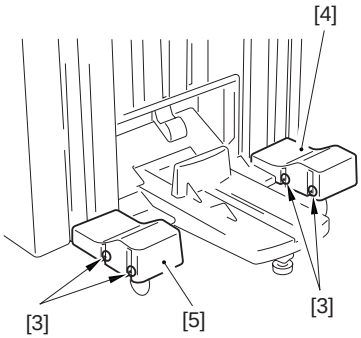
F03-101-18

2) Open the finisher front cover. Remove the screw [1], and detach the spanner [2] from behind the front cover.



F03-101-19

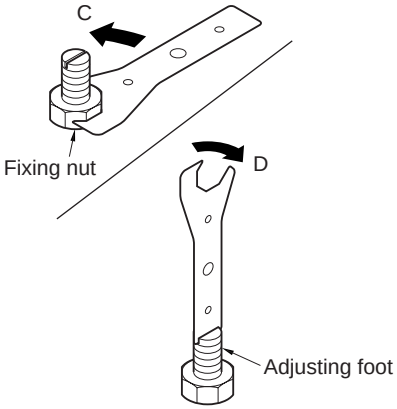
3) Remove the four screws [3], and detach the front foot cover [4] and the rear foot cover [5].



F03-101-20

1.1.5-2 Correcting Slope A

1) Loosen the fixing nut in the direction of arrow C in the figure. Turn the adjusting foot of the caster in the direction of arrow D several times. Perform this on both front and rear feet.

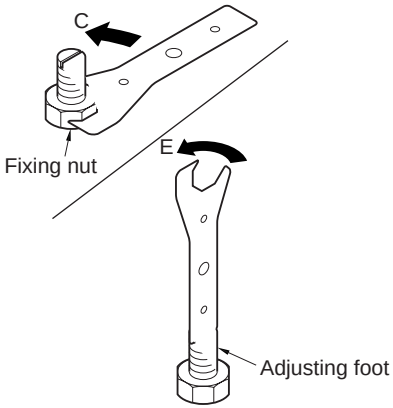


F03-101-21

2) Check the gap between the finisher and the copier. If the gap still has a discrepancy, turn the adjusting foot as needed. If it has been turned excessively, turn it back. Perform this on both front and rear feet until the gap is the same at the top and the bottom.
3) When the gap is even, tighten the front and rear fixing nuts.
4) Mount the foot cover (front, rear).
5) Attach the spanner.

1.1.5-3 Correcting Slope B

1) Loosen the fixing nut in the direction of arrow C in the figure. Turn the adjusting foot of the cater in the direction of E in the figure several times. Perform this on both front and the rear feet.

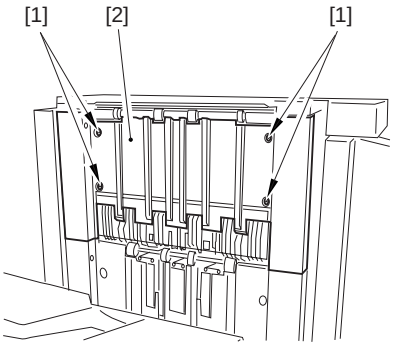


F03-101-22

2) Check the gap between the finisher and the copier. If the gap still has a discrepancy, turn the adjusting foot as needed. If it has been tightened excessively, turn it back. Perform this on both front and rear feet until the gap is the same at the top and the bottom.
3) When the gap is even, tighten the front and rear fixing nuts.
4) Mount the foot covers (front, rear).
5) Attach the spanner.

1.1.6 Removing the Stack Wall (upper)

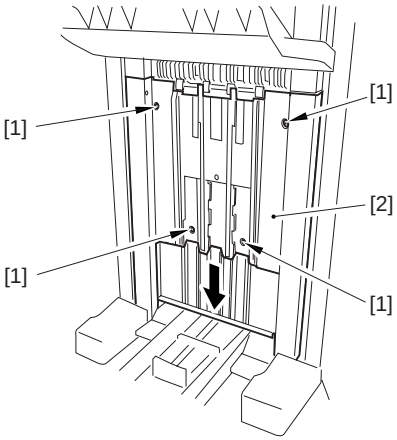
1) Move down the tray A below the stack wall (upper). (See 1.3.1.)
2) Remove the four screws [1], and detach the stack wall (upper ; [2]).



F03-101-23

1.1.7 Removing the Stack Wall (lower)

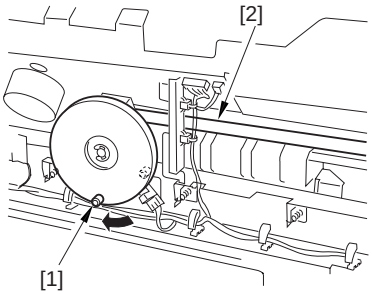
1) Detach the upper stack wall.
2) Open the front door, and remove the stopper (lower).
3) Remove the four screws [1], and detach the stack wall (lower; [2]).



F03-101-24

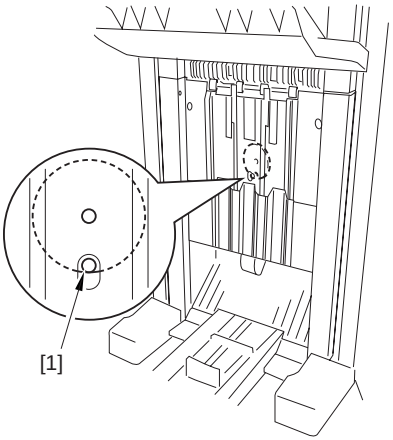
1.1.8 Mounting the Stack Wall (lower)

1) Turn the shutter drive shaft [2] so that the shutter drive member [1] is at the bottom.



F03-101-25

2) Mount the stack wall (lower) so that the member [1] is in view through the hole in the stack wall (lower).

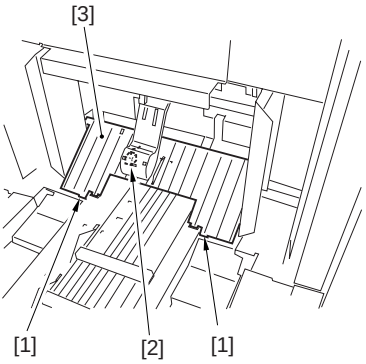


F03-101-26

1.2 Handling Tray Unit

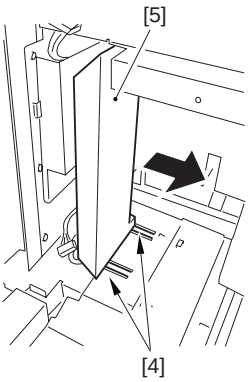
1.2.1 Removing the Handling Tray Unit

1) Remove the stack wall (upper).
2) Remove the stack wall (lower).
3) Free the two claws [1], and disconnect the connector [2]; then, detach the delivery tray slope [3].



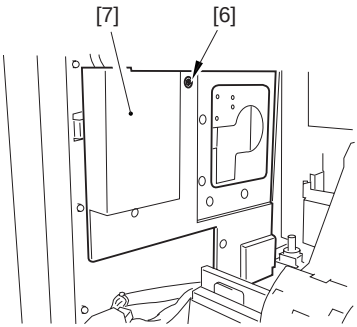
F03-102-01

4) While pushing the two claws [4], slide out the side guide (rear; [5]).



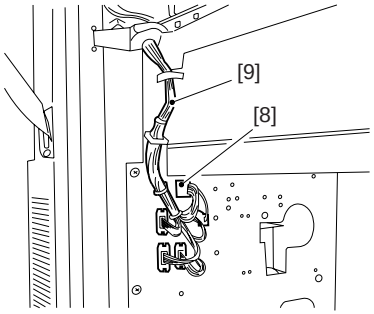
F03-102-02

5) Slide out the saddle unit.
6) Remove the screw [6], and detach the connector cover [7].



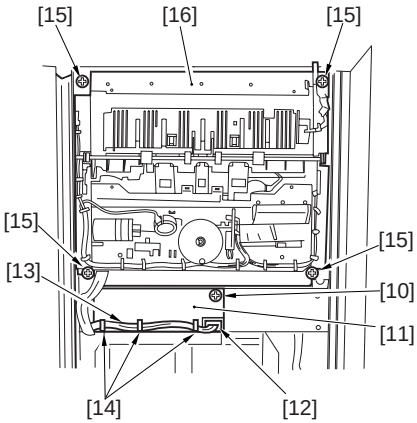
F03-102-03

7) Disconnect the eight connectors [8], and free the harness [9] from the cord clamp.



F03-102-04

8) Remove the screw [10], and detach the PCB cover [11].
9) Disconnect the connector [12], and free the harness [13] from the cord clamp [14].
10) Move up the tray A to the topmost position, and move down the tray B to the bottommost position.
11) Remove the four screws [15], and detach the holding tray unit. [16].



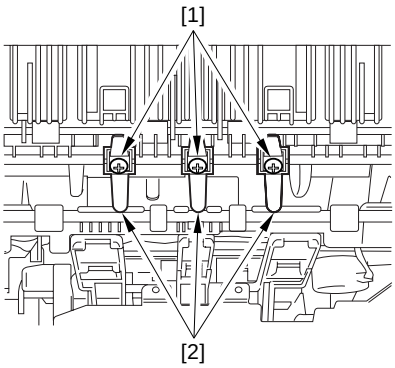
F03-102-05

1.2.2 Removing the Paddle Unit

1) While lifting the swing guide, remove the screw [1] to detach the paddle unit [2].

Memo

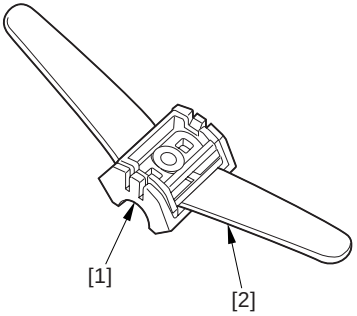
When you have removed the holding tray, you may detach the paddle unit from the handling tray unit.



F03-102-06

1.2.3 Removing the Paddle Unit

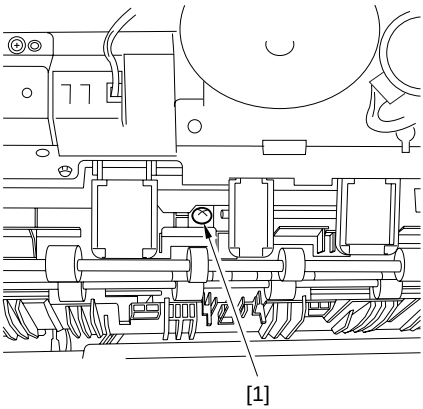
1) Remove the paddle unit. (See 1.2.2.)
2) Remove the retaining member [1], and detach the paddle [2].



F03-102-07

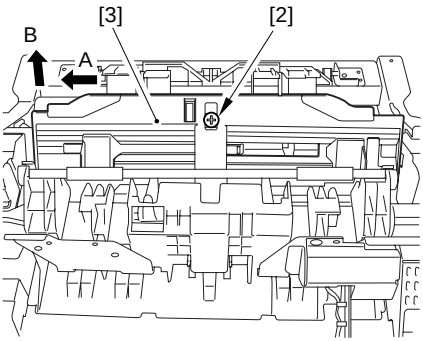
1.2.4 Removing the Handling Tray

1) Remove the handling tray unit. (See 1.2.1.)
2) Remove the screw [1] of the stack delivery roller lower.



F03-102-08

3) Remove the screw [2] of the holding tray.
4) Slide the handling tray [3] in the direction of arrow A, and then detach it in the direction of arrow B.



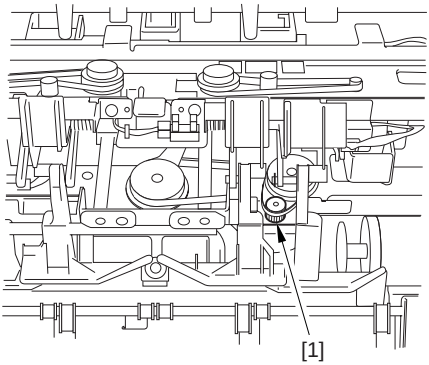
F03-102-09

1.2.5 Removing the Alignment Motor

Memo

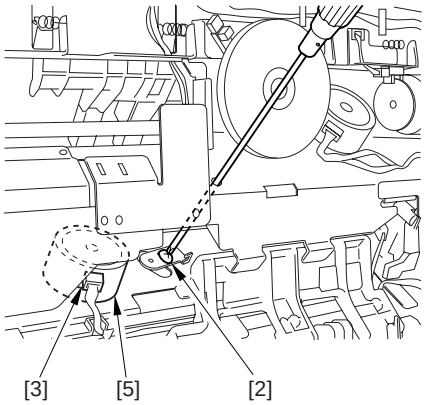
Here, the removal of the front alignment motor is discussed. The rear alignment motor is removed in the same way.

1) Remove the handling tray unit (1.2.1) together with the handling tray (1.2.4).
2) Turn the tray auxiliary plate motor [1] by hand to move the tray auxiliary plate away from home position.



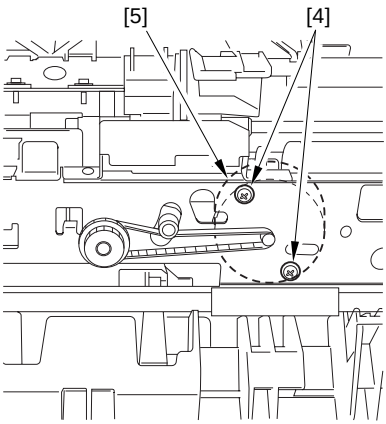
F03-102-10

3) Loosen the screw [2] to reduce the tension on the belt.
4) Disconnect the connector [3].



F03-102-11

5) Remove the two screws [4], and detach the alignment motor [5].

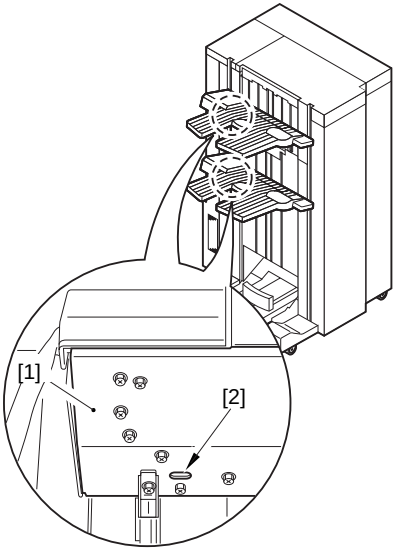


F03-102-12

1.3 Tray A Unit/Tray B Unit

1.3.1 Moving Down the Tray A/B Unit

1) While holding the tray frame [1] from below, insert a screwdriver into the long hole [2] in the rear of the body.



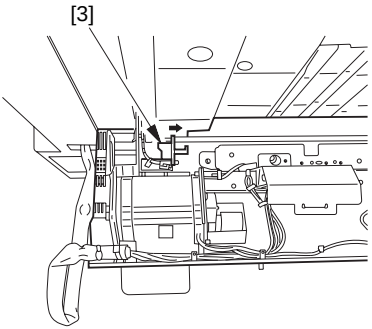
F03-103-01

2) While freeing the ratchet with a screwdriver or the like, move down the tray A/B unit.

Memo

The tray A/B may be detached to free the ratchet [3].

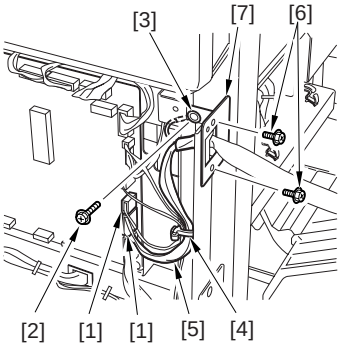
If the power is turned on while the latchet is not engaged, the locks of the tray lock sensor will not change, causing 'E540/E542'.



F03-103-02

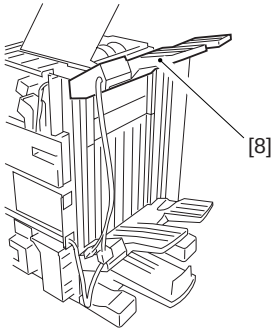
1.3.2 Removing the Tray A Unit

1) Open the upper cover, and detach the support pole cover.
2) Remove the rear cover and the rear upper cover.
3) Remove the stopper (upper).
4) Disconnect the two connectors [1], and remove the screw [2] to detach the grounding wire [3].
5) Free the harness [5] from the cord clamp [4]; then, remove the two screws [6], and detach the harness holder [7].



F03-103-03

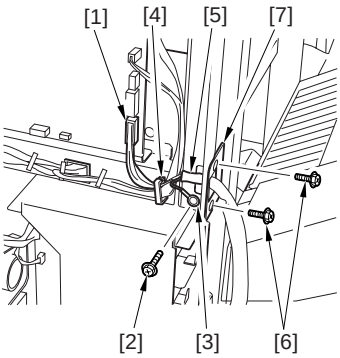
6) Pull off the tray A unit [8] upward.



F03-103-04

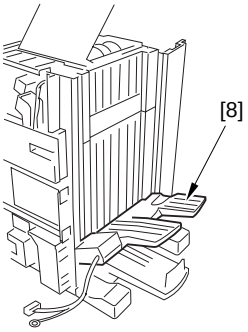
1.3.3 Removing the Tray B Unit

1) Remove the tray A unit.
2) Remove the stopper (lower).
3) Open the upper cover.
4) Disconnect the connector [1], and remove the screw [2] to detach the grounding wire [3]; then, free the sharpness [5] from the cord clamp [4].
5) Remove the two screws [6], and detach the harness holder [7].



F03-103-05

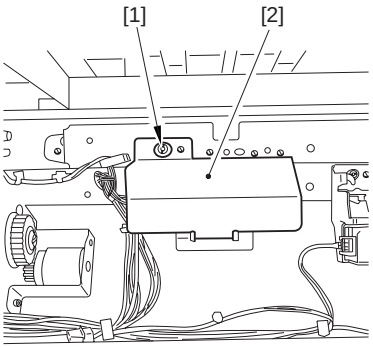
6) Pull of fate tray B unit [8] upward.



F03-103-06

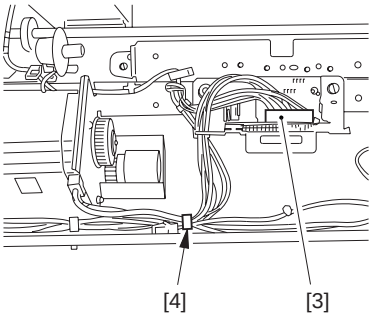
1.3.4 Removing the Try A/B Lift Motor (M13/M12)

1) Remove the tray A/B.
2) Move down the tray A/B unit to the bottommost position (1.3.1). Otherwise, the tray can drop along the rack when the motor is removed.
3) Remove the screw [1], and detach the motor driver PCB cover [2].



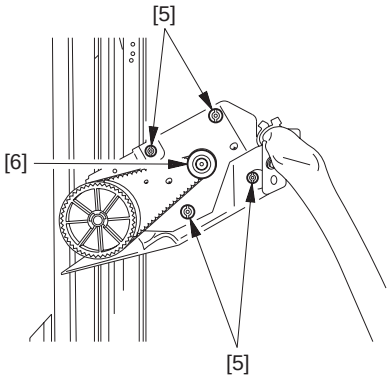
F03-103-07

4) Disconnect the connector [3], and free the harness from the cord clamp [4].



F03-103-08

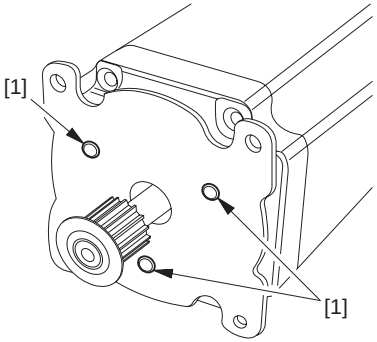
5) Remove the four screws [5], and detach the motor [6].



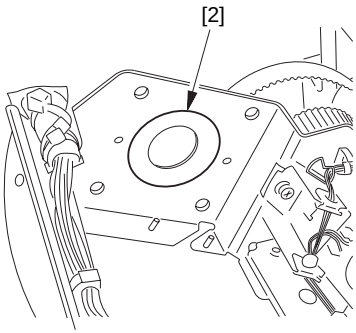
F03-103-09

1.3.5 Mounting the Tray A/B Lift Motor (M13/M12)

1) Mount the motor so that the circle connecting the protrusion [1] of the screw hole of the motor will match the round hole (large, [2]) of the motor mounting face.



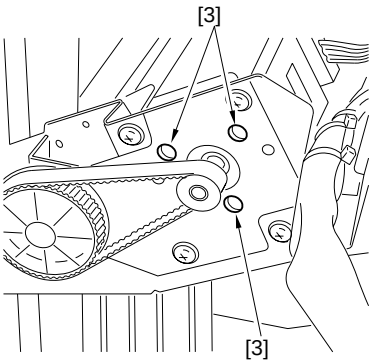
F03-103-10



F03-103-11

Memo

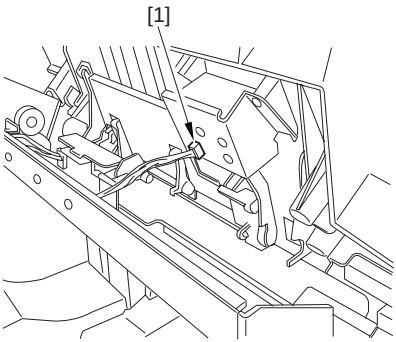
You can find out whether the protrusion is matched against the round hole (large) with reference to the small hole [3] on the drive belt side.



F03-103-12

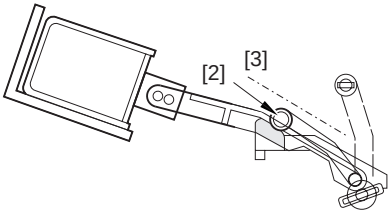
1.3.6 Adjusting the Position of the Sub Tray Solenoid (SL3; with paper folding unit istalled)

1) Remove the tray B.
2) Disconnect the connector [1] of the sub tray solenoid cable.



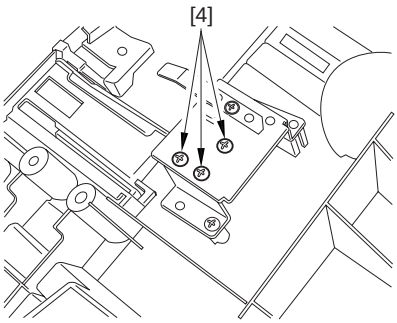
F03-103-13

3) Check to make sure that the support member [2] of the lever unit is not sticking beyond the tray face [3]. If it is, adjust the height as follows:



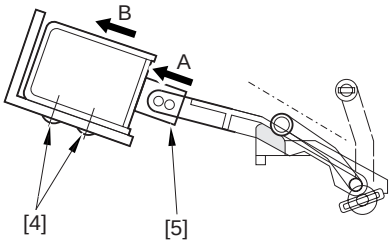
F03-103-14

4) Loosen the three screws [4] of the solenoid unit.



F03-103-15

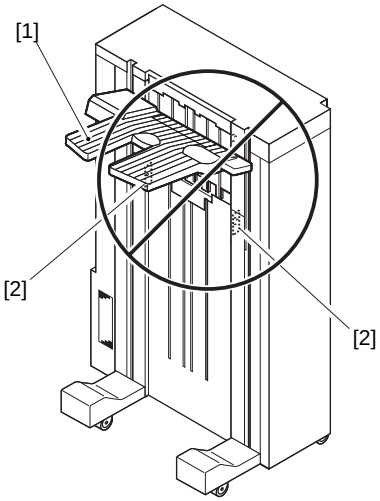
5) Cause the solenoid to become attracted. (F03-103-16-A)
6) With the solenoid attracted, hook your finger on the solenoid shaft [5], and pull the solenoid body. (F03-103-16-B)
7) When the support member of the lever unit is pulled as far as it butts against the stopper, tighten the screw [4].



F03-103-16

1.3.7 Position of Tray B at Power-On

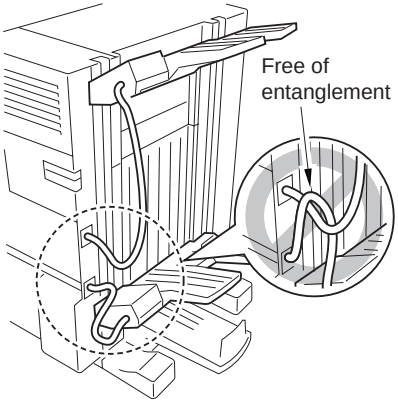
The tray B [1] must not be above the tray B paper sensor [2] at power on. If it is, an error will be issued when the position of the tray B is checked.



F03-103-17

1.3.8 Harness of the Tray A/B

After mounting the tray A/B, check to make user that the harnesses are not entwined.

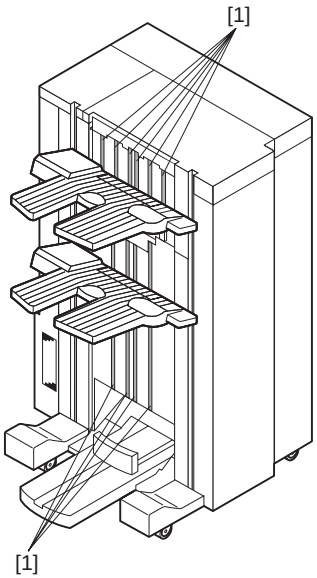


F03-103-18

1.3.9 Points to Note When Handling the Stack Wall Rail

Take care not to subject the stack wall rail [1] to scratches or dents, which can affect the stacking performance.

If dirt is excessive, use alcohol to clean.

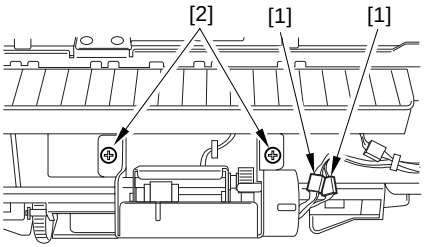


F03-103-19

1.4 Knurled Belt Releasing Unit

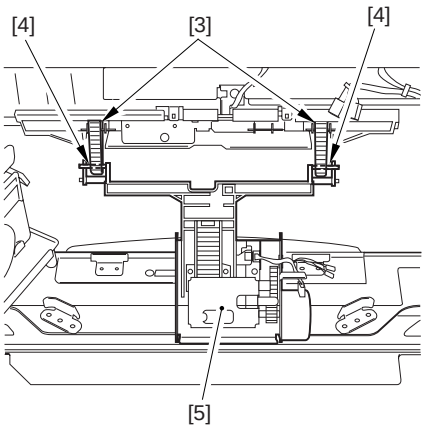
1.4.1 Removing the Knurled Belt Releasing Unit

1) Disconnect the finisher from the copier.
2) Disconnect the two connectors [1], and remove the two screws [2].



F03-104-01

3) While freeing the knurled belt [3] from the pulley [4], detach the knurled belt releasing unit [5].

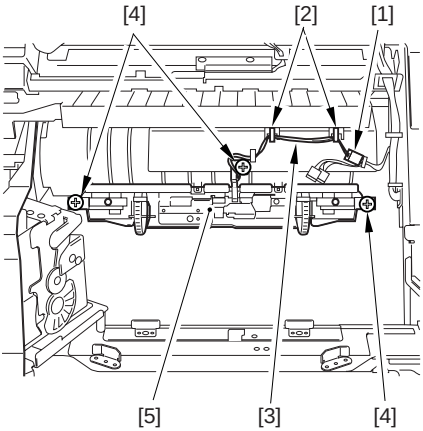


F03-104-02

1.5 Knurled Belt

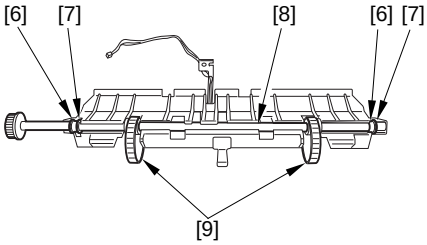
1.5.1 Remove the Knurled Belt

1) Remove the handling tray unit. (1.2.1)
2) Disconnect the finisher from the copier. (1.1.3)
3) Remove the rear over.
4) Disconnect the connector [1], and free the harness [3] from the cord clamp [2].
5) Remove the three screws [4], and detach the sort delivery guide [5].



F03-105-01

6) Remove the two E-rings [6] on both sides of the sort delivery roller and the bearing [7] from the front.
7) Detach the knurled belt [8] from the sort delivery roller shaft.

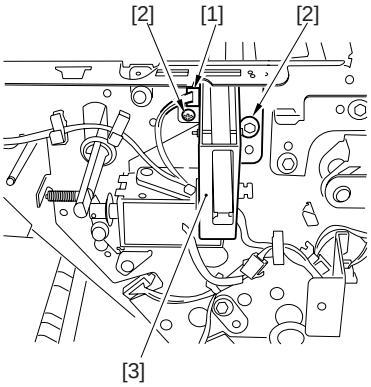


F03-105-02

1.6 Buffer Roller Unit

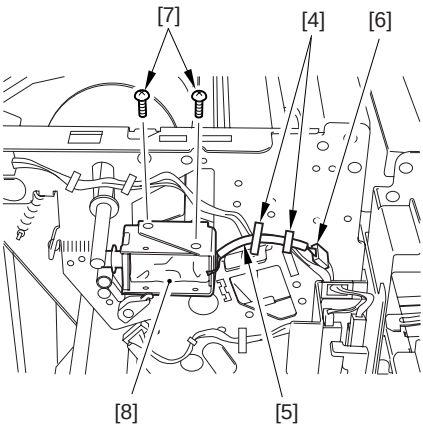
1.6.1 Removing the Buffer Roller Unit

1) Open the front cover and the upper cover.
2) Remove the buffer roller knob and the inside cover.
3) Disconnect the connector [1], and remove the two screws [2]; then, detach the upper cover sensor base [3].



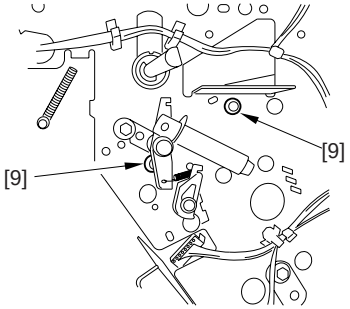
F03-106-01

4) Free the harness [5] from the cord clamp [4].
5) Disconnect the connector [6], and remove the two screws [7]; then, detach the buffer path switching solenoid (SL1; [8]).

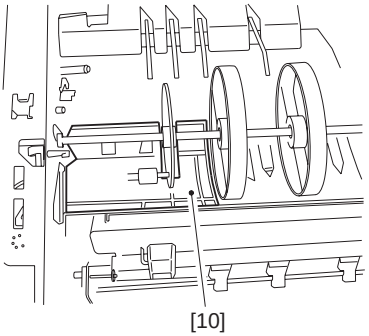


F03-106-02

6) Remove the two screws [9], and detach the prism support plate [10].

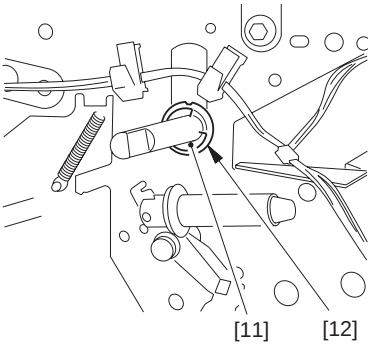


F03-106-03



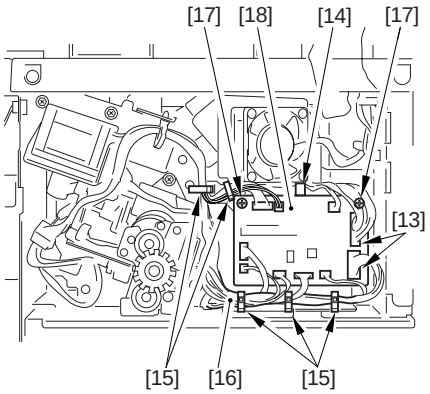
F03-106-04

7) Remove the E-ring [11] from the front end of the buffer roller shaft, and detach the bearing [12].



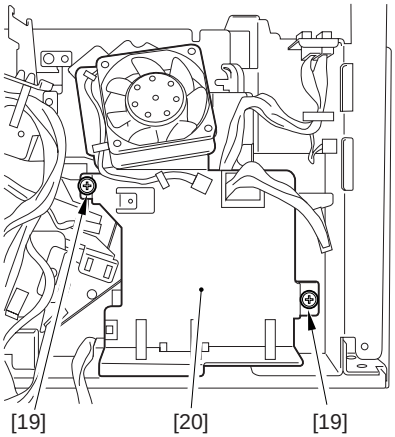
F03-106-05

8) Remove the rear upper cover and the rear cover.
9) Remove the punch waste case holder.
10) Disconnect the ten connectors [13] of the punch driver PCB and the connector [14] of the punch fan; then, free the harness [16] from the cord clamp.
11) Remove the two screws [17], and detach the punch driver PCB [18].



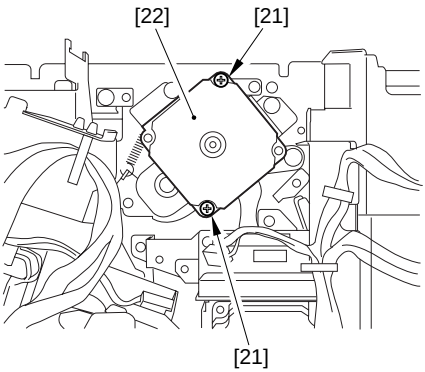
F03-106-06

12) Remove the two screws [19], and detach the punch fan [20] together with the base.



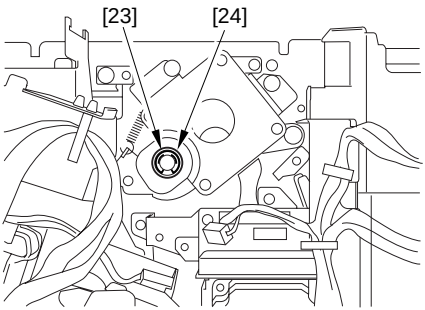
F03-106-07

13) Remove the two screws [21], and detach the buffer motor [22].



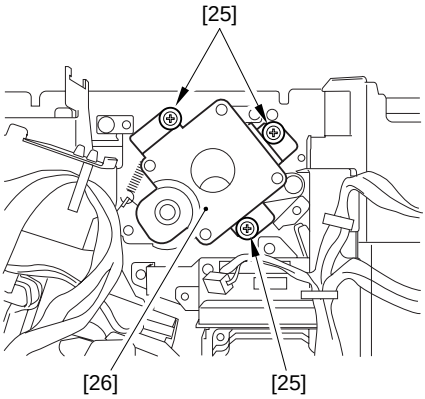
F03-106-08

14) Remove the E-ring [23] at the rear end of the buffer shaft, and detach the bearing [24].



F03-106-09

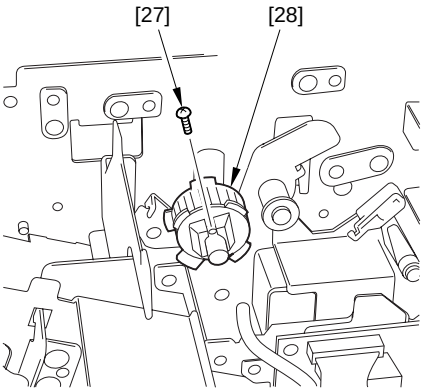
15) Remove the three screws [25], and detach the buffer motor base [26].



F03-106-10

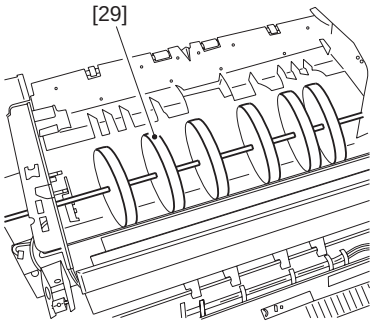
16) Remove the screw [27], and remove the gear [28] of the buffer roller shaft.

Take care not to drop the pin in the gear.



F03-106-11

17) Remove the buffer roller unit [29].

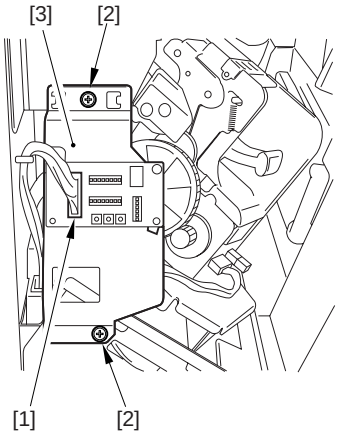


F03-106-12

1.7 Stapler Unit

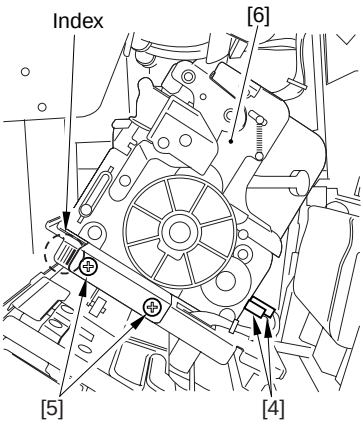
1.7.1 Removing the Stapler

1) Open the front cover, and remove the inside cover.
2) Disconnect the connector [1], and remove the two screws [2]; then, detach the switch PCB [3] together with the base.



F03-107-01

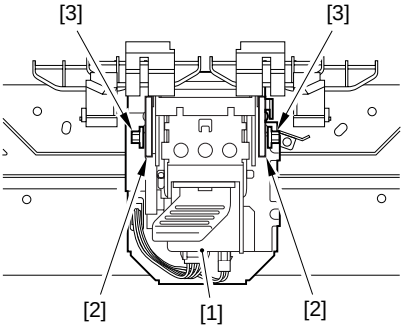
3) Disconnect the two connectors [4], and remove the two screws [5]; then, detach the stapler [7]. Before removing, be sure to take note of the stapler positioning index.



F03-107-0-2

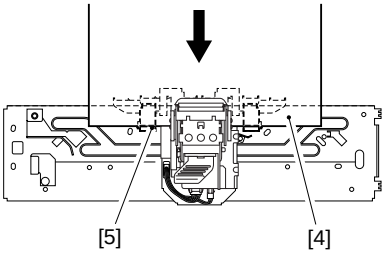
1.7.2 Adjusting the Position of the Stapler Paper Stopper

1) Disconnect the finisher from the copier.
2) Move the stapler unit [1] to the middle of the rail.
3) Loosen the screws ([3], 2 each) on the stapler paper stopper (left, right; [2]).



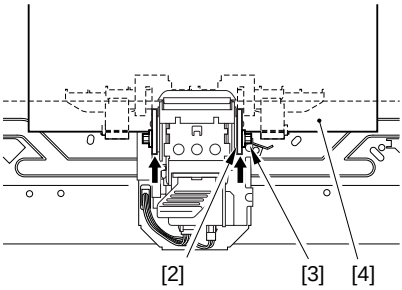
F03-107-03

4) While lifting the swing guide, insert a stack of several sheets [4], and butt it against the rear end stopper [5].



F03-107-04

5) While butting the stapler paper stopper (left, right; [2]) against the stack of sheets [4], tighten the screw [3].

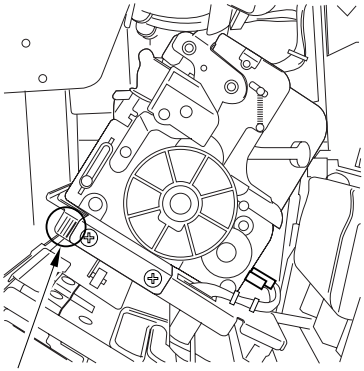


F03-107-05

1.7.3 Positioning the Stapler

1.7.3-1 Using the Index

Mount the stapler holder with reference to the index taken note of before removing it. (Normally, match it against the middle index to position it correctly).

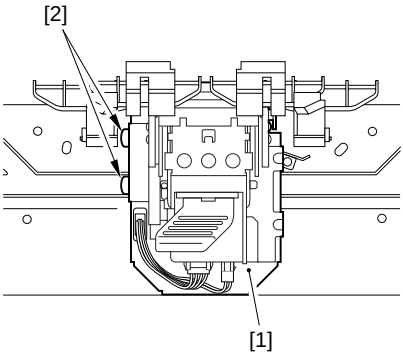


F03-107-06

1.7.3-2 Using the Stopper

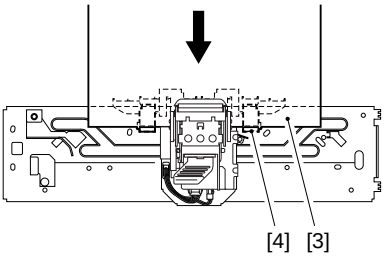
If the index is not clear, perform the following; this method is useful when the stapler paper stopper has not been moved:

1) Move the stapler unit [1] to the middle of the rail.
2) Loosen the two stapler holder fixing screws [2].



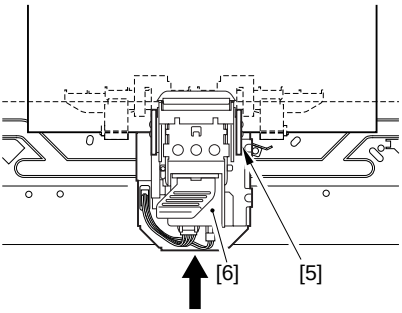
F03-107-07

3) Lifting the swing guide, insert a stack of several sheets [3], and butt it against the rear end stopper [4].



F03-107-08

4) Slide the stapler holder [6] until the stapler paper stopper [5] butts against the stack of sheets; then, tighten the screw.

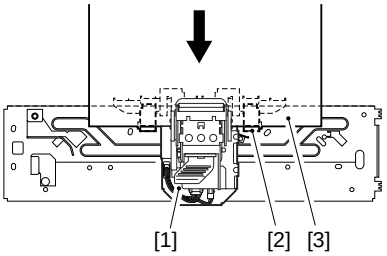


F03-107-09

1.7.3-3 Positioning by Stapling

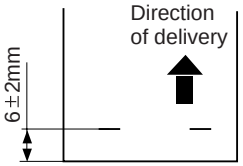
If the index is not clear upon replacement of the stapler holder and, in addition, the stapler has moved, perform the following:

1) Disconnect the finisher from the copier.
2) Fix the stapler holder to the base temporarily. At this time, try to position it somewhat toward the rear.
3) Move the stapler [1] to the middle of the rail.
4) Loosen the screws (2 each) of the stapler paper stopper (left, right).
5) While lifting the swing guide, insert a stack of several sheets [2], and butt it again the rear edge stopper [3].



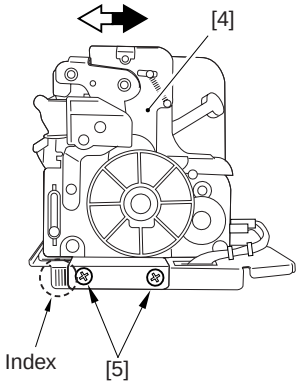
F03-107-10

6) Perform manual stapling.
7) Check the position of the staple against the standards.



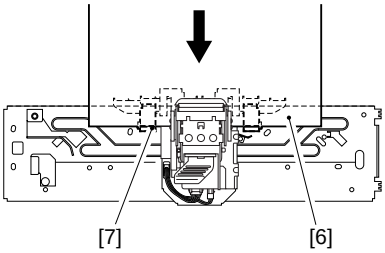
F03-107-11

8) According to the result of comparison, move the stopper holder [4] with reference to the index (2 screws [5]).



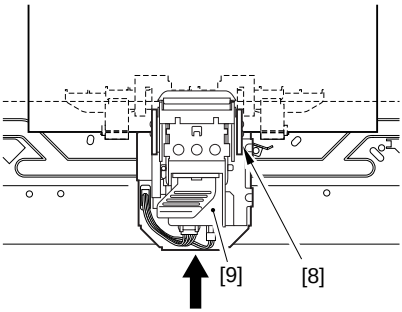
F03-107-12

9) While lifting the swing guide, insert a stack of several sheets [6], and butt it against the rear edge stopper [7].



F03-107-13

10) Slide the stapler holder [9] unit the stapler paper stopper [8] butts against the paper sack, and tighten the screw.

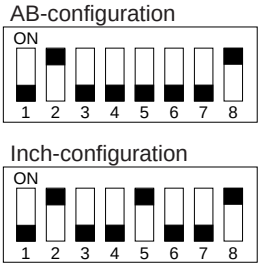


F03-107-14

1.7.4 Adjusting the Position of the Stapler (front, 1-point)

If you have replaced the EEPROM (IC108) of the finisher controller PCB, perform the following:

1) Set SW973 on the switch PCB as follows:

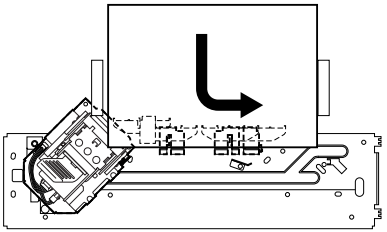


F03-107-15A

2) Press SW976.

- The swing guide of the finisher opens and, at the same time, the front aligning plate and the rear aligning plate move to home position. Then, the front/rear aligning plate moves to the front 1-point stapling position. The stapler also moves to the front 1-position stapling position. The latest setting is indicated by DSP971 on the switch PCB; between '-12' and '+12'.

3) Place several sheets of A4 or LTR sheets, and insert them into the holding tray. At this time, butt the trailing edge of the stack against the rear aligning plate.



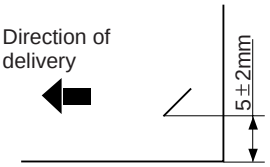
F03-107-15B

- If the gap between the front aligning plate and the paper front edge is 1 mm or more, turn off the power; then, shift all bits of SW973 to OFF, and stop the adjustment. Then, adjust the alignment width, and then perform the adjustment of the stapling position.

4) Press SW976 of the switch PCB.

- In response, the stapler performs stapling. The indication of DSP971 will be '0'.

5) Remove the stack of sheets, and check the staple position against the standard. If it is correct, end the adjustment. Turn off the power, and shift all bits of SW973 to OFF, and turn on the power once again. If the stapling position must still be adjusted, go to the next step.



F03-107-15C

6) Press SW976 once so that a new setting may be entered.
- The stapler moves to home position once, and then moves back to stapling position. DSP971 indicates the latest setting.

7) According to the result of comparison, press SW975 (+) or SW974 (-) on the finisher controller PCB.
- Each press on SW975 (+) shifts the stapling position to the front by about 0.42 mm, and the indication of DSP971 advances in the direction of '+' by '1',
- Each press on SW974 (-) moves the stapling position toward the rear by about 0.42 mm. The indication of DSP971 advances in the direction of '-' by 1.

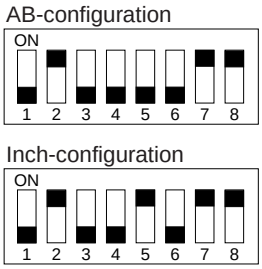
8) As in step 3), insert a stack of several A4 or LTR sheets into the handling tray.
9) Press SW976 once so that the new setting will be accepted.
- Manual stapling will take place automatically so that you can check the stapling position. The indication of DSP971 will be '0'.

10) Turn off the power.
11) Shift all bits of SW973 to OFF.
12) Turn off the power, and move down the swing guide.

1.7.5 Adjusting the Stapling Position (rear, 1-point)

If you have replaced the EEPROM (IC108) of the finisher controller PCB or replaced the stapler, perform the following:

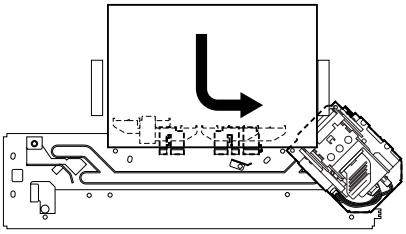
1) Set SW973 of the switch PCB as follows:



F03-107-15D

2) Press SW976 of the switch PCB.
- The swing guide of the finisher opens and, at the same time, the front aligning plate and the rear aligning plate move to home position. Then, the front aligning plate and the rear aligning plate move to the rear 1-point stapling position. The stapler also moves to the rear 1-point stapling position. DSP971 on the switch PCB indicates the latest setting; between '-12' and '+12'.

3) Holding a stack of several A4 or LTR sheets, insert it into the handing tray. At this time, butt the trailing edge of the stack against the rear aligning plate.



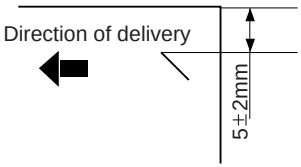
F03-17-15E

- If the gap between the front aligning plate and the paper front edge is 1 mm or more, turn off the power; then, shift all bits of SW973 to OFF to stop adjustment. Thereafter, adjust the alignment width, and then adjust the stapling position once again.

4) Press SW973 on the stitch PCB.

- In response, the stapler will execute stapling operation. The indication of DSP971 will be '0'.

5) Remove the stack of sheets, and check the stapling position against the standard. If the stapling position is correct, end the adjustment. Turn off the power, and shift all bits of SW973 to OFF, and turn on the power once again. If the stapling position must still be adjusted, go to the net step.



F03-107-15F

6) Press SW976 once so that a new setting may be entered.

- The stapler will move to home position once and then back to the stapling position. DSP971 indicates the latest setting.

7) According to the result of comparison, press SW975 (+) or SW974 (-) on the finisher controller PCB.

- Each press on SW975 (+) shifts the stapling position toward the front by about 0.42 mm. The setting of DSP971 advances in the direction of '+' by '1'.
- Each press on SW974 (-) shifts the stapling position toward the rear by about 0.42 mm. The setting of DSP971 moves in the direction of '-' by '1'.

8) As in step 3), insert several sheets of A4 or LTR paper into the handling tray.

9) Press SW976 once so that the new setting will be accepted.

- Automatic stapling will take place so that you can check the stapling position. The indication of DSP971 will be '0'.

10) Turn off the power.

11) Shift all bits of SW973 to OFF.

12) Turn on the power, and move down the swing guide.

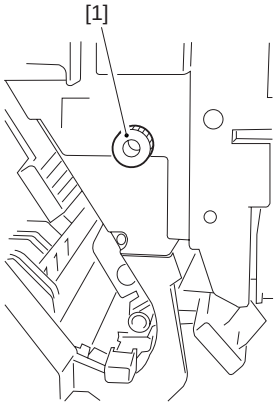
1.8 Punch Unit

Before removing the punch unit, perform the following so that the punch waste is moved to the waste case.

1) Shift bits 1, 6, 7, and 8 of DIP SW973 on the switch PCB to ON.
2) Press SW976 on the switch PCB to turn on the punch waste feed motor.
3) Keep the motor ON for 5 min.
4) Press SW976 to stop the motor.

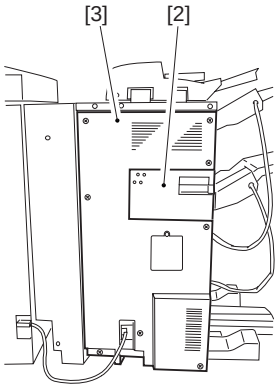
1.8.1 Removing the Punch Slide Unit

1) Open the front cover, and remove the punch knob [1].



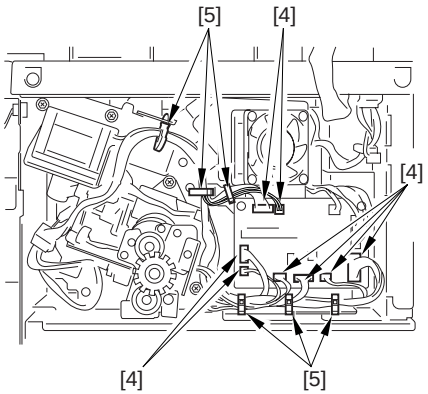
F03-108-01

2) Remove the inside cover. (4 screws)
3) Remove the punch waste case [2] and the rear cover [3].



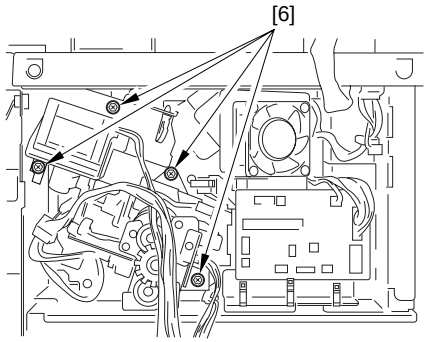
F03-108-02

4) Disconnect the eight connectors [4], and free the harness from the five cord clamps [5].

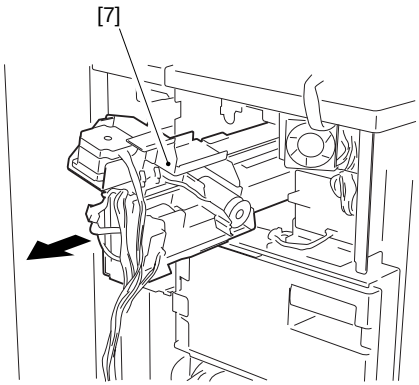


F03-108-03

5) Remove the four screws [6], and slide out the punch slide unit [7] to the front.

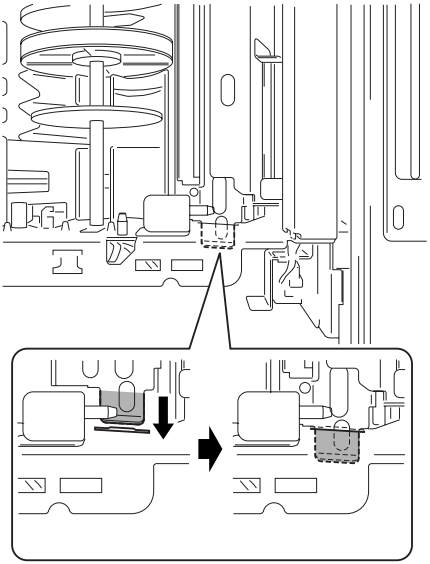


F03-108-04



F03-108-05

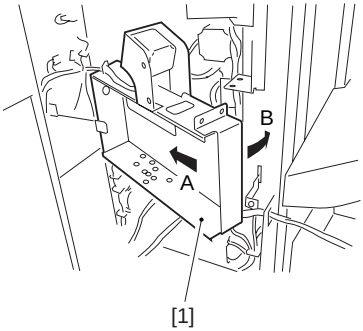
When mounting, be sure that the tip of the punch slide unit is fully in the slit as shown.



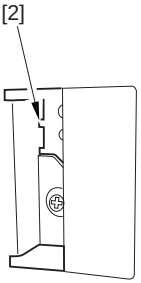
F03-108-06

1.8.2 Mounting the Punch Waste Case Holder

1) Mount the waste case holder [1] to the finisher frame in the sequence indicated by arrows: arrow A, and then arrow B. When fitting the holder in the direction of arrow B, match the hole in the waste case holder and the protrusion [2] of the finisher.

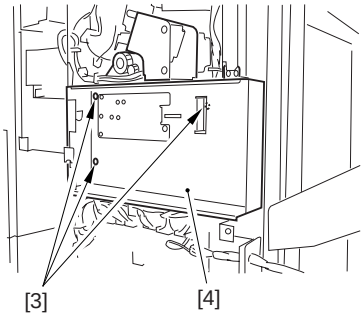


F03-108-07



F03-108-08

2) Secure the waste case holder [4] with three screws [3].

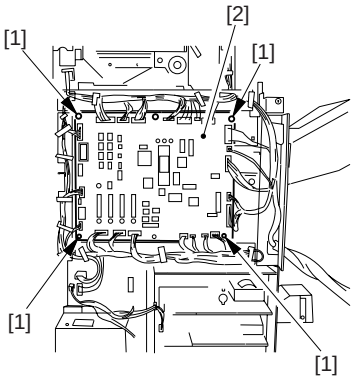


F03-108-09

1.9 PCBs

1.9.1 Removing the Finisher Controller PCB

1) Remove the rear cover.
2) Disconnect the 26 connectors, and remove the four screws [1] to detach the finisher controller PCB [2].



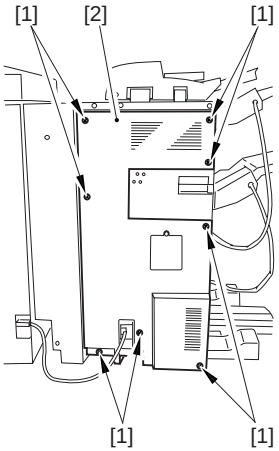
F03-109-01

2 Saddle Stitcher Assembly

2.1 Saddle Unit

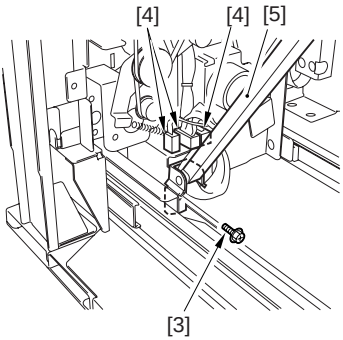
2.1.1 Removing the Saddle Unit

1) Remove the eight screws [1], and detach the rear cover [2].



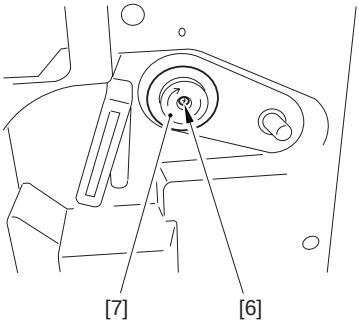
F03-201-01

2) Slide out the saddle unit; then, remove the screw [3] and disconnect the three connectors [4] to detach the harness guide [5].



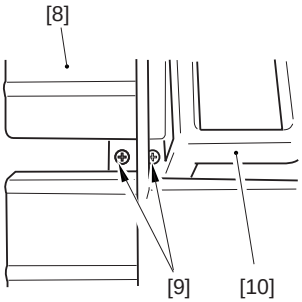
F03-201-02

3) Remove the screw [6], and detach the folding roller knob [7].



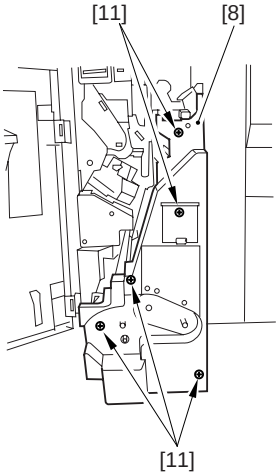
F03-201-03

4) Remove the two screws [9] from the cut-off on the left side of the saddle unit inside cover [8], and detach the grip [10].



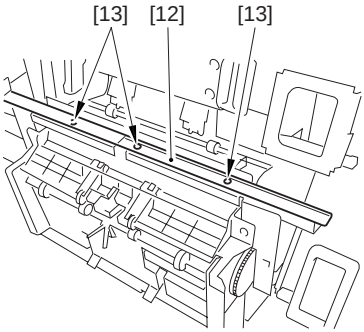
F03-201-04

5) Remove the five screws [11], and detach the saddle unit inside cover [8].



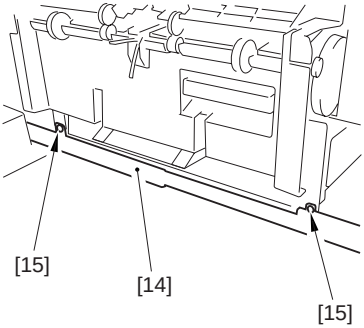
F03-201-05

6) Remove the three screws [13] of the left middle rail [12].



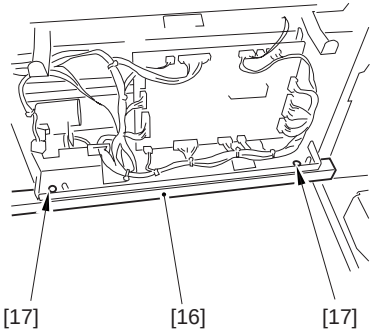
F03-201-06

7) Remove the two screws [15] from the left lower rail [14].



F03-201-07

8) Remove the PCB cover. (4 screws)
9) Remove the two screws [18] of the right lower rail [16], and detach the saddle unit.

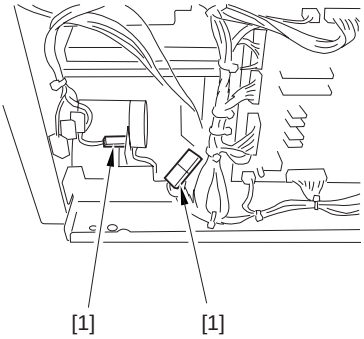


F03-201-08

2.1.2 Removing and Mounting the Folding Roller

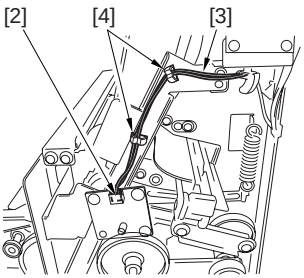
2.1.2-1 Removing the Folding Roller

1) Slide out the saddle unit.
2) Disconnect the two connectors [1].



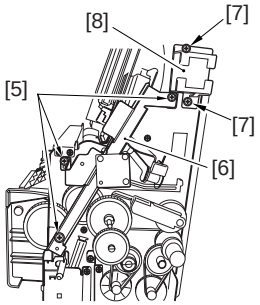
F03-201-09

3) Disconnect the connector [2] of the saddle jam LED PCB, and free the harness [3] from the tie-wrap [4].



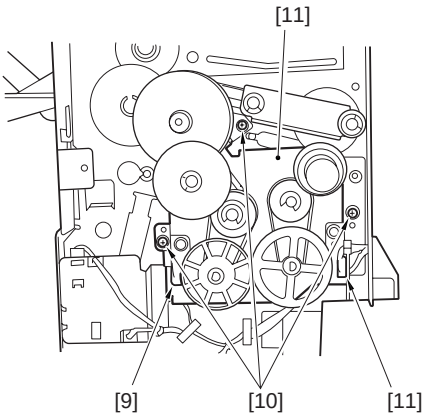
F03-201-10

4) Remove the three screw [5], and detach the stitcher base unit fixing plate (front; [6]).
5) Remove the two screws [7], and detach the stay [8].



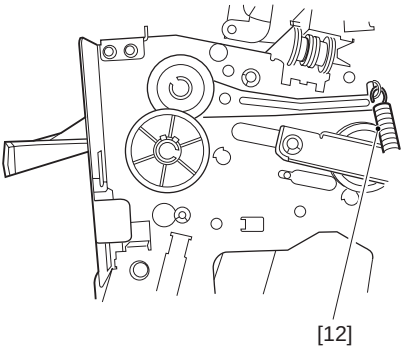
F03-201-11

6) Disconnect the two connectors [9], and remove the three screws [10]; then, detach the folding/paper pushing plate motor base [11].

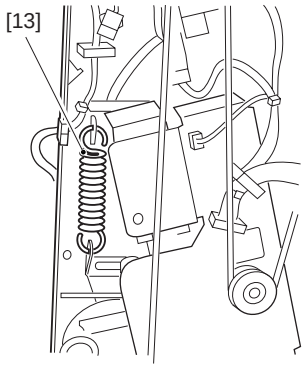


F03-201-12

7) Remove the tension springs front [12] and rear [13].

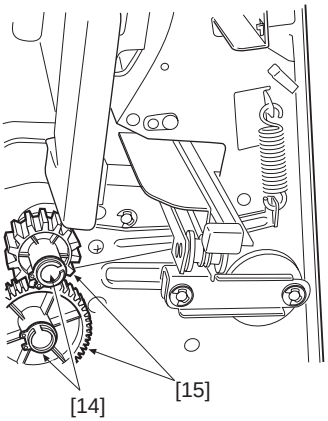


F03-201-13



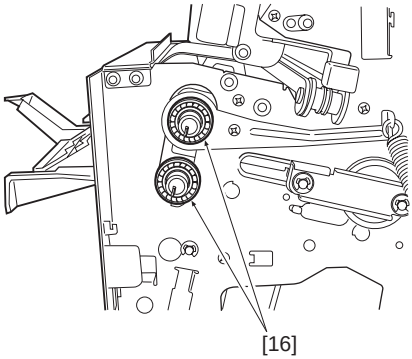
F03-201-14

8) Remove the two C-rings [14], and detach the two gears [15].



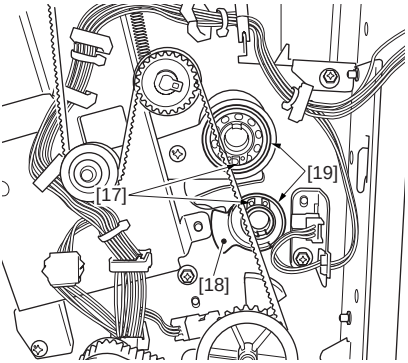
F03-201-15

9) Remove the two bearings [16].



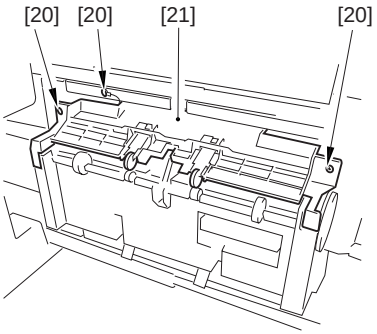
F03-201-16

10) Likewise, remove the two C-rings [17], sensor flag [19], and two bearings [19].



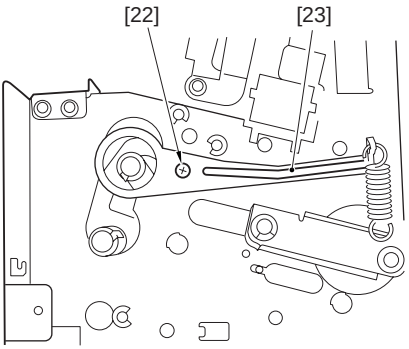
F03-201-17

11) Remove the three screws [20], and detach the delivery guide [21].

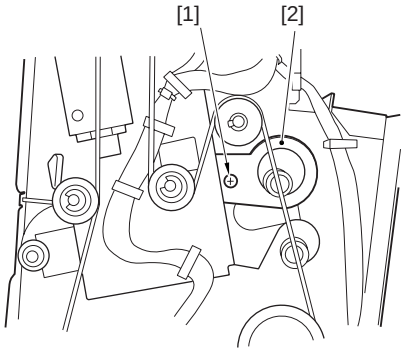


F03-201-18

12) Remove the stepped screws [22] (1 each), and detach the front and rear tensioners [23].

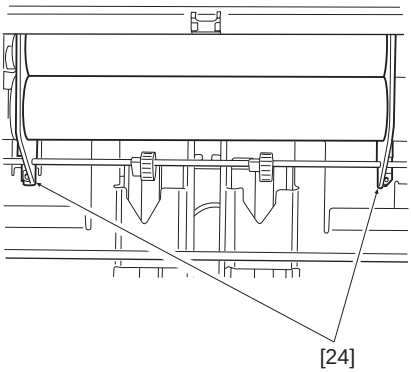


F03-201-19



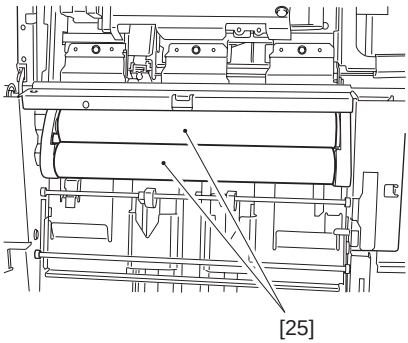
F03-201-20

13) Remove the two aligning plates [24]. (1 screw)



F03-201-21

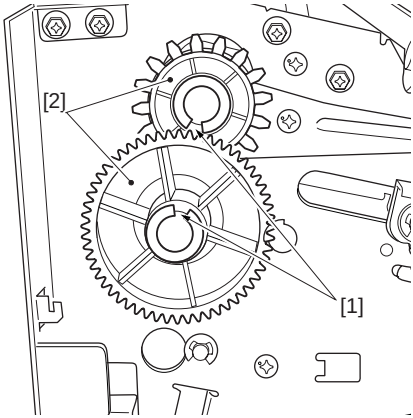
14) Shift the roller [25] to the front; then, slide it out in the direction of delivery.



F03-201-22

2.1.2-2 Mounting the Folding Roller

1) Mount the gears [2] so that the openings [1] in the folding roller face each other, matching the phase.

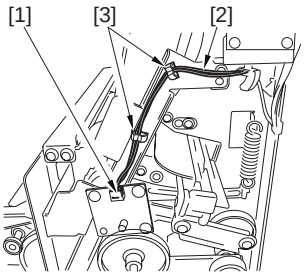


F03-201-23

2.1.3 Adjusting the Position of the stitcher

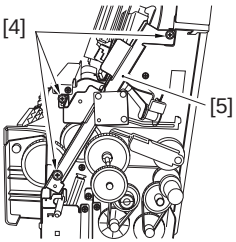
Poor adjustment can lead to stitching faults.

1) Remove the saddle unit inside cover.
2) Disconnect the connector [1] of the saddle jam LED PCB, and free the harness [2] from the tie-wrap [3].



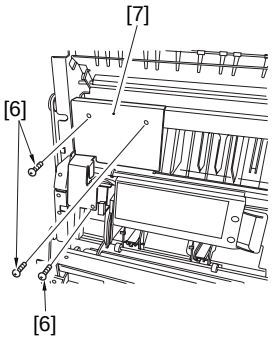
F03-201-24

3) Remove the three screws [4], and detach the stitcher base unit fixing plate (front, [5]).



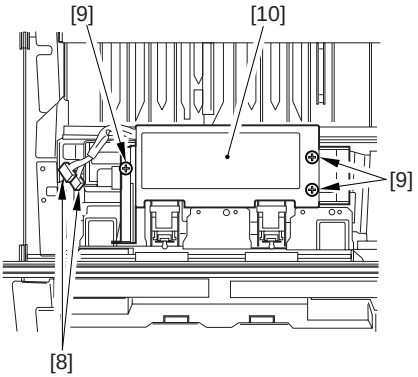
F03-201-25

4) Slide put the saddle unit to the front.
5) Remove the three screws [6], and detach the stitcher base unit fixing plate (rear, [7]).



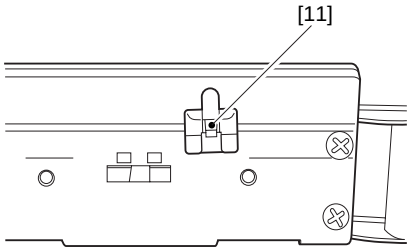
F03-201-26

6) Disconnect the two connectors [8].
7) Remove the three screws [9], and detach the stitcher base unit cover [10].



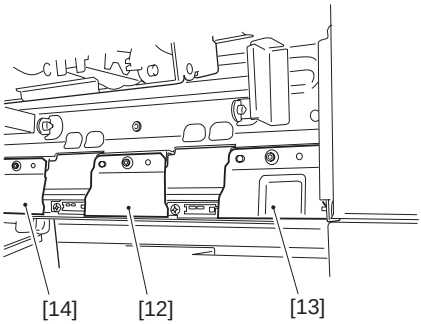
F03-201-27

8) Detach the positioning tool [11] from behind the cover.



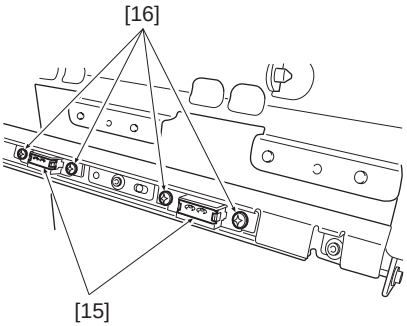
F03-201-28

9) For the rear, remove the front guide plate [13]; for the front, on the other hand, remove the rear guide plate [14]. (1 screw each).



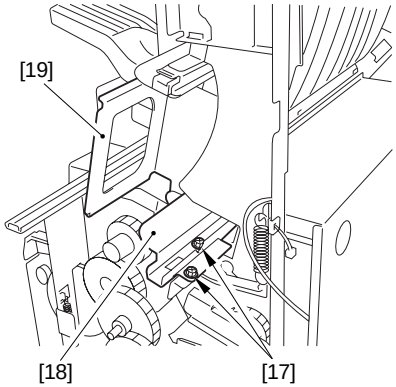
F03-201-29

10) Loosen the two screws [16] on the stitcher base [15].



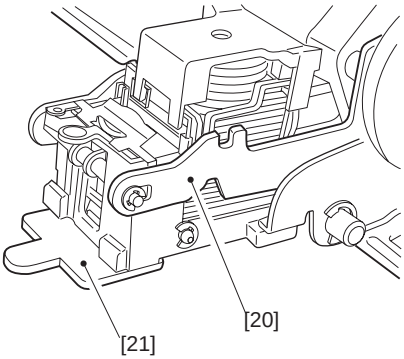
F03-201-30

11) Remove the two screws [17], and detach the fixing plate [18] to slide out the stitcher unit [19] to the front.



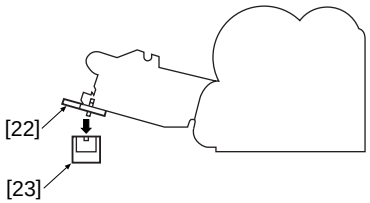
F03-201-31

12) Insert the tool [21] into the punching slot of the stitcher [20].



F03-201-32

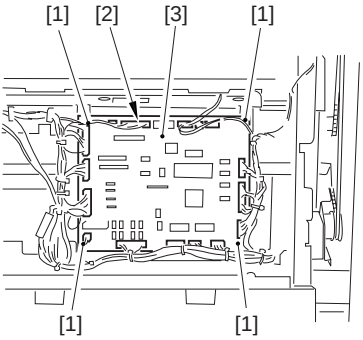
13) Shift down the stitcher; then, while turning the stitcher gear, match the protrusion [22] of the tool and the recess in the base, and tighten the screw [16] on the base [23] to secure it in place.



F03-201-33

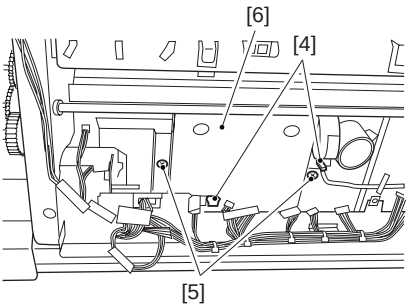
2.1.4 Mounting the Positioning Plate Unit

1) Remove the PCB cover.
2) Remove the four screws [1], and disconnect the 17 connectors [2]; then, detach the saddle stitcher controller PCB [3].



F03-201-34

3) Disconnect the two connectors [4], and remove the two screws [5].
4) While shifting the unit [6] to the left/right, detach it.

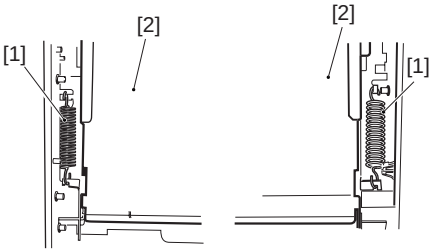


F03-201-35

2.1.5 Removing the No. 1/No. 2 Paper Deflecting Plate

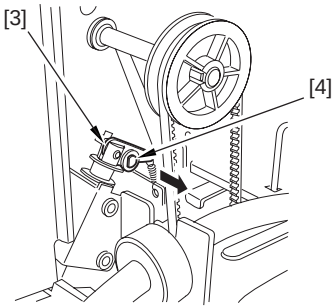
Remove the finisher assembly rear cover.

1) Remove the two tension springs [1] to release the inlet guide plate [2].



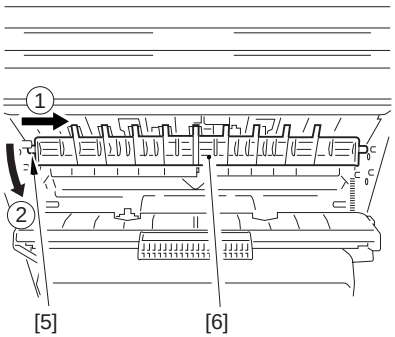
F03-201-36

2) Free the claw [3] of the deflecting plate bushing, and pull out the deflecting plate shaft [4] toward the rear of the machine.



F03-201-37

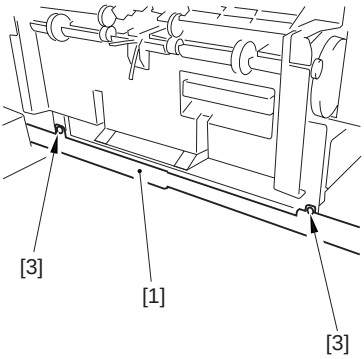
3) Detach the front shaft [5] of the paper deflecting plate from the front side plate, and detach the paper deflecting plate [6] in the direction shown in the figure.



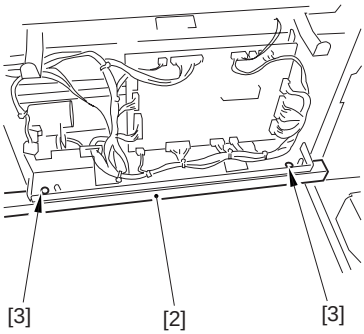
F03-201-38

2.1.6 Fitting of the Saddle Unit

1) Place the saddle unit on the left lower rail [1] and the right lower rail [2], and secure it in place with a screw [3].

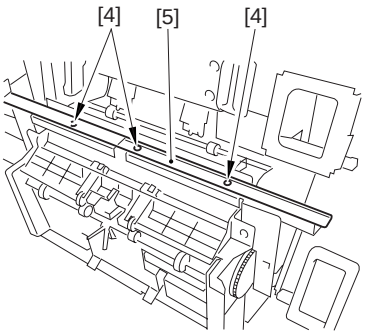


F03-201-39



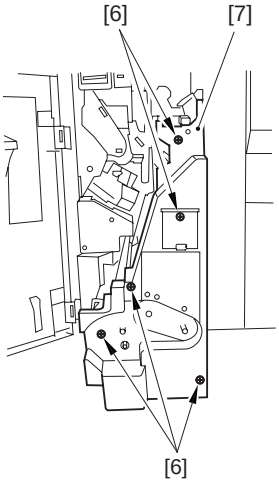
F03-201-40

2) With three screws [4], secure the saddle unit to the left middle rail [5].



F03-201-41

3) Fit the saddle unit inside. If no resistance is felt, mount the saddle unit inside cover [7] with four screws [6].



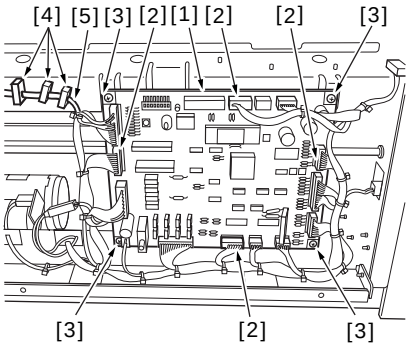
F03-201-42

4) If resistance is felt when fitting the saddle unit inside, slide it out, and loosen the two screw on the left upper stay.
5) Fit in the saddle unit.
6) Tighten the two screws on the left upper stay.
7) Mount the saddle unit inside cover.
8) Mount the saddle unit PCB cover.

2.1.7 Removing/Mounting the Paper Pushing Plate

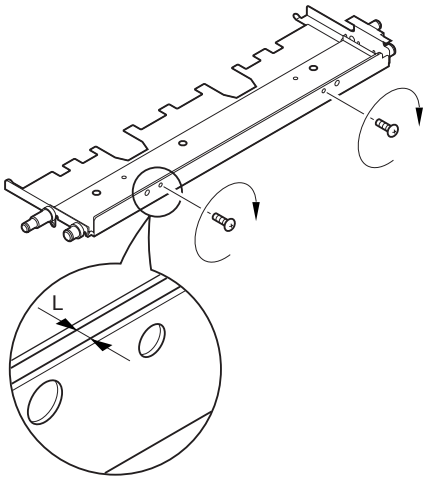
2.1.7-1 Removing the Paper Pushing Plate

1) Slide out the saddle unit, and detach the PCB cover. (4 screws)
2) Remove the folding roller knob and the front lower cover. (6 screws)
3) Remove the saddle stitcher controller PCB [1]. (17 connectors [2], 4 screws [3])
4) Free the harness [5] from the cord clamp [4].



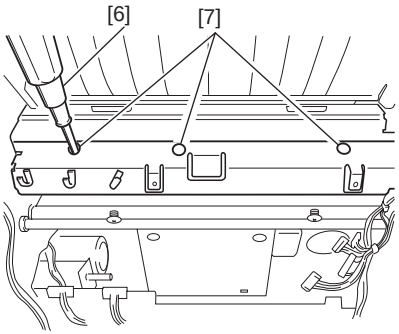
F03-201-43

5) Fit in the screws into the two screw holes of the pushing plate case until they stop. These screws will be used as a reference later when determining the distance L for mounting the paper pushing plate. (Use the screws that were used to hold the PCB cover in place.)

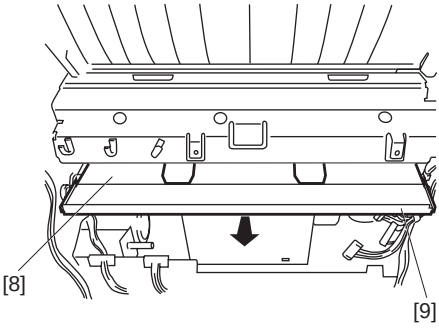


F03-201-44

6) Insert a screwdriver [7] into the three holes [6] of the rail, and remove the screws; then, detach the pushing plate [8] and the paper pushing plate [9].



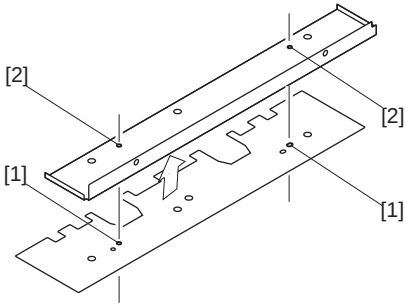
F03-201-45



F03-201-46

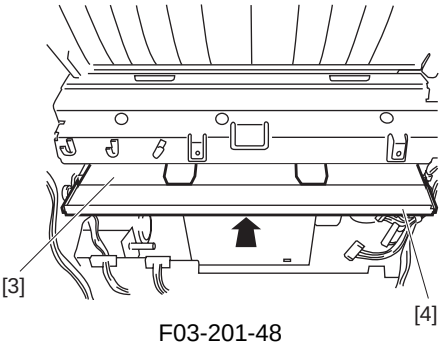
2.1.7-2 Adjusting the Position of the Paper Pushing Plate

1) Match the hole [1] of the paper pushing plate with the emboss [2] of the pushing plate fixing plate. (Note the face and the back of the paper pushing plate.)



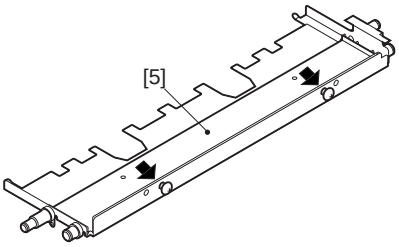
F03-201-47

2) Put the paper pushing plate [3] and the pushing plate fixing plate [4] through the gap into the machine, and place it temporarily on the pushing plate base. Check to make sure that the emboss of the pushing plate fixing plate and the hole in the pushing plate base are matched.



F03-201-48

3) Butt the pushing plate fixing plate [5] against the tips of the two screws that were previously fitted.



F03-201-49

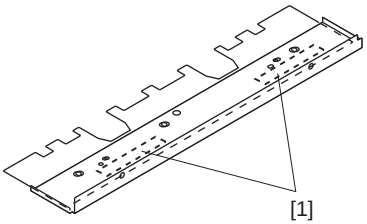
4) With three screws, secure the paper pushing plate and the pushing plate fixing plate in place.
5) Remove the two screws used as reference (to which the pushing plate fixing plate was butted).
6) Mount the parts that were removed to detach the paper pushing plate.

2.7.1-3 Reference

When putting the paper pushing plate inside the machine together with the pushing plate fixing plate, they at times tend to separate, making the work difficult. If such is the case, work as follows:

a. Using Double-Sided Tape

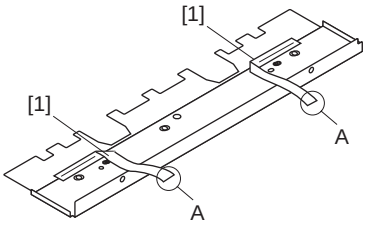
Keep the paper pushing plate and the pushing plate fixing plate together with double-sided tape[1] (F03-201-51). Then, perform the work under 2.1.7-2, starting with step 2).



F03-201-50

b. Using Tape

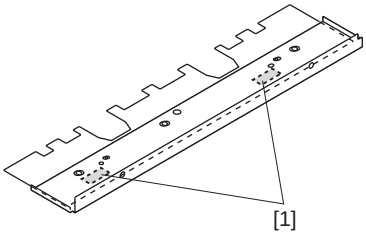
1) Attach a length of tape to the seam between the paper pushing plate an the pushing plate fixing plate; then, fold it at a right angle. Be sure that the bend of the tape will be longer than the bend of the pushing plate fixing plate (F03-201-52).
2) Perform the work under 2.1.7-2, starting from step 2) to step 6). At this time, be sure to keep the end of the tape (A) outside the machine.
3) Pull the end of the tape (A) fully outside the machine. Be sure no piece of tape will remain inside the machine.
4) Mount the external covers.



F03-201-51

c. Using Adhesive

Keep the paper pushing plate and the pushing plate fixing plate together using adhesive [1]. Then, perform the work under 2.1.7-2 starting with step 2).



F03-201-52

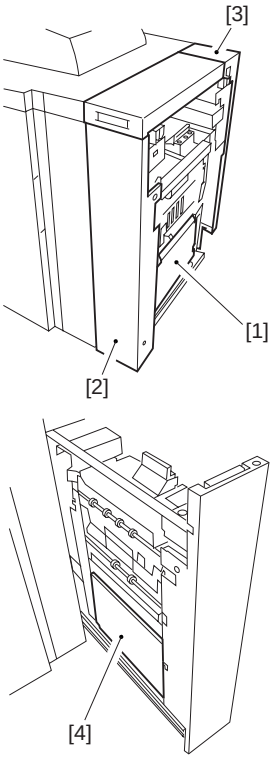
3 Paper Folding Unit-B1 (folder)

3.1 External Covers

Remove the covers as follows when cleaning, checking, or repairing the inside of the machine; those covers that can be detached by mere removal of their mounting screws are omitted from the discussions:

[1] Right lower cover (2)
[2] Front cover (3)
[3] Rear cover (2)
[4] Left lower cover (2)

The number in parentheses are the number of mounting screws used.

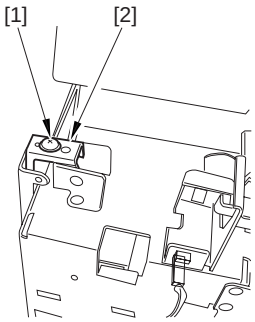


F03-301-01

3.2 Folder

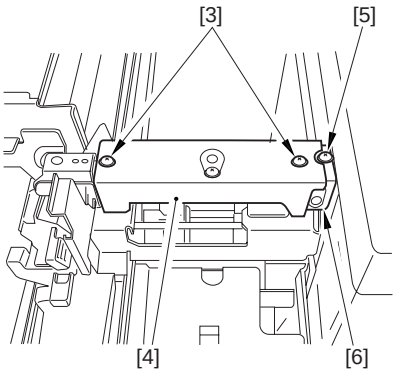
3.2.1 Disconnecting from the Copier

1) Remove the rear cover.
2) Slide out the folder.
3) Remove the screw [1], and detach the hook (rear, [2]).



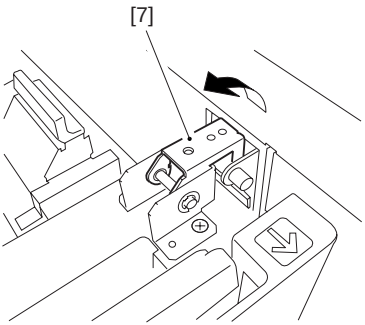
F03-302-01

4) Remove the two screws [3], and detach the magnet catch plate [4]; then, remove the screw [5], and detach the latch fixing plate [6].



F03-302-02

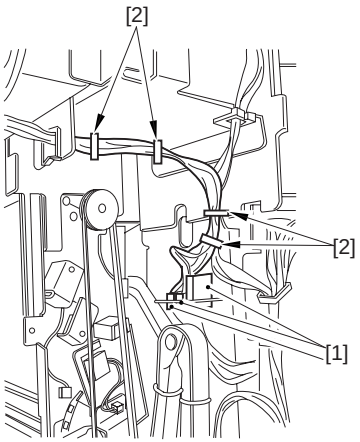
5) Free the hook (front, [7]).
6) Disconnect the folder from the copier.



F03-302-03

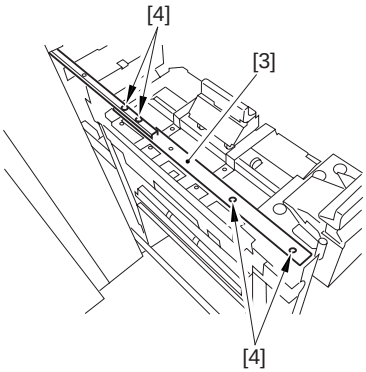
3.2.2 Removing the Folder (upper)

1) Disconnect the folder from the copier.
2) Disconnect the three connectors [1] connected to the finisher unit, and free the harness from the holder [2].



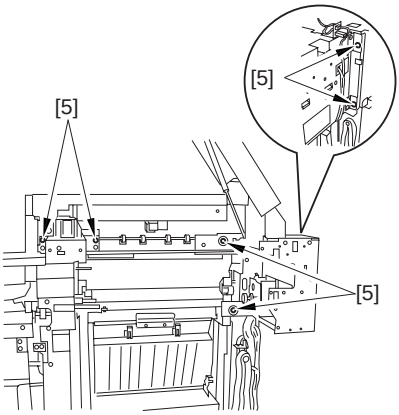
F03-302-04

3) Remove the four mounting screws [4] of the aculide rail [3].



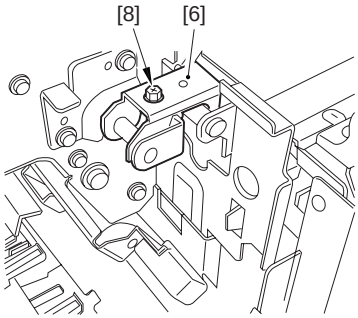
F03-302-05

4) Remove the six screws [5].

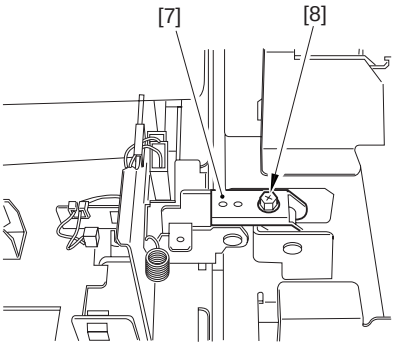


F03-302-06

5) Remove the finisher assembly right upper cover.
6) Remove the front hook [6] and the rear hook [7], and remove the screw [8] (1 each) to release.

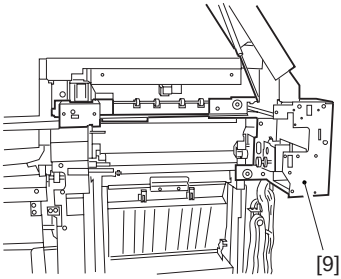


F03-302-07



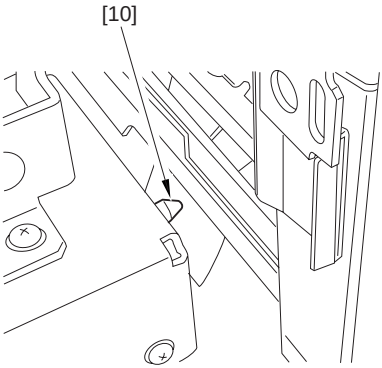
F03-302-08

7) Remove the upper folder [9].



F03-302-009

When performing steps 4) and 5), be sure to hold the upper holder in place.
When mounting the upper holder, be sure to match the positioning pin [10] and the receiving hole.

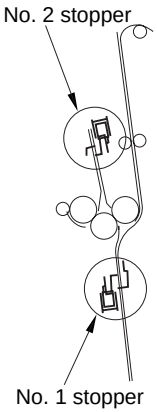


F03-302-10

3.3 Feeding System

3.3.1 Positioning the Folding Stopper

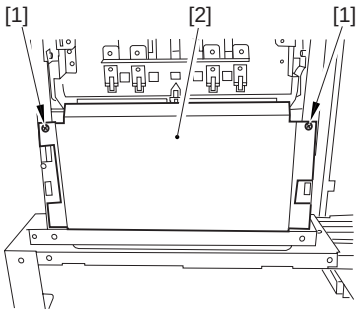
If the folding position is not as indicated after checking the movement of paper, adjust the position of the corresponding stopper.



F03-303-01

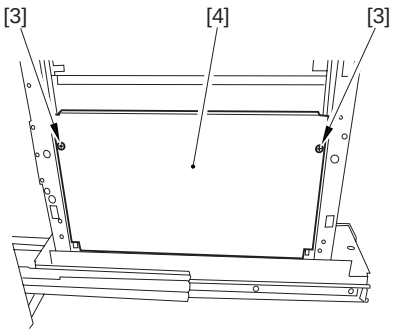
3.3.1-1 No. 1 Stopper

1) Slide out the folder, and detach the front cover.
2) Remove the two screws [1], and detach the right lower cover [2].



F03-303-02

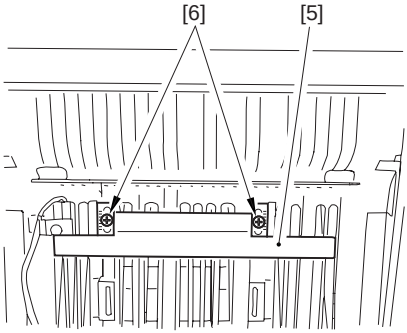
3) Remove the two screws [3], and detach the left lower cover [4].



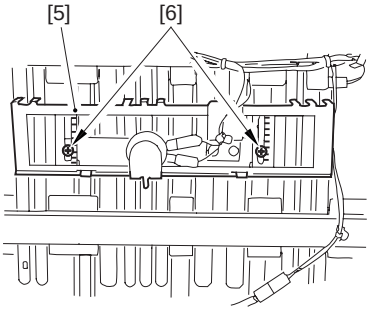
F03-303-03

4) Loosen the two adjusting screws [7], and adjust the position of the stopper [5].

For A3/279 x 432 mm (11" x 17")



For B4

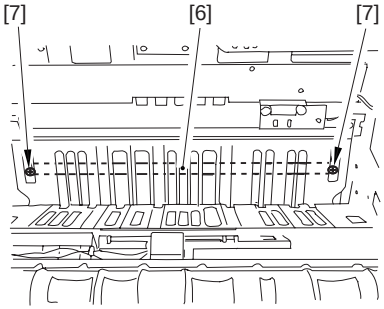


F03-303-04

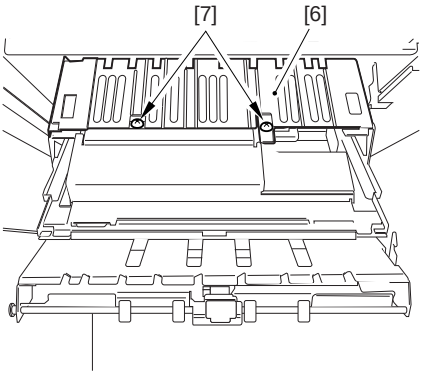
3.3.1-2 No. 2 Stopper

1) Slide out the folder, and open the left guide.
2) Loosen the two adjusting screws [2], and adjust the position of the stopper [1].

For A3/279 x 432mm (11" x 17")



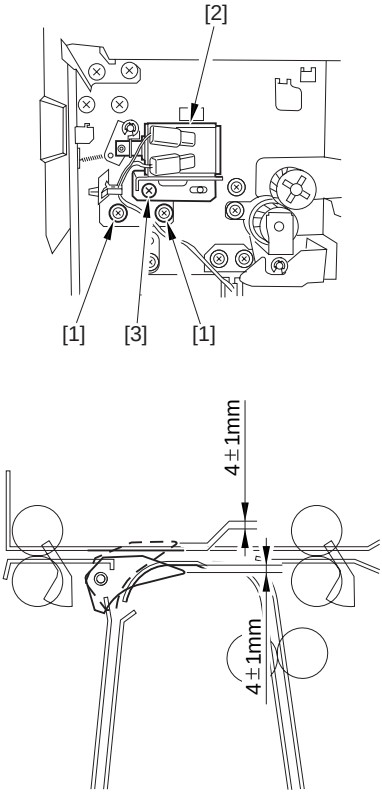
For B4



F03-303-05

3.3.2 Adjusting the Inlet Guide

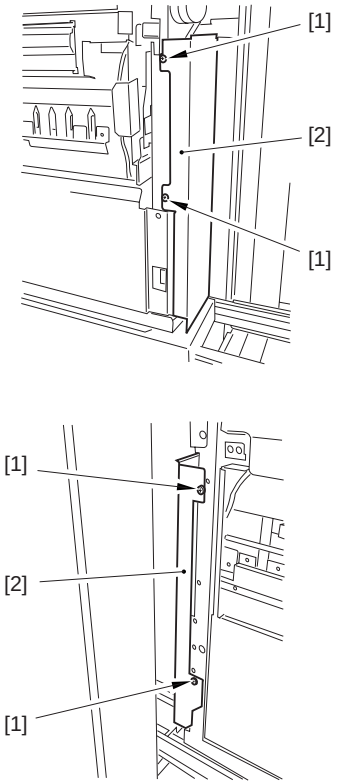
1) Remove the front cover and the front inside cover.
2) Loosen the two adjusting screws [1], and loosen the adjusting screw to adjust so that the tip of the inlet guide is 4 ± 1mm from the lower guide plate (not the top of the rib).
3) Loosen the adjusting screw [3] to adjust so that the upper guide plate is 4 ± 1 mm from the inlet guide when the inlet solenoid (SL71; [2]) goes ON.



F03-303-06

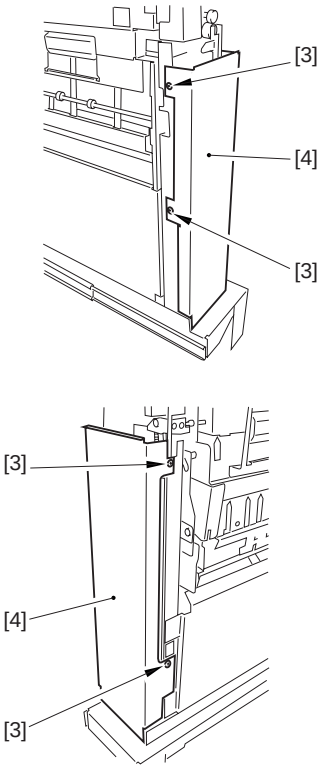
3.3.3 Adjusting the Pressure of the Folding Roller

1) Remove the folder front cover and the rear cover.
2) Remove the four screws [1], and detach the inside cover (front; [2]).



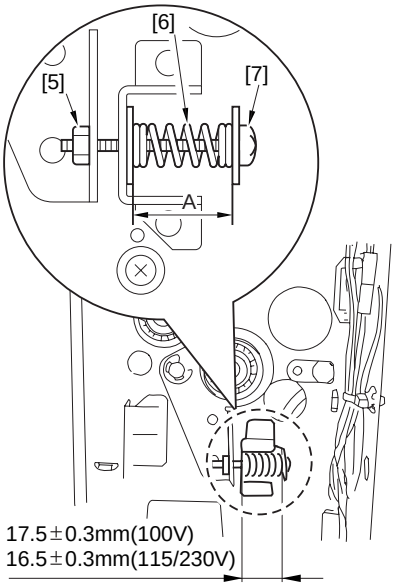
F03-303-07

3) Remove the four screws [3], and detach the inside cover (rear; [4]).

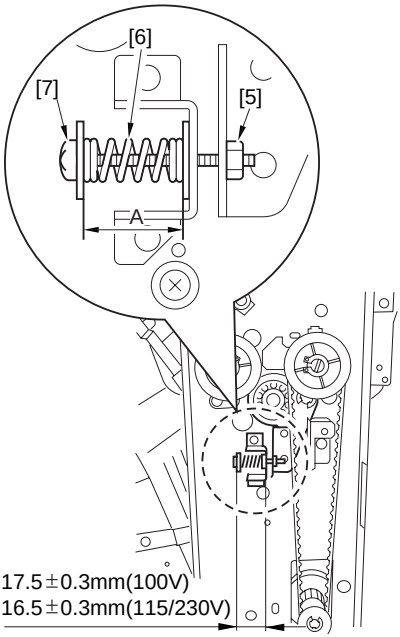


F03-303-08

4) Loosen the fixing nut [5], and turn the adjusting screw [7] so that length A of the pressure spring [6] is 17.5 ± 0.3 mm (100V model) or 16.5 ± 0.3 mm (115/230V model).



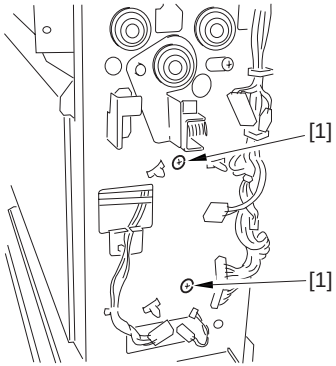
F03-303-09a



F03-303-09b

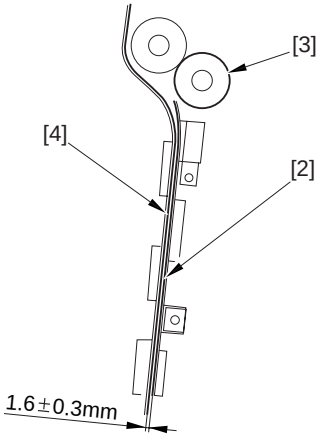
3.3.4 Adjusting the No. 1 Folding Path Guide Plate

1) Remove the front cover and the rear cover.
2) Remove the four screws, and detach the belt cover (front, rear).
3) Remove the folder driver PCB.
4) Tighten the two screws each (front, rear; [1]) temporarily.



F03-303-10

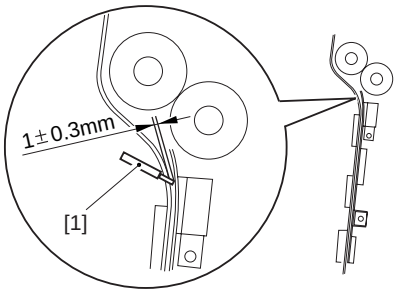
5) Turn the four adjusting screws indicated in step 4) so that the gap between the top edge of the lower left guide [2] and the folding roller A [3] and the gap between the bottom edge of the lower left guide and the left guide [4] (between rib tops) is 1.6 ± 0.3 mm.



F03-303-11

3.3.5 Adjusting the Position of the Left Guide Static Eliminator

1) Open the upper cover, and slide out the folder unit.
2) Remove the right lower cover, and open the left guide.
3) Loosen the two adjusting screws, and adjust so that the protrusion of the static eliminator 1 [1] from the guide face (not the rib top) for the left guide is 1 ± 0.3 mm.

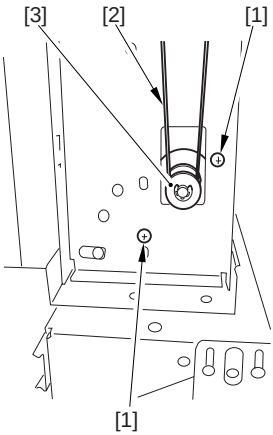


F03-303-12

3.4 Drive System

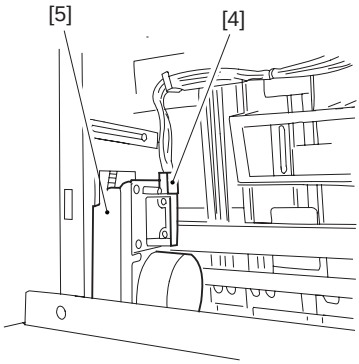
3.4.1 Removing the Folder Motor (M71)

1) Open the upper cover, and remove the rear cover.
2) Remove the right lower cover.
3) Remove the four screws, and detach the inside cover (front).
4) Remove the two screws [1], and free the drive belt [2] from the gear [3].



F03-304-01

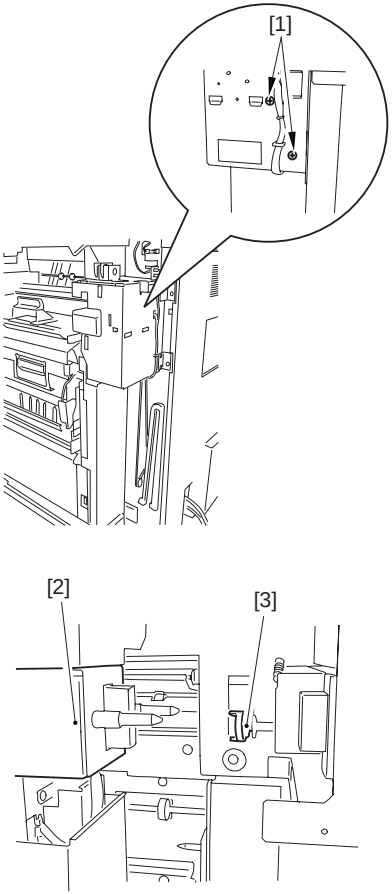
5) Disconnect the connector [4], and detach the folder motor [5].



F03-304-02

3.4.2 Positioning the Coupling for the Horizontal Path Drive

1) Separate the folder from h copier.
2) Loosen the two screws [1].
3) Slide in and out the folder unit [2] two to three times so that the coupling [3] of the horizontal path drive will be correctly positioned.



F03-304-03

4) Push in the folder unit, and tighten the two screws loosened in step 2).

3.4.3 Adjusting the Tension of the Feeding Belt

3.4.3-1 Feeding Belt A

Secure the screw [1] in place so that the flange distance is 5 ± 1 mm.

3.4.3-2 Feeding Belt B

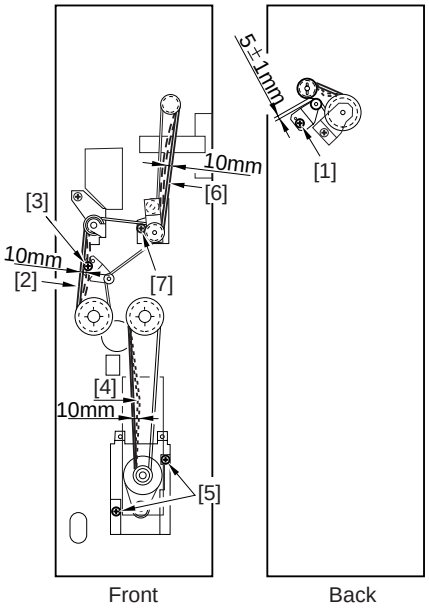
Secure the screw [3] in place so that the slack of the feeding belt B [2] is 10 mm when it is pushed using a tension gauge with a force of 500 ± 100 g.

3.4.3-3 Feeding Belt C

Secure the screw [5] in place so that the slack of the feeding belt C [4] is 10 mm when it is pushed using a tension gauge with a force of 500 ± 100 mm.

3.4.3-4 Feeding Belt D

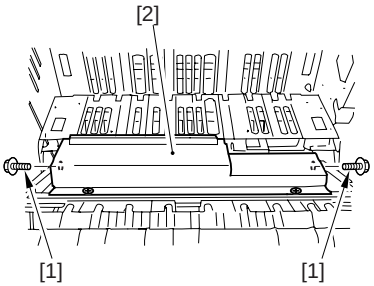
Secure the screw [7] so that the slack of the feeding belt D [6] is 10 mm when it is pushed using a tension gauge with a force of 500 ± 100 g.



F03-304-04

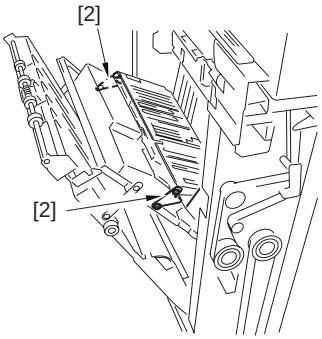
3.4.4 Adjusting the Position of the Pressure Releasing Solenoid (SL73)

1) Slide out the folder unit, and open the left guide.
2) Remove the two screws [1], and detach the left guide cover [2].



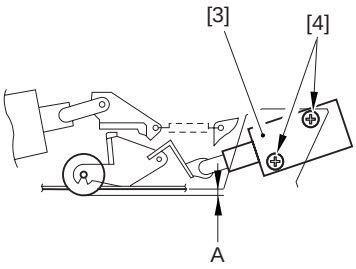
F03-304-05

3) Remove the screw (front, rear; 1 each), and detach the guide plate from the arm [2].



F03-304-06

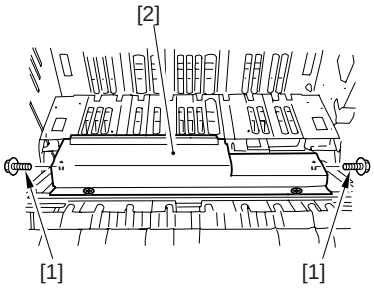
4) Loosen the two adjusting screws [4] to adjust the position of the pressure releasing solenoid (SL73, [3]) so that the value of A is 2 ± 0.3 mm when the solenoid goes ON.



F03-304-07

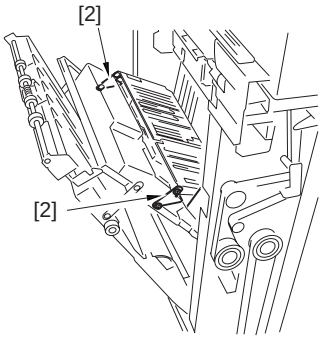
3.4.5 Adjusting the Position of the Pressure Solenoid (SL74)

1) Slide out the folder unit, and open the left guide.
2) Remove the two screws [1], and remove the left guide cover [2].



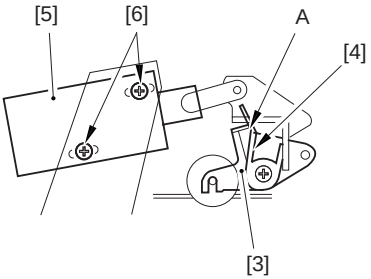
F03-304-08

3) Remove the E-ring (front, rear; 1 each), and detach the guide plate from the arm [2].



F03-304-09

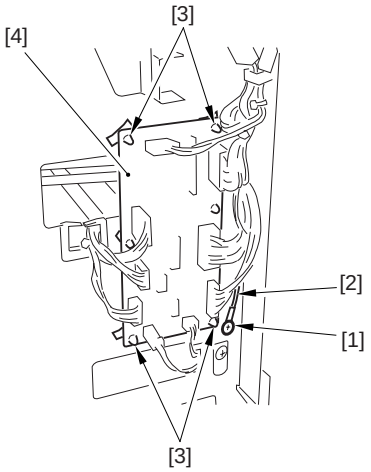
4) Loosen the two adjusting screws [6] to adjust the position of the pressure solenoid (SL74, [5]) so that the pressure member arm [3] and the pressure spring [4] will come into contact at A when the solenoid goes ON.



F03-304-10

3.5 Removing the Folder Driver PCB

1) Remove the rear cover.
2) Slide out the folder unit.
3) Remove the four screws, and detach the belt cover (rear).
4) Remove the screw [1], and detach the grounding wire [2].
5) Disconnect all connectors (9 pc.) from the PCB; then, detach the folder drive PCB [4] from the four locking supports [3].



F03-305-01

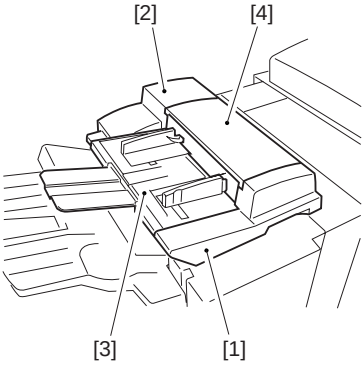
4 Inserter

4.1 Externals and Controls

4.1.1 External Covers

Remove the covers as follows when cleaning, checking, or repairing the inside of the machine; those covers that can be detached by mere removal of their mounting screws are omitted from the discussions:

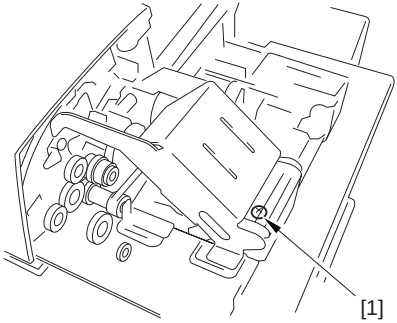
[1] Front cover (4)
[2] Rear cover (3)
[3] Pickup tray (2)
[4] Upper cover



F03-401-01

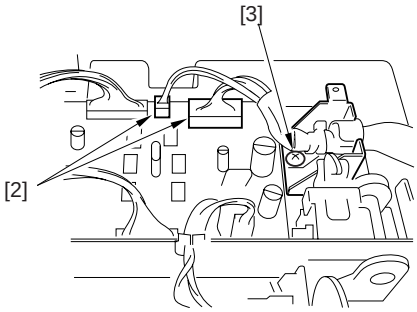
4.1.2 Removing the Inserter

1) Close the inserter, and detach the rear cover.
2) Loosen the screw [1] on the inserter hinge.



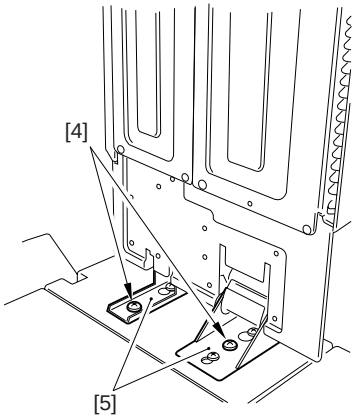
F03-401-02

3) Disconnect the two connectors [2] of the interface cable of the inserter drive PCB, and remove the screw [3].



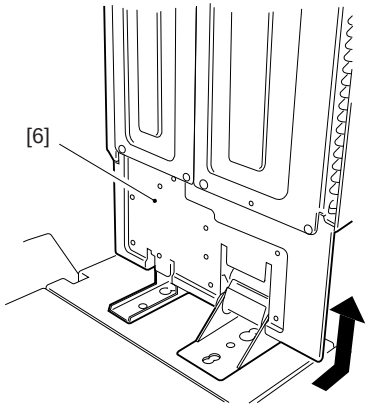
F03-401-03

4) Open the inserter, and remove the two screws [5] of the inserter hinge [4].



F03-401-04

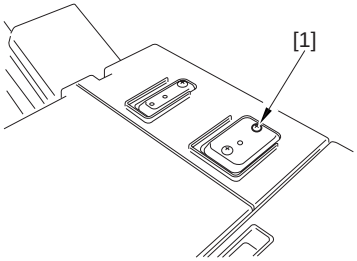
5) Slide the inserter unit [6] to the rear to detach.



F03-401-05

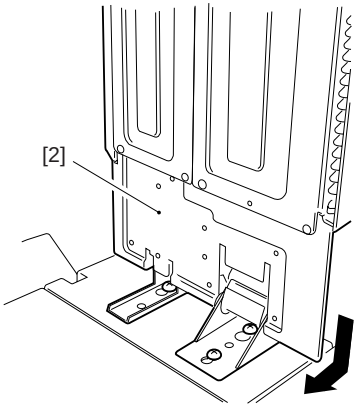
4.1.3 Fixing the Inserter

1) Fit the screw ([1]; M5x8, white) to the inserter base. After forcing it fully, loosen it for 2.5 times for the next step.



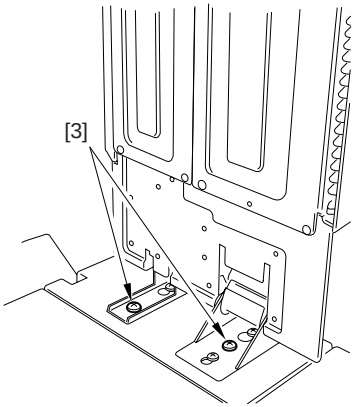
F03-401-06

2) Place the inserter [2] on the inserter base. Fit the three screws of the inserter base into the holes of the inerter hinge.



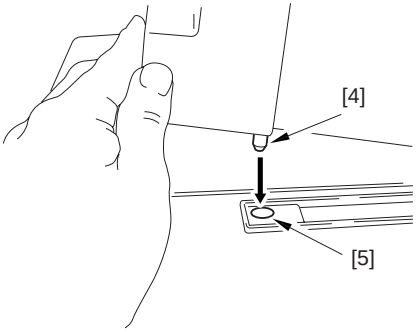
F03-401-07

3) Force the two screws ([3]; M5x8, white) into the inserter hinge. At this time, keep them temporarily tightened.



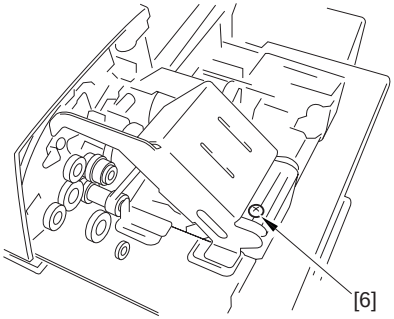
F03-401-08

4) Close the inserter. At this time, be sure to match the pin [4] of the inserter base front with the hole [5] of the finisher right upper cover.



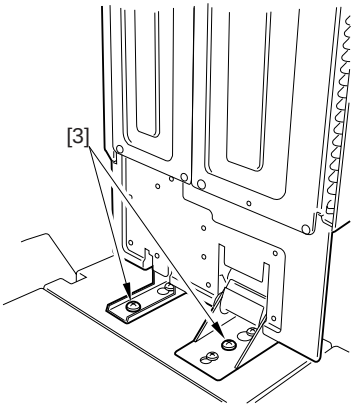
F03-401-09

5) Tighten the rear screw [6] of the inserter right hinge rear. (You may hold down the front of the inserter to facilitate the work.)



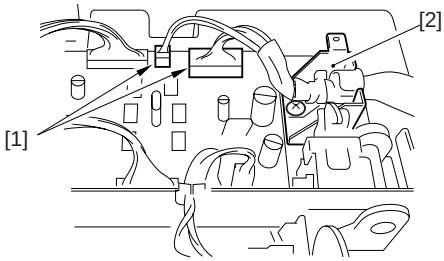
F03-401-10

6) Open the inserter, and tighten the two screws [3] of the inserter hinge temporarily tightened in step 3).



F03-401-11

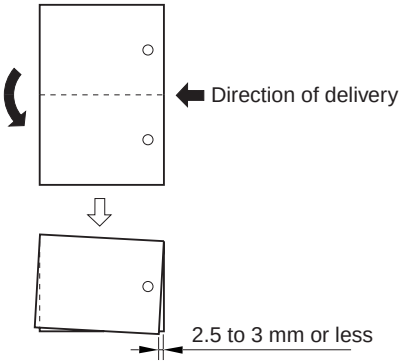
7) Close the inserter, and connect the two connectors [7] of the I/F cable to the inserter driver PCB.
8) Secure the cable base [8] to the inserter base. (M4x6; black)
9) Mount the inserter rear cover. (3 screws)



F03-401-12

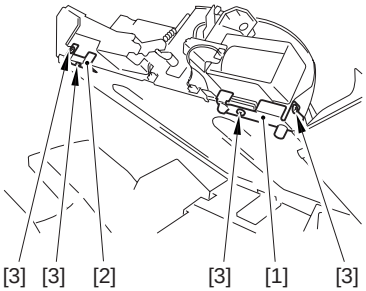
4.1.4 Correcting the Skew

1) Prepare a sheet of paper with punch holes (pickup up from inserter).
2) Fold the sheet in two so that the punch hole match.
3) Check the displacement shown in the figure; if it is 2.5 to 3 mm or less, end the work.



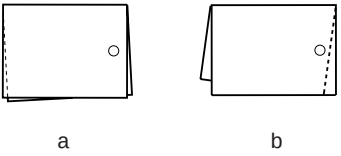
F03-401-13

4) Remove the inserter front cover. (4 screws)
5) Remove the the two screws [3], and detach the adjuster units right [1] and left [2].



F03-401-14

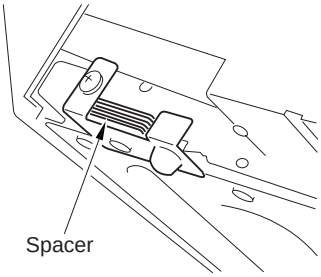
6) Adjust the spacer of the adjuster unit (right) in reference to sheets slid between the unit base plate and the inserter front plate as shown.



If a, decrease the number of sheets.
If b, increase the number of sheets.

F03-401-15

7) Check the position of the holes as instructed from steps 1) through 3). If not as indicated, go to step 6); if as indicated, go to the following step.
8) Mount the left adjuster unit to the inserter front. For the spacer, use sheets fewer than the sheets used for the right adjusting unit by 2.
9) Mount the inserter front cover.

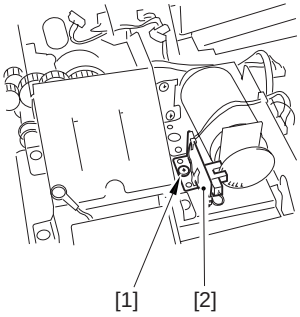


F03-401-16

4.2 Pickup Unit

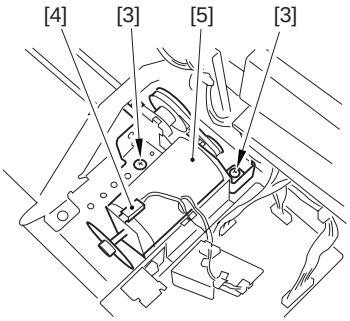
4.2.1 Removing the Pickup Unit

1) Remove the rear cover.
2) Remove the screw [1], and detach the pickup motor clock sensor support plate [2].



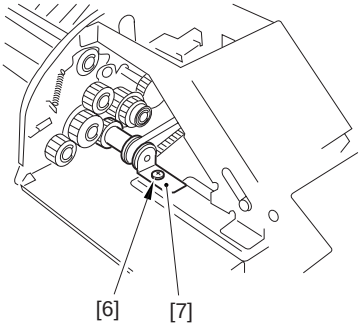
F03-402-01

3) Remove the two screws [3], and disconnect the connector [4]; then, detach the pickup motor unit [5].



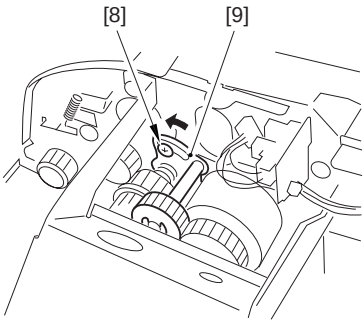
F03-402-02

4) Remove the screw [6], and detach the belt pulley unit [7].

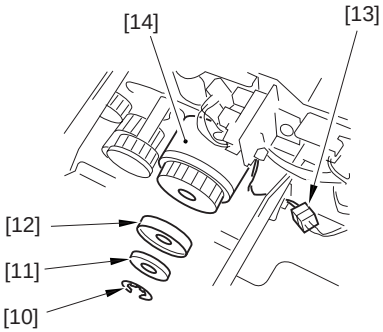


F03-402-03

5) Loosen the screw [8], and shift the gear support plate [9] to the left; then, remove the E-ring [10], spacer (small, [11]), and pacer (lager, [12]), and disconnect the connector [13]. Thereafter, detach the pickup clutch [14].

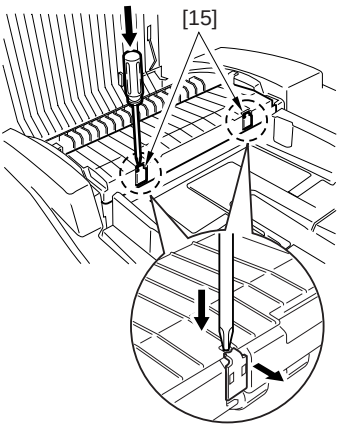


F03-402-04



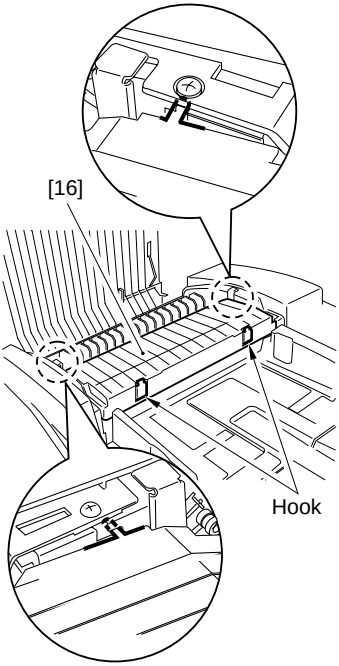
F03-402-05

6) Open the upper cover, and insert a screwdriver from above the hook to free the two hooks [15].



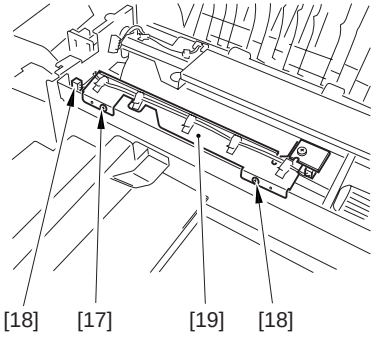
F03-402-06

7) Free the hook of the pickup assembly cover [16] from the right stay and detach it while paying attention to the hook of the front/rear side plate.



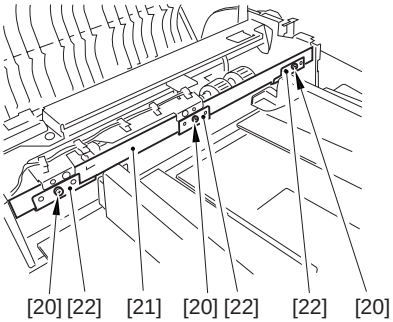
F03-402-07

8) Remove the two screws [17], and disconnect the connector [18]; then, detach the sensor stay [19].



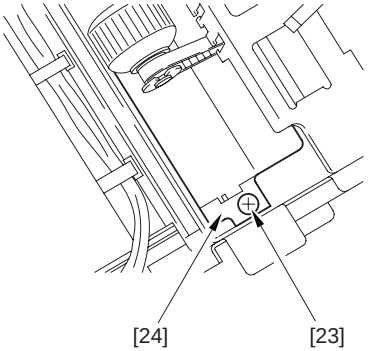
F03-402-08

9) Remove the three screws [20], and detach the three guide plates [22] from the stay [21].

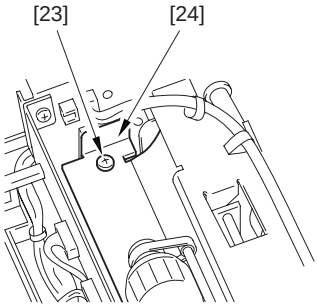


F03-402-09

10) Remove the two screws [23], and detach the lower guide [24].

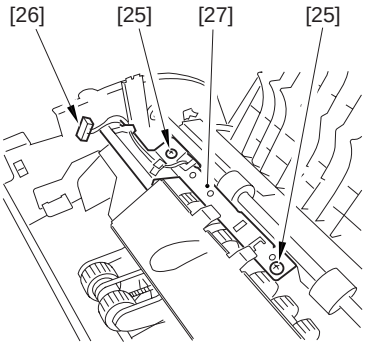


F03-402-10



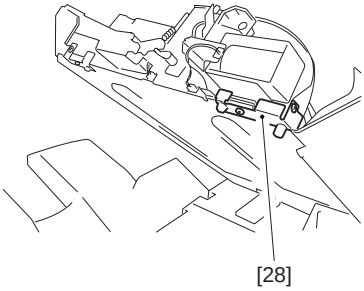
F03-402-11

11) Remove the two screws [25], and disconnect the connector [26]; then, detach the sensor stay [27].



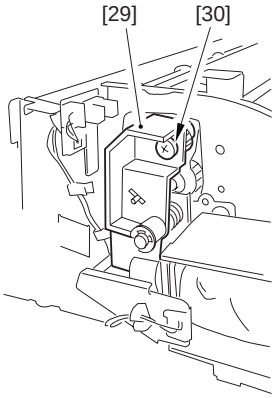
F03-402-12

12) Remove the front cover. (4 screws)
13) Remove the adjuster unit (right, [24]). (2 screws)



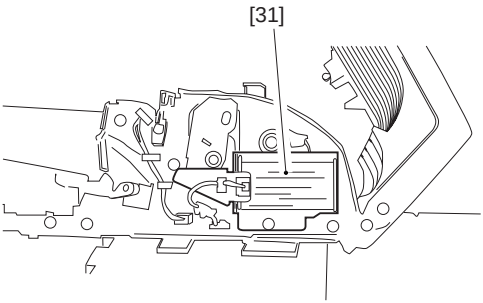
F03-402-13

14) Remove the stepped screw [30] of the solenoid arm [29].



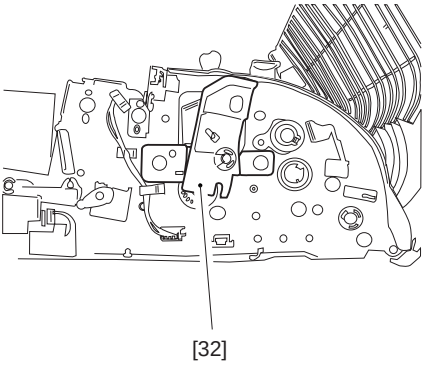
F03-402-14

15) Remove the pickup solenoid unit [31]. (1 connector, 1 screw)



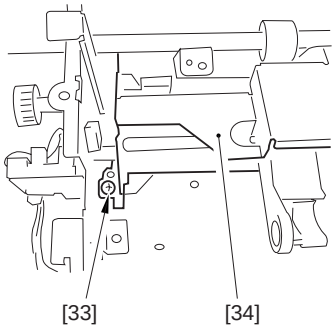
F03-402-15

16) Remove the pickup unit positioning plate [32]. (2 screws)

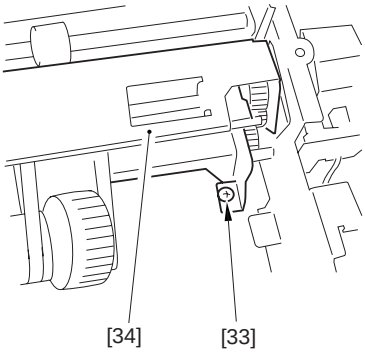


F03-402-16

17) Remove the two screws [33], and detach the pickup unit [34].



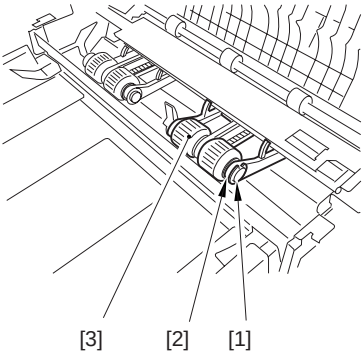
F03-402-17



F03-402-18

4.2.2 Removing the Pickup Roller

1) Remove the pickup assembly cover.
2) Remove the E-ring [1], and detach the roller arm [2]; then, detach the pickup roller [3].



F03-402-19

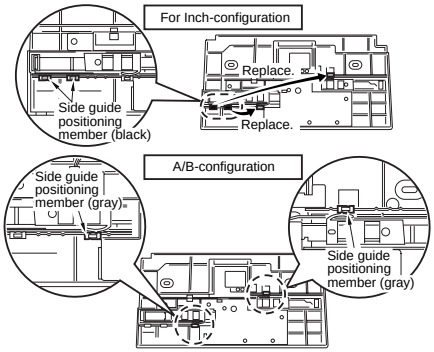
4.2.3 Positioning the Side Guide

The rail for the side guide is provided with a notches so that the side guide stops at specific default sizes. Some size notches, however, are closely located to each other, at times stopping the side guide in the wrong position.

To ensure the correct positioning of the side guide, the machine comes with two side guide positioning members; replace the members as follows to select the appropriate sizes:

Side guide	Side guide stop position	
Color of positioning member	Face with 1 notch	Face with 2 notches
Gray (for A/B)	A4R	A4R LTR-R
Black (for Inch)	LTR-R	LTR-R A4R

T03-402-01



F03-402-20

CHAPTER 4

MAINTENANCE AND INSPECTION

1 Periodically Replaced Parts

1.1 Finisher Unit

The finisher unit does not have parts that require periodical replacement.

1.2 Saddle Stitcher Unit

The saddle stitcher does not have parts that require periodical replacement.

1.3 Folder

The folder does not have parts that require periodical replacement.

1.4 Inserter

The inserter does not have parts that require periodical replacement.

2 Guide to Durables

Some of the parts of the machine may require replacement once or more over the product warranty because of deterioration or damage. Replace them as needed.

As of February 2001

2.1 Finisher Unit

No.	Part name	Part No.	Q'ty	Life	Remarks
A1	Stapler	FB5-9308	1	500,000 stapling operations	About 5000 per cartridge
A2	Knurled belt	FB5-9103	2	To tray B; 1 million prints	
A3	Upper stack delivery roller	FB4-8363	1		
A4	Sort static eliminator	FB5-9128	1		
A5	Sort static eliminator 2	FB5-9006	2		
A6	Puncher unit	FG6-7548 (2-hole) FG6-7549 (2/3-hole) FG6-7550 (4-hole, France) FG6-7551 (4-hole, Sweden)	1	1 million punching operations	If 200 g/m^2 paper at 5% image, 100,000 times
A7	Punch static eliminator	FB5-8684	1		
A8	Staple guide F	FF6-1191	1		
A9	Staple guide R	FF6-1192	1		
A10	Staple guide C	FF6-1193	1		

2.2 Saddle Stitcher Unit

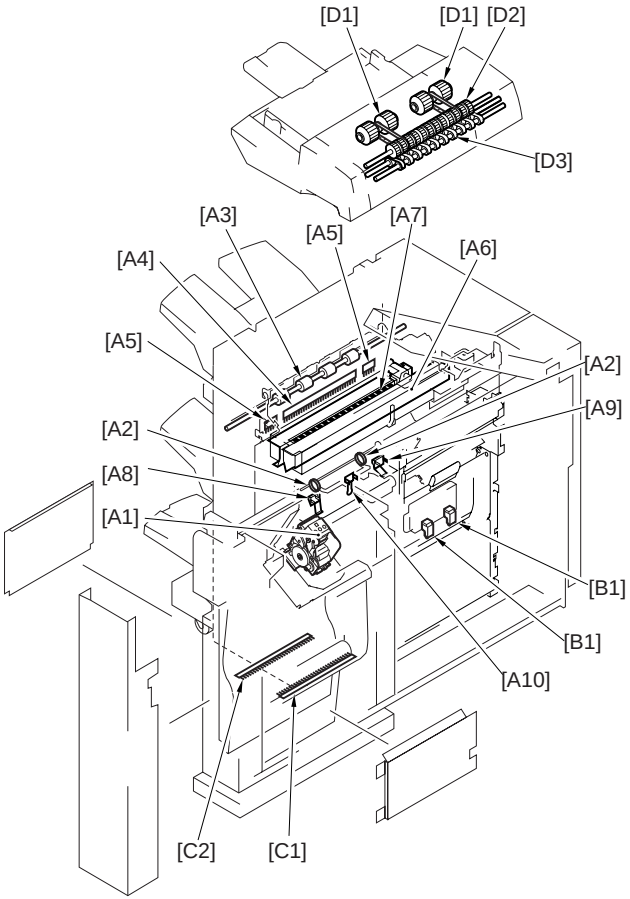
No.	Part name	Part No.	Q'ty	Life	Remarks
B1	Stapler	FF5-8687	2	100,000 stapling operations	About 2000 stapling operations per cartridge

2.3 Folder

No.	Part name	Part No.	Q'ty	Life	Remarks
C1	Static eliminator (right)	FA1-4842-030	1	Folding 1 million sheets	
C2	Static eliminator (left)	FA4-2371-000	1		

2.4 Inserter

No.	Part name	Part No.	Q'ty	Life	Remarks
D1	Pickup roller	FB4-7640-000	2	Inserter	
D2	Feeding roller	FG6-3304-000 (separation unit)	1	250,000 prints (pickup)	Replacement of the separation unit as a whole is recommended; however, the feeding roller or the separation belt may be replaced on its own.
		FB4-6991-000 (feeding roller)	12		
D3	Separation belt	FG6-3304-000 (separation unit)	1		
		FC2-1827-000 (separation belt)	11		



F04-204-01

3 Scheduled Maintenance

As of February 2001

3.1 Finisher Unit

Item	Intervals	Work	Remarks
Paper surface sensor	Every 250,000 prints of copier delivery	Cleaning	Blower brush
Inlet path sensor			
Buffer path paper sensor			
Lower path paper sensor			
Punch waste sensor prism			Dry wiping
Photosensor around punch unit (Note 1)	Upon replacement of puncher unit		Using blower brush

Note 1: punch paper edge sensor (P21), punch motor home position sensor (PI22), punch sensor home position sensor (PI23), punch home position sensor (PI24), punch front sensor (PI25)

3.2 Inserter

Item	Intervals	Work	Remarks
Pickup roller	Every 100,000 prints of inserter pickup	Cleaning	Using service mode
Feeding roller			
Separate belt			
Pull-out belt			
Intermediate feeding roller			
Paper set sensor			Using blower brush

3.3 Maintenance Procedure

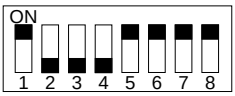
3.3.1 Cleaning the Components Inside the Inserter

a. Separation Belt and Feeding Roller

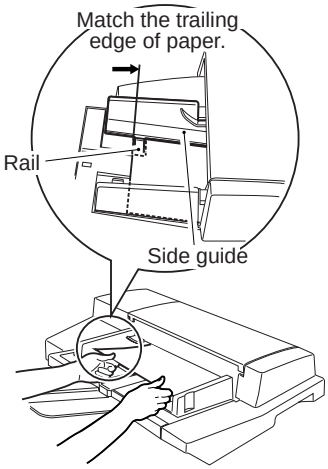
1) Obtain a single sheet of A4 or LTR copy paper.
2) Remove the finisher PCB cover.
3) Set SW103 on the finisher controller PCB as indicated in F04-303-01.
4) Moisten the paper obtained in step 1) with alcohol.
5) Press SW104 on the finisher controller PCB.
   - The separation assembly starts to operate.
6) Keep the copy paper on the pickup slot to clean the roller.

> The pull-off roller is also operating. To avoid letting the copy paper pulled in by the pull-off roller, hold the paper as shown in F04-303-02 for A4 and in F04-303-03 for LTR.

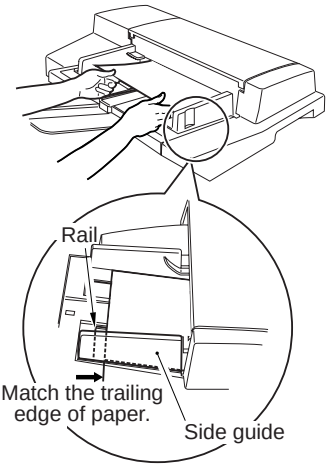
7) After cleaning, press SW104 once again.
   - The separation assembly stops to operate.



F04-303-01



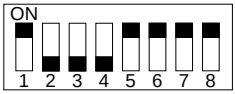
F04-303-02



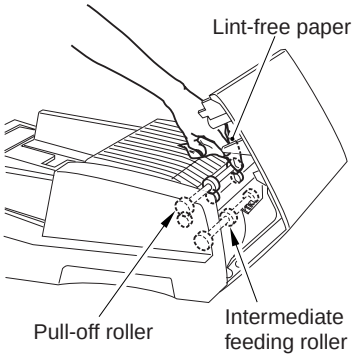
F04-303-03

b. Pull-Off Roller and Intermediate Feeding Roller

1) Open the inserter upper cover.
2) Remove the PCB cover of the finisher.
3) Set SW103 of the finisher controller PCB as indicated in F03-303-04.
4) Press SW104 on the finisher controller PCB.
   • The roller starts to rotate.
5) Clean the roller with lint-free paper moistened with alcohol.
6) After cleaning, press SW104 of the finisher controller PCB.
   • The roller stops to operate.



F03-303-04



F03-303-05

CHAPTER 5

TROUBLESHOOTING

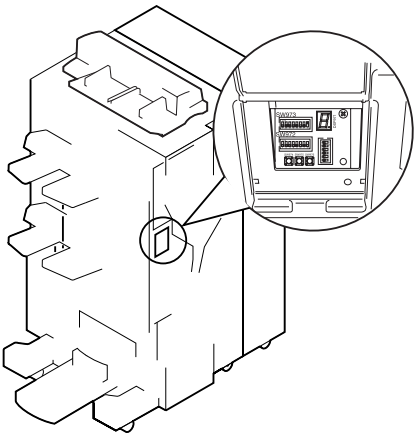
1 Making Adjustments

1.1 Electrical System

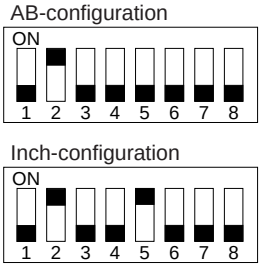
1.1.1 Adjusting the Alignment Width

If you have replaced the EEPROM (IC102) of the finisher controller PCB, front aligning plate motor (M4), or rear aligning plate motor (M5), make the following adjustments:

1) Using the door switch actuator, turn on the two door switches. Set SW973 on the switch PCB as indicated.



F05-101-01



F05-101-02

2) Press SW976 on the switch PCB.

- The swing guide of the finisher opens and, at the same time, the front aligning plate and the rear aligning plate move to home position. Thereafter the rear aligning plate moves to the rear aligning position, while the front aligning plate moves from the rear aligning plate to a point 'A4 width or LTR width + $'. DSP971 of the switch PCB indicates '-4', which is the initial offset value.

3) Keep several sheets of A4 or LTR paper together, and insert it into the handling tray. (Be sure that the leading edge of the stack butts against the rear aligning plate.)
4) Butt the trailing edge of the stack against the rear aligning plate.
5) Press SW975. Each press shifts the front aligning plate toward the rear by about 0.42 mm. Each press, further, advances the offset reading of DSP971 on the switch PCB up to '+4'. Repeat this until there is no gap between the front edge of the stack and the front aligning plate.

- You cannot enter a value higher than '+4'.

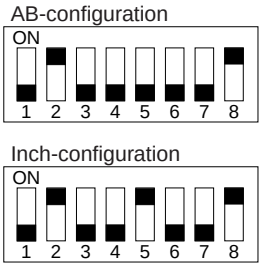
6) Press SW976 on the switch PCB.
- The setting will be stored, and the front/ rear aligning plate return to home position.
- If you happen to have pressed SW975 too many times and the front aligning plate has moved too far, press SW974. The front aligning plate will stop once, returns to home position, and then moves back to adjustment start position. Go back to step 5), and start over.

7) Turn off the power.
8) Shift all bits of SW973 of the finisher PCB to OFF.
9) Turn on the power.
- The swing guide will move down.

1.1.2 Adjusting the Stapling Position (front, 1-position)

If you have replaced the EEPROM of the finisher controller PCB or the stapler, make the following adjustments:

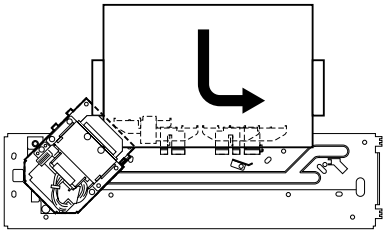
1) Using the door switch actuator, turn on the two door switches. Set SW973 of the switch PCB as indicated:



F05-101-03

2) Press SW976 on h switch PCB.
- The swing guide of the finisher opens and, at the same time, the front aligning plate and the rear aligning plate return to home position. Then, the front aligning plate and the rear aligning plate move to the front 1-point stapling position. The stapler also moves to the front 1-point stapling position. DSP771 on the switch PCB indicates the latest setting, which is between '-12' and '12'.

3) Keep several sheets of A4 or LTR paper together, and insert the stack into the handling tray. At this time, be sure to butt the trailing edge of the stack against the rear aligning plate.

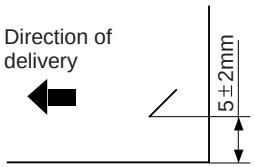


F05-101-04

- If the gap between the front aligning plate and the front edge of the stack is 1 mm or more, turn off the power, and shift all bits of SW973 to OFF to stop adjustment. Then, adjust the alignment range width, and then start over.

4) Press SW976 on the switch PCB.
- The stapler performs stapling.

5) Take out the stack, and check the stapling position against the standard. If the stapling position is as indicated, end the adjustment.
   Turn off the power, and shift all bits of SW973 to OFF, and then turn on the power once again. If you need to adjust the stapling position, go to the following step:



F05-101-05

6) Press SW976 once so that the machine is ready to accept a new setting.
- The stapler moves to home position once, and then returns to the stapling position once again. LED 101 indicates the latest setting.

7) Press SW975 or SW974 on the switch PCB according to the result of comparison.
- Each press on SW975 shifts the stapling position toward the front by about 0.42 mm. The reading of DSP971, on the other hand, advances in the direction of '+'.
- Each press on the SW974 shits the stapling position toward the rear by about 0.42 mm. The reading of DSP971, on the other hand, advances in the direction of '-'.

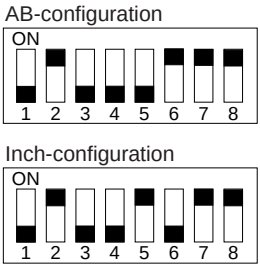
8) As in step 3), insert several sheets of A4 or LTR paper into the handling tray.
9) Press SW976 once so that the machine accepts the new setting.
- The machine executes stapling automatically so that you can check the stapling position.

10) Turn off the power.
11) Shift all bits of SW973 to OFF.
12) Turn on the power to move down the swing guide.

1.1.3 Adjusting the Stapling Position (rear 1-point)

If you have replaced the EEPROM (IC102) on the finisher controller PCB or the stapler, make the following adjustments:

1) Using the door switch actuator, turn on the two door switches. Set SW973 on the SW973 as follows:

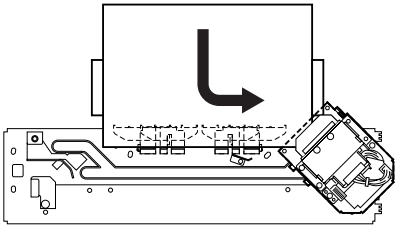


F05-101-06

2) Press SW976 on the switch PCB.

- The swing guide of the finisher opens and, at the same time, the front aligning plate and the rear aligning plate return to home position. Then, the front aligning plate and the rear aligning plate move to the rear 1-point stapling position. The stapler also moves to the rear 1-point stapling position. The setting of DSP971 on the switch PCB indicates the latest setting, which is between '-12' and '12'.

3) Keep several sheets of A4 or LTR paper together, and insert the stack into the holding tray. At this time, be sure to butt the trailing edge of the stack again the rear aligning plate.



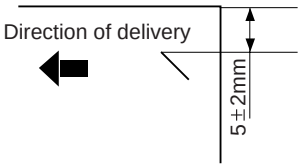
F05-101-07

- If the gap between the front aligning plate and the paper front edge is 1 mm or more, turn off the power, and shift all bits of SW973 to OFF to stop the adjustment. Then, adjust the alignment width, and then start over.

4) Press SW976 note switch PCB.

- The stapler executes stapling.

5) Take out the stack of sheets, and check the stapling position against the standard. If the stapling position is correct, end the adjustment. Turn off the power, shift all bits of SW973 to OFF, and turn on the power once again. If you need to correct the stapling position, go to the following step:



F05-101-08

6) Press SW976 once so that the machine is ready to accept a new setting.
- The stapler returns to home position and then moves back to the stapling position once again. LED101 indicates the latest setting.

7) Press SW975 or SW974 on the switch PCB according to the result of comparison.
- Each press on SW975 shift the stapling position toward the front by about 0.35 mm. The reading of DSP971 advances in the direction of '+' by '1'.
- Each press on SW974 shifts the stapling position toward the rear by about 0.35 mm. The reading of DSP971 advances in the direction of '-' by '1'.

8) As in step 3), insert a stack of several sheets of A4 or LTR paper into the handling tray.
9) Press SW976 so that the new setting will be stored.
- The machine executes stapling automatically so that you can check the stapling position.

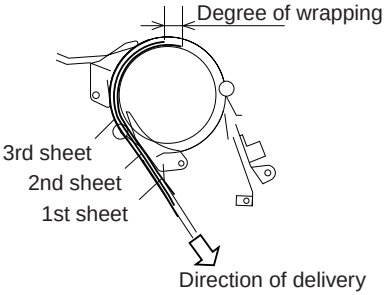
10) Turn off the power.
11) Shift all bits of SW973 to OFF.
12) Turn off the power to move down the swing guide.

1.1.4 Adjusting the Wrapping on the Buffer Roller

Perform the adjustments that follow for the following:

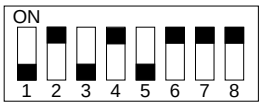
a. If you have replaced the EEPROM (IC102) on the finisher controller PCB.
b. If the degree of wrapping has changed for some reason.

The degree of wrapping refers to the displacement between the first and second sheets or between the second and third sheets.



F05-101-09

1) Using the door switch actuator, turn on the two door switches. Set SW973 on the switch PCB as indicated:



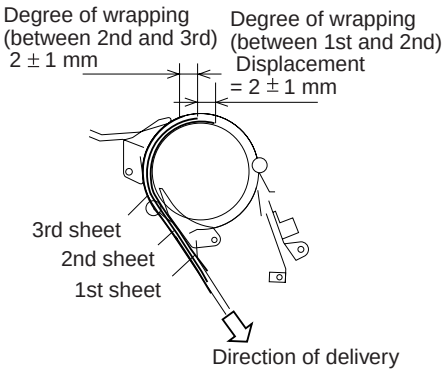
F05-101-10

2) Set '2' to as the copy count on the copier, select sort mode, and place three originals.

3) Press the Start key.
- The machine starts to operate, and stops as soon as paper wraps around the buffer roller.

4) Open the front cover and the upper cover, and measure the displacement between the sheets of paper wrapping around the buffer roller (between 1st and 2nd sheets, between 2nd and 3rd sheets).
- After taking measurements, remove the stack of sheets.

5) Compare the degree of wrapping (displacement) against the standards.



F05-101-11

6) Turn off the power, and set SW973 on the switch PCB as indicated:

F05-101-12

The finisher may fail to operate hereafter if the upper cover is not closed.

7) Press the switch (SW976) on the switch PCB.
DSP971 (LED) indicates '1' or '2' (degree of wrapping for 1st and 2nd sheets), and then indicates the latest setting.

8) Press SW975 (+) or SW974 (-) as many times as necessary to adjust the degree of wrapping between 1st and 2nd sheets, thereby entering a new setting.
- ■ Each press on SW975 (+) or SW974 (-) changes the degree of wrapping by about 1.74 mm.
- ■ Each press on SW975 (+) increases the degree of wrapping.
- ■ Each press on SW974 (-) decreases the degree of wrapping.

9) After entering the setting, press the switch (SW976) so that the machine accepts the new setting.
DSP971 (LED) indicates '2' and '3' (between 2nd and 3rd sheets), and indicates the latest setting.

10) Press SW975 (+) and SW974 (-) as many times as necessary to adjust the degree of wrapping between 2nd and 3rd sheets, thereby entering a new setting.
- ■ Each press on SW975 (+) or SW974 (-) changes the degree of wrapping by about 1.74 mm.
- ■ Each press on SW975 (+) increases the degree of wrapping.
- ■ Each press on SW974 (-) decreases the degree of wrapping.

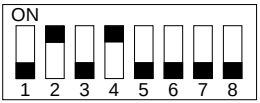
11) After entering the new setting, press the switch (SW976) so that the the machine accepts the new setting.
DSP971 (LE) reads '0' to indicate the end of operation.

1.1.5 Sensor Initial Adjustment

If y have replaced any of the sensors or the EEPROM (IC102), perform the following adjustments:

- Inlet path paper sensor (S1)
- Buffer path paper sensor (S2)
- Lower path paper sensor (S3)
- Tray B paper sensor (S4)
- Tray A power sensor (S5)
- Punch waste sensor (S6)

1) Check to make sure that there is no paper in the paper path and the sort tray. Close the upper cover and the front cover.
2) Dispose of the punch waste inside the punch waste case, and fit the case in the finisher.
3) Set SW973 on the switch PCB as indicated:



F05-101-13

4) Press SW976 on the switch PCB.
- The machine starts adjustment mode. The tray A/B also moves to the 1000-sheet stacking position (to avoid blocking the tray A/B paper sensor (S4/S5)).

5) Monitor DSP971 on the switch PCB while the machine executes automatic adjustment if to see which sensor is being adjusted. (Table 5-101)

No.	Sensor
1	Inlet path paper sensor (S1)
2	Buffer path paper sensor (S2)
3	Lower path paper sensor (S3)
4	Tray B paper sensor (S4)
5	Tray A power sensor (S5)
6	Punch waste sensor, advance warning (S6)
7	Punch waste sensor, full (S6)

T05-101-01

6) When the adjustment ends, check DSP973 to find out the result.
- If DSP971 indicates '0', all sensors are normal.
- If DSP971 indicates 'F', the output level of any of the sensors is not normal.

7) Press SW975 or SW974 on the switch PCB so that details of the result of the adjustment is indicated.
- After the sensor number (Table 5-102), details are indicated for that particular sensor (Table 5-103).
- A press on SW975 moves to the next sensor, while a press on SW974 moves to the previous sensor.

No.	Sensor
1	Inlet path paper sensor (S1)
2	Buffer path paper sensor (S2)
3	Lower path paper sensor (S3)
4	Tray B paper sensor (S4)
5	Tray A paper sensor (S5)
6	Punch waste sensor, advance warning (S6)
7	Punch waste sensor, full (S6)

T05-101-02

Level 3	Level 2	Level 1	Level 0
			
Indicates that the sensor output level is good.	Indicates that the sensor output level is starting to drop.	Indicates that the sensor output level is near the lower limit for use.	Indicates that the sensor output level is below the lower limit for use (faulty sensor).

T05-101-03

- If the detail of the result is level 2, level 1, or level 0, clean the sensor and check how the sensor is mounted.
- After cleaning and checking the sensor, try the adjustment once gain; if still level 1, be ready for replacement.
- After cleaning and checking the sensor, try the adjustment once again; if still level 0, replace the sensor.

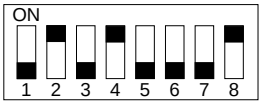
8) Press SW976 on the switch PCB.
- The result will be stored.
- The tray A/B will move up to initial position.

9) Turn off the power, and shit all bits of SW973 to OFF.

1.1.6 Adjusting the Speed of the Swing Guide

If you have replaced the EEPROM (ICS107) on the finisher controller PCB or the swing motor (M8) or disassembled/reassembled parts associated with the swing mechanism, make the following adjustments:

1) Set SW973 on the switch PCB as indicated:



F05-101-14

2) Press SW976 on the switch PCB.
- The machine starts automatic adjustment, and the swing guide makes several swinging movements.
- The machine automatically adjusts the output voltage to the swing motor drive circuit so that the time period (T1) from when the swing motor starts to when the swing guide closed sensor (PI15) goes OFF is as specified.

3) Check DSP971 to find out the result of automatic adjustments:
- OK if 'A'.
- NG if F, F11, F1, F2, F4, F5, or F6.

4) If the result is 'A' (OK), press SW976 on the switch PCB.
- The machine accepts the new setting.
- If T1 is too long or too short, the output voltage of the default will be stored.

5) Turn off the power.
6) Shift all bits of SW103 to OFF.

7) If the result is 'NG', press SW976 on the switch PCB to execute the adjustment once gain.
8) If 'NG' is indicted after several attempts, check the following:

- Belt of the swing guide motor for tension.
- Swing guide closed sensor (PI5) for mounting condition.

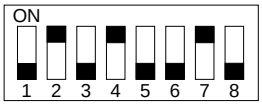
Memo

If the swing guide has started to wear and, as a result, the noise of the guide increases when it moves up/down, execute this adjustment to correct the motor drive speed; the noise may decrease.

1.1.7 Indication for the Swing Guide Speed

You can measure, evaluate, and indicate the time it takes the swing guide to move up or down using this mode. If jams occur often near the swing guide, check the time length:

1) Set SW973 on the finisher controller PCB as indicate:



F05-101-15

2) Press SW976 on the PCB.

- The switch guide performs several swinging operations, and the machine automatically measures the time it takes the guide to move up/down.

3) When the up/down movement of the swing guide ends, check DSP971 the PCB for the result.

- If the reading of DSP971 is '0', the result is within standards.
- If the reading of DSP971 is 'F', on the other hand, the result is outside the standard.

4) Press SW975 or SW974 on the PCB.

- DSP971 indicates the time length of ascent and the time length of descent.
- A press on SW75 brings up the ascent time length, while a press on SW974 indicates the descent time length.
- In the case of ascent time length, the indication will be 'a', 'b', and 'c' in sequence.
- In the case of descent time, the indication will be 'a', 'b', and 'c' in sequence.

'a' represents the 100s; 'b' represents the 10s; and 'c' represents the 1s; all in units of 'msec'

Memo

The standard ascent time length is 250 ± 15 ms, while the standard descent time length is 250 ± 15 msec.

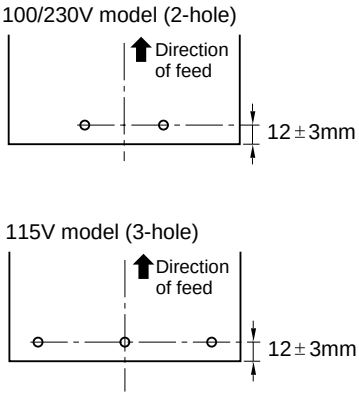
5) Turn off the power.
6) Shift all bits of SW973 to OFF.

Memo

If the ascent/descent time length is too long, suspect a mechanical fault.

1.1.8 Adjusting the Position of Punch Holes (feed direction)

1) Make a copy in punch mode, and check the position of the punch holes.



F05-101-16

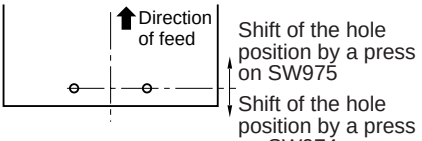
2) Set SW973 on the switch PCB as follows:

F05-101-17

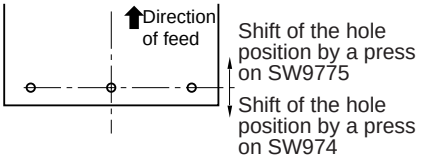
3) Press SW976 on the switch PCB.
- DSP971 on the switch PCB indicates the latest setting.

4) Press SW975 or SW974 on the switch PCB as many times as necessary in reference to the position of the punch holes checked in step 1. Each press on the switch shifts the position of holes by 0.5 mm. DSP971 on the finisher controller PCB indicates the new setting.

100/230V model (2-hole)



115V (3-hole)



F05-101-18

5) Press SW976 on the switch PCB.
- The machine will accept the new setting.

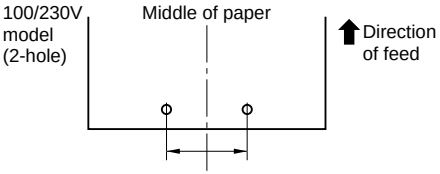
6) Turn off the power.
7) Shift all bits of SW973 to OFF.

Memo

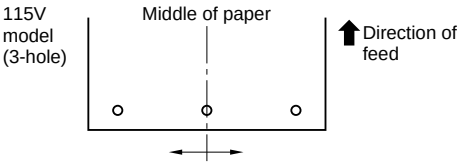
The setting may be changed in the copier's service mode: SORTER>PNCH-HLE.

1.1.9 Adjusting the Punch Hole Position (in direction of horizontal registration)

1) Make a copy in punch mode, and check the position of the punch holes.



Vertical displacement (in left/right direction in figure) of the two hole in relation to the middle of paper is ± 1 mm.



Vertical displacement (in left/right direction) of the middle hole in relation to the middle of paper is ± 1 mm.

F05-101-19

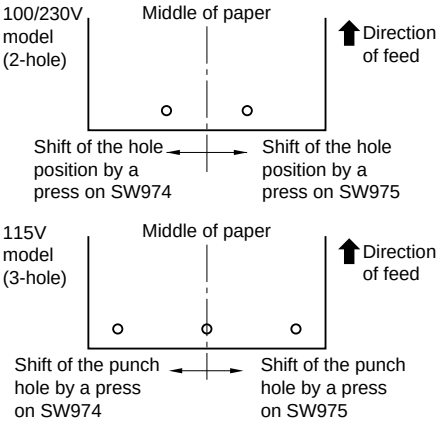
Regardless of the mode of delivery (face up or face down), make a check with the top face of the sheet delivered in the tray as the top face.

2) Set SW973 of the switch PCB as indicated:

F05-101-20

3) Press SW976 on the switch PCB.
- DSP971 on the switch PCB indicates the current setting.

4) Press SW975 or SW974 on the PCB as necessary according to the position of the punch holes checked in step 1). Each press shifts the punch hole position by 0.33 mm. The reading of DPS971 on the PCB also changes.

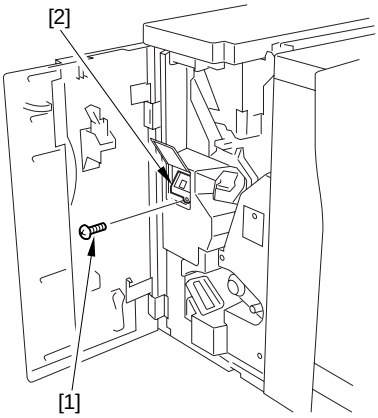


F05-101-21

1.1.10 Adjusting the Sensitivity of the Sensors

If you have replaced any of the following sensors, make the adjustments that follow:
- Punch paper edge sensor (PI21)
- Punch driver PC
- Also, make the adjustments if when installing the punch unit (accessory).

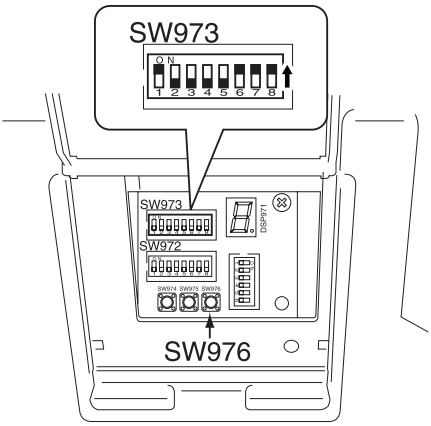
1) Turn on the copier's power switch so that the copier is in standby.
2) Open the front door of the finisher, and remove the screw [1] to detach the switch PCB cover [2].



F05-101-22

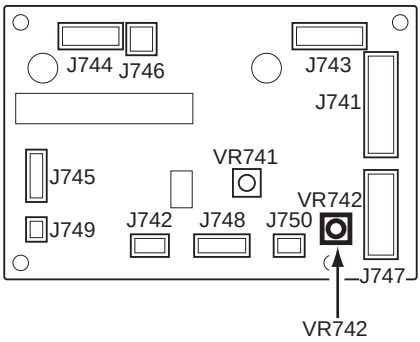
3) Turn on the two front door switches of the finisher using the door switch actuators.

4) Set DIP SW973 as shown (bits 1, 6, 7, and 8 at ON), and turn on the push switch (SW976):
   - The punch waste feed motor rotates.
   - LED741 goes ON.



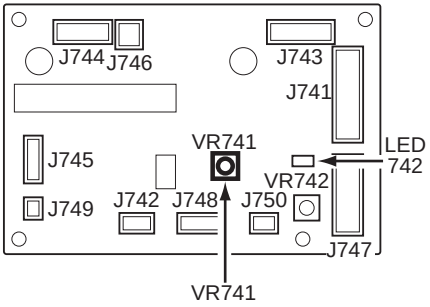
F05-101-23

5) Turn the variable resistor (VR742) on the punch driver PCB fully counter-clockwise.



F05-101-24

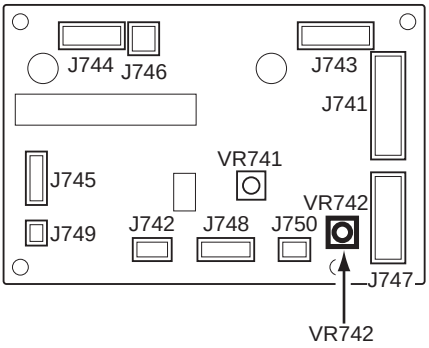
6) Turn the variable resistor (VR741) on the punch driver PCB fully clockwise, and check to make sure that LED742 goes OFF.



F05-101-25

7) Turn the variable resistor (VR741) on the punch driver PCB fully counter-clockwise, and check to make sure that LED742 goes ON.
8) Turn the variable resistor (VR741) on the punch driver clockwise, and check to make sure that LED742 starts to flash.

9) If LED742 does not flash while the variable resistor (VR741) is turned, give the variable resistor (VR742) a 1/2 turn in clockwise direction, and start over with step 5).
If LED742 still does not flash, give the variable resistor (VR742) another 1/2 half turn in clockwise direction, and start over with step 5).



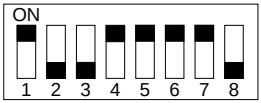
F05-101-26

Then, go over the following:
- Check the punch paper edge sensor (PI21) for mounting condition.
- Try replacing the punch paper edge sensor (PI21).

10) Shift all bits of DIP SW973 to OFF (normal operation), and turn off and then on the copier.

1.1.11 After Replacing the EEPROM (IC102)

1) Turn off the copier.
2) Set SW973 on the switch PCB as indicated.



F05-101-27

3) Turn on the copier.
4) Hold down SW976 and SW975 on the stitch PCB at the same time for 3 sec or more.
- The machine initializes the EEPROM.

5) Make the adjustments indicated in Table 5-104.

• Alignment with • Stapling position (front, 1-point) • Stapling position (rear, 1-point) • Degree of wrapping on buffer roller • Sensor initial level • Swing guide speed • Punch hole position (in direction of feed) • Punch hole position (in direction of horizontal registration)

T05-101-04

1.1.12 Replacing the Finisher Controller (in response to E505)

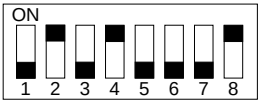
1) Turn off the copier.
2) Remove the EEPROM (IC102) from the new PCB. (Do not dispose of the ROM as yet.)
3) Remove the EEPROM from the old PCB, and mount it to the socket of the new PCB (ICS102).
4) Remove the old PCB from the finisher, and mount the new PCB to the finisher .
5) Turn on the copier. If the copier does not indicate 'E055', end the work. (The contents of the old PCB are backed up on the new PCB.)
   If 'E505' is indicated, go to the following step:

→ If 'E505' occurs once again, the EEPROM is faulty. You cannot back up the memory using the old EEPROM.

6) Turn off the copier, and replace the EEPROM mounted to the new PCB with the EEPROM removed and put aside from the new PCB.
7) Perform the work under 11. "After Replacing the EEPROM."

1.1.13 Initializing the RAM

1) Set SW973 on the switch PCB as indicated:



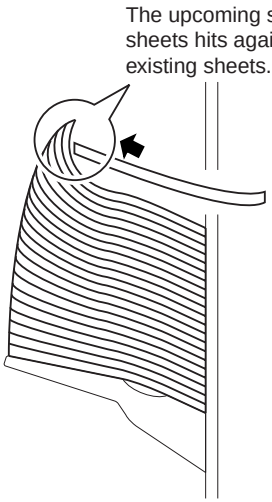
F05-101-28

2) To clear the counter only,
   Hold down SW976 and SW974 on the switch PCB at the same time for 3 sec or more.
   To clear all data,
   Hold down SW976 and SW975 on the switch PCB at the same time for 3 sec or more.
3) Turn off the power, and shift all bits of SW973 to OFF.

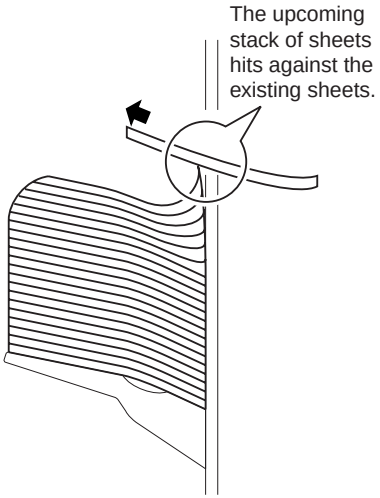
1.1.14 Selecting Upward Curl Paper Mode

a. Outline

At times, sheets in tray B can show appreciable curling, preventing correct depositing of subsequent sheets. See the diagrams that follows:



F05-101-29



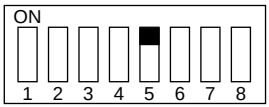
F05-101-30

As needed, perform the following:

1) Turn over the sheets in the source of paper (cassette).
   If the upward curling increases, turn over the sheets in the cassette once again.
   If the curling still is appreciable and the sheets fail to be stacked correctly, select 'finisher stack enhancement mode' in the copier's service mode:
   COPIER>OPTION>BODY>FTMP-DOWN.
   0: OFF, 1: lower by 5°C, 2: lower by 10°C, 3: lower by 15°C
   If this fails to show good results, select 'upward curl paper mode.'

b. Selecting Upward Curl Paper Mode

1) Turn off the power.
2) Set SW972 of the circuit as indicated.

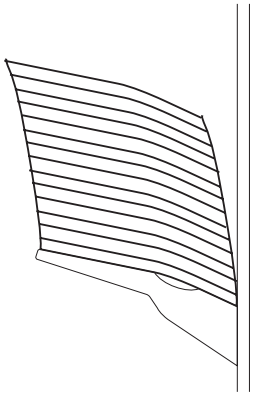


The bits other than bit 5 must be set according to the mode and model in question.

F05-101-31

3) Turn on the power.

- When this mode starts, the speed of delivery will increase; as a result, the sheet will be delivred without its trailing edge being trapped even when its leading edge hits the existing sheets. The increase in speed depends on the number of sheets in the stack.
- If stacks of sheets with little curl or with downward curl are delivered after selecting this mode, the increase in speed can cause the stacks to be deposited away from the stacking wall (F05-101-32), making it very important to check the type of paper the user uses before selecting this mode.

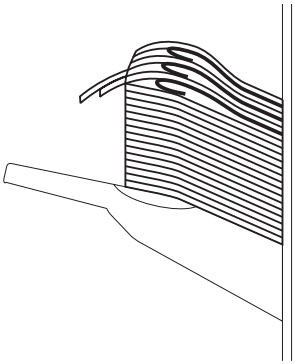


F05-101-32

1.1.15 Selecting Downward Curl Paper Mode

a. Outline

At times, sheets stacked in the handling tray can develop downward curl. A subsequent stack of sheets will then tend to slide beyond the existing stack, adversely affecting the overall stacking performance. (for small-size paper, 5-131a)



F05-101-33

b. Service Work

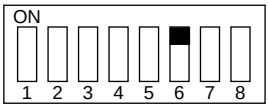
As necessary, turn over the sheets inside the cassette, and make copies.

- If the copies are stacked properly, end the work.
- Select 'finisher stack enhancement mode' in the copier's service mode: COPIER>OPTION>BODY>FTMP-DOWN.
  0: OFF, 1: lower by 5°C, 2: lower by 10°C, 3: lower by 15°C

- If the curl is more appreciable than before turning over the paper, turn over the paper, and select 'downward curl paper mode'.
- If the curl is less appreciable but a stacking fault as shown in F05-101-33 still occurs, select 'downward curl paper mode'.

c. Selecting Downward Curl Mode

1) Turn off the copier.
2) Remove the PCB cover (1 screw), and shift bit 6 of SW972 of the circuit to ON. (F05-101-34)
3) Mount the PCB cover (1 screw), and turn on the copier.



The bits other than bit 6 must be set according to the mode and model in question.

F05-101-34

d. Operating in Downward Curl Paper Mode

[1] Retracting the Tray Auxiliary Plate
The mode is not selected, a stack is delivered after retracting the tray auxiliary plate; when the mode is selected, a stack is delivered as the tray auxiliary plate is retracted.

[2] Detecting the Height of the Tray B
The remedial operation for the height is not expected even when paper has been added (by the user) to the tray B while the holding tray is in operation.

[3] Operation of the Sub Tray
The sub tray is moved down while a stack is delivered.

[4] Operation of the Paddle
The paddle is operated intermittently.

[5] Number of Alignment Operations
The alignment operation is expected twice (excludes the last sheet of a stack).

[6] Starting Alignment Operation
The alignment operation is started in sync with the operation of the paddle.

[7] Moving Up the Tray on Delivery
If no Z-fold sheet exits, the tray is moved up when the stack consists of 6 sheets instead of 11 sheets.

e. Conditions of Operation

If a stack of two sheets or more is stacked, the foregoing operations will be as follows:

	Small-size paper	Large-size paper	Z-fold paper
Operation [1]	Applicable	Not applicable	Not applicable
Operation [2]	Applicable	Applicable	Applicable
Operation [3]	Applicable	Not applicable	Applicable
Operation [4]	Not applicable	Not applicable	Applicable
Operation [5]	Not applicable	Not applicable	Applicable
Operation [6]	Not applicable	Not applicable	Applicable
Operation [7]	Applicable	Not applicable	Not applicable

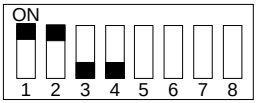
T05-101-05

1.1.16 Adjusting the Folding Position (saddle stitcher assembly)

The folding position is adjusted by changing the setting of SW1 (bits 6 through 8) on the saddle sticker controller PCB to mach the folding position against the stitching position (i.e., by adjusting the distance over which the paper positioning plate is moved from the stitching position to the folding position).

If you have replaced the saddle sticker controller PCB, you must be sure that the setting of SW1 on the new PCB must be the same as that on the old PCB. If you need to change the folding position for some reason, perform the following:

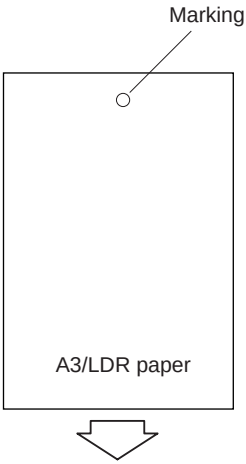
1) Remove the finisher assembly rear cover, and tape the inlet cover open sensor (PI69) actuator of the saddle sticker assembly in place.
2) Insert the door switch actuator into the finisher assembly front door switch (2 locations).
3) Slide out the saddle assembly.
4) Remove the PCB cover, and set bits 1 through 4 of SW1 on the saddle stitcher controller PCB as indicated.



Bits 5 through 8 are not changed.

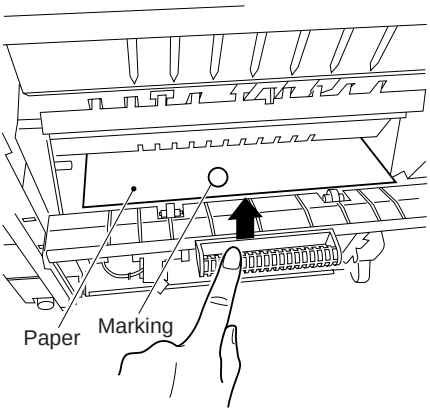
F05-101-35

5) Press SW2 on the saddle sticker controller PCB so that the feed motor (M41) starts to rotate.
6) Before pickup takes place, mark the top of the paper (two sheets of A3 or LDR).



F05-101-36

7) Open the inlet cover, and feed two sheets of paper. Be sure to stick in the sheets until their leading edges butt against the paper positioning plate.

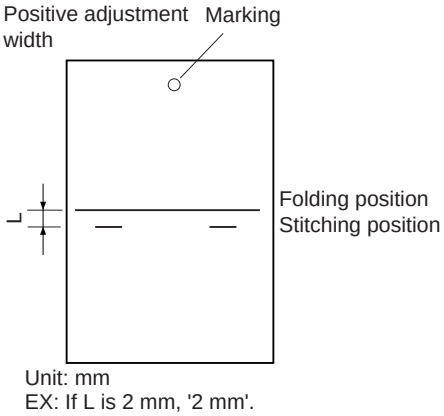


F05-101-37

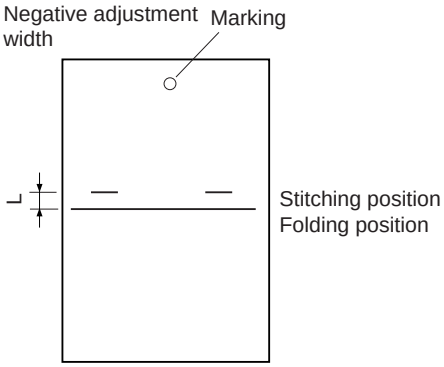
8) Close the inlet door.
9) Press SW2 on the saddle sticker controller PCB.

- The saddle sticker assembly will stitch the sheets, folds them, and delivers them automatically.

10) Measure the distance (L) between the stitching position and the folding position. Use either 'positive adjustment width' or 'negative adjustment width' to suit the relationship between the positions.
- If the stitching position is below the folding position, use 'positive adjustment width'.
- If the stitching position is above the folding position, use 'negative adjustment width'.



Unit: mm
EX: If L is 2 mm, '2 mm'.



Unit: mm
EX: if L is 1.5 mm, 1.5 mm.

F05-101-38

11) By referring to the table that follows, change the setting of bits 6 through 8 of SW1.
- If the adjustment width is 0,
  The stitching position and the folding position are correctly matched. Do not change the setting.
- If for 'positive adjustment width',
  Subtract the interval from the value in T-$, and change the setting of SW1.

EX:If the current setting of SW1 is +2 and the interval is +2 mm, set SW1 to -2.
- If for 'negative adjustment',
  Add the interval to the value in T-$, and change the setting of SW1.

EX:If the current setting of SW1 is -1 and the interval is -1.5 mm, set SW1 to +2.

bits of SW1			Setting
bit 6	bit 7	bit 8	(in mm)
OFF	ON	ON	+3
OFF	ON	OFF	+2
OFF	OFF	ON	+1
OFF	OFF	OFF	0
ON	OFF	ON	-1
ON	ON	OFF	-2
ON	ON	ON	-3

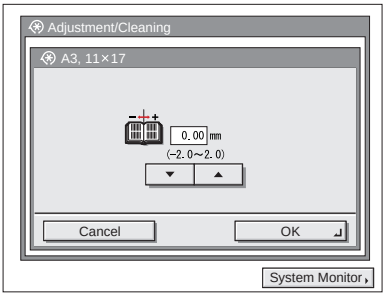
Do not change the following bits:

bit 6	bit 7	bit 8
ON	OFF	

1.1.17 Stitching Position (middle binding)

Use the copier's user mode to perform the following:

1) Press the User Mode key in the copier's control panel to start user mode.
2) Press 'adjust/clean' on the LCD.
3) Press 'Saddle Stitch Position Adjustment'.
4) Select the size: 'A3, 11x17', 'B4' or 'A4R, LTRR'.
5) Pressing the Down key or the Up key, enter the adjustment value in units of 0.25 mm. To stop adjustment, press the Cancel key.



F05-101-39

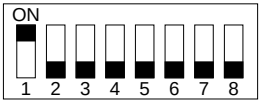
6) Press the OK key to store the change.

1.1.18 Adjusting the Folder Feed Path Paper Sensor 3 (S8)

If you have replaced the folder driver PCB or the feed path sensor (or, if jams occur often near the feed path sensor), perform the following:

1) Remove the folder rear cover and the rear inside cover.
2) Remove the finisher assembly PCB cover.
3) Check to find out if paper exists near the feed path sensor 3. If any, remove it.
4) Turn on the copier.
5) set SW973 of the switch PCB as indicated, and press SW976.

- The inlet motor (M1) rotates and, as a result, the power supply fan (FM1) goes ON, causing the folder driver PCB to be supplied with power.



F05-101-40

6) Turn VR791 so that LED791 of the folder driver PCB starts to flash.

- The sensitivity on the light-receiving side of the sensor is adjusted.
- If the LED remains ON at all times even when VR791 is turned, suspect a fault in the sensor. Replace the sensor or the driver PCB.

7) Turn off the copier.
8) Shift all bits of SW973 on the switch PCB to OFF.
9) Mount the finisher assembly PCB cover.
10) Mount the folder rear cover and the rear inside cover.

1.1.19 Adjusting the Inserter Paper Set Sensor (S9)

If you have replaced the inserter driver PCB or the paper set sensor (or, if jams occur often near the paper sent sensor or the paper set detection mechanism is faulty), perform the following:

1) Remove the inserter rear cover.
2) Check t find out if there is paper in the inserter tray. If any, remove it.
3) Turn on the copier.
4) Turn VR841 until LED843 starts to flash.

- The sensitivity of the light-receiving side of the sensor is adjusted.
- If the LED remains ON at all times even when VR843 is turned, suspect a fault in the sensor. Replace the sensor on the drive PCB.

5) Turn off the copier.
6) Mount the inserter rear cover.

1.2 Mechanical System

1.2.1 Adjusting the Inserter Pickup Tray Horizontal Registration

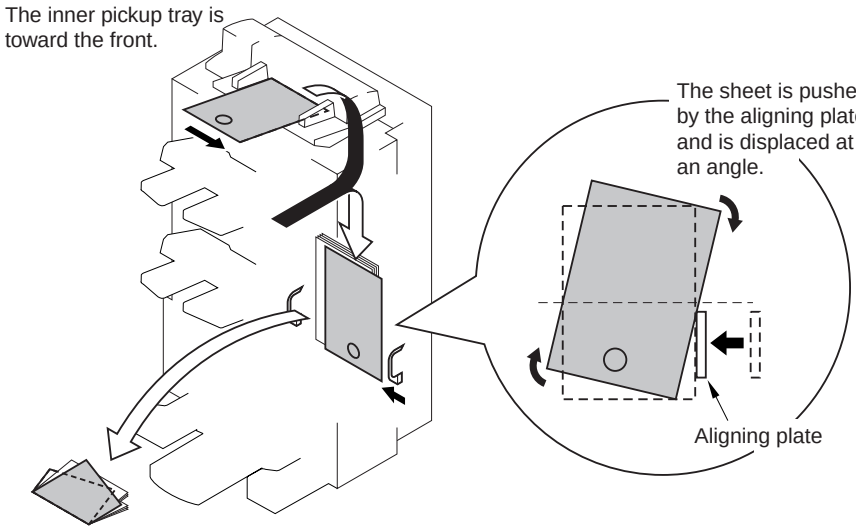
If the pickup tray on the inserter is displaced appreciably to the front or the rear, the saddle stitcher assembly can fail to align sheets from the inserter. As a result, the sheet will be stitched, folded, and delivered without alignment in relation to its host stack. This is especially true of the following:

- The inserter sheet is thick.
- The inserter sheet is not a copy.
- The stack consists of 15 sheets or so.

a. Symptom

a-1 If the inserter pickup tray is displaced to the front (misalignment 1),

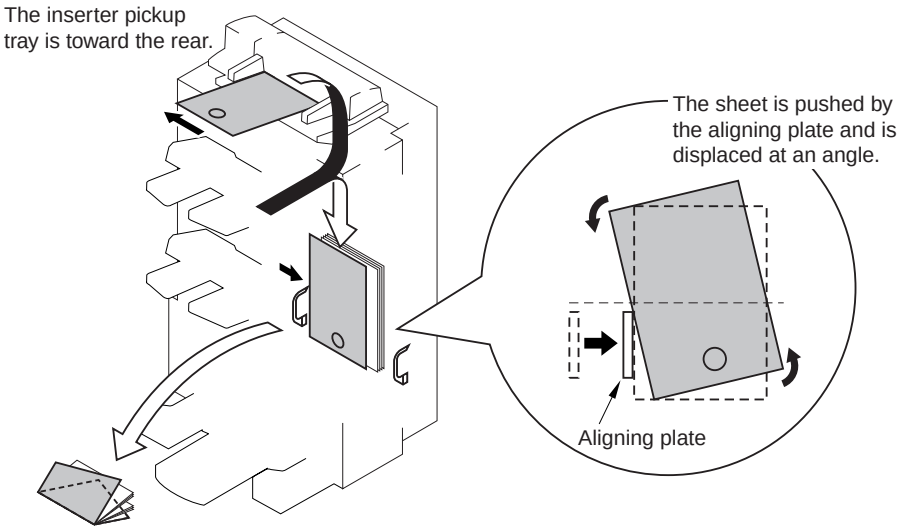
1) The inserter sheet arrives at the saddle unit toward the front in relation to the existing stack.
2) Of the two aligning plates of the saddle stitcher, the one at the front comes into contact with the inserter sheet. The inserter sheet is held down by the feed path and is turned.
3) The inserter sheet and its host stack are stitched and folded white remaining out of alignment (referred to as misalignment 1).



F05-102-01

a-2 If the inserter pickup tray is displaced to the rear (misalignment 2),

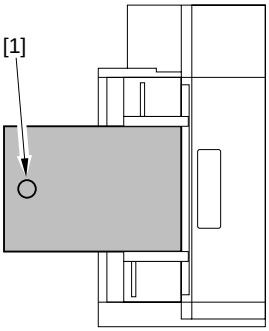
1) The inserter sheet arrives to the saddle stitcher unit toward the rear in relation to the existing stack.
2) Of the two aligning plates of the saddle stitcher, the one at the rear comes into contact with the inserter sheet. The inserter sheet is held down by the feed path and is turned.
3) The inserter sheet and its host stack are stitched and folded while remaining out of alignment (referred to as misalignment 2).



F05-102-02

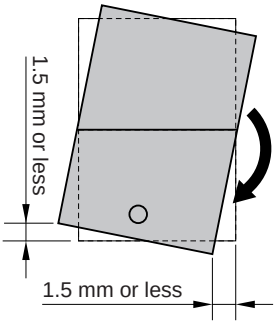
Memo

1. So that the misalignment may be more easily checked, put a marking [1] on the inserter sheet, and feed the sheet with the marking on the trailing edge.

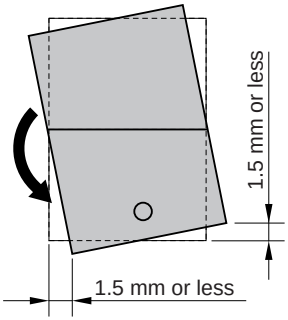


F05-102-03

2. To measure the alignment, refer to the side with the marking. Otherwise, the measurement will be affected by the difference in length between the inserter sheet and its host stack.



Misalignment 1



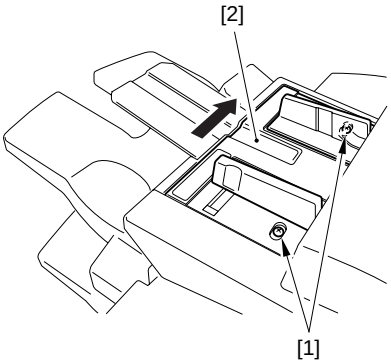
Misalignment 2

F05-102-04

b. Adjusting the Horizontal Registration

b-1 Misplacement 1

1) Loosen the two fixing screws [1] on the inserter pickup tray.
2) Shift the inserter pickup tray [2] toward the rear.

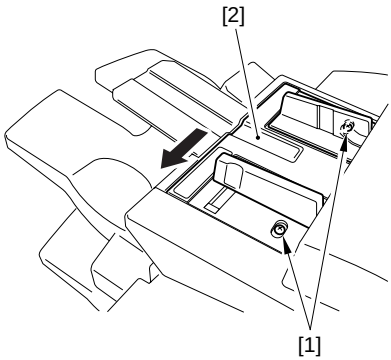


F05-102-05

3) Tighten the two fixing screws.
4) Check the misalignment. If correct, end the work. Otherwise, start with step 2 of b-1. If the adjustment was in excess and misalignment 2 has resulted, perform the instructions under b-2.

b-2 Misalignment 2

1) Loosen the two fixing screws [1] on the inserter pickup tray.
2) Shift the inter pickup tray [2] toward the front.



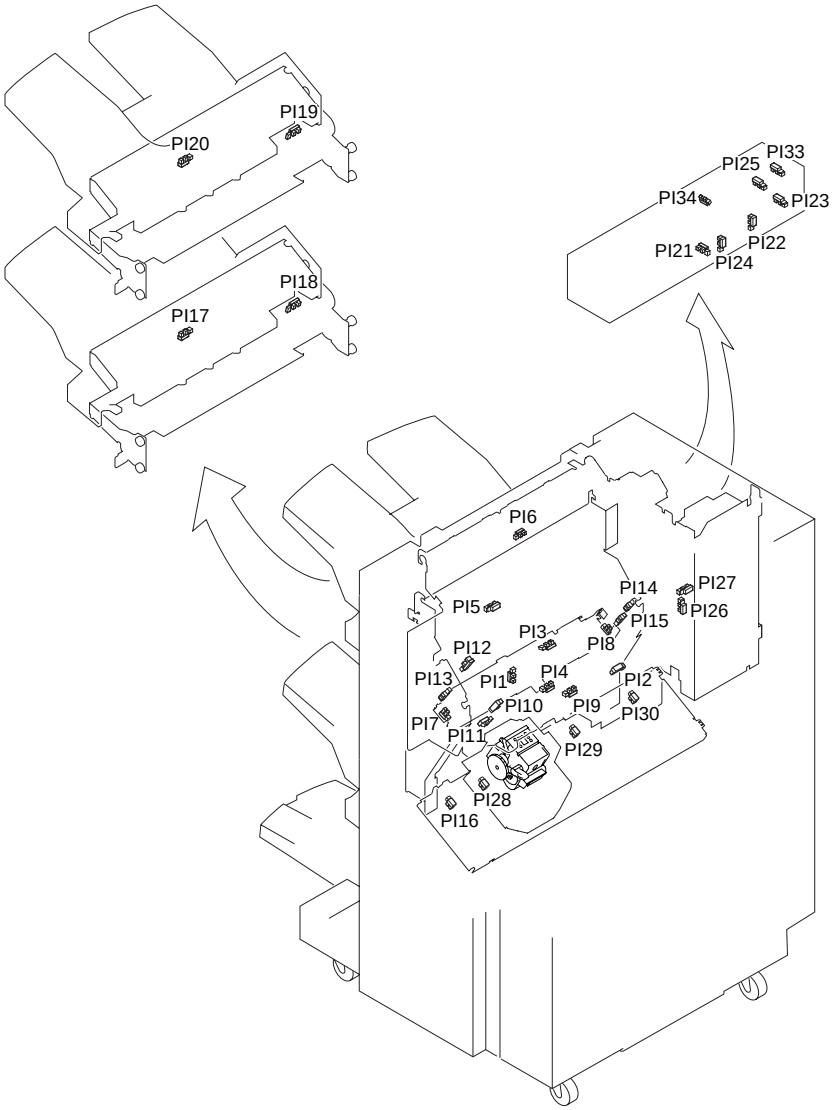
F05-102-06

3) Tighten the two fixing screws.
4) Check the misalignment. If correct, end the work. Otherwise, start over with step 2) of b-2. If the adjustment was in excess and misalignment 1 has resulted, perform the instructions under b-1.

2 Arrangement of Electrical Parts

2.1 Finisher Unit

2.1.1 Sensors

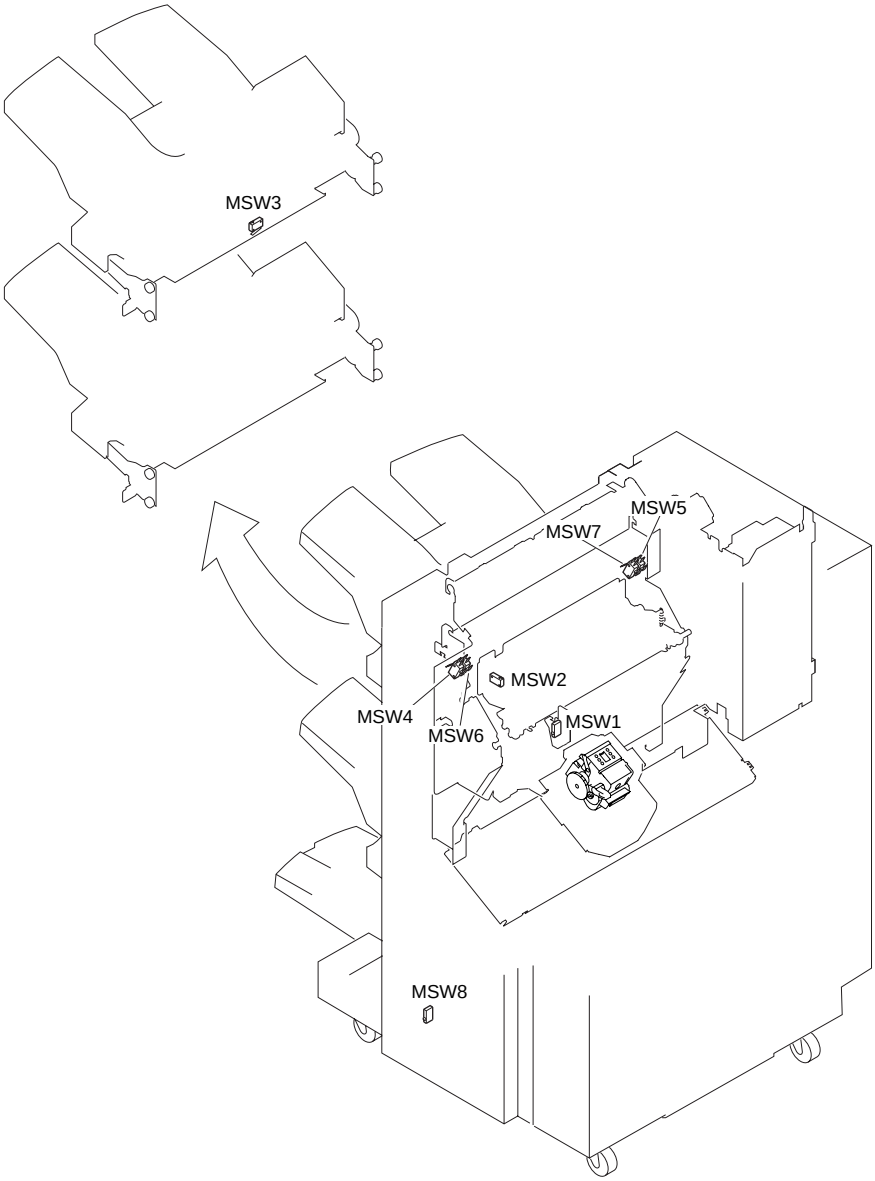


F05-201-01

Name	Notation	Function
Photointerrupter	PI1	Front door detection
	PI2	Inlet path paper detection
	PI3	Post-buffer path paper detection
	PI4	Sort delivery detection
	PI5	Upper cover open detection
	PI6	Non-sort delivery detection
	PI7	Front aligning plate home position detection
	PI8	Rear aligning plate home position sensor
	PI9	Swing motor clock detection
	PI10	Tray auxiliary plate retraction detection
	PI11	Stack feed motor clock detection
	PI12	Shutter home position sensor
	PI13	Paddle home position detection
	PI14	Swing guide closed detection
	PI15	Swing guide open detection
	PI16	Stapler shift home position detection
	PI17	Tray B paper detection
	PI18	Tray B idle rotation detection
	PI19	Tray A idle rotation detection
	PI20	Tray A paper detection
	PI21	Punch paper edge detection
	PI22	Punch motor home position detection
	PI23	Punch sensor home position detection
	PI24	Punch home position detection
	PI25	Punch front detection
	PI26	Punch waste feed detection
	PI27	Punch waste paper feed detection
	PI28	Knurled belt shift enable detection 1
	PI29	Knurled belt shift enable detection 2
	PI30	Knurled belt shift enable detection 3
	PI31	Knurled belt home position detection
	PI32	Stack delivery detection
	PI33	Punch 2/3-hole detection
	PI34	Punch motor clock detection

T05-201-01

2.1.2 Microswitches

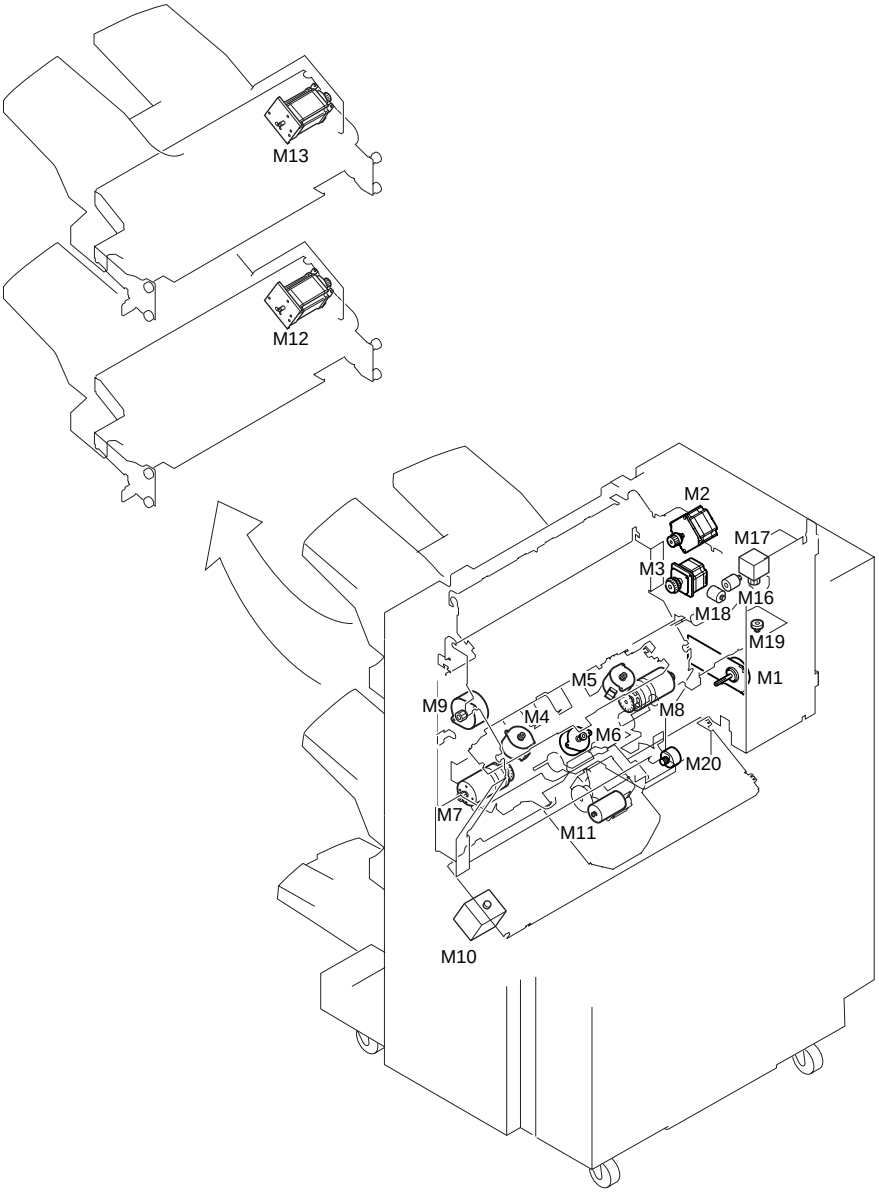


F05-201-02

Name	Notation	Function
Microswitch	MSW1	Front door open detection 1
	MSW2	Swing guide open detection
	MSW3	Tray approach switch
	MSW4	Tray safety detection (front)
	MSW5	Tray safety detection (rear)
	MSW6	Stapler safety detection (front)
	MSW7	Stapler safety detection (rear)
	MSW8	Front door open detection 2

T05-201-02

2.1.3 Motors

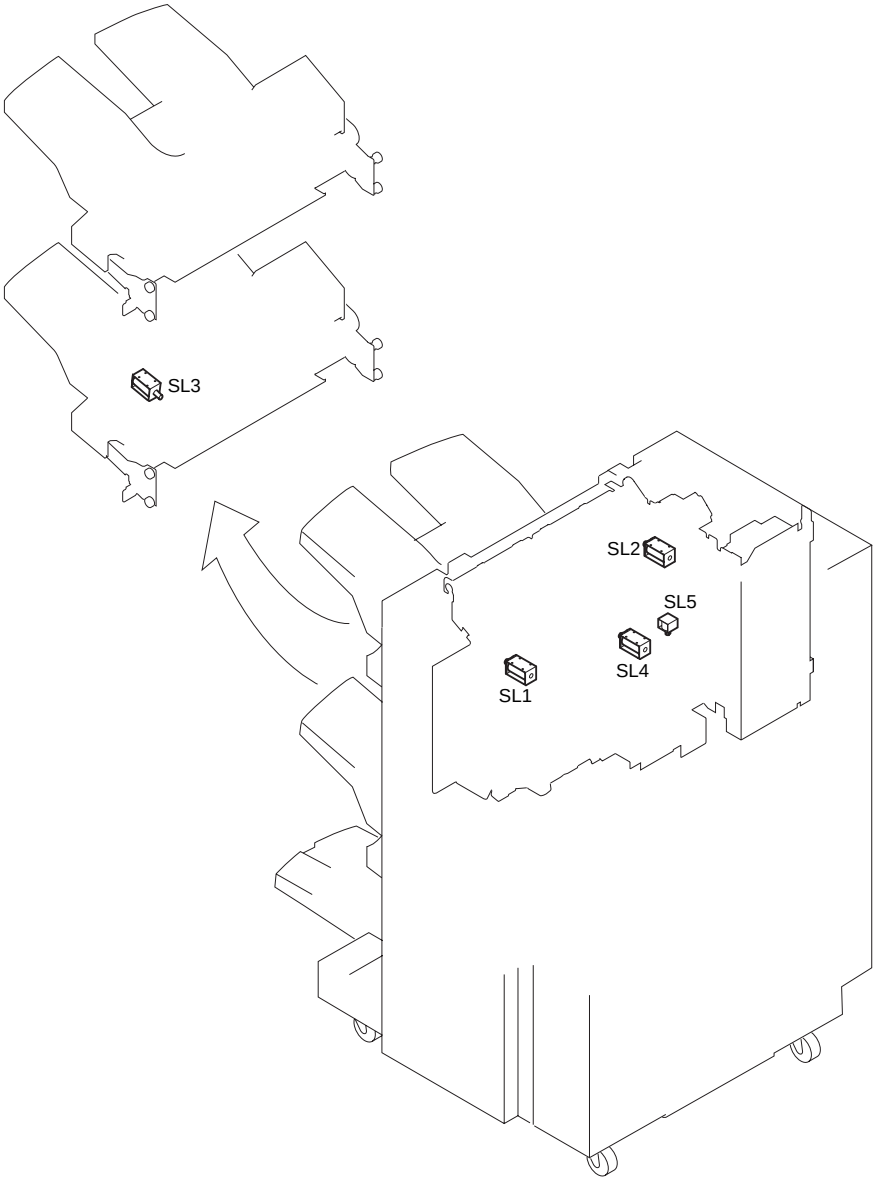


F05-201-03

Name	Notation	Function
Motor	M1	Inlet motor
	M2	Buffer motor
	M3	Delivery motor
	M4	Front aligning plate motor
	M5	Rear aligning plate motor
	M6	Tray auxiliary plate motor
	M7	Stack delivery motor
	M8	Swing motor
	M9	Paddle motor
	M10	Stapler shift motor
	M11	Stapler motor (inside stapler)
	M12	Tray B lift motor
	M13	Tray A lift motor
	M16	Punch waste feed motor
	M17	Punch registration motor
	M18	Punch motor
	M19	Punch sensor shift motor
	M20	Knurled belt motor

T05-201-03

2.1.4 Solenoids

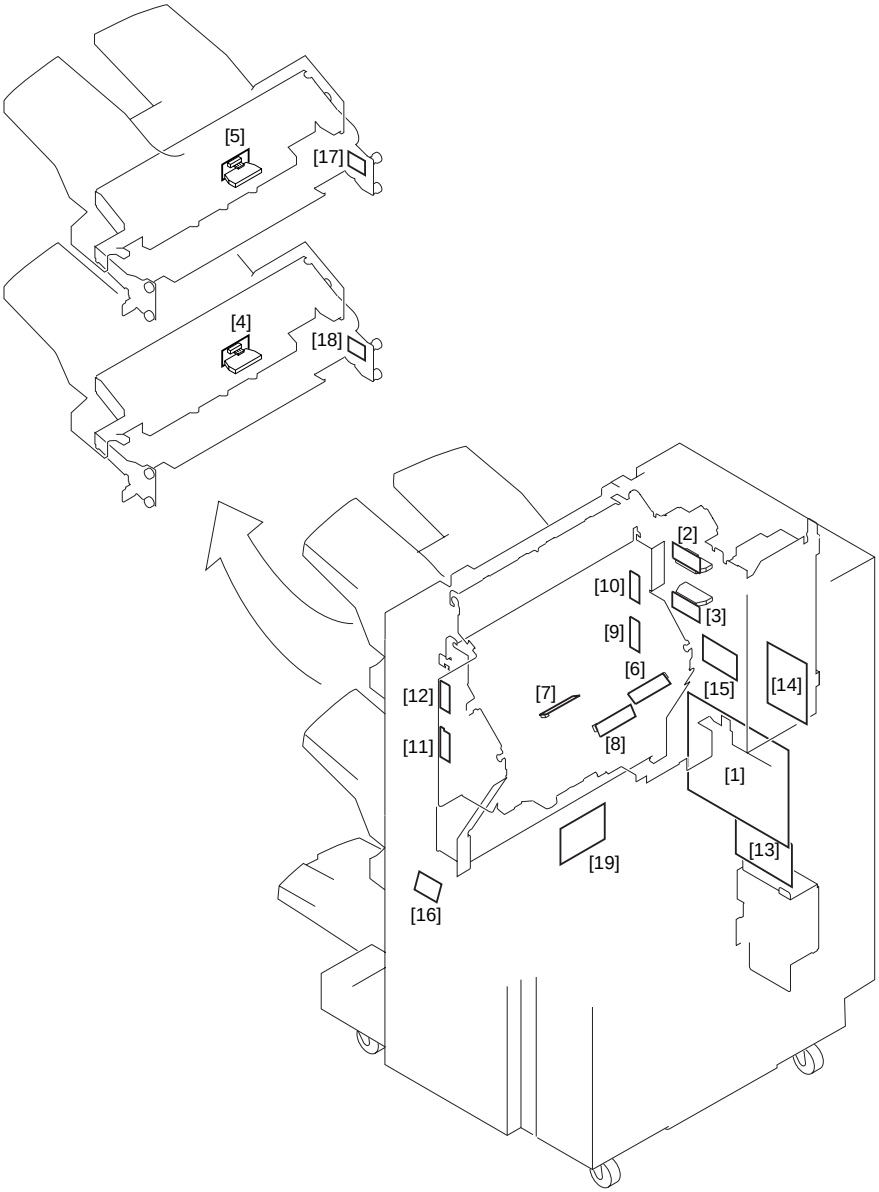


F05-201-04

Name	Notation	Function
Solenoid	SL1	Buffer path switching solenoid
	SL2	Upper path switching solenoid
	SL3	Sub tray solenoid (w/ folder installed)
	SL4	Delivery auxiliary rib solenoid
	SL5	Rear edge drop solenoid

T05-201-04

2.1.5 PCBs

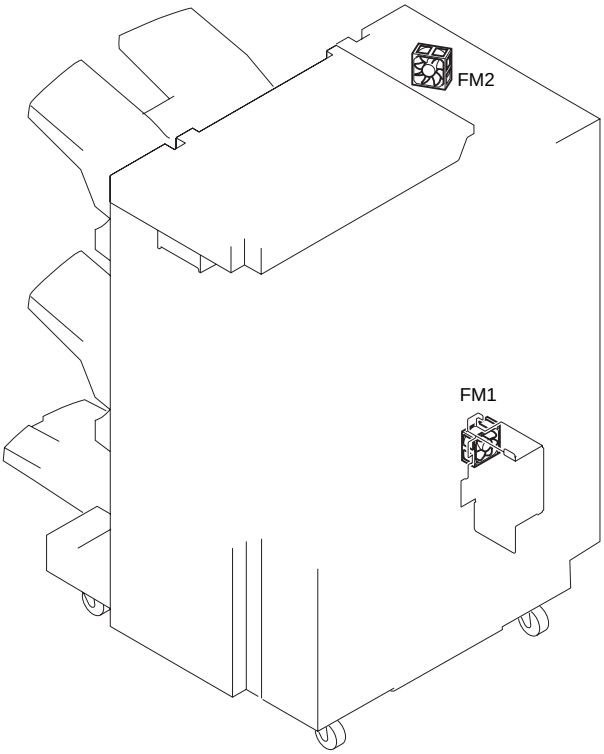


F05-201-05

Notation	Name
[1]	Finisher controller PCB
[2]	Buffer motor driver PCB
[3]	Delivery motor driver PCB
[4]	Tray B lifter motor driver PCB
[5]	Tray A lifter motor driver PCB
[6]	Inlet path paper detection (S1)
[7]	Buffer path paper detection (S2)
[8]	Lower path paper detection (S3)
[9]	Tray B sensor LED
[10]	Tray A sensor LED
[11]	Tray B sensor PCB (S4)
[12]	Tray A sensor PCB (S5)
[13]	Fuse PCB
[14]	Punch driver PCB
[15]	Punch waste sensor PCB
[16]	Switch PCB
[17]	Tray A area detection PCB
[18]	Tray B area detection PCB
[19]	Stapler driver PCB

T05-201-05

2.1.6 Fans



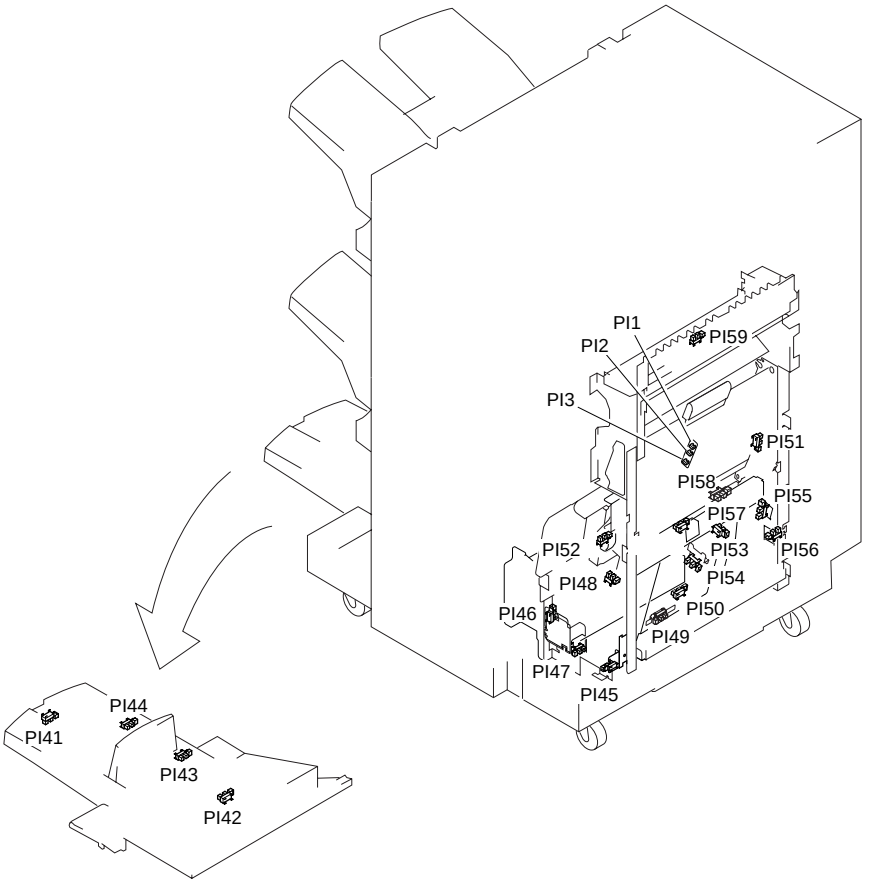
F05-201-06

Notation	Description
FM1	Power supply fan
FM2	Feeder cooling fan

T05-201-06

2.2 Saddle Sticher Unit

2.2.1 Photointerrupters

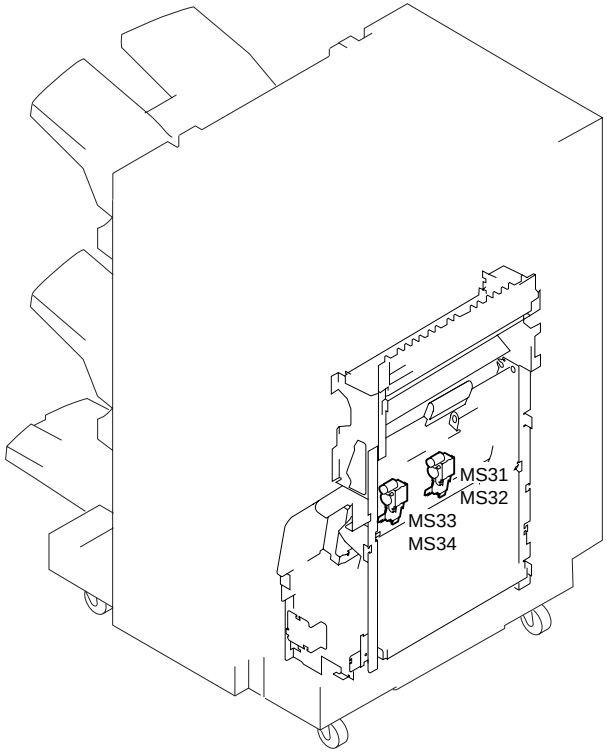


F05-202-01

Name	Notation	Function
Photointerrupter	PI41	Saddle tray home position detection
	PI42	Saddle tray paper detection 1
	PI43	Saddle tray paper detection 2
	PI44	Saddle try paper detection 3
	PI45	Paper pushing plate motor clock detection
	PI46	Outlet cover open detection
	PI47	Folder motor clock detection
	PI48	Aligning plate home position detection
	PI49	Paper positioning plate home position detection
	PI50	Paper positioning plate paper detection
	PI51	Inlet cover open detection
	PI52	Delivery detection
	PI53	Crescent roller phase detection
	PI54	Guide home position detection
	PI55	Paper pushing plate home position detection
	PI56	Paper pushing plate leading edge detection
	PI57	Vertical path paper detection
	PI58	Paper folding home position detection
	PI59	Saddle inlet paper detection
	PI60	No. 1 paper detection (paper sensor PCB)
	PI61	No. 2 paper detection (paper sensor PCB)
	PI62	No. 3 paper detection (paper sensor PCB)

T05-202-01

2.2.2 Switches

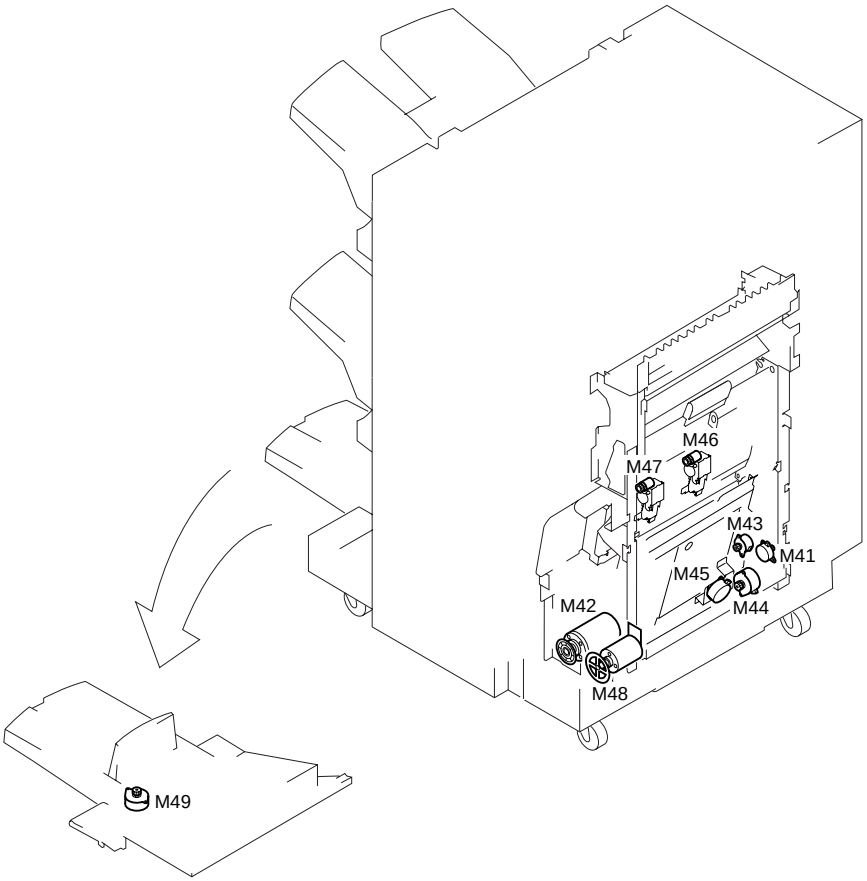


F05-202-02

Name	Notation	Function
Microswitch	MS31	Staple detection (rear)
	MS32	Stitching home position detection (rear)
	MS33	Staple detection (front)
	MS34	Stitching home position detection (front)

T05-202-02

2.2.3 Motors

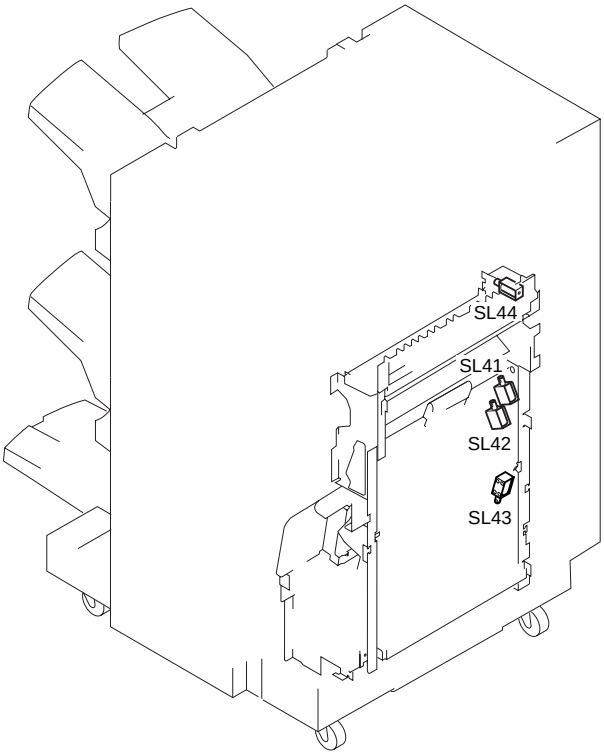


F05-202-03

Name	Notation	Function
Motor	M41	Feed motor
	M42	Paper folder motor
	M43	Guide motor
	M44	Paper positioning plate motor
	M45	Alignment motor
	M46	Stitcher motor (rear)
	M47	Stitcher motor (front)
	M48	Paper pushing plate motor
	M49	Saddle tray motor

T05-202-03

2.2.4 Solenoids

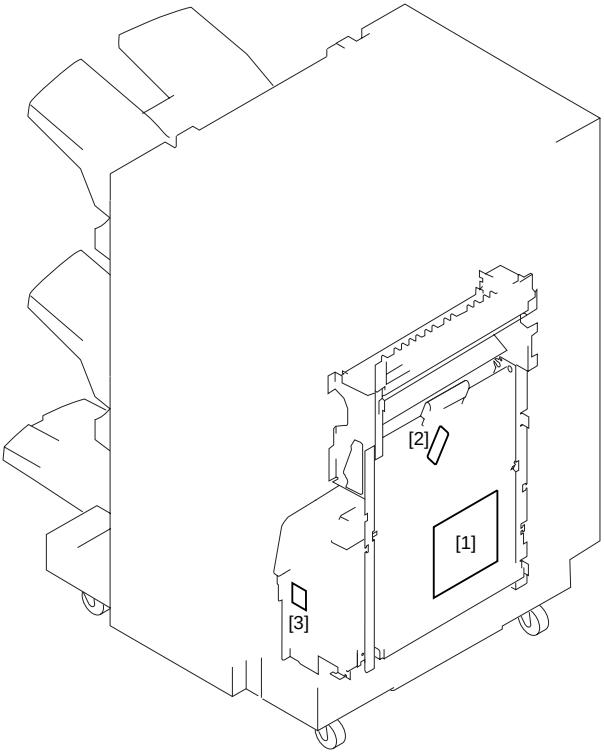


F05-202-04

Name	Notation	Function
Solenoid	SL41	No. 1 paper deflecting plate solenoid
	SL42	No. 2 paper deflecting plate solenoid
	SL43	Feeding roller contact solenoid
	SL44	Saddle inlet solenoid

T05-202-04

2.2.5 PCBs

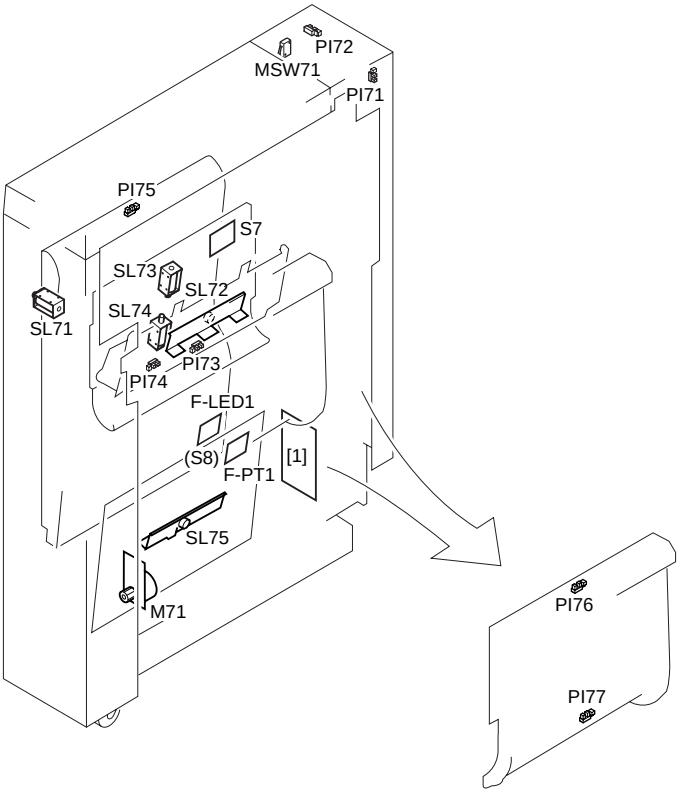


F05-202-05

Ref.	Name
[1]	Saddle stitcher controller PCB
[2]	Paper sensor PCB
[3]	Saddle jam LED PCB

T05-202-05

2.3 Paper Folder unit-B1 (folder)

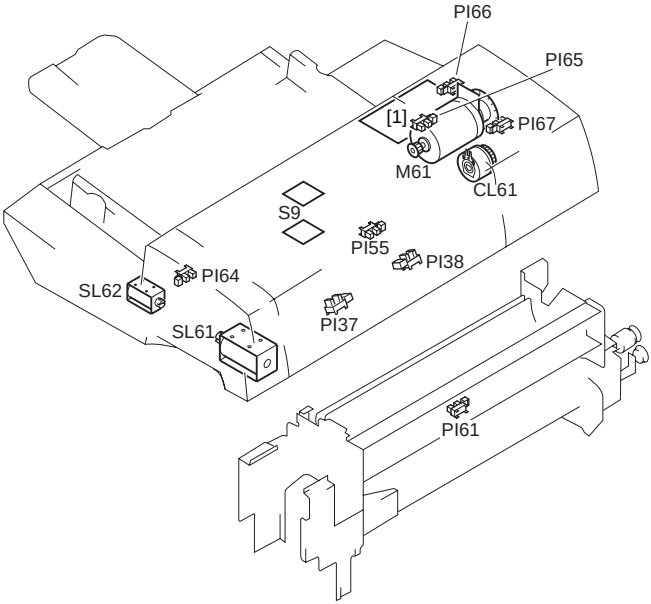


F05-203-01

Motor	Notation	Function
Solenoid	M71	Folder motor
	SL71	Folder inlet solenoid
	SL72	B4 Z-fold No. 2 stopper solenoid
	SL73	Releasing solenoid
	SL74	Locking solenoid
	SL75	B4 Z-fold No. 1 stopper solenoid
Photointerrupter	PI71	Folder set detection
	PI72	Upper cover open/closed detection
	PI73	Fold path residual paper detection 1
	PI74	Fold path residual paper detection 3
	PI75	Feed path paper detection 4
	PI76	Feed path paper detection 1
	PI77	Fold path paper residual paper detection 2
Sensor	S7	Feed path paper detection 2
	F-LED1 (S8)	Feed path paper detection 3
	F-PT1 (S8)	Feed path paper detection 3
Switch	MSW71	Folder upper door switch
PCB	[1]	Folder driver PCB

T05-203-01

2.4 Cover Inserter-A1 (inserter)



F05-204-01

Name	Notation	Function
Photointerrupters	PI61	Inserter feed detection 3
	PI62	Inserter separation detection 1
	PI63	Inserter separation detection 2
	PI64	Inserter cover open detection (front)
	PI65	Inserter over open detection (rear)
	PI66	Inserter open detection
	PI67	Inserter motor clock detection
Sensor	S9	Inserter paper set sensor (light-emitting)
		Inserter paper set sensor (light-receiving)
Motor	M61	Inserter motor
Solenoid	SL61	Inserter pickup solenoid
	SL62	Inserter stopper plate solenoid
Clutch	CL61	Inserter separation clutch
PCB	[1]	Inserter driver PCB

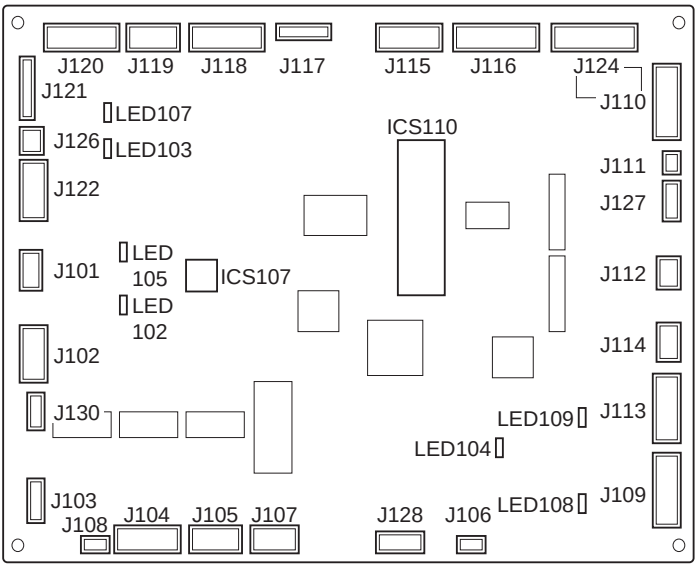
T05-204-01

2.5 LEDs and Check Pins by PCB

Of the LEDs and check pins used in the machine, those needed in the field are discussed.

Do not touch VRs and check pins not indicated herein. They are for use at the factory, and require special tools and accuracy.

2.5.1 Finisher Controller PCB

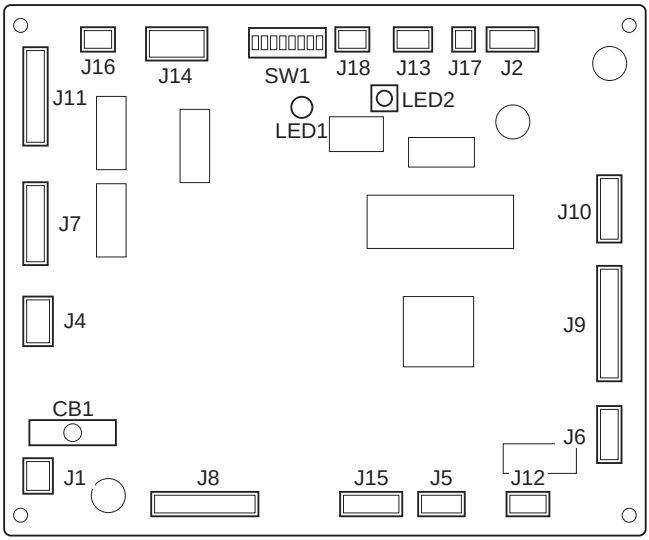


F05-205-01

LED	Description
LED102	Goes ON in response to 5 V (J101-3).
LED103	Goes ON in response to 24 VR (J126-1). Goes OFF when the front cover switch (MSW1) is opened.
LED104	Remains ON when the stack delivery motor (M7) rotates normally (in response to clocks from the stack delivery motor clock sensor (PI12)).
LED105	Goes ON in response to 24 VU (J101-1). Goes OFF in response to a press on the Power Save switch on the copier or to a shift to low-power mode.
LED106	Flashes while downloading takes place.
LED107	Remains ON while the inlet motor (M1) rotates normally (in response to clocks from the inlet motor).
LED108	Goes ON in response to 36 VTRY (J112-1).
LED109	Goes ON in response to 36 V (J113A-8, 9, 10). Goes OFF if separated by the module disconnecting switch. Goes OFF when the tray approach switch (MSW3) is pressed.
LED110	Goes ON when the stapler is not inside the range of knurled belt interference.
LED111	Remains ON when the stapler current limiter is under way or when the stapler signal connector (J774, J772) is disconnected.

T05-205-01

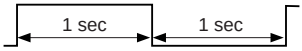
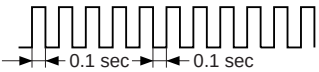
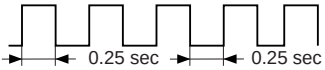
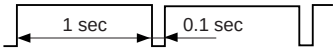
2.5.2 Saddle Stitcher Controller PCB



F05-205-02

Stitch	Function
DIPSW1, bits 1 through 2	Used to start correction of any discrepancy between stitching position and folding position.
DIPSW1, bits 6 through 8	Used to enter the adjustment value to correct stitching position and folding position.
SW2	Used to start correction of any discrepancy between stitching position and folding position.
LED1	Indicates the state of the saddle stitcher assembly.

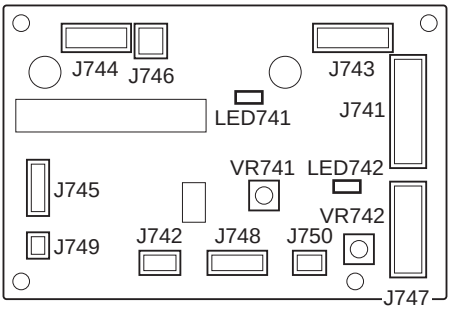
T05-205-02

No.	Condition	LED1 indication	
1	Normal	Repeats being ON for 1 sec and OFF for 1 sec.	
2	Error	Repeats being ON for 0.1 sec and OFF for 0.1 sec.	
3	Jam	Repeats being ON for 0.25 sec and OFF for 0.25 sec.	
4	Tray alarm	Repeats being ON for 0.5 sec and OFF for 0.1 sec.	
5	Stapler alarm	Repeats being ON for 1 sec and OFF for 0.1 sec.	

The state (ON or OFF) of LED1 enables a check on the condition of the saddle stitcher assembly.
LED101 on the finisher controller PCB or the copier itself offers more detailed information.
Note 1: For the DIPSW1 on the saddle stitcher controller PCB, bits 1 through 4 must be OFF.
Note 2: A press on SW2 of the saddle stitcher controller PCB in condition 2 through 5 above causes the display to be in factory mode. To return to the previous mode, press SW2 once again.

T05-205-03

2.5.3 Punch Drive PCB

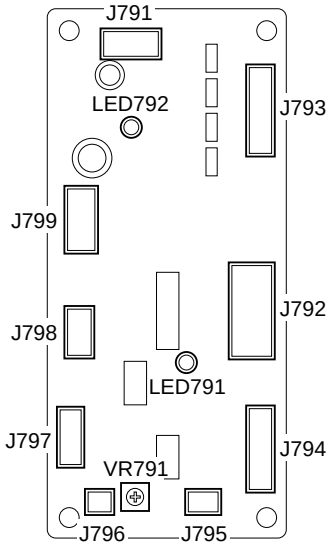


F05-205-03

LED	Description
LED741	Goes ON in response to 24 V. Goes OFF when disconnected by the module disconnecting switch.
LED742	State of the Paper Edge Sensor (PI21; adjustment) If good, flashes (standby). If poor, OFF/ON (standby).

T05-205-04

2.5.4 Folder Drier PCB



F05-205-04

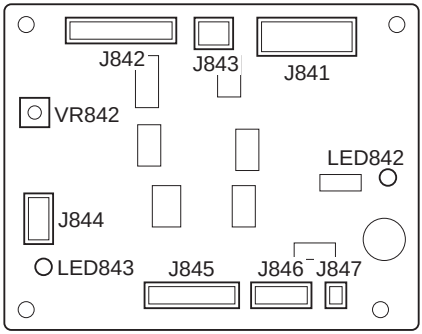
LED	Description
LED792	Goes ON when 24 VZFLD/5V is supplied and the FANON signal goes ON. Goes OFF when disconnected by the module disconnecting switch.
LED791	Indicates the result of adjustment on the feed path paper sensor 3 (S8) and the state of paper detection: If ON, paper has been detected. If flashing, paper has not been detected and the adjustment has been completed. If OFF, sensor adjustment is recommended.

T05-205-05

Volume	Description
VR791	Used to adjust the feed path paper sensor 3 (S8).

T05-205-06

2.5.5 Inserter Driver PCB



F05-205-05

LED	Function
LED842	Goes ON in response to 24VINS/5V. Goes OFF when disconnected by the modular disconnecting switch. Goes OFF in response to a press on the Power Save switch or a shift to low power mode.
LED843	Indicates the result of adjustment on the paper set sensor (S9) or the state of paper detection. If ON, paper has been detected. If flashing, paper has not been detected or adjustment has been completed. If OFF, sensor adjustment is recommended.

T05-205-07

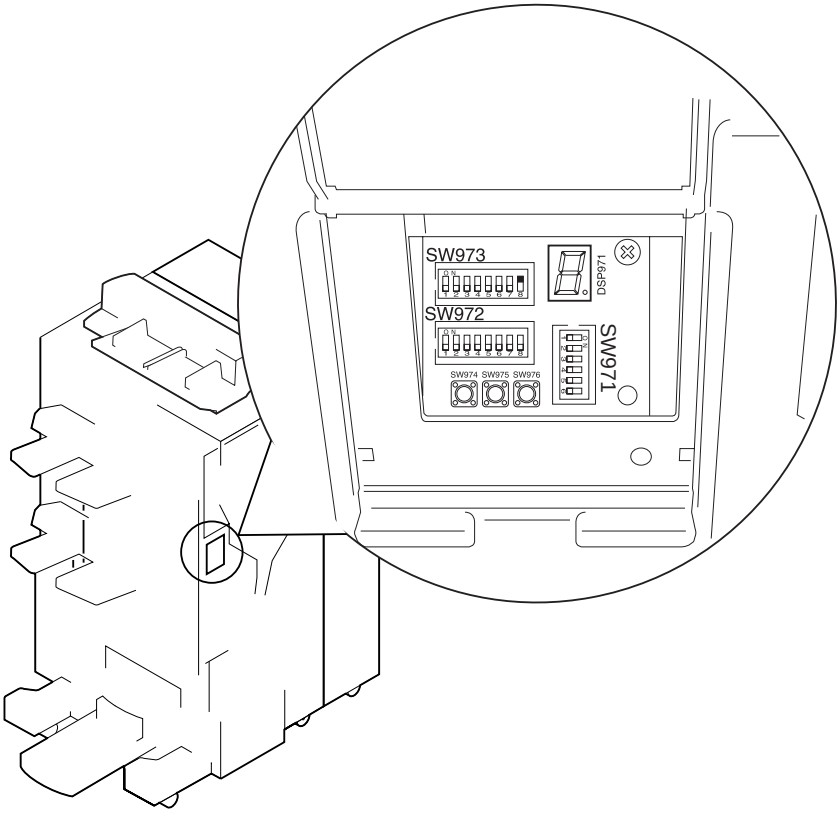
Volume	Function
VR842	Used to adjust the paper set sensor (S9).

T05-205-08

2.5.6 Functions of the DIP Switch

The three DIP switches on the switch PCB have the following functions:

- SW971: enable/disables the unit.
- SW972: sets operating mode.
- SW973: checks operation and makes adjustments.



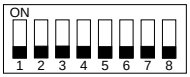
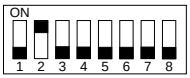
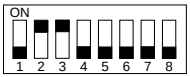
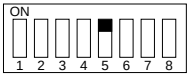
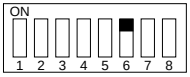
F05-205-06

a. SW971

bit	ON	OFF
1	Punch unit enabled	Punch unit disabled
2	Tray A enabled	Tray A disabled
3	Inserter unit enabled	Inserter unit disabled
4	Folder unit enabled	Folder unit disabled
5	Saddle unit enabled	Saddle unit disabled
6	Punch unit enabled	Punch unit disabled

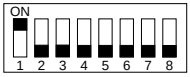
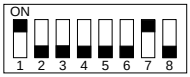
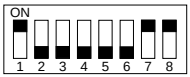
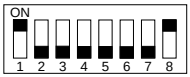
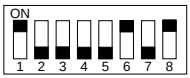
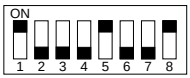
T05-205-09

b. SW972

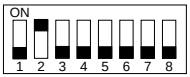
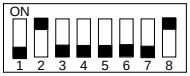
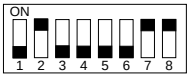
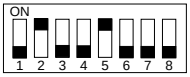
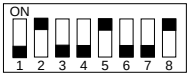
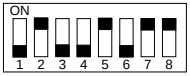
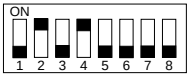
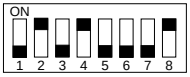
Setting	Operating mode
	Assumes that the punch unit is not used.
	Assumes that the 2-hole punch unit is used.
	Assumes that the 2/3-hole punch unit is used.
	Assumes that the 4-hole punch unit (Swedish) is used.
	Assumes that the 4-hole punch unit (French) is used.
	Corrects upward curl paper. Note: Except bit 5, the setting depends on the presence/absence of the punch unit or the specifications of the punch unit.
	Corrects lower curl paper Note: Except bit 6, the setting depends on the presence/absence of the puncher unit or the specifications of the punch unit.

T05-205-10

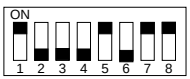
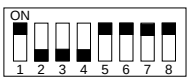
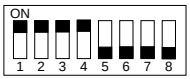
c. SW973

Setting	Item	Description
	Inlet motor operation	A press on SW976 rotates the motor. Another press stops it.
	Buffer motor operation	
	Delivery motor operation	
	Folder motor operation	
	Inserter motor operation	
	Stack delivery motor operation	
	Swing operation	A press on SW976 opens the swing guide. Another press closes it.
	Auxiliary tray operation	A press on SW976 causes the auxiliary tray to move outside the machine. Another press causes it to move back inside the machine.
	Paddle operation	A press on SW976 causes the paddle to rotate for a specific period of time. To rotate it thereafter, turn off and then on the power and press SW976.
	Solenoid, clutch operation	Each press on SW976 turns ON the following in sequence: buffer path switch, upper path switch, knurled belt, sub tray, saddle inlet, inserter pickup, inserter stopper and inserter separation solenoids, clutch. This is invalid if no option is installed.
	Folder solenoid operation	Each press on SW976 turns ON the following in sequence: folder inlet, B4 No. 2 stopper, B4 No. 1 stopper, unlocking, locking solenoid.
	Finisher stapling operation	Each press on SW976 causes stapling operation.
	Stapler slide operation	Each press on SW104 moves the stapler from home position, to front binding position, to rear binding position, and then to 2-position binding position.

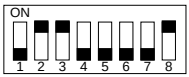
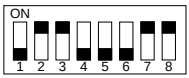
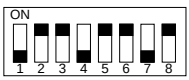
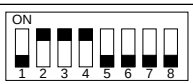
T05-205-11

Setting	Item	Size	Description
	Alignment width adjustment		See the descriptions for their respective items.
	Stapling position adjustment (front, 1-point)	A4	
	Stapling position (rear, 1-point)		
	Alignment width adjustment		
	Stapling position (front, 1-point)	LTR	
	Stapling position (front, 1-point)		
	Sensor initial adjustment		See the descriptions for their respective items.
	Swing guide speed adjustment	-	
	Swing guide speed indication		A press on SW976 indicates the swing guide speed.

T05-205-12

Setting	Name	Description
	Buffer roller wrapping adjustment (feeding operation)	See the descriptions for their respective items.
	Buffer roller wrapping adjustment (adjustment input)	
	Punch motor rotation	A press on SW976 executes punching operation.
	Punch registration motor rotation	Each press on SW976 causes the punch unit to move from the home position, or to home position.
	Punch sensor shift motor rotation	Each press no SW976 causes the punch paper edge sensor to move from home position, or to home position.
	Punch waste feed motor rotation	Each press on SW976 causes the punch waste feed motor to rotate. Another press stops it. This operation requires that the punch waste case be set in position.
	Shutter separation	Each press on SW976 repeats opening and closing the shutter.
	Inserter roller, belt cleaning	Each press on SW976 turns ON the inserter motor and the separation clutch. Another press turns them OFF.
	RAM initialization	When both SW976 and SW975 are held down for 3 sec or more, the RAM will be initialized.
		When both SW976 and SW974 are held down for 3 sec or more, all counter items will be initialized.
	E505 setting	In 10 sec after power-on, E505 is reset.

T05-205-13

Setting	Name	Operation
	50-sheet stapler counter*1	A press on SW976 indicates the counter readings starting with the top digit (decimal). When both SW974 and SW975 are held down for 3 sec or more, the counter readings are initialized individually. Each reading is incremented every 10 operations, and the latest is retained in memory. If the power is turned off before counting 10 operations, no count is made.
	100-sheet stapler counter*1	
	Saddle stapler counter*1	
	Punch waste counter*2	
	Saddle stitcher unit paper passage counter	
	Paper folder unit paper passage counter	
	Punch operation counter	
	Finisher unit stapling operation counter	
	Saddle stitcher operation counter	

*1: Cleared when the absence of a staple is detected.

*2: Cleared when the punch waste case is detached and then attached.

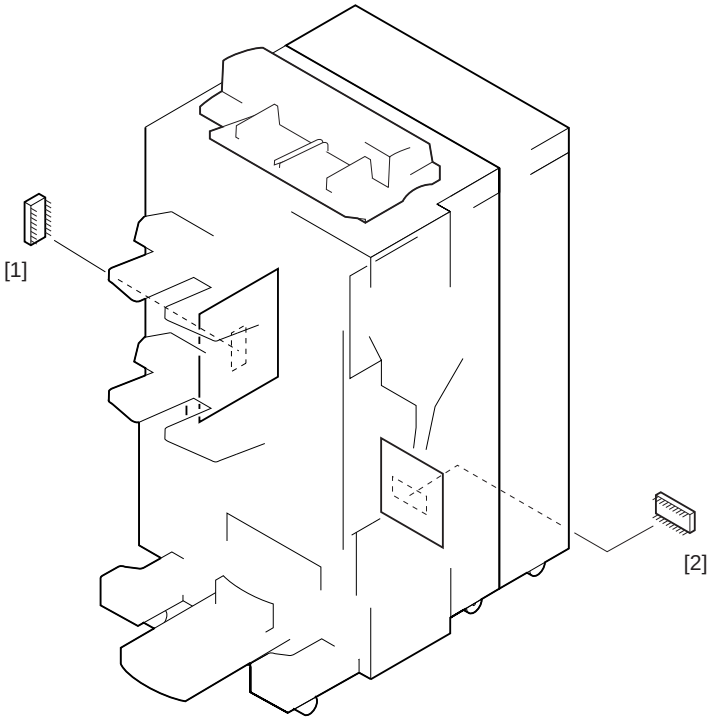
T05-205-14

2.6 Upgrading

The machine can be upgraded as follows:

Function	Upgrading	Remarks
Finisher unit	ROM replacement [1]	Requires downloading from master to slave.
Saddle stitcher unit	ROM replacement [2]	
Folder unit	None	Control is by the finisher unit.
Inserter unit	None	Control is by the finisher unit.

T05-206-01



F05-206-01

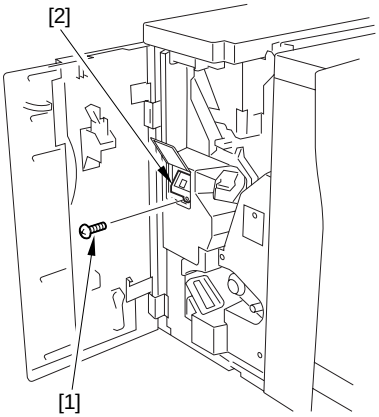
Upgrading the Finisher Unit

Upgrading the finisher unit consists of the following:

- Replacing the ROM on the finisher controller PCB.
- Downloading from master to slave.

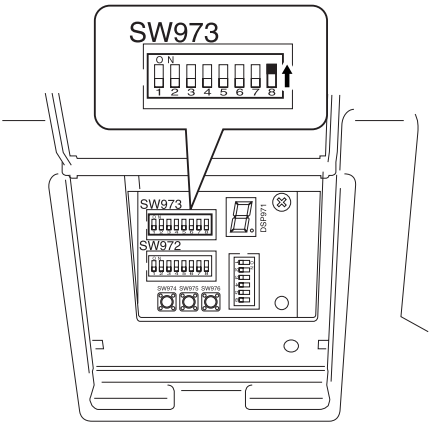
To download from master to slave, perform the following:

1) Turn off the copier.
2) Replace the ROM on the finisher controller PCB.
3) Open the front cover of the finisher; then, remove the screw [1], and detach the switch cover [2].



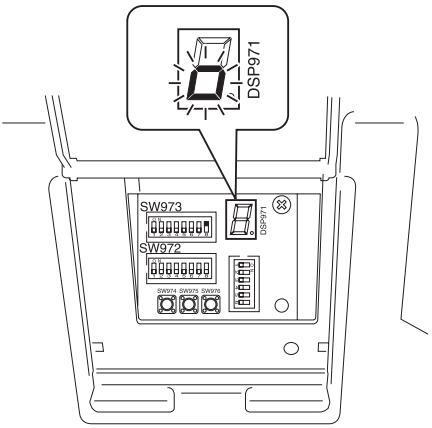
F05-206-02

4) Shift only bit 8 of DIP switch (SW973) to ON.



F05-206-03

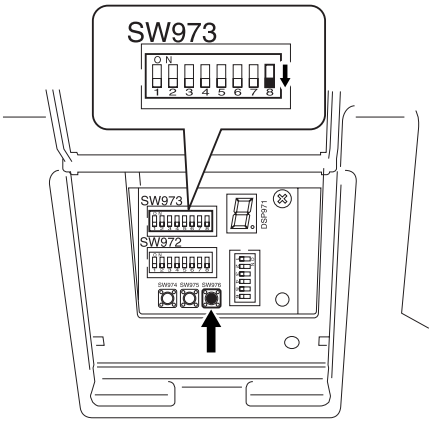
5) Turn on the copier.
The LED (DSP971) operates as follows to indicate that the machine has started download mode.



F05-206-04

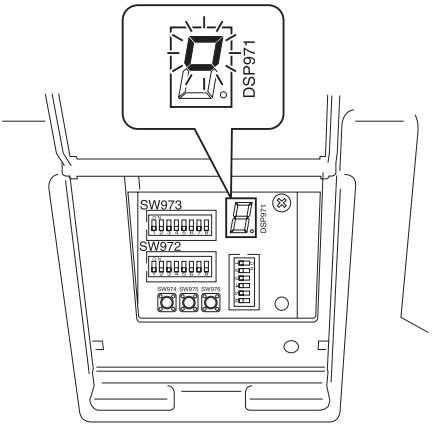
6) Check the indication of the LED (DSP971), and shift bit 8 of the DIP switch (SW973) to OFF; then, press the switch (SW976).
   ■ The LED (DSP971) flashes its segments in turns to indicate the downloading is taking place.

If downloading does not start for about 3 min, the copier's control panel indicates 'E506'.



F05-206-05

7) When downloading ends normally, the LED (DSP971) starts to flash all its segments at the same time.
   If an error occurs during downloading, the copier's control panel indicates 'E506'.
   ■ Download time: about 90 sec



F05-206-06

8) Check the indication of the LED (DSP971); thereafter, turn off and then on the copier's power switch.
9) Upgrade the finisher using the copier's service mode.

3 Troubleshooting Malfunctions

3.1 Finisher Unit

3.1.1 E500 (communication with copier)

Finisher controller PCB, Cover DC controller PCB	**1) Turn off and then on the copier's power switch. Is the problem corrected?** YES: End.
Fuse PCB	**2) Are the communication line of the fuse PCB and the grounding wire normal?** **J716-7 and J717-1** **J716-6 and J717-3** **J716-4 and J717-4** **J716-5 and J717-5** NO: Replace the fuse PCB.
Switching regulator	**3) Is the voltage between J85-1 (+) and J85-2 (-) on the stitching regulator 5 V?** NO: Replace the switching regulator.
Wiring	**4) Is the wiring between the finisher controller PCB and the switching regulator normal?** **5) Is the wiring between the copier DC controller PCB and the fuse PCB normal?** NO: Correct the wiring.
Finisher controller PCB, Copier DC controller PCB	**6) Replace the finisher controller PCB. Is the problem corrected?** YES: End. NO: Replace the copier DC controller PCB.

3.1.2 E503 (communication with saddle stitcher unit)

Finisher controller PCB, Saddle stitcher controller PCB	**1) Turn off and then on the copier's power stitch. Is the problem corrected?** YES: End.
Wiring	**2) Is the wiring between the finisher controller PCB and the saddle stitcher controller PCB normal?** NO: Correct the wiring.
Power supply, Saddle stitcher controller PCB	**3) Is 24 VDC present between J1-1 (+) and -2 (-) of the saddle stitcher controller PCB?** NO: Check the wiring between the fuse PCB and the finisher controller PCB. YES: Replace the saddle stitcher controller PCB.

3.1.3 E505 (checksum fault)

Finisher controller PCB	**1) Turn off and then on the copier's power switch. Is the problem corrected?** YES: End. **2) Turn off the power, and shift bits 1, 2, 3, and 4 of SW103 of the finisher controller PCB to ON. Turn on the power, and wait for about 10 sec. Turn off the power, and shift all bits of SW103 to OFF. Is the problem corrected when the power is turned on once again?** YES: End. NO: Replace the finisher controller PCB.

3.1.4 E506

Slave program download (error)	**1) Try downloading in download move several times. Is the problem corrected?** YES: End. NO: Replace the finisher controller PCB.

3.1.5 E510 (inlet motor M1 fault)

-	**1) Does LED103 on the finisher controller PCB go ON when the power is turned on?** NO: Go to step 2. YES: Go to step 7.
Switching regulator	**2) Is the voltage between J85-3, 4 (+) and J85-5, 6 (-) on the switching regulator 24 V?** NO: Replace the switching regulator.
Wiring	**3) Is the voltage between J711-7, 8 (+) and J711-5, 6 (-) on the fuse PCB 36 V?** NO: Correct the wiring between J85 and J711.
Front cover switch (MSW1)	**4) Disconnect J721 on the fuse PCB. Check the length between J721-1 and J721-3 on the harness side for electrical continuity. Does continuity exit when the front cover is closed but not when the cover is opened?** NO: Check to see that the actuator on the front cover is pushing the switch correctly. If yes, replace the switch or correct the wiring between the PCB and the switch.
Fuse PCB	**5) Is the voltage at J714-5 (+) on the fuse PCB 24 V?** NO: Replace the fuse PCB.
Wiring	**6) Is the voltage at J101-1 (+) on the finisher controller PCB 24 V?** NO: Correct the wiring between J714 on the fuse PCB and J101 on the finisher controller PCB.

Shorting connector	**7) Is the shorting connector between J1090-6 and -8 of the folder joint normal?** NO: Connect the shorting connector correctly (not when the folder is installed).
Folder upper door switch (MSW10)	**8) Is the folder upper door switch normal?** NO: Correct the switch.
Finisher controller PCB	**9) Is the voltage between J124-12, 13 (+) and -10, 11 (-) on the finisher controller PCB 24 V?** **10) Is the voltage between J121-9 (+) and -8 (-) on the finisher controller PCB 5 V?** NO: Replace the finisher controller PCB.
Wiring, Inlet motor (M1)	**11) Is the wiring between J121 on the finisher controller PCB and J95 of the inlet motor normal?** NO: Correct the wiring. YES: Replace the inlet motor.

3.1.6 E514 (stack delivery motor M7 fault)

-	**1) Does the stack delivery motor rotate in keeping with delivery of stacks?** YES: Go to step 2. NO: Go to step 4.
Wiring	**2) Is the wiring between the finisher controller PCB and the sensor normal?** NO: Correct the wring.
Sensor power supply, Stack delivery motor clock sensor (PI10)	**3) Measure the voltage between J105B-8 (+) and J105B-7 (-) on the finisher controller PCB. Is it 5 VDC?** NO: Replace the finisher controller PCB. YES: Replace the sensor.
Power supply, Finisher controller PCB	**4) Is the voltage at J101-1 (+) on the finisher controller PCB 24 V?** NO: Check the switching regulator and the fuse PCB. YES: Replace the finisher controller PCB.

3.1.7 E530 (rear aligning plate motor M5)

-	**1) Does the rear aligning plate operate in keeping with alignment operation?** NO: Go to step 2. YES: Go to step 4.
Finisher controller PCB, Wiring	**2) Is the voltage at J104A-6 (+) on the finisher controller PCB 24 V?** NO: Check the supply of 24 VU to the finisher controller PCB. If good, replace the finisher controller PCB. If not good, correct the power supply system.
Wiring	**3) Check the wiring from J104A-6 to -10 of the finisher controller PCB and to the rear alignment plate motor. Is it normal?** NO: Correct the wiring. YES: Replace the rear alinging plate motor.
Rear aligning plate home position sensor (PI8), Finisher controller PCB	**4) Is the voltage between J104B-6 (+) and J104B-7 (-) on the finisher controller PCB 5 V?** YES: Replace the sensor. NO: Replace the finisher controller PCB.

3.1.8 E531 (stapler motor M11)

-	**1) Does the stapler operate in keeping with stapling operation?** YES: Go to step 2. NO: Go to step 3
Stapling home position sensor (PI19), Finisher controller PCB	**2) Try moving the stapler by hand. Does the state of J127-3 (+) on the finisher controller PCB change?** NO: Check the power to the sensor. If good, replace the stapler. If not, replace the finisher controller PCB.
Finisher controller PCB	**3) Is 24 VSTP supplied to J771-1 (+) on the finisher controller PCB?** YES: Replace the finisher controller.
Stapler safety stitcher (front; MSW8), Stapler safety switch (rear; MSW9), Swing guide switch (MSW2)	**4) Are the three microswitches in the power route to the stapler normal?** NO: Correct or replace the faulty sensor.
Wiring	**5) Is 24 VSTP supplied by J719-1 (+) on the fuse PCB?** YES: Correct the wiring.
Switching regulator, Wiring	**6) Is 24 VSTP supplied by J719-1 (+) of the switching regulator?** NO: Replace the switching regulator. YES: Correct the wiring from the switching regulator to the fuse PCB; if normal, replace the stapler.

3.1.9 E532 (stapler shift motor M10)

-	**1) Does the stapler shift at the correct timing?** YES: Go to step 2. NO: Go to step 3.
Stapler shift home position sensor (PI16), Finisher controller PCB	**2) Try shifting the stapler by hand. Does the state of J110B-12 (+) of the finisher controller PCB change?** NO: Check the power to the sensor; if good, replace the sensor. If not good, replace the finisher controller PCB.
Finisher controller PCB	**3) Is 24 VSTP supplied to J113-1 (+) of the finisher controller PCB?** YES: Replace the finisher controller PCB.
Wiring	**4) Is 24 VSTP supplied by J719-1 (+) of the fuse PCB?** YES: Correct the wiring.
Stapler safety switch (front; MSW6), Stapler safety switch (rear; MSW7), Front door switch (MSW2)	**5) Are the three microswitches in the power route to the stapler normal?** NO: Corer the wiring.
Switching regulator, Wiring	**6) Is 2 VSTP present at J719 (+) of the switching regulator?** NO: Replace the switching regulator. YES: Check the wiring from the switching regulator to the fuse PCB; if normal, replace the motor.

3.1.10 E535 (swing motor M8 fault; detail code 62)

-	**1) Does the swing guide operate at the correct timing?** YES: Go to step 2. NO: Go to step 3.
Swing guide open sensor (PI15), Finisher controller PCB	**2) Try operating the swing guide by hand. Does the state of J107B-6 (+) on the finisher controller PCB change?** NO: Check the power to the sensor. If good, replace the sensor. If not good, replace the finisher controller PCB.
Finisher controller PCB	**3) Is 24 VU supplied to J101-1 (+) on the finisher controller PCB?** YES: Replace the finisher controller PCB.
Wiring	**4) Is 24 VU present at J714-5 (+) on the fuse PCB?** YES: Correct the wiring.
Switching regulator, Wiring	**5) Is 24 VU present at J85-3 (+) on the switching regulator?** NO: Replace the switching regulator. YES: Check the wiring from the switching regulator to the fuse PCB; if normal, replace the motor.

3.1.11 E535 (swing motor M8; detail code 01)

-	**1) Does the swing guide operate at the correct timing?** YES: Go to step 2. NO: Go to step 3.
Swing guide closed sensor (PI15), Finisher controller PCB	**2) Try operating the swing guide by hand. Does the state of J107B-6 (+) on the finisher controller PCB change?** NO: Check the power to the sensor. If good, replace the sensor. If not good, replace the finisher controller PCB.
Finisher controller PCB	**3) Is 24 VU supplied to J101-1 (+) on the finisher controller?** YES: Replace the finisher controller PCB.
Wiring	**4) Is 24 VU present at J714-5 (+) on the fuse PCB?** YES: Correct the wiring.
Switching regulator, Wiring	**5) Is 24 VU present at J85-3 (+) of the switching regulator?** NO: Replace the switching regulator. YES: Check the wiring from the switching regulator to the fuse PCB; if normal, replace the motor.

3.1.12 E537 (front aligning plate motor M4)

-	**1) Does the front aligning plate operate in keeping with alignment operation?** NO: Go to step 2. YES: Go to step 4.
Finisher controller PCB, Power supply	**3) Is the voltage at J104A-1 (+) of the finisher controller PCB 24 V?** NO: Check the supply of 24 VU to the finisher controller PCB. If good, replace the finisher controller PCB. If not, correct the power supply system.
Wiring	**3) Is the wiring from J104A-1 to -5 of the finisher controller PCB and to the rear aligning plate motor normal?** NO: Correct the wiring. YES: Replace the front aligning plate motor.
Front aligning plate home position sensor (PI7), Finisher controller PCB	**4) Is the voltage between J104B-3 (+) and J104B-2 (-) on the finisher controller PCB 5 V?** YES: Replace the sensor. NO: Replace the finisher controller PCB.

3.1.13 E540 (tray A lifter motor M13)

36 VDC	**1) Is 36 VDC present at J113-8, -9, -10 of the finisher controller PCB?** NO: Check the supply route of 36 VDC; correct any fault, if found. Check the tray safety switch (front, rear; MSW6, 7) and the tray approach switch (MSW5).
Tray lifter mechanism	**2) Is there a fault or an obstacle to the tray lifter mechanism?** YES: Remove the fault or the obstacle.
Tray A lifter motor (M13)	**3) Does the tray lifter motor rotate at the correct timing?** NO: Replace the motor and the tray lifter motor drive PCB.
Tray A lock sensor (PI19)	**4) Is the tray A lock sensor normal?** NO: Replace the sensor.

3.1.14 E542 (tray B lift motor M12; during operation)

36 VDC	**1) Is 36 VDC present at J109A-8, -9, and -10 of the finisher controller PCB?** NO: Check the power route of 36 VDC, and correct any fault. Check the tray safety switch (front, rear: MSW6, 7).
Tray lifter mechanism	**2) Is there a fault or an obstacle in the tray lifter mechanism?** YES: Remove the fault and the obstacle, if any.
Tray B lifter motor (M12)	**3) Does the tray lifter motor rotate at the correct timing?** NO: Replace the motor and the tray B lifter motor driver PCB.
Tray B lock sensor (PI18)	**4) Is the tray B lock sensor normal?** NO: Replace the sensor.

3.1.15 E551 (activation power supply fan FM1; detail code 01)

Finisher controller PCB	**1) Is the level of J103-7 on the finisher controller PCB 0?** NO: Replace the finisher controller PCB.
Fuse PCB	**2) Is the voltage of J715-1 of the fuse PCB 24 VDC?** NO: Replace the fuse PCB.
Power supply fan (FM1)	**3) Does the power supply fan rotate?** NO: Replace the power supply fan.
Finisher controller PCB	**4) Is the level of J103-6 of the finisher controller PCB 1?** NO: Replace the power supply fan. YES: Replace the finisher controller PCB.

3.1.16 E551 (activation feeder cooling fan FM2; detail code 02)

Feeder cooling fan (FM2)	**1) Does the punch fan rotate (during punching operation)?** NO: Replace the punch fan.
Finisher controller PCB	**2) Is the level of J118B-12 on the finisher controller PCB 1?** NO: Replace the punch fan. YES: Replace the finisher controller PCB.

3.1.17 E577 (paddle motor M9)

Paddle home position sensor (PI13)

1) Is the paddle home position sensor normal?

NO: Replace the sensor.

Paddle motor (M9), Finisher controller PCB

2) Does the paddle rotate at the correct timing?

NO: Replace the motor and the finisher controller PCB.

3.1.18 E583 (tray auxiliary plate motor M6)

Tray auxiliary plate home position sensor (PI10)

1) Is the tray auxiliary plate home position sensor normal?

NO: Replace the sensor.

Tray auxiliary plate motor (M6), Finisher controller PCB

2) Does the tray auxliary plate motor rotate at the correct timing?

NO: Replace the motor and the finisher controller PCB.

3.1.19 E584 (shutter)

Shutter drive mechanism

1) Is the drive mechanism from the paddle motor to the shutter normal?

NO:

Paddle motor (M9)

2) Does the paddle motor rotate?

NO: Replace the paddle motor.

Shutter home position sensor (PI12)

3) Is the shutter home position sensor normal?

NO: Replace the sensor.

YES: Replace the finisher controller PCB.

3.1.20 E590 (punch rotation)

Punch motor home position sensor (PI22)	**1) Is the punch motor home position sensor normal?** NO: Replace the sensor.
Wiring	**2) Is the wiring between the punch motor home position sensor and the finisher controller PCB normal?** NO: Correct the wiring.
Punch rotation motor (M18)	**3) Try rotating the punch motor (using the DIP switch). Is it normal?** NO: Replace the punch motor.
Punch unit	**4) Remove the punch unit, and try rotating it by hand. Does it rotate smoothly?** NO: Replace the punch unit.
Punch driver PCB	**5) Try replacing the punch drive PCB. Is the problem corrected?** NO: Replace the finisher controller PCB. YES: End.

3.1.21 E593 (punch registration)

Punch horizontal registration home position sensor (PI24)	**1) Is the punch horizontal registration home position sensor normal?** NO: Replace the sensor.
Horizontal registration mechanism	**2) Try sliding the punch unit by hand. Is there any physical resistance?** YES: Correct it to remove any physical resistance.
Punch horizontal registration motor (M17)	**3) Is the punch horizontal registration motor normal?** NO: Replace the motor.
Finisher controller PCB, Punch driver PCB	**4) Try replacing the punch driver PCB. Is the problem corrected?** NO: Replace the finisher controller PCB. YES: End.

3.1.22 E594 (punch paper edge sensor horizontal registration)

Punch paper edge sensor home position sensor (PI21)	**1) Is the punch paper edge sensor home position sensor normal?** NO: Replace the sensor.
Wiring	**2) Is the wiring between the punch paper edge sensor home position sensor and the finisher controller PCB normal?** NO: Correct the wiring.
Punch sensor shift motor (M19)	**3) Try rotating the punch sensor shift motor (using the DIP switch). Is it normal?** NO: Replace the punch sensor shift motor.
Punch slide unit	**4) Try moving the punch paper edge sensor home position sensor by hand. Does it move smoothly?** NO: Correct the mechanical system so that it moves smoothly.
Punch drive PCB	**5) Try replacing the punch drive PCB. Is the problem corrected?** NO: Replace the finisher controller PCB. YES: End.

3.1.23 E595 (punch waste feeder)

Punch waste feed sensor (PI27)	**1) Is the punch water feed sensor normal?** NO: Replace the sensor.
Wiring	**2) Is the wiring between the punch waste feed sensor and the finisher controller PCB Normal?** NO: Correct the wiring.
Punch waste feed motor (M16)	**3) Try rotating the punch waste feed motor (using DIP switch). Is it normal?** NO: Replace the punch waste feed motor.
Punch driver PCB	**4) Try replacing the punch driver PCB. Is the problem corrected?** NO: Replace the finisher controller PCB. YES: End.

3.2 Saddle Stitcher Unit

3.2.1 E5F0 (fault in paper positioning plate; detail: 01/02)

Paper positioning plate home position sensor (PI49)	**1) Check the paper positioning plate home position sensor. Is the sensor normal?** NO: Replace the sensor.
Saddle stitcher controller PCB	**2) Does the paper positioning plate operate at a specific timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the positioning plate drive mechanism. If a fault is found, correct it; otherwise, go to step 3).
Paper positioning plate motor (M4)	**3) Does the paper positioning plate operate at a specific timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the positioning plate drive mechanism. If a fault is found, correct it; otherwise, go to step 4). **4) Try replacing the paper positioning plate motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.
Saddle stitcher controller PCB	**5) Try replacing the paper positioning plate motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.

3.2.2 E5F1 (folder motor)

Folder motor clock sensor (PI47)	**1) Check the folder motor clock sensor. Is the sensor normal?** NO: Replace the sensor.
Paper folding home position sensor (PI58)	**2) Check the paper folding home position sensor. Is the sensor normal?** NO: Replace the sensor.
Saddle stitcher controller PCB	**3) Does the folder motor operate at the correct timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the folding roller drive mechanism, and correct any fault; if normal, go to step 3.
Folder motor (M42)	**4) Does the folder motor operate at the correct timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the folding roller drive mechanism, and correct any fault; if normal, go to step 3. **5) Try replacing the folder motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.
Saddle stitcher controller PCB	**6) Try replacing the folder motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.

3.2.3 E5F2 (guide motor; detail code 01/02)

Guide home position sensor (PI54)

1) Check the guide home position sensor. Is the sensor normal?

NO: Replace the sensor.

Saddle stitcher controller PCB

2) Does the guide motor operate at the correct timing?

YES: Replace the saddle stitcher controller PCB.

NO: Check the guide plate drive mechanism, and correct any fault; if normal, go to step 3.

Guide motor (M43)

3) Does the guide motor operate at the correct timing?

YES: Replace the saddle stitcher controller PCB.

NO: Check the guide plate drive mechanism, and correct any fault; if normal, go to step 3.

Guide motor (M43)

3) Does the guide motor operate at the correct timing?

YES: Replace the saddle stitcher controller PCB.

NO: Check the guide plate drive mechanism, and correct any fault; if normal, go to step 3.

4) Try replacing the guide motor. Is the problem corrected?

YES: End.

NO: Replace the saddle stitcher controller PCB.

Saddle stitcher controller PCB

5) Try replacing the saddle stitcher controller PCB. Is the problem corrected?

YES: End.

NO: Replace the saddle stitcher controller PCB.

3.2.4 E5F3 (alignment motor; detail code 01/02)

Aligning plate home position sensor (PI48)	**1) Check the aligning plate home position sensor. Is the sensor normal?** NO: Replace the sensor.
Saddle stitcher controller PCB	**2) Does the aligning plate motor operate at the corrected timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the aligning plate drive mechanism, and correct any fault; if normal, go to step 3.
Alignment motor (M45)	**3) Does the alignment motor operate at the correct timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the aligning plate drive mechanism, and correct any fault; if normal, go to step 3. **4) Try replacing the alignment motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.
Saddle stitcher controller PCB	**5) Try replacing the alignment motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.

3.2.5 E5F4/E5F5 (stitcher; detail code 01/02)

Stitcher	**1) Are the front and rear stitchers and their bases mounted correctly?** NO: Mount them correctly.
Stitching home position (MS34/32)	**2) Is the stitching home position switch of the front and rear stitchers normal?** NO: Replace the front or rear stitcher.
Saddle stitcher controller PCB, Stitcher motor (M46/M47)	**3) Do the front and rear stitchers operate at the correct timing?** YES: Check the wiring between the stitcher and the saddle stitcher controller PCB; if normal, replace the controller PCB. NO: Replace the front or rear stitcher.

3.2.6 E5F6 (paper pushing plate motor; detail code 01/02)

Paper pushing plate home position sensor (PI47)	**1) Check the paper pushing plate home position sensor. Is the sensor normal?** NO: Replace the sensor.
Saddle stitcher controller PCB	**2) Does the paper pushing plate motor operate at the correct tinning?** YES: Replace the saddle stitcher controller PCB. NO: Check the paper pushing plate drive mechanism, and correct any fault; if normal, go to step 3.
Paper pushing plate motor (M48)	**3) Does the paper pushing plate motor operate at the correct timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the paper pushnig plate drive mechanism, and correct any fault; if normal, go to step 3. **4) Try replacing the paper pushing plate motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.
Saddle stitcher controller PCB	**5) Try replacing the paper pushing plate motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.

3.2.7 E5F6 (paper pushing plate motor; detail code 03)

Paper pushing plate leading edge position sensor (PI56)	**1) Check the paper pushing plate leading edge position sensor. Is the sensor normal?** NO:
Saddle stitcher controller PCB	**2) Does the paper pushing panel motor operate at the correct timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the paper pushing plate mechanism, and correct any fault; if normal, go to step 3.
Paper pushing plate motor (M48)	**3) Does the paper pushing saddle motor operate at the correct timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the paper pushing plate drive mechanism, and correct any fault; if normal, go to step 3. **4) Try replacing the paper pushing plate motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.
Saddle stitcher controller PCB	**5) Try replacing the saddle stitcher controller PCB. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.

3.2.8 E5F6 (fault in paper pushing plate motor; detail: 04)

Paper pushing plate motor clock sensor (PI45)	**1) Check the paper pushing plate motor clock sensor. Is the sensor normal?** NO: Replace the sensor.
Saddle stitcher controller PCB	**2) Does the paper pushing plate motor operate at a specific timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the paper pushing plate drive mechanism. If a fault is found, correct it; otherwise, go to step 4).
Paper pushing plate motor (M48)	**3) Does the paper pushing plate motor operate at a specific timing?** YES: Replace eth saddle stitcher controller PCB. NO: Check the paper pushing plate drive mechanism. If a fault is found, correct it; otherwise go to step 3. **4) Try replacing the paper pushing plate motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.
Saddle stitcher controller PCB	**5) Try replacing the paper pushing plate motor. Is the problem corrected?** YES: End. NO: Replace the saddle sticher controller PCB.

3.2.9 E5F7 (saddle tray motor)

Saddle tray home position sensor (PI41)	**1) Check the saddle tray home position sensor. Is the sensor normal?** NO: Replace the sensor.
Saddle stitcher controller PCB	**2) Does the stacking wall operate at the correct timing?** YES: Replace the saddle stitcher controller PCB. NO: Check the stacking wall drive mechanism, and correct any fault; if normal, go to step 3.
Saddle tray motor (M20)	**3) Replace the saddle stitcher controller PCB.** NO: Check the stacking wall drive mechanism, and correct any fault; if normal, go to step 3. **4) Try replacing the saddle tray motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.
Saddle stitcher controller PCB	**5) Try replacing the saddle tray motor. Is the problem corrected?** YES: End. NO: Replace the saddle stitcher controller PCB.

3.2.10 E5F8 (sensor connector; detail code 01)

Guide home position sensor (PI54; connector)	**1) Are the connectors of the guide home position sensor and the saddle stitcher controller PCB connected?** NO: Connector the connectors.
Wiring	**2) Is the circuit wiring between the sensor and the saddle stitcher broken?** YES: Correct the wiring.
Power supply	**3) Is 5 VDC present at J9-7 of the saddle stitcher controller PCB?** NO: Replace the saddle stitcher controller PCB.
Ground	**4) Is J9-8 of the saddle stitcher controller PCB connected to ground correctly?** NO: Replace the saddle stitcher controller PCB.

3.2.11 E5F8 (sensor connector; detail code 02)

Paper pushing plate home position sensor (PI55; connector)	**1) Are the paper pushing plate home position sensor and the saddle stitcher controller PCB connected correctly?** NO: Connect the connectors.
Wiring	**2) Is the wiring between the sensor and the saddle stitcher broken?** YES: Correct the wiring.
Power supply	**3) Is 5 VDC present at J9-10 on the saddle stitcher controller PCB?** NO: Replace the saddle stitcher controller PCB.
Ground	**4) Is J9-11 of the saddle stitcher controller PCB grounded correctly?** NO: Replace the saddle stitcher controller PCB.

3.2.12 E5F8 (sensor connector; detail code 03)

Paper pushing plate leading edge position sensor (PI56; connector)	**1) Are the connectors of the paper pushing plate leading edge position sensor and the saddle stitcher controller PCB connected correctly?** NO: Connect the connectors.
Wiring	**2) Is the wiring between the sensor and the saddle stitcher broken?** YES: Correct the wiring.
Power supply	**3) Is 5 VDC present at J9-13 of the saddle stitcher controller PCB?** NO: Replace the saddle stitcher controller PCB.
Ground	**4) Is J9-14 of the saddle stitcher controller connected to ground correctly?** NO: Replace the saddle stitcher controller PCB.

3.2.13 E5F9 (power supply)

Non-E5F9	**1) Disconnect the saddle stitcher unit using the module disconnecting switch, and turn on the power. Does an error other than those associated with the saddle stitcher unit occur?** YES: Correct the fault.*1
Front cover stitch (MSW1)	**2) Is the front cover switch (MSW1) of the finisher unit turned on/off correctly?** NO: Replace the switch, or correct the switching mechanism.
Finisher controller PCB	**3) Disconnect the saddle stitcher unit using the modular disconnecting switch. Is J103-1 (SDL_KILL) of the finisher '1'? Is it '0' when the unit is not disconnected?** NO: Replace the finisher controller PCB.
Fuse PCB	**4) Is the voltage of J713-1 of the fuse PCB 24 VDC?** NO: Replace the fuse PCB.
Circuit breaker (CB1)	**5) Is the tab on the circuit breaker (CB1) of the saddle stitcher controller PCB up?** YES: Push the tab.
Connector	**6) Is J1 of the saddle stitcher controller PCB connected?** NO: Connect J4.
Harness, Saddle stitcher controller PCB	**7) Is the harness between J713 of the finisher controller PCB and J1 of the saddle stitcher controller PCB normal?** NO: Correct the harness. YES: Replace the saddle stitcher controller PCB.

*1: A fault other than E5F9 has cut 24 VSDL (supply for power), and the E5F9 is detected before that fault.

3.3 Folder

3.3.1 E518 (folder motor)

Wiring	**1) Is the wiring between the folder and the folder driver correct?** NO: Correct the wiring. **2) Is the wiring between the finisher controller and the folder drive normal?** NO: Correct the wiring.
Finisher controller PCB	**3) Does the folder motor operate at the correct timing?** YES: Replace the finisher controller PCB. NO: Check the motor drive mechanism, and correct any fault; if normal, go to step 4.
Folder motor (M14)	**4) Does the folder motor operate at the correct timing?** YES: Replace the finisher controller PCB. NO: Check the motor drive mechanism, and correct any fault; if normal, go to step 4. **5) Try replacing the folder motor. Is the problem corrected?** YES: End. NO: Replace the folder diver PCB.
Folder drive PCB	**6) Try replacing the folder motor. Is the problem corrected?** YES: End. NO: Replace the folder drive PCB.

3.4 Inserter

3.4.1 E515 (inserter motor)

Inserter motor clock sensor (PI67)	**1) Check the inserter motor clock sensor. Is the sensor normal?** NO: Replace the sensor.
Finisher controller PCB	**2) Does the inserter motor operate at the correct timing?** YES: Replace the finisher controller PCB. NO: Check the motor drive mechanism, and correct any fault; if normal, go to step 3.
Inserter motor (M61)	**3) Does the inserter motor operate at the correct timing?** YES: Replace the finisher controller PCB. NO: Check the motor drive mechanisms, and correct any fault; if normal, go to step 3. **4) Try replacing the inserter motor. Is the problem corrected?** YES: End. NO: Replace the inserter driver PCB.
Inserter drive PCB	**5) Try replacing the inserter motor. Is the problem corrected?** YES: End. NO: Replace the inserter driver PCB.

4 Self Diagnosis

The CPU (IC101Z) on the finisher controller PCB is equipped with a self diagnostic mechanism which runs a check as needed and communicates the presence of a fault, if found, to the copier in the form of a code and a detail code.

The CPU (Q1) on the saddle stitcher unit is also equipped with a self diagnostic mechanism which runs a check as needed and communicates the presence of a fault, if found, to the finisher controller PCB.

In response, the copier indicates the received code in its control panel. (The detail code may be checked in its service mode or with reference to LED101 on the finisher controller PCB.)

4.1 Self Diagnosis

4.1.1 Finisher Unit

E500	
Main cause	Data communication (with copier)
Detection	The communication between the copier and the finisher is disrupted and, in addition, it is not resumed after an attempt at transmission for 5 sec. The communication is disrupted under the foregoing condition and resumed three times within 5 sec.
E501	
Main cause	Data communication (with slave CPU)
Detection	The communication between the master CPU (IC101) and the slave CPU (IC121) is disrupted.
E503	
Main cause	Data communication (with saddle stitcher unit)
Detection	The communication with the saddle stitcher unit is disrupted.
E505	
Main cause	Backup RAM (EEPROM)
Detection	The checksum at power-on has a fault.
E506	
Main cause	Download error
Detection	The following detail codes are used: 01 serial communication error 02 write error 03 user program transfer error 04 slave program transfer error 05 download time-out

E510	
Main cause	Inlet motor (M1)
Detection	The clocks from the inlet motor is 50 mm/sec or less for 1 sec or more while the motor is in operation.
E514	
Main cause	Stack delivery motor (M7) Stack motor clock sensor (PI12) Front aligning plate motor (M4)
Detection	The clocks from the stack delivery motor clock sensor is 50 mm/sc or less for 1 sec or more when the motor is in operation.
E537	
Main cause	Front aligning plate motor (M4) Front aligning plate home position sensor (PI7)
Detection	The front aligning plate does not leave the front aligning plate home position sensor when the front aligning plate motor is driven for 4 sec. The front aligning plate does not return to front aligning plate home position sensor when the front aligning plate motor is driven for 4 sec.
E530	
Main cause	Rear aligning plate motor (M5) Rear aligning plate home position sensor (PI9)
Detection	The rear aligning plate does not leave rear aligning plate home position sensor when the rear aligning plate motor is driven for 4 sec. The rear aligning plate does not return to rear aligning plate home position sensor when the rear aligning plate motor is driven for 4 sec.
E531	
Main cause	Stapler motor (M6) Stapler home position detecting switch (inside stapler)
Detection	The stapler does not leave stapler home position when the stapler motor is driven or 0. 5 sec. The stapler does not return to stapler home position when the stapler motor is driven for 0.5 sec.
E532	
Main cause	Stapler shift motor (M10) Stapler shift home position sensor (P16)
Detection	The stapler shift home position sensor does not go OFF when the stapler shift motor is driven for 4 sec. The stapler shift home position is not detected when the stapler shift motor is driven for 4 sec.

E535-FF

Main cause	Swing motor (M8) Swing guide open sensor (PI15)
Detection	The swing guide closed sensor does not detect the swing guide when the swing motor is driven for 2 sec.

E535-01

Main cause	Swing motor (M8) Swing guide open sensor (PI14)
Detection	The swing guide closed sensor does not detect the swing guide when the swing motor is driven fro 2 sec.

E540

Main cause	Tray A lifter motor (M13) Tray A lock sensor (PI19) Tray A UP position sensor Tray A DOWN position sensor
Detection	The up/down movement does not end within 25 sec after the tray lifter motor is driven. The clocks from the tray idle rotation sensor is disrupted for 250 msec while the motor is rotating. The tray A is located below the tray B range.

E542

Main cause	Tray B lifter motor (M12) Tray B lock sensor (PI18) Tray B lower limit sensor Tray B UP position sensor Tray DOWN position sensor
Detection	The up/down movement does not end within 25 sec after the tray lifter motor is driven. The clocks from the tray idle rotation sensor is disrupted for 250 msec while the sensor is rotating. The input from the tray B UP position sensor is '0' at power-on (i.e., the tray B is above the tray paper sensor PCB).

E551-01

Main cause	Power supply fan (FM1)
Detection	The power supply fan is at rest for 2 sec or more.

E551-02

Main cause	Feeder cooling fan (FM2)
Detection	The feeder cooling fan is at reset for 2 sec or more.

E577

Main cause	Paddle motor (M9) Paddle home position sensor (PI13)
Detection	The paddle home position sensor does not detect the paddle within 5 sec after the motor is started.

E583

Main cause	Tray auxiliary plate motor (M6) Tray auxiliary plate housing sensor (PI10)
Detection	The tray auxiliary plate housing sensor does not go ON within 2 sec after the motor is started when the tray auxiliary plate is retracted.

E584

Main cause	Paddle motor (M9) Shutter home position sensor (PI12)
Detection	The shutter home position sensor does not go ON within 5 sc after the paddle motor is driven (while returning to home position).

E590

Main cause	Punch rotation motor (M18) Punch motor home position sensor (PI22)
Detection	The punch motor home position sensor does not detect punch motor home position when the punch motor is driven for 0.3 (at time of initialization) or 0.2 (at time of punching). The punch motor home position sensor detects the punch motor home position, or the sensor does not go OFF when the punch motor is driven for 0.3 sec (at time of initialization) or 0.2 sec (at time of punching).

E593	
Main cause	Punch registration motor (M17) Punch home position sensor (PI24)
Detection	The punch home position sensor detects home position when pulses equivalent of the shift of the punch registration motor over a specific distance (about 42 mm) are generated. The punch home position sensor detects home position, or when the sensor does not go OFF when the punch registration motor is driven for pulses equivalent of the shift over a specific distance (about 42 mm).
E594	
Main cause	Punch sensor home position sensor (PI23) Punch sensor shift motor (M19)
Detection	The punch paper edge sensor home position sensor does not detect home position when the punch sensor shift motor is driven for 5 sec. While the punch home position sensor detects home position, the sensor does not go OFF when the punch sensor shift motor is driven for 5 sec.
E595	
Main cause	Punch waste feed motor (M16) Punch waste feed sensor (PI27)
Detection	The output of the punch waste feed sensor does not change when the punch waste feed motor is rotated for $ sec or more.

4.1.2 Saddle stitcher Unit

E5F0

Main cause	Paper position plate motor (M44) Paper positioning palte home position sensor (PI49)
Detection	The following detail codes are used: 01 The paper positioning plate home position sensor does not go ON when the paper positioning plate is driven for 1.25 sec. 02 The paper position plate home position sensor does not go OFF when the paper position plate motor is driven for 1 sec or more.

E5F1-01

Main cause	Folder motor (M42) Folder motor clock sensor (PI47)
Detection	The number of pulses from the folder motor drops below a specific value.

E5F1-02

Main cause	Folder motor (M42) Paper folder home position sensor (PI58)
Detection	The state of the paper folding home position sensor does not change when the folder motor is driven for 3 sec.

E5F2

Main cause	Guide motor (M43) Guide home position sensor (PI54)
Detection	The following detail codes are used: 01 The guide home position sensor does not go ON when the guide motor is driven for 0.4 sec or more. 02 The guide home position sensor does not go OFF when the guide motor is driven for 1 sec or more.

E5F3

Main cause	Alignment motor (M45) Aligning plate home position sensor (PI48)
Detection	The following detail code are used: 01 The aligning plate home position sensor does not go ON when the alignment motor is driven for 0.5 sec or more. 02 The aligning plate home position sensor does not go OFF when the alignment motor is driven for 1 sec or more.

E5F4

Main cause	Stitcher motor (rear, M46) Stitching home position switch (rear, MS32)
Detection	The following detail codes are used: 01 The stitching home position switch does not go OFF when the stapling motor (rear) is rotated CW for 0.5 sec or more. 02 At time of jam recovery, the stitching home position switch does not go ON when the stitcher motor (rear) is rotated counterclockwise for 0.5 sec or more.

E5F5

Main cause	Stitcher motor (front, M47) Stitching home position switch (front, MS34)
Detection	The following detail codes are used: 01 The stitching home position switch does not go OFF when the stitcher motor (front) is rotated CW for 0.5 sec or more. 02 At time of jam recovery, the stitching home position switch does not go ON when the stitcher motor (front) is rotated CCW for 0.5 sec or more.

E5F6

Main cause	Paper pushing plate motor (M48) Paper pushing plate home position sensor (PI55)
Detection	The following detail codes are used: 01 While a shift is made to home position, the paper pushing plate home position sensor does not go ON when the paper pushing plate motor is driven for 0.3 sec or more. 02 While a shift is made to paper pushing plate leading edge position, the paper pushing plate home position sensor does not go OFF when the paper pushing plate motor is driven for 0.3 sec or more.

E5F6-03

Main cause	Paper pushing plate motor (M48) Paper pushing plate leading edge position sensor (PI56)
Detection	When a shift is made from paper pushing plate leading edge position to home position, the paper pushing plate leading edge position sensor does not go OFF when the paper pushing plate motor is driven for 0.3 sec or more.

E5F06-04

Main cause	Paper pushing plate motor (M48) Paper pushing plate motor clock sensor (PI45)
Detection	The number of pulses of the paper pushing plate motor clock sensor drops below a specific value.

E5F6-05

Main cause	Paper pushing plate motor (M48) Paper pushing plate leading edge position sensor (PI56)
Detection	The paper pushing plate leading edge sensor does not go ON when the paper pushing plate motor is driven for 0.3 sec or more after the paper pushing plate home position sensor goes OFF.

E5F7

Main cause	Saddle tray motor (M20) Saddle tray home position sensor (PI41)
Detection	The following detail codes are used: 01 The saddle tray home position sensor does not go ON when the saddle tray motor is driven for 8 sec or more. 02 The saddle home position sensor does not go Off when the saddle tray motor is driven for 1 sec or more.

E5F8-01

Main cause	Connector of the guide position sensor (PI54)
Detection	The connector of the guide home position sensor is identified as being disconnected.

E5F8-02

Main cause	Connector of the paper pushing plate home position sensor (PI55)
Detection	The connector of the paper pushing plate home position sensor is identified as being disconnected.

E5F8-03

Main cause	Connector of the paper pushing plate leading edge position sensor (PI56)
Detection	The connector of the paper pushing plate leading edge sensor is identified as being disconnected.

E5F9

Main cause	Power supply to the saddle stitcher unit
Detection	The following detail codes are used: 01/02/03 24VSDL (supply for power) to the saddle stitcher controller is not supplied at power-on or at the start of operation, and 24 VR (supply for logic) is supplied.

4.1.3 Folder

E518

Main cause	Folder motor (M71)
Detection	The clock input from the folder motor is below a specific value while the folder motor is rotating.

4.1.4 Inserter

E515

Main cause	Inserter motor clock sensor (PI67) Inserter motor (M61)
Detection	the input from the inserter motor clock sensor drops below a specific value while the inserter motor is rotating.

4.2 Alarm

4.2.1 Finisher Unit

Error	Condition	Detection	Machine operation	Resetting
Stapler absent	• The stapler is not fitted.	• At all times	• The operation of the stapler motor (M6) and the stapler shift motor (M4) is prohibited.	• Fit the stapler.
Stapler absent	• The stapler cartridge has run out of staples.	• At all times.	• Normal operation is possible; however, operation depends on instructions from the copier.	• Replace the staple cartridge or fit it correctly.
Tray A stack excess	• The number of sheets in the tray is in excess of a specific value.	• At all times.	• Normal operation may be continued.	• The absence of paper in the tray is detected while at rest.
Tray B stack excess	• The number of sheets in the tray is in excess of a specific value.	• Normal monitoring.	• Normal operation may be continued.	• The absence of paper in the tray is detected.

4.2.2 Saddle Stitcher Unit

a. Overstacking

Error	Condition	Detection	Machine operation	Resetting
Overstacking	• The number of sheets in the delivery tray is in excess of a specific value.	• At the end of delivery of the stack that causes the error.	• Normal operation may be continued.	• When the stacks are removed from the tray.
Stitch stack excess	• The number of sheets in the compartment exceeds 15.	• When the sheet that causes the error is deposited.	• Stitching is prohibited.	• When the paper is removed from the compartment.

b. Stitch Alarm

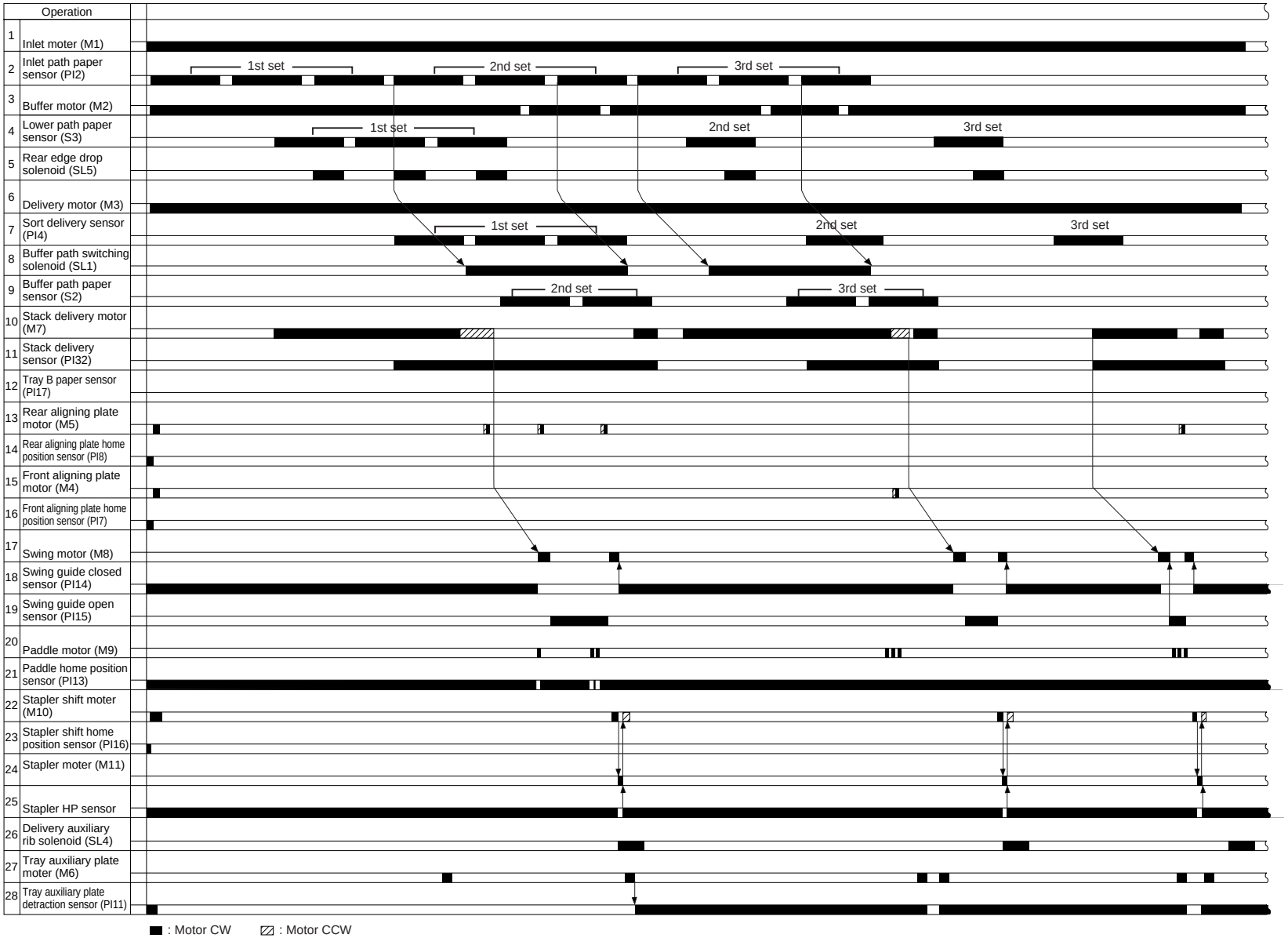
Error	Condition	Detection	Machine operation	Resetting
Stitch faulty	• Stitching does not end in 1 sec.	• After the start of stitching, home position is not detected within 0.5 sec; then, home position is detected within 0.5 sec after the stitcher motor is rotated in reverse. (If home position is not detected within 0.5 after it is rotated in reverse, an error will be indicated.)	• Stitching is stopped.	• When the jam staple is removed.
Stitching excess	• The number of sheets in the compartment exceeds 15.	• When the sheet that causes the condition is deposited.	• Stitching is prohibited. • Stitching is prohibited.	• When the paper is removed from the compartment.
Mixed sizes	• When sheets of different sizes are deposited in the compartment.	• When the sheet that causes the condition is deposited.	• Alignment is prohibited. • Stitching is prohibited.	• When the paper is removed form the compartment.
Stitch staples few	• When the staple is removed from the stitcher unit. • When the number of remaining staples is inadequate.	• When the number of remaining staples is inadequate except when the stitching is under way.	• The inadequacy is communicated to the machine.	• When the staple cartridge is fitted.

APPENDIX

1 GENERAL TIMING CHART

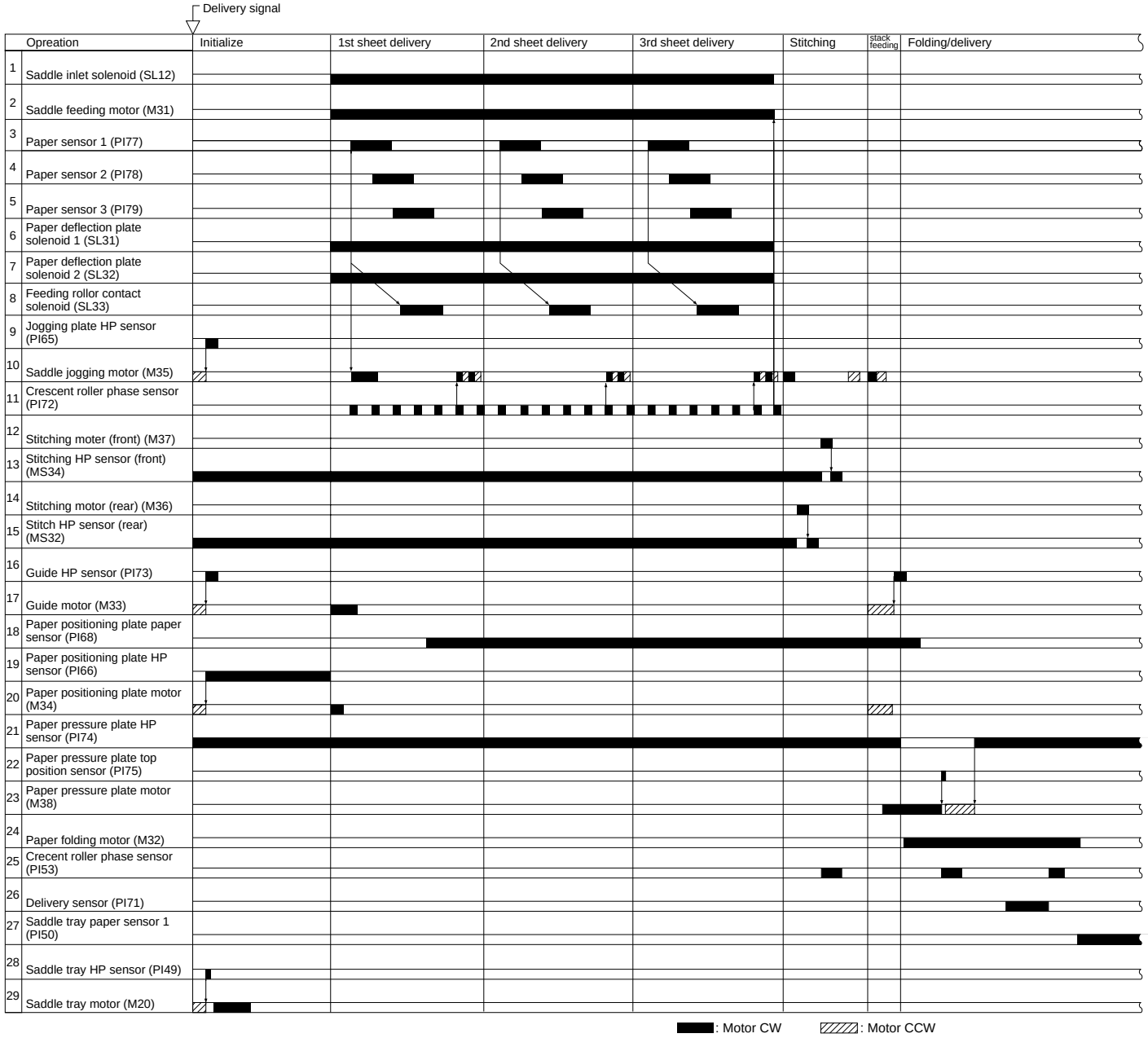
1.1 Finisher Unit

A4, 3copies, 1-point, Front Stapling



1.2 Saddle Stitcher Unit

A4R/LTRR, 3sheets



2 LIST OF SIGNALS/ABBREVIASTIONS

The following is a list of signals and abbreviations used in this document and the circuit diagrams:


Memo

The abbreviations in parentheses are electrical signals but are analog, which cannot be expressed in terms of '1' and '0'. Others are digital signals, which can be expressed as being either '1' or '0'.

2.1.1 Finisher

BFDMTRCLK	BUFFER MOTOR CLOCK DETECTION Signal
[BFLEDAJ]	BUFFER PASS LED ADJUST Command
BFPCB	BUFFER PAPER PCB PAPER DETECTION Signal
BFPSSCHG	BUFFER PASS CHANGE SOLENOID DRIVE Command
BFPSSXIT	BUFFER PASS EXIT PAPER DETECTION Signal
BNDLDELV	BUNDLE DELIVERY PAPER DETECTION Signal
CD	CARTRIDGE SIZE DETECTION Signal
CRTSET	STAPLE CARTRIDGE SET Signal
DLVAUXSL	DELIVERY AUXILIARY RIB SOLENOID DRIVE Command
DSTD	DUST DETECTION Signal
[ENTLEDAJ]	ENTRANCE PASS LED ADJUST Command
ENTPASSPA	ENTRANCE PASS PAPER DETECTION Signal
ENTPCB	ENTRANCE PASS PCB PAPER DETECTION Signal
FANON	FAN ON Command
FANSTP	FAN STOP Signal
FDBLT	FEED BELT SOLENOID DRIVE Command
FDROPN	FRONT COVER OPEN Signal
FEEDFAN	FEED FAN ON Command
FJOGHP	FRONT JOG PLATE HOME POSITION DETECTION Signal
FULLED	FULL DETECTIION LED DRIVE Command
HOOKEMP	HOOK EMPTY Signal
KRLBLHP	KNURLED BELT HP Signal
KRLBLEB1	KNURLED BELT SHIFT ENABLE Signal 1
KRLBLEB2	KNURLED BELT SHIFT ENABLE Signal 2
KRLBLEB3	KNURLED BELT SHIFT ENABLE Signal 3
[LWRPLEDADJ]	LOWER PASS LED ADJUST Command
LWRPPCB	LOWER PASS PCB PAPER DETECTION Signal
MDLED	PRE-NOTICE LED DRIVE Command
NSTDLV	NON-SORT DELIVERY PAPER DETECTION Signal
PCH2/3HL	PUNCH UNIT 2/3 HOLE DETECTION Signal
PDLHP	PADDLE HOME POSITION Signal
PFANON	PUNCH FAN DRIVE Command

PFANSTP	PUNCH FAN STOP DETECTION Signal
PHCMPL	PUNCH COMPLETE DETECTION Signal
PHCONTST	PUNCH CONTAINER SET DETECTION Signal
PHFEEDMT	PUNCH DUST FEED DETECTION Signal
PHHP	PUNCH UNIT HOME POSITION DETECTION Signal
PHPADG	PUNCH PAPER EDGE DETECTION Signal
PHROTHP	PUNCH ROTATION HOME POSITION DETECTION Signal
PHSNRHP	PUNCH EDGE SENSOR HOME POSITION DETECTION Signal
PNHMREF	PUNCH ROTATION MOTOR REFERENCE Signal
PNHREGREF	PUNCH REGIST REGISTRATION MOTOR REFERENCE Signal
PNHSCRMD	PUNCH DUST FEED MOTOR DRIVE Command
PNSNRHOLD	PUNCH SENSOR SLIDE MOTOER HOLD Command
READY	STAPLER READY Signal
SBTRYPH	SUB-TRAY SOLENOID PUSH DRIVE Command
SBTRYPL	SUB-TRAY SOLENOID RELEASE DRIVE Command
SLFPRIM	SELF PRIMING Signal
SMPPAPRMV	NON-SORT TRAY PAPER REMOVAL DETECTION Signal
SMPTRYDL	SAMPLE TRAY LOCK DETECTION Signal
SMPTRYLEDAJ	NON-SORT TRAY PAPER SENSOR LED ADJUST Command
SMPTRYLWPO	SAMPLE TRAY LOWER POSITION DETECTION Signal
SMPTRYPA	SAMPLE TRAY PAPER DETECTION Signal
SMPTRYPAP	NON-SORT TRAY PAPER SENSOR PAPER DETECTI0N Signal
SMPTRYUPPO	SAMPLE TRAY UP POSITION DETECTION Signal
SOPAPRMV	SORT TRAY PAPER REMOVAL DETECTION Signal
SOTRYLEDAJ	SORT TRAY PAPER SENSOR LED ADJUST Command
SOTRYPAP	SORT TRAY PAPER SENSOR PAPER DETECTI0N Signal
SPTTRYIN	SUPPORT TRAY IN DETECTION Signal
STCLS	SHUTTER CLOSED DETECTION Signal
STDLV	SORT DELIVERY PAPER DETECTION Signal
STPDRHP	STAPLER DRIVE HOME POSITION Signal
STPLHP	STAPLER UNIT HOME POSITION Signal
STTRYDL	SORT TRAY LOCK DETECTION Signal
STTRYLW	SORT TRAY LOWER LIMIT DETECTION Signal
STTRYLWPO	SORT TRAY LOWER POSITION DETECTION Signal
STTRYPA	SORT TRAY PAPER DETECTION Signal
STTRYUPPO	SORT TRAY UP POSITION DETECTION Signal
SWDGDCL	SWING GUIDE CLOSED Signal
SWGMTRCLK	SWING MOTOR CLOCK DETECTION Signal
SWGOPN	SWING GUIDE OPEN Signal
UPCVROPN	UPPER COVER OPEN DETECTION Signal
UPSCHG	UPPER PASS CHANGE SOLENOID DRIVE Command

2.1.2 Saddle Stitcher

2NDPA	No.2 PAPER SENSOR DETECT Signal
3RDPA	No.3 PAPER SENSOR DETECT Signal
ACCOFF	ACC OFF DETECTION Signal
DELVMS	DELIVER YDOOR OPEN DETECT SWITCH Signal
EJCVR	DELIVERY DOOR OPEN DETECT Signal
FDRLHP	CRESCENT ROLLER PHASE DETECT Signal
FLPSL1	FLAPPER DRIVE Signal 1
FSPSL2	FLAPPER DRIVE Signal 2
HKEMP1	STAPLE ABSENT DETECT Signal 1
HKEMP1	STICHER (FRONT) STAPLE PRESENT DETECT
HKEMP2	STAPLE ABSENT DETECT Signal 2
HKEMP2	STICHER (REAR) STAPLE PRESENT DETECT
INSON	INSORTER ON DETECTION Signal
JOGHP	ALIGNMENT GIDE HP DETECT Signal
LUNGEH	PAPER PUSHING PLATE HP DETECT Signal
LUNGET	PAPER PUSHING PLATE TOP POSITION DETECT Signal
PAFLDHP	PAPER FOLD HOME POSITION DETECTION Signal
PAPPOS	PAPER POSITION PLATE HP DETECT Signal
PDEL	DELIVERY DETECT Signal
PPOSPA	PAPER POSITIONING PLATE PAPER DETECT Signal
PNHON	PUNCH UNIT ON DETECTION Signal
RLNIPSL	CRESCENT ROLLER CONTACT SOLENOID DRIVE Signal
SDLON	SADDLE STITCHER ON DETECTION Signal
SENTPA	SADDLE STITCHER ENTERANCE PAPER DETECTION Signal
SENTSL	SADDLE STITCHER ENTERANCE SOLENOID DRIVE Command
SJMLED	SADDLE STITCHER JAM LED DRIVE Command
SMPON	SAMPLE TRAY ON DETECTION Signal
STCHHP1	STITCHING HP DETECT Signal 1
STCHHP2	STITCHING HP DETECT Signal 2
STRYHP	SADDLE TRAY HOME POSITION DETECTION Signal
STRYPA1	SADDLE TRAY PAPER DETECTION Signal 1
STRYPA2	SADDLE TRAY PAPER DETECTION Signal 2
STRYPA3	SADDLE TRAY PAPER DETECTION Signal 3
TRYPAR	TRAY PAPER DETECT Signal
VPJM	VERTICAL PATH PAPER DETECT Signal
ZHLDON	Z-HOLDER ON DETECTION Signal

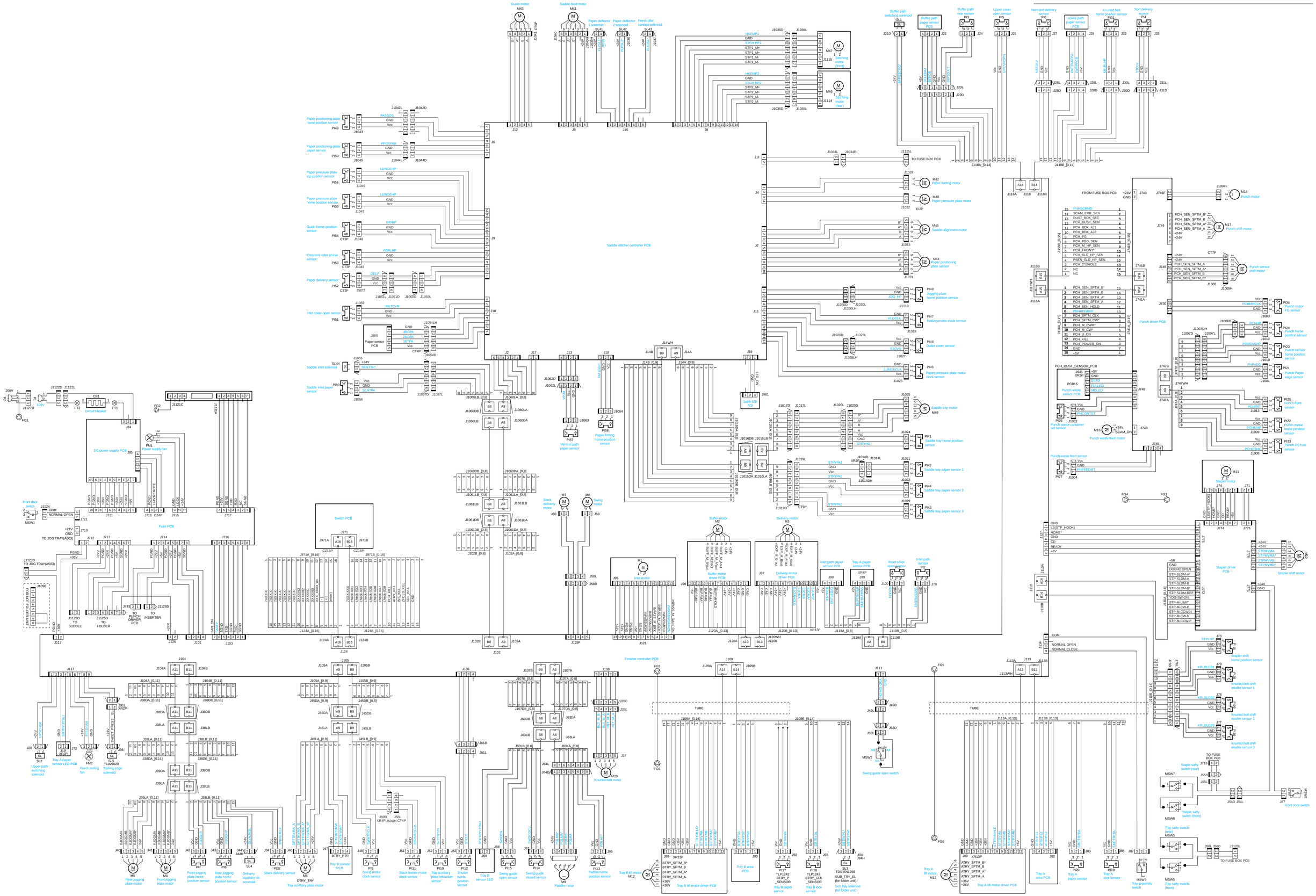
2.1.3 Folder

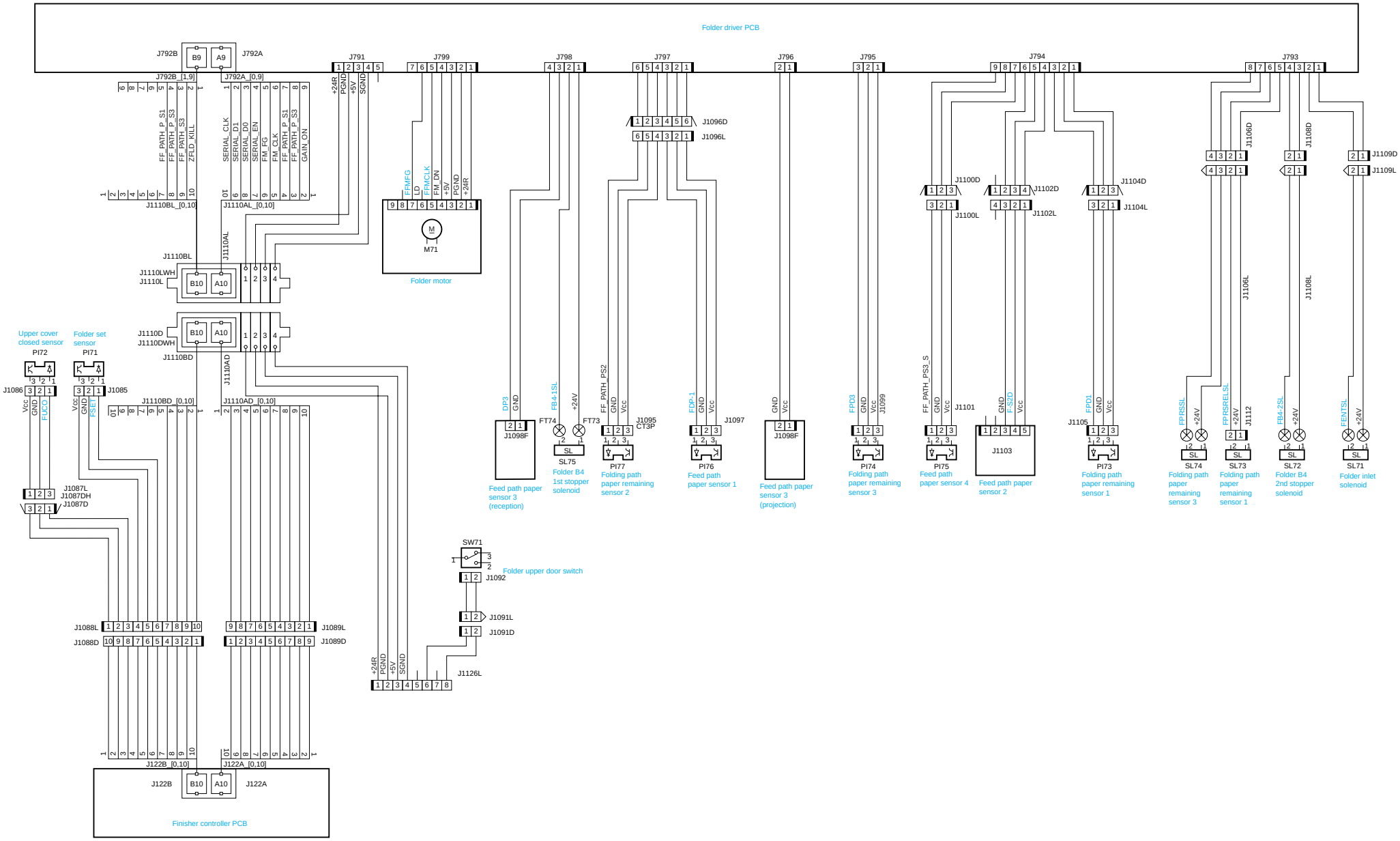
DP3	FOLDER FEED PATH PAPER DETECTION Signal 3
FB4-2SL	FOLDER B4 STOPPER SOLENOID DRIVE Command 2
F-DP1	FOLDER FEED PATH PAPER DETECTION Signal 1
F-S2D	FOLDER FEED PATH PAPER DETECTION Signal 2
FENTSL	FOLDER ENTERANCE SOLENOID DRIVE Command
FPD1	FOLEDED PAPER DETECTION Signal 1
FSET	FOLDER SET DETECTION Signal
FUCO	FOLDER UPPER COVER CLOSED DETECTION Signal
HPD	HORIZONTAL PATH PAPER DETECTION Signal

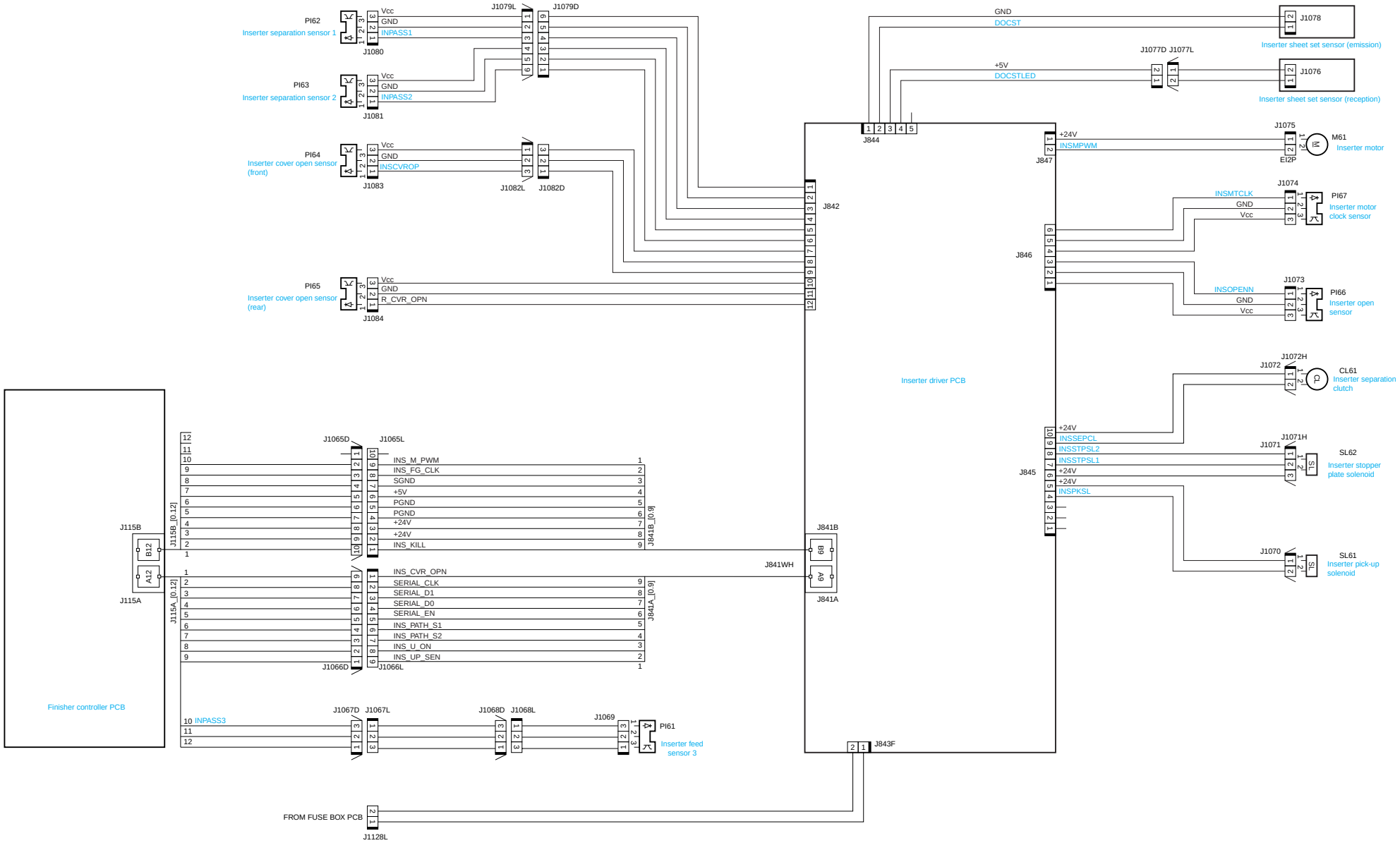
2.1.4 Inserter

DOCST	INSORTER DOCUMENT SET DETECTION Signal
DOCSTLED	INSORTER DOCUMENT LED DRIVE Command
FB4-1SL	FOLDER B4 STOPPER SOLENOID DRIVE Command 1
FPRSRELSL	FOLDER PRESSURE RELEASE SOLENOID DRIVE Command
FPRSSL	FOLDER PRESSURE SOLENOID DRIVE Command
INSCVROP	INSORTER COVER OPEN DETECTION Signal
INSMTCLK	INSORTER MOTOR CLOCK DETECTION Signal
INSOPNN	INSORTER OPEN DETECTION Signal
INSPASS1	INSORTER PATH PAPER DETECTION Signal 1
INSPASS2	INSORTER PATH PAPER DETECTION Signal 2
INSPASS3	INSORTER PATH PAPER DETECTION Signal 3
INSPKSL	INSORTER PICK-UP SOLENOID DRIVE Command
INSPKUP	INSORTER PICK-UP DETECTION Signal
INSSEPCL	INSORTER SEPARATION CLUTCH DRIVE Command
INSSTPSL1	INSORTER STOPPER SOLENOID DRIVE Command 1 (PULL)
INSSTPSL2	INSORTER STOPPER SOLENOID DRIVE Command 2 (RELEASE)

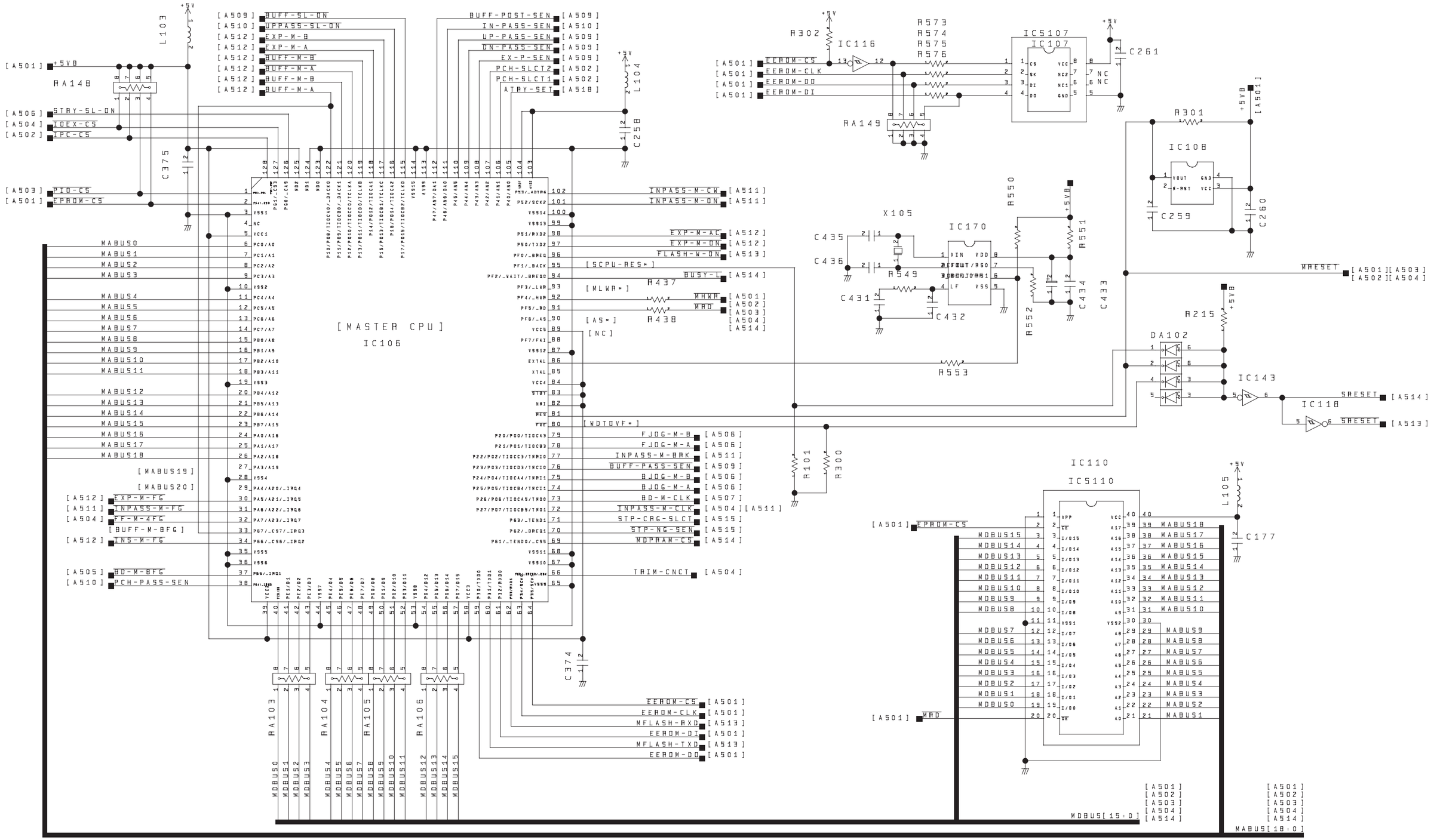
3 SADDLE FINISHER GENERAL CIRCUIT DIAGRAM

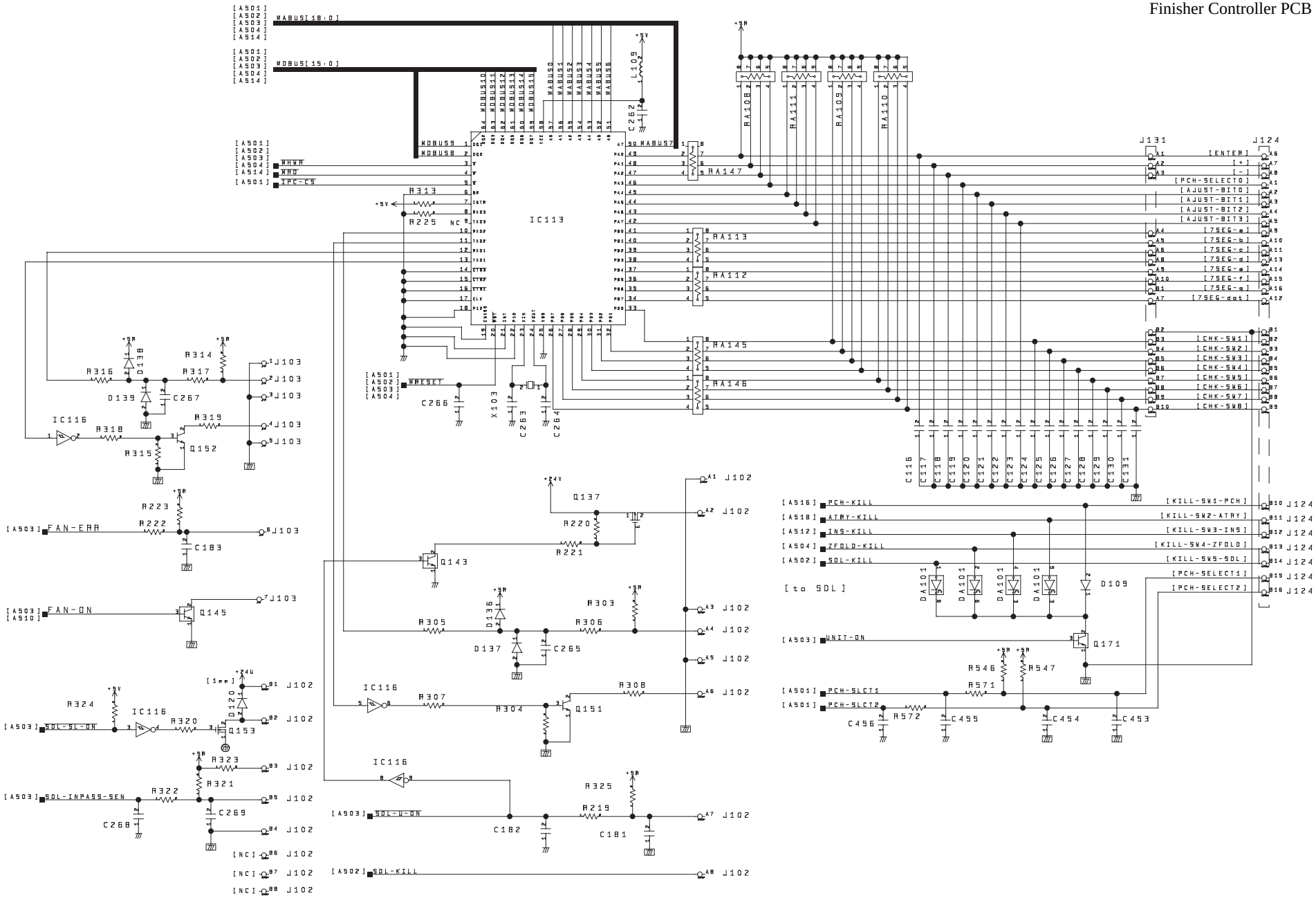




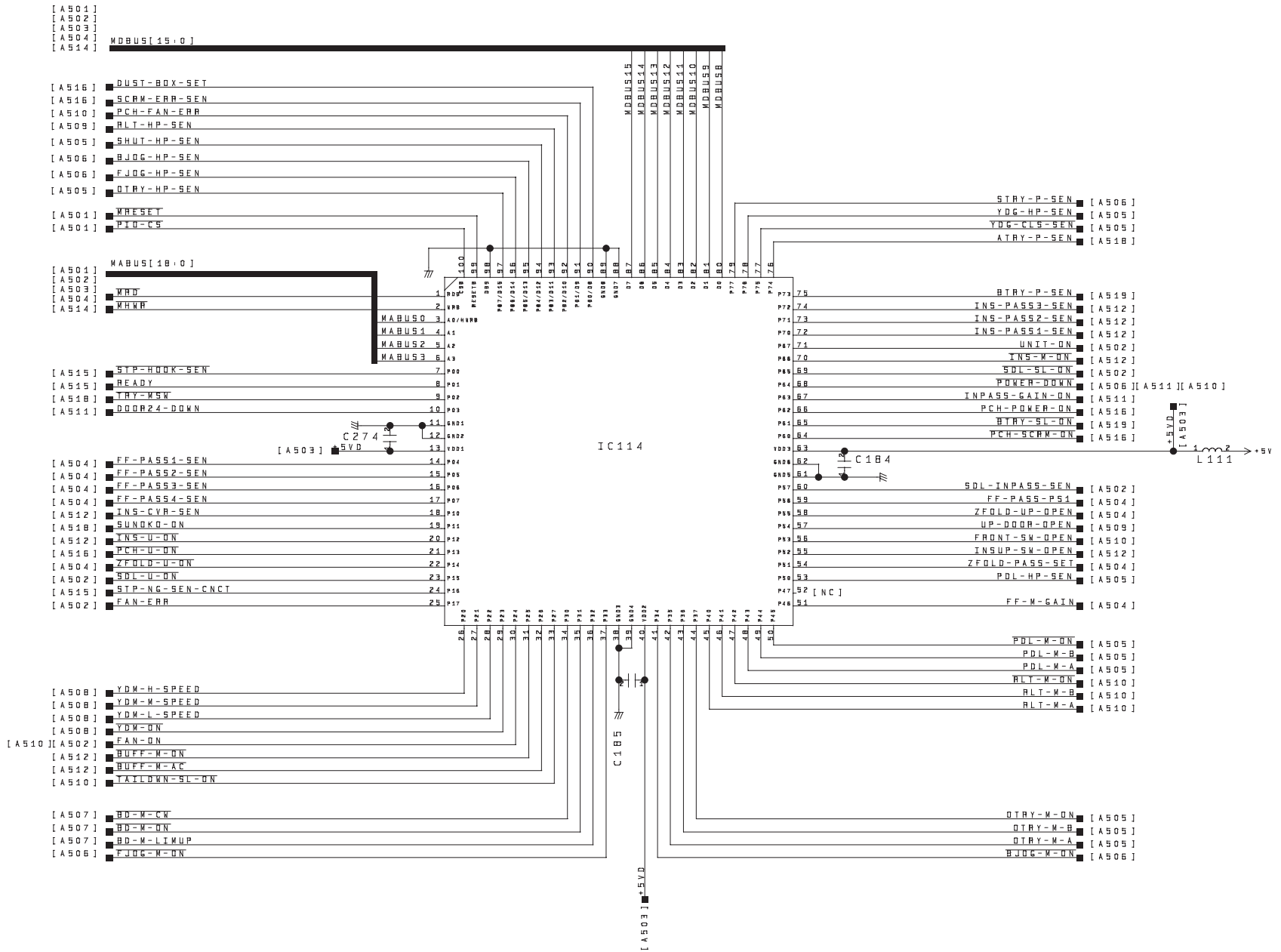

PI62
Inserter separation sensor 1
Vcc
GND
INPASS1
J1080
PI63
Inserter separation sensor 2
INPASS2
J1081
PI64
Inserter cover open sensor (front)
INSCVROP
J1083
PI65
Inserter cover open sensor (rear)
R_CVR_OPN
J1084
J1079L
J1079D
J1082L
J1082D
J842
J844
GND
DOCST
J1078
Inserter sheet set sensor (emission)
+5V
DOCSTLED
J1077D J1077L
J1076
Inserter sheet set sensor (reception)
Inserter driver PCB
+24V
INSMPWM
J847
J1075
M61
Inserter motor
EI2P
INSMTCLK
GND
Vcc
J1074
PI67
Inserter motor clock sensor
J846
INSOPENN
J1073
PI66
Inserter open sensor
J1072H
J1072
CL61
Inserter separation clutch
+24V
INSSEPCL
INSSTPSL2
INSSTPSL1
+24V
+24V
INSPKSL
J845
J1071H
J1071
SL62
Inserter stopper plate solenoid
J1070
SL61
Inserter pick-up solenoid
J1065D
J1065L
INS_M_PWM
INS_FG_CLK
SGND
+5V
PGND
PGND
+24V
+24V
INS_KILL
J841B_[0.9]
J841B
J841WH
J841A
INS_CVR_OPN
SERIAL_CLK
SERIAL_D1
SERIAL_D0
SERIAL_EN
INS_PATH_S1
INS_PATH_S2
INS_U_ON
INS_UP_SEN
J841A_[0.9]
J1066D
J1066L
J115B
J115A
J115B_[0.12]
J115A_[0.12]
Finisher controller PCB
10 INPASS3
11
12
J1067D J1067L
J1068D J1068L
J1069
PI61
Inserter feed sensor 3
J843F
FROM FUSE BOX PCB
J1128L

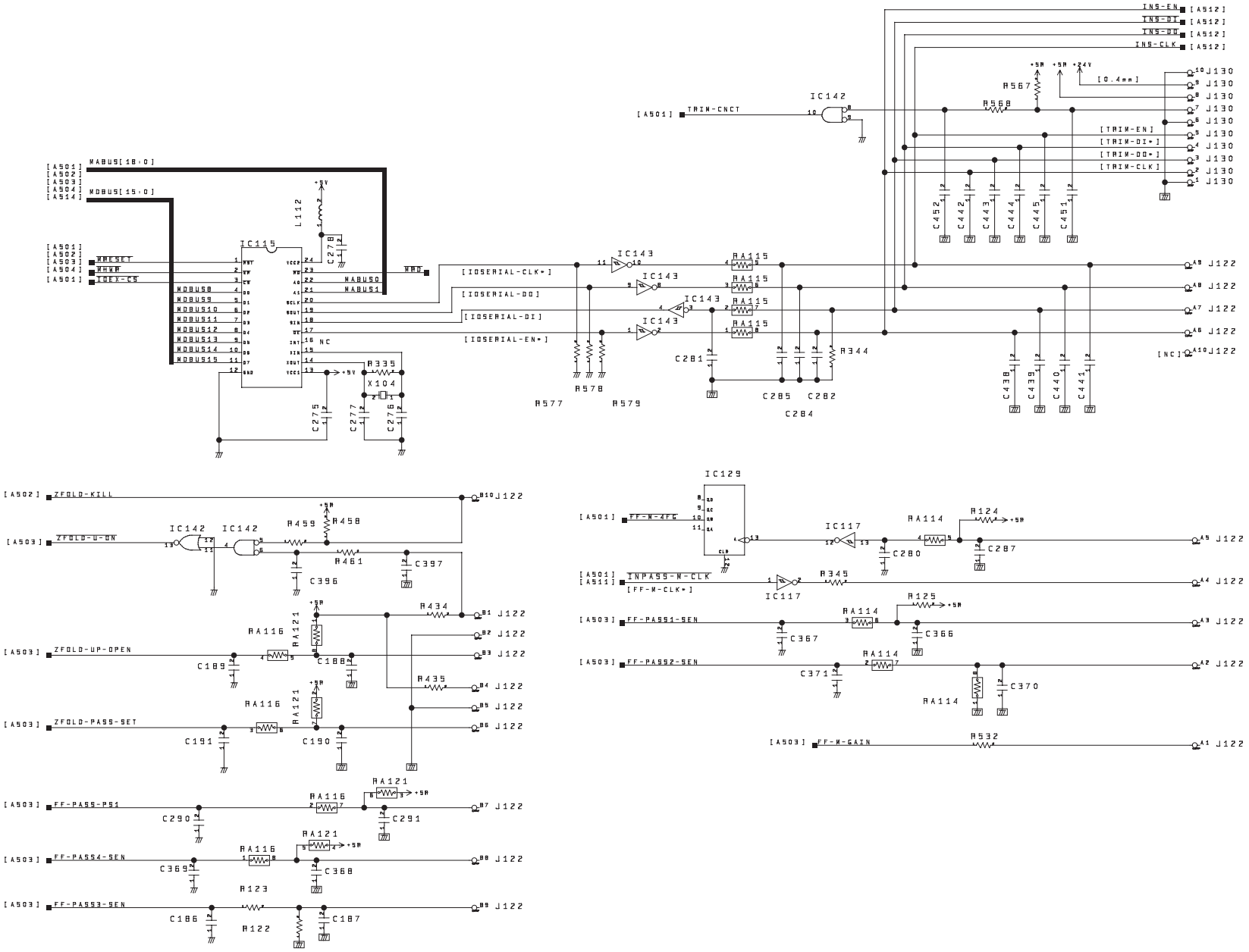
Finisher Controller PCB (1/20)

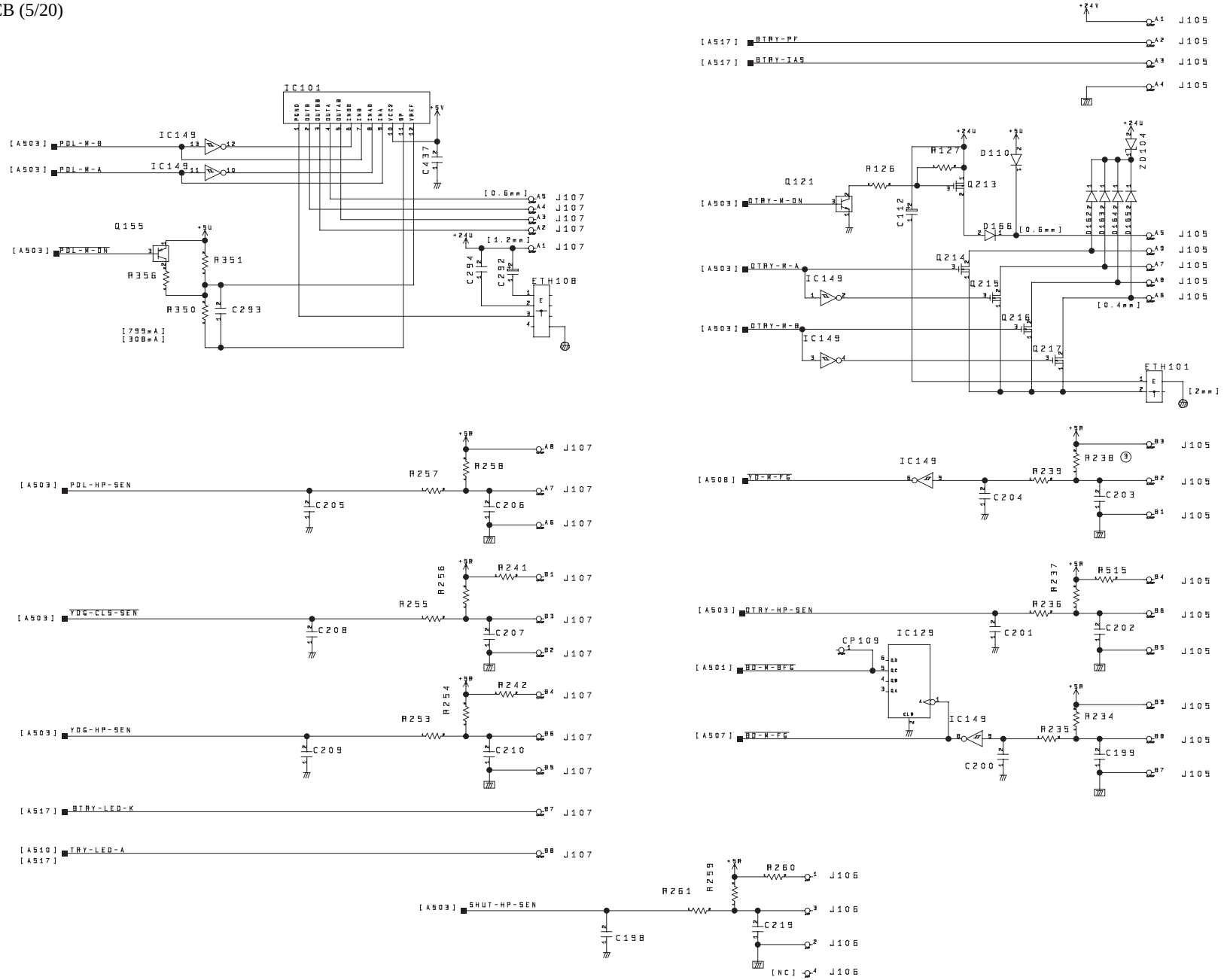


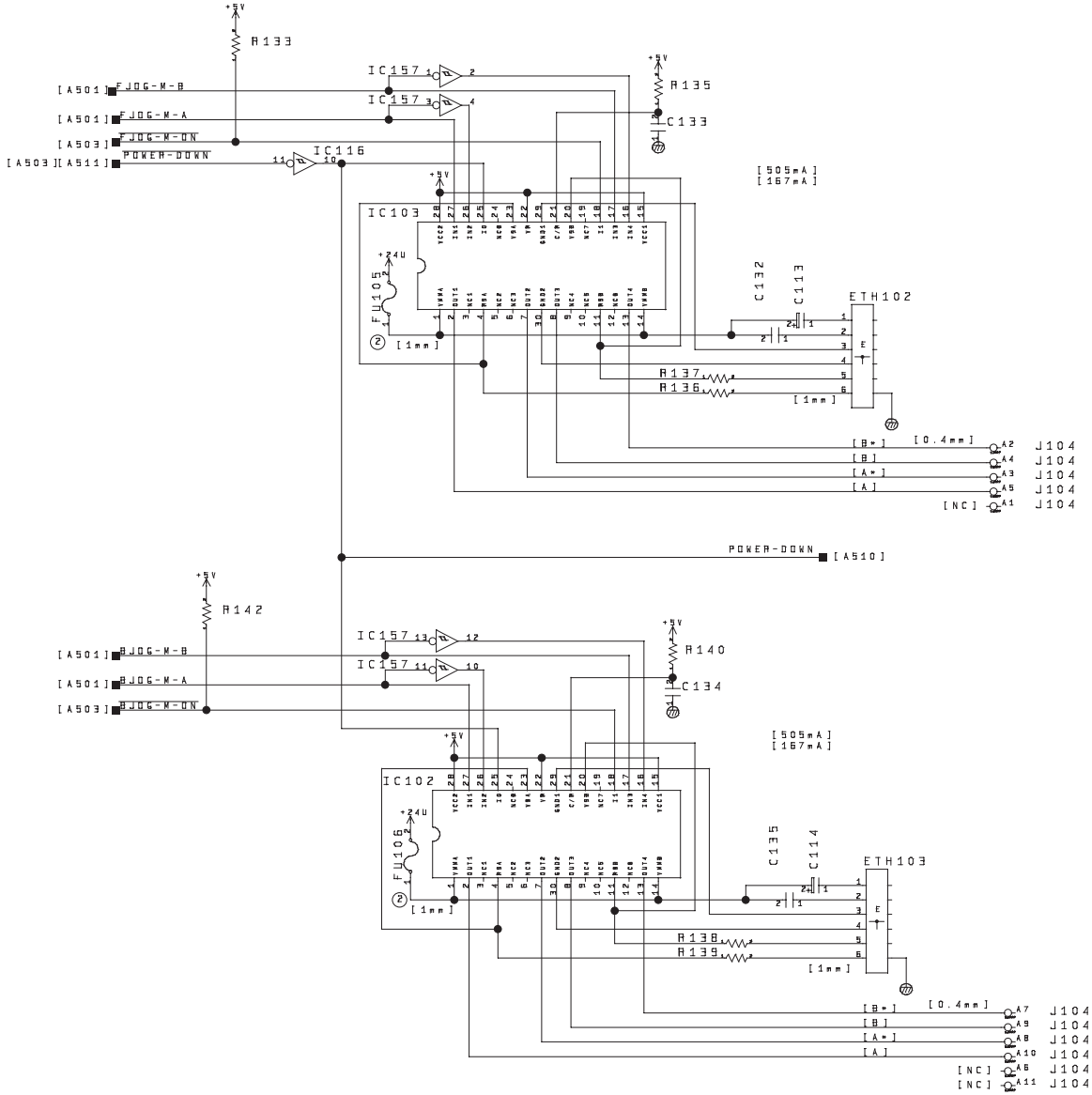

IC113
IC116
Q137
Q143
Q145
Q151
Q152
Q153
Q171
D109
D120
D136
D137
D138
D139
X103
C182
C181
C183
C265
C266
C267
C268
C269
C454
C455
C456
R219
R220
R221
R222
R223
R225
R315
R316
R317
R318
R319
R320
R321
R322
R323
R324
R546
R547
R571
R572
[to SDL]

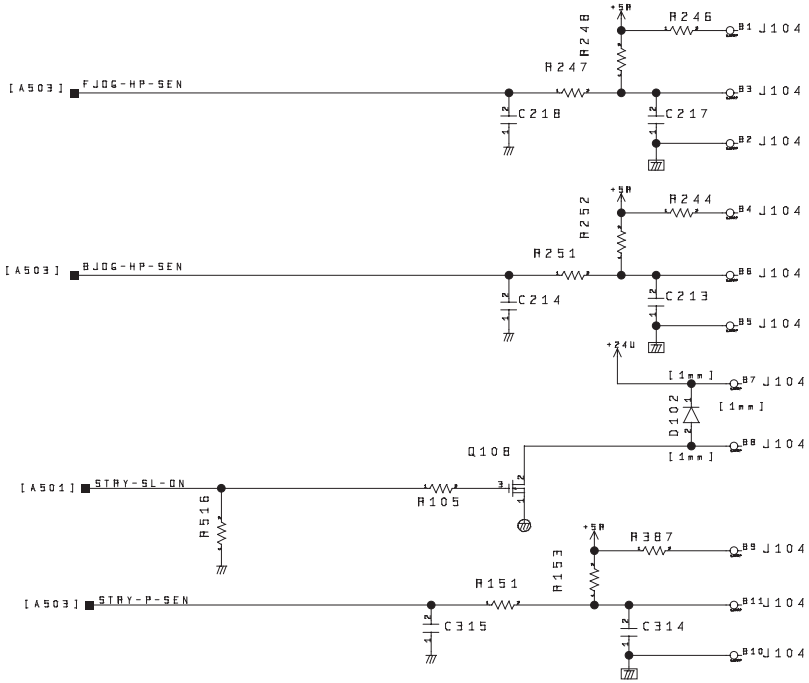
Finisher Controller PCB (3/20)



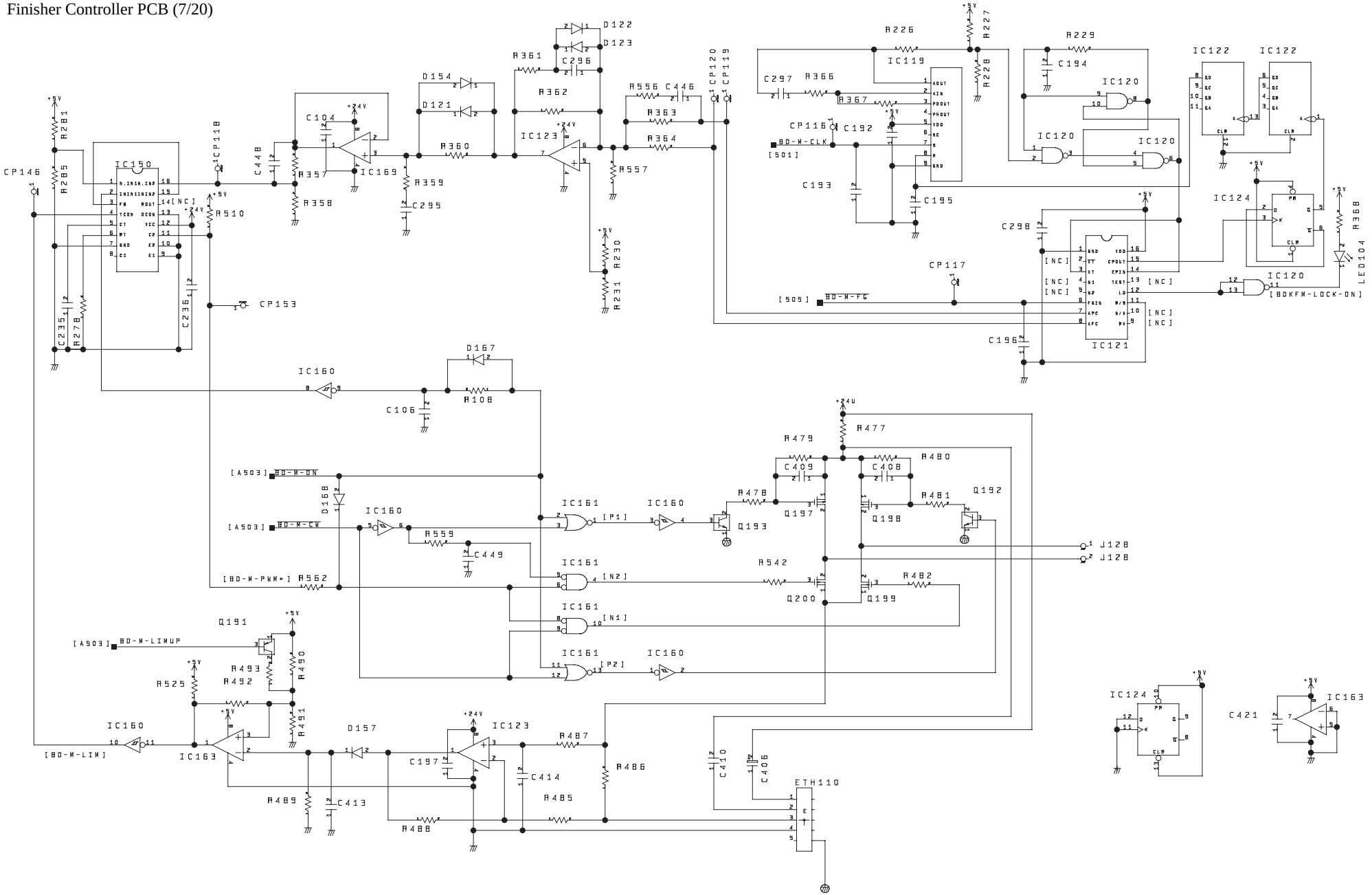


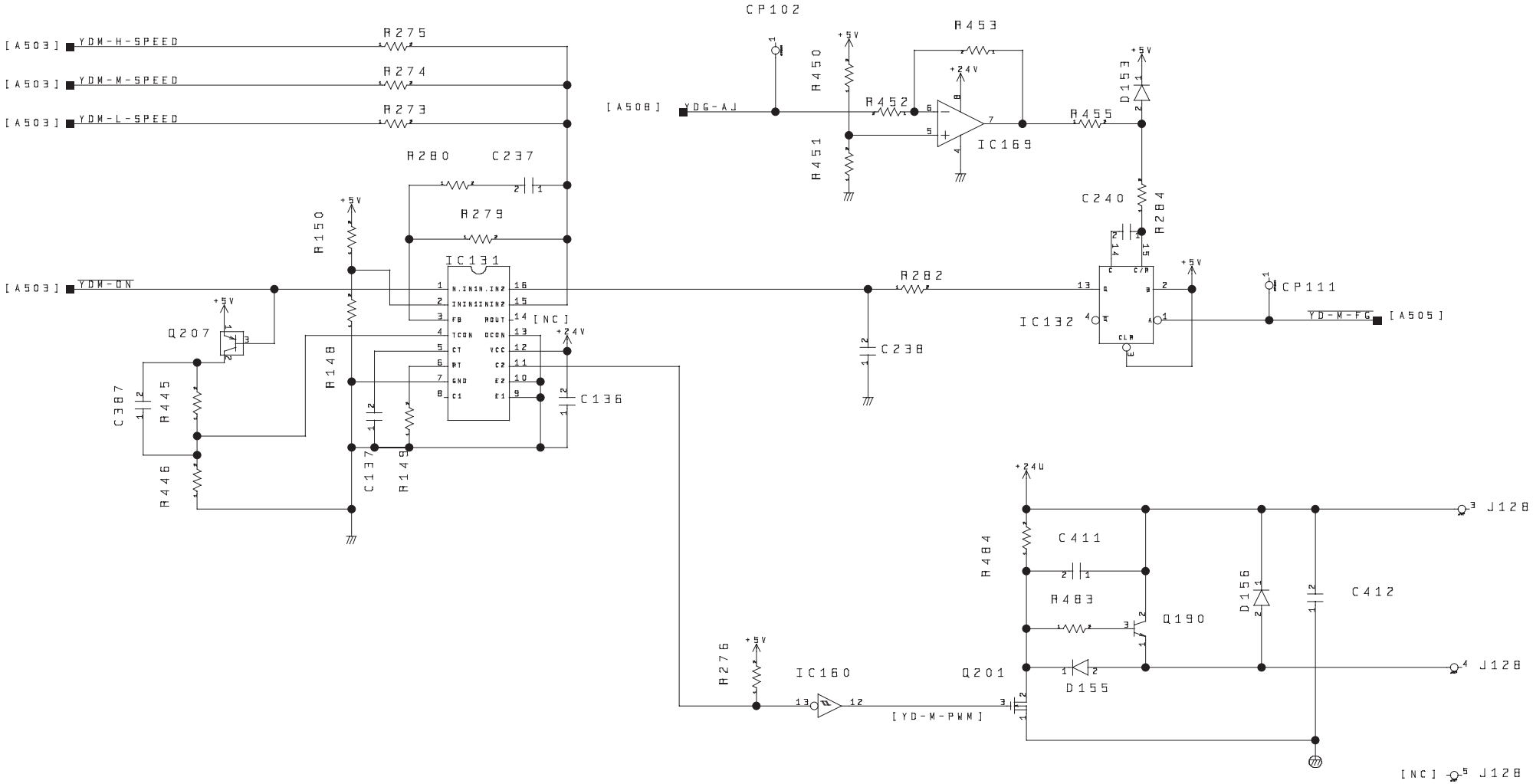



+5V
R133
[A501] FJOG-M-B
[A501] FJOG-M-A
[A503] FJOG-M-ON
[A503][A511] POWER-DOWN
IC157
IC116
R135
C133
IC103
[505mA]
[167mA]
+24U
FU105
[1mm]
C132
C113
ETH102
R137
R136
[B-] [0.4mm]
[B]
[A-]
[A]
[NC]
A2 J104
A4 J104
A3 J104
A5 J104
A1 J104
POWER-DOWN [A510]
R142
[A501] RJOG-M-B
[A501] RJOG-M-A
[A503] RJOG-M-ON
R140
C134
IC102
FU106
C135
C114
ETH103
R138
R139
A7 J104
A9 J104
A8 J104
A10 J104
A6 J104
A11 J104

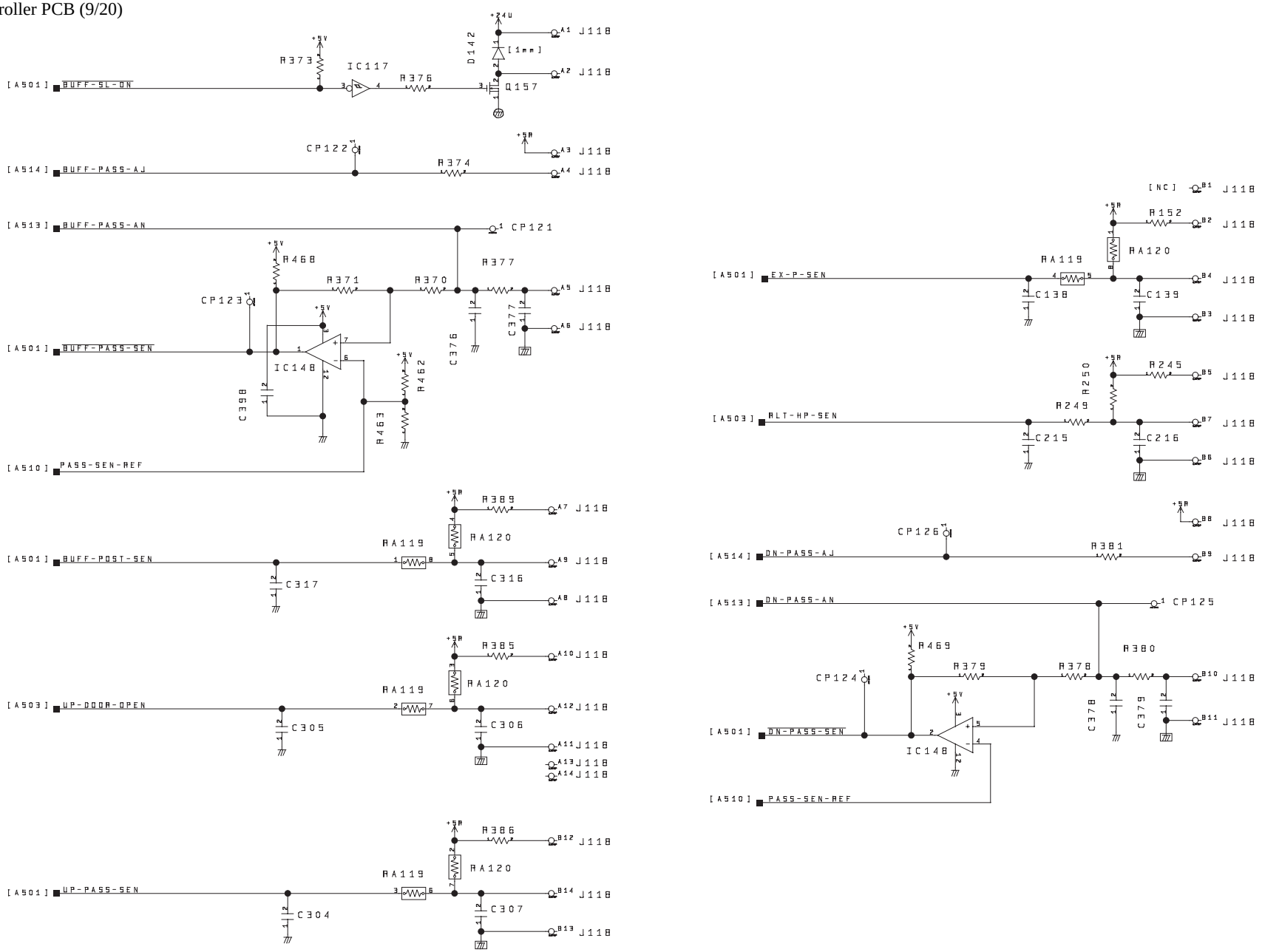

[A503] FJOG-HP-SEN
R248
R247
R246
C218
C217
B1 J104
B3 J104
B2 J104
[A503] RJOG-HP-SEN
R252
R251
R244
C214
C213
B4 J104
B6 J104
B5 J104
+24U
[1mm]
B7 J104
D102
B8 J104
Q108
[A501] STRY-SL-ON
R105
R516
R387
R153
R151
[A503] STRY-P-SEN
C315
C314
B9 J104
B11 J104
B10 J104

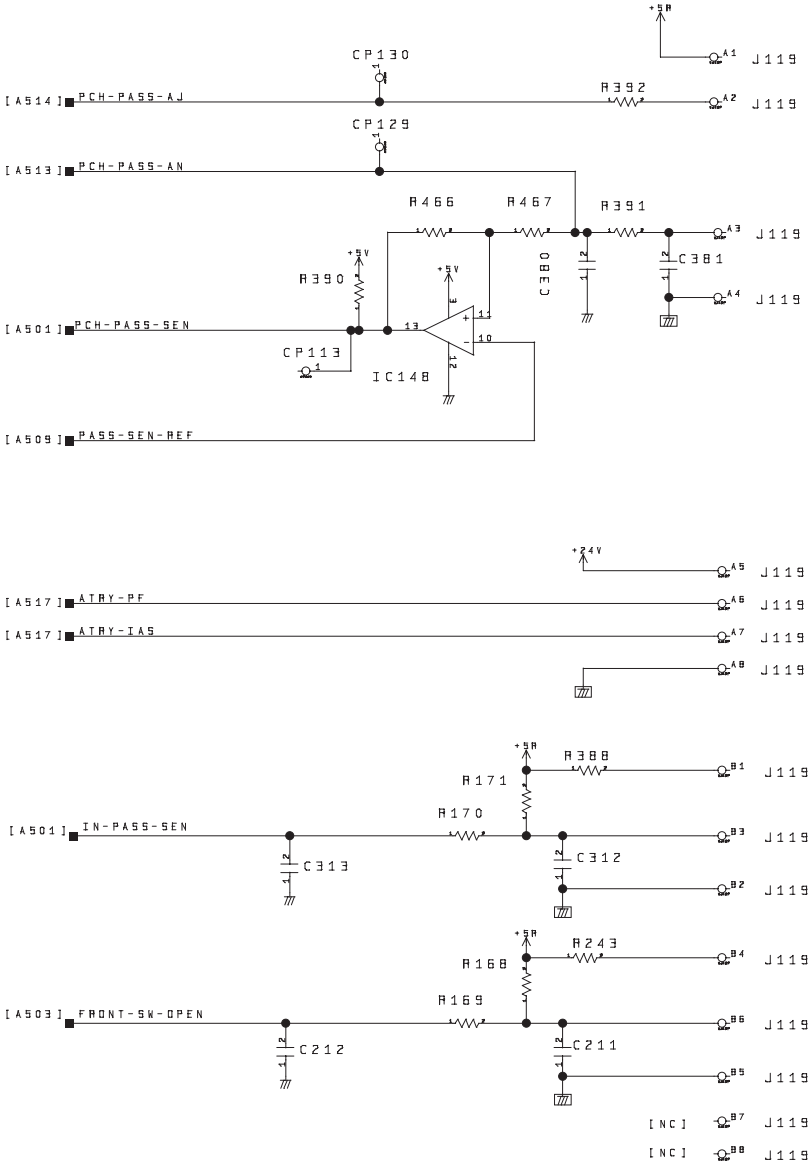
Finisher Controller PCB (7/20)

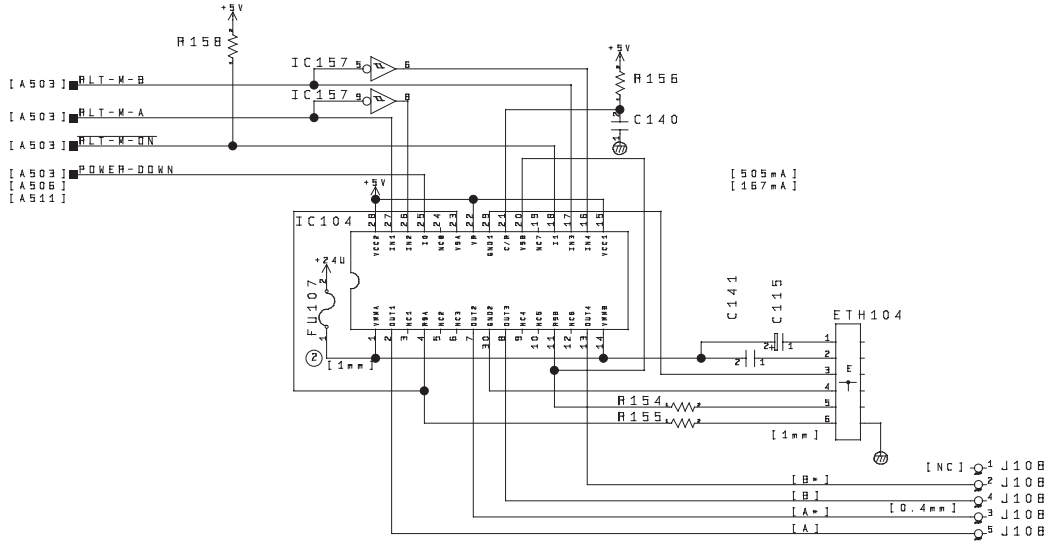


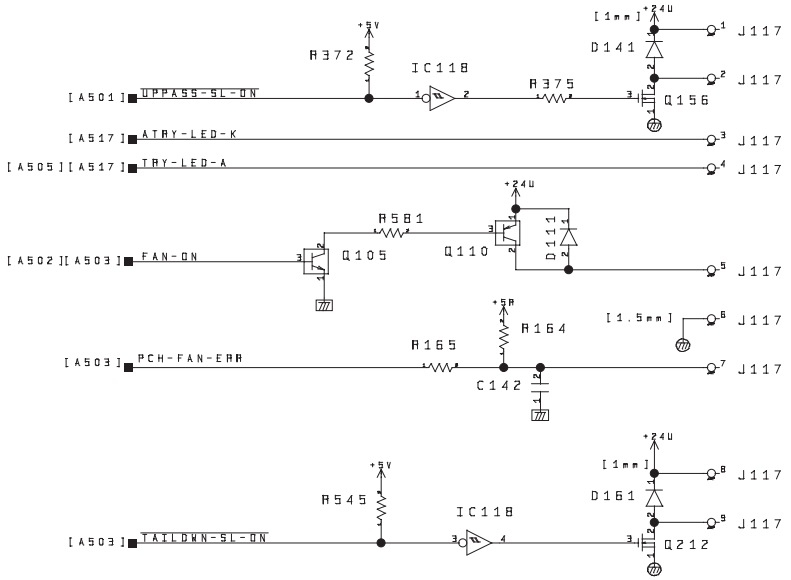

[A503] YDM-H-SPEED
[A503] YDM-M-SPEED
[A503] YDM-L-SPEED
[A503] YDM-ON
R275
R274
R273
R280
C237
R279
R150
IC131
Q207
R148
C387
R445
R446
C137
R149
C136
[NC]
+24V
+5V
CP102
[A508] YDG-AJ
R450
R451
R452
R453
IC169
R455
D153
C240
R284
R282
C238
IC132
CP111
YD-M-FG
[A505]
R484
C411
R483
Q190
D156
C412
J128
R276
IC160
Q201
D155
[YD-M-PWM]
[NC] J128

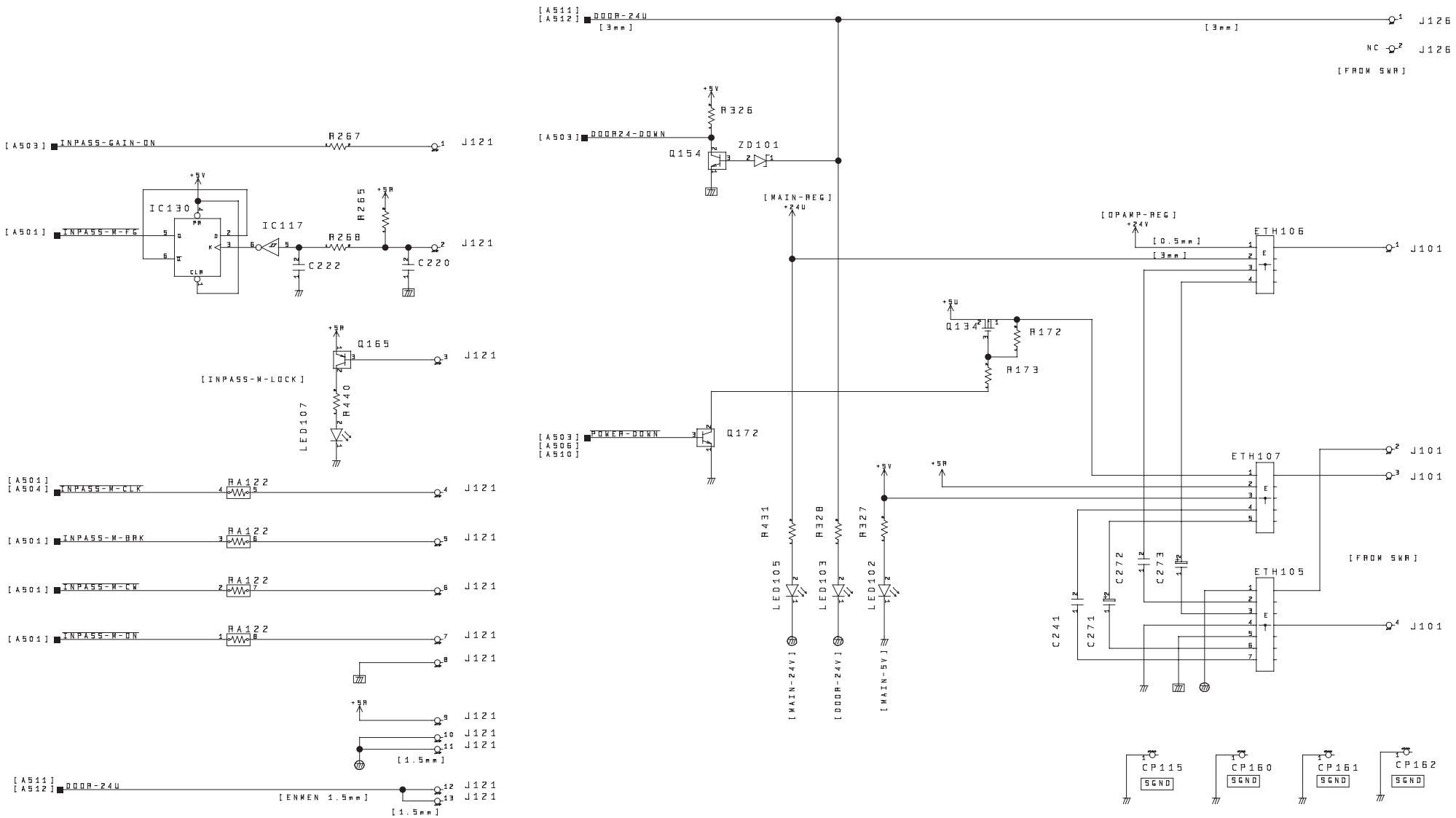
Finisher Controller PCB (9/20)

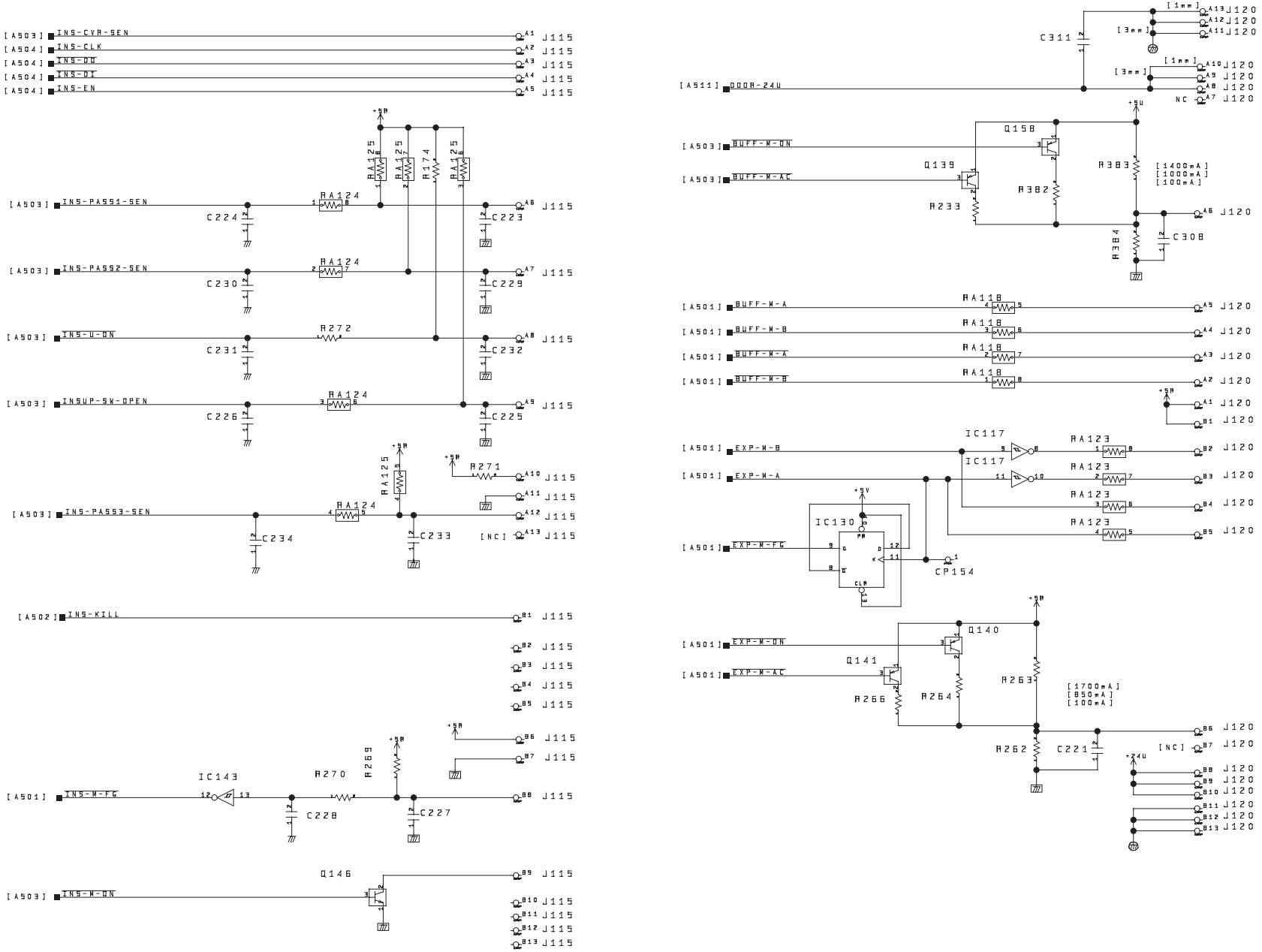


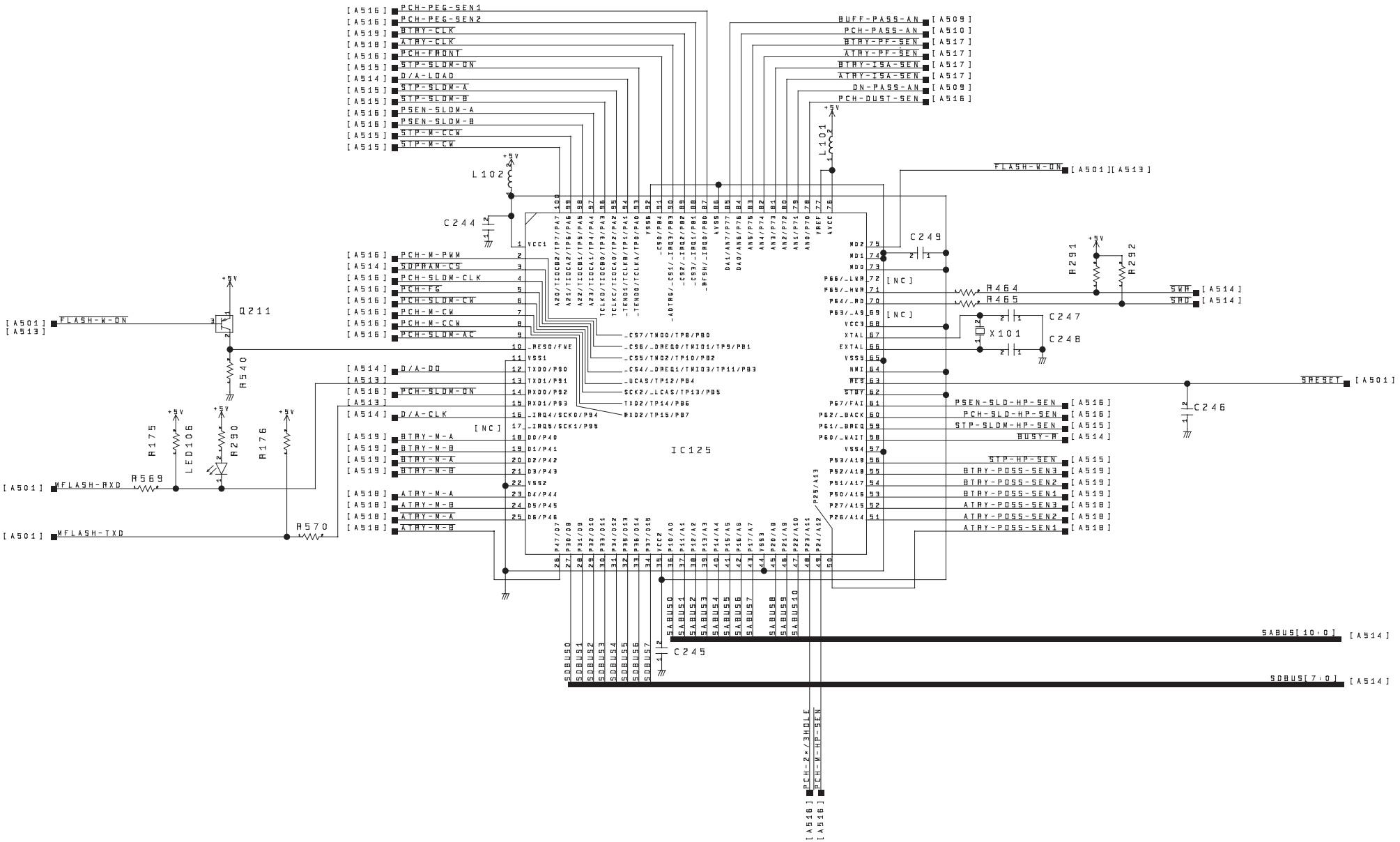

+5R
CP130
R392
CP129
[A514] PCH-PASS-AJ
[A513] PCH-PASS-AN
R466
R467
R391
C380
C381
R390
[A501] PCH-PASS-SEN
CP113
IC148
[A509] PASS-SEN-REF
J119
+24V
[A517] ATRY-PF
[A517] ATRY-IAS
R388
R171
R170
[A501] IN-PASS-SEN
C313
C312
R243
R168
R169
[A503] FRONT-SW-OPEN
C212
C211
[NC]
[NC]

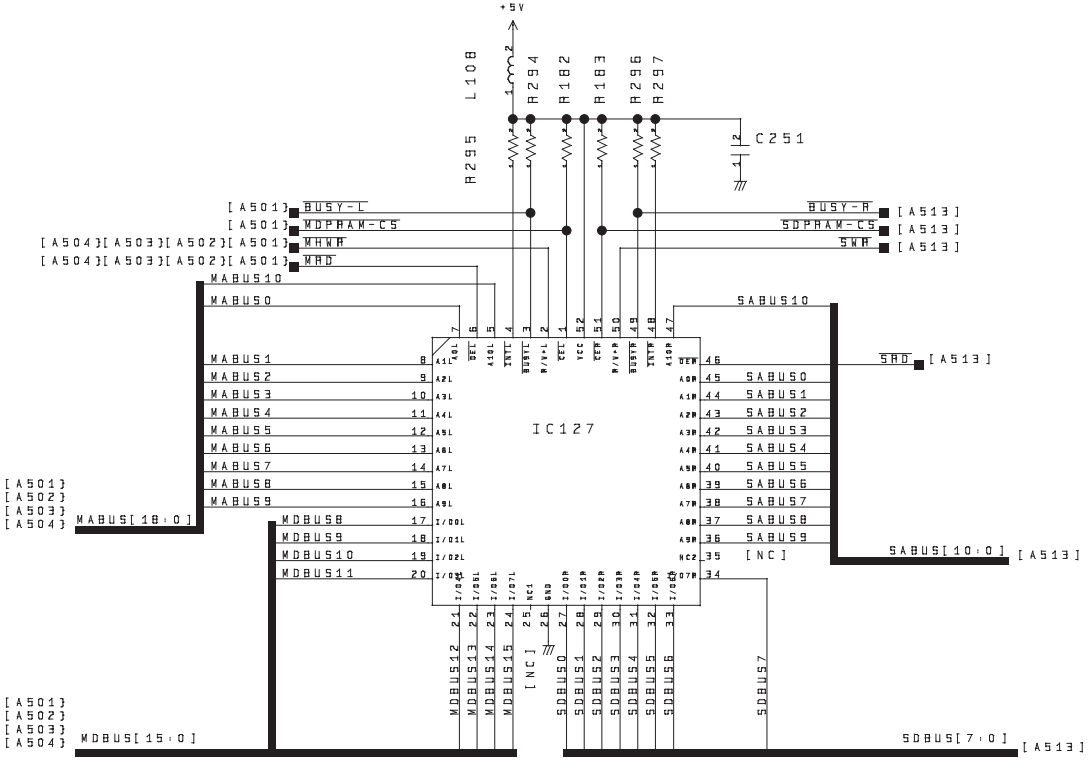

R158
IC157
[A503] BLT-M-B
[A503] BLT-M-A
[A503] BLT-M-ON
[A503] [A506] [A511] POWER-DOWN
R156
C140
[505mA]
[167mA]
IC104
FU107
C141
C115
ETH104
R154
R155
[1mm]
[0.4mm]
[NC]
[B-]
[B]
[A-]
[A]
J108

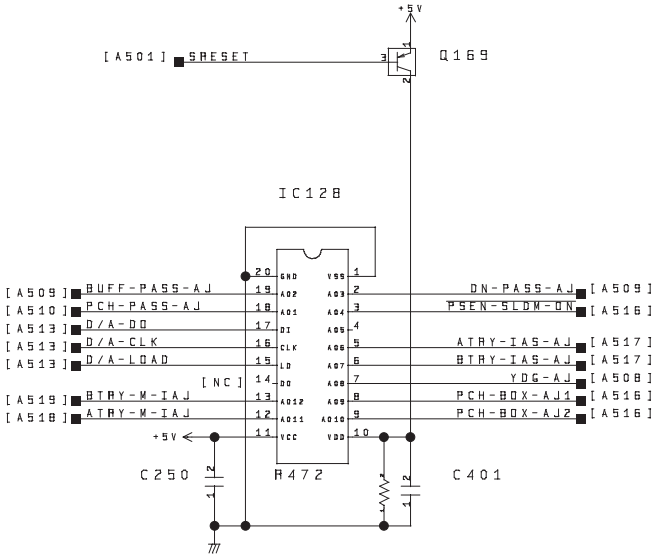

R372
IC118
[A501] UPPASS-SL-ON
R375
D141
Q156
[A517] ATRY-LED-K
[A505] [A517] TRY-LED-A
R581
Q105
Q110
D111
[A502] [A503] FAN-ON
R164
R165
[A503] PCH-FAN-ERR
C142
[1.5mm]
R545
[A503] TAILDOWN-SL-ON
D161
Q212
[1mm]
J117

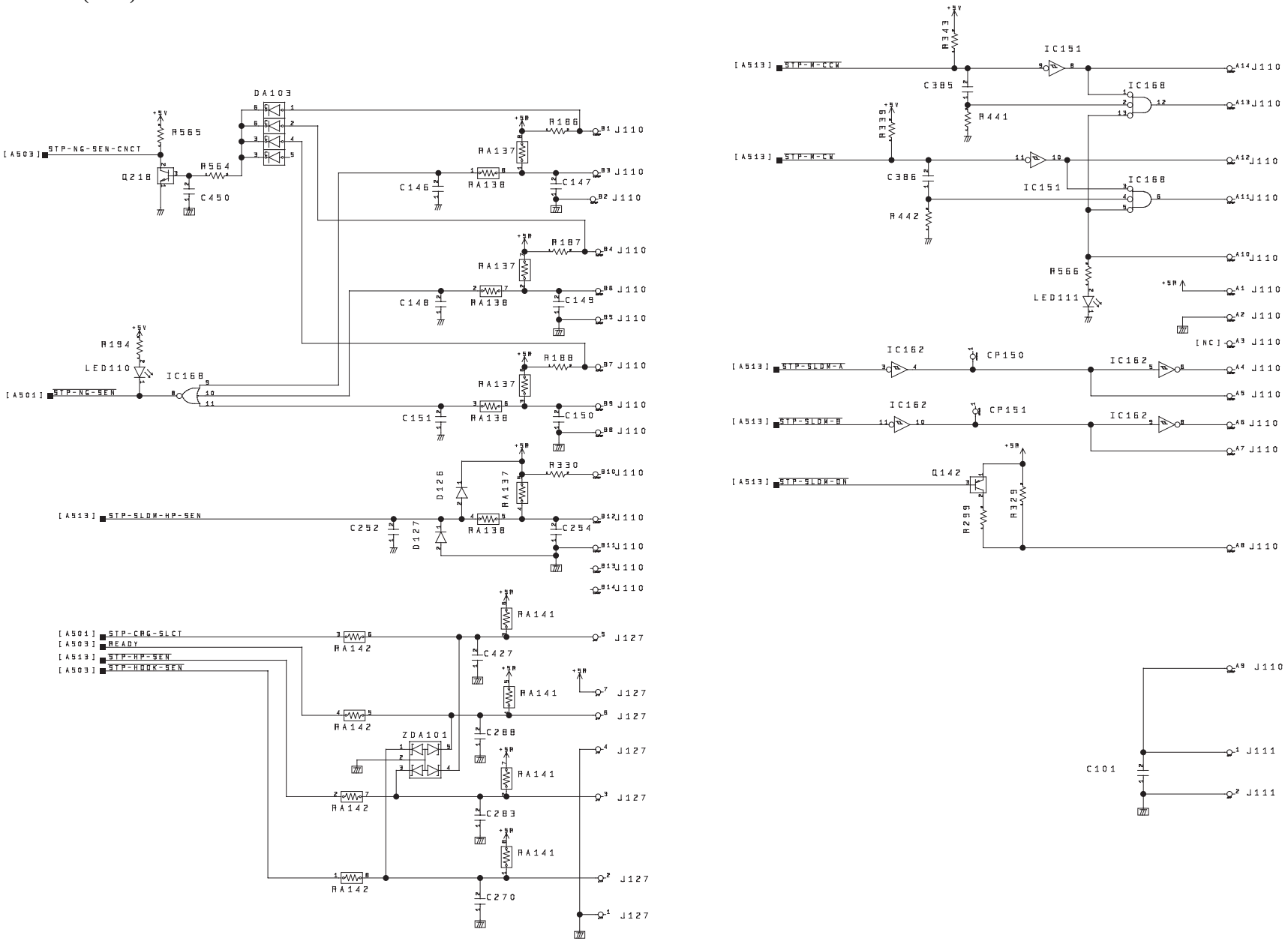


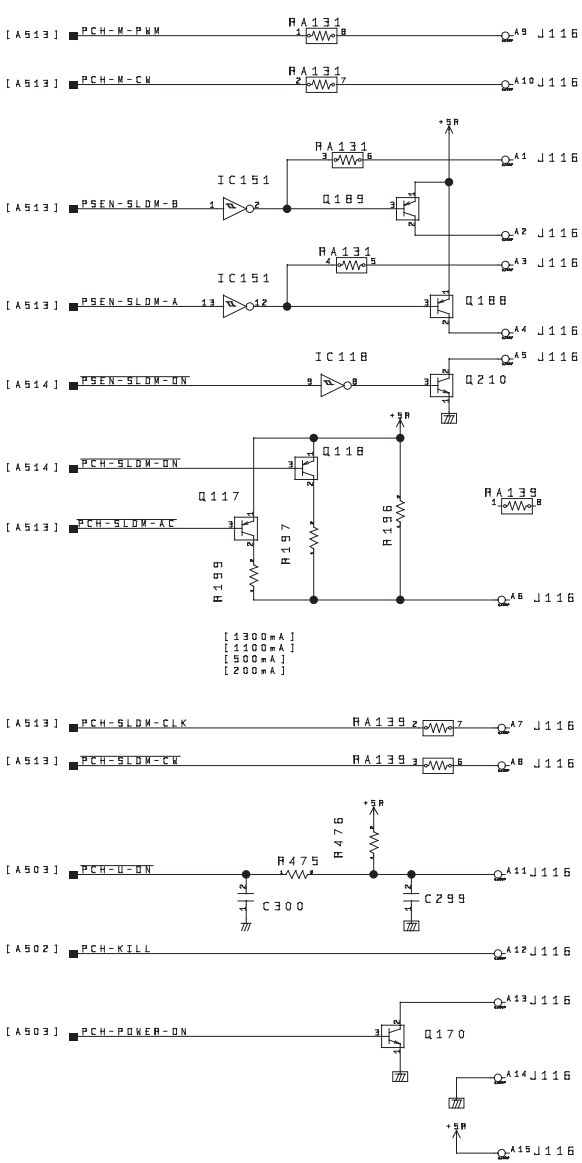

[A503] INS-CVR-SEN
[A504] INS-CLK
[A504] INS-DO
[A504] INS-DI
[A504] INS-EN
J115
[A503] INS-PAS51-SEN
[A503] INS-PAS52-SEN
[A503] INS-U-DN
[A503] INSUP-SW-OPEN
[A503] INS-PAS53-SEN
[A502] INS-KILL
[A501] INS-M-FG
[A503] INS-M-DN
[A511] DOOR-24U
[A503] BUFF-M-DN
[A503] BUFF-M-AC
[A501] BUFF-M-A
[A501] BUFF-M-B
[A501] EXP-M-B
[A501] EXP-M-A
[A501] EXP-M-FG
[A501] EXP-M-DN
[A501] EXP-M-AC
J120
[1mm]
[3mm]
[1400mA]
[1000mA]
[100mA]
[1700mA]
[850mA]
[100mA]
NC
[NC]
IC117
IC130
IC143
CP154
Q139
Q140
Q141
Q146
Q158
R174
R233
R234
R262
R263
R264
R266
R269
R270
R271
R272
R382
R383
R384
C221
C223
C224
C225
C226
C227
C228
C229
C230
C231
C232
C233
C234
C308
C311

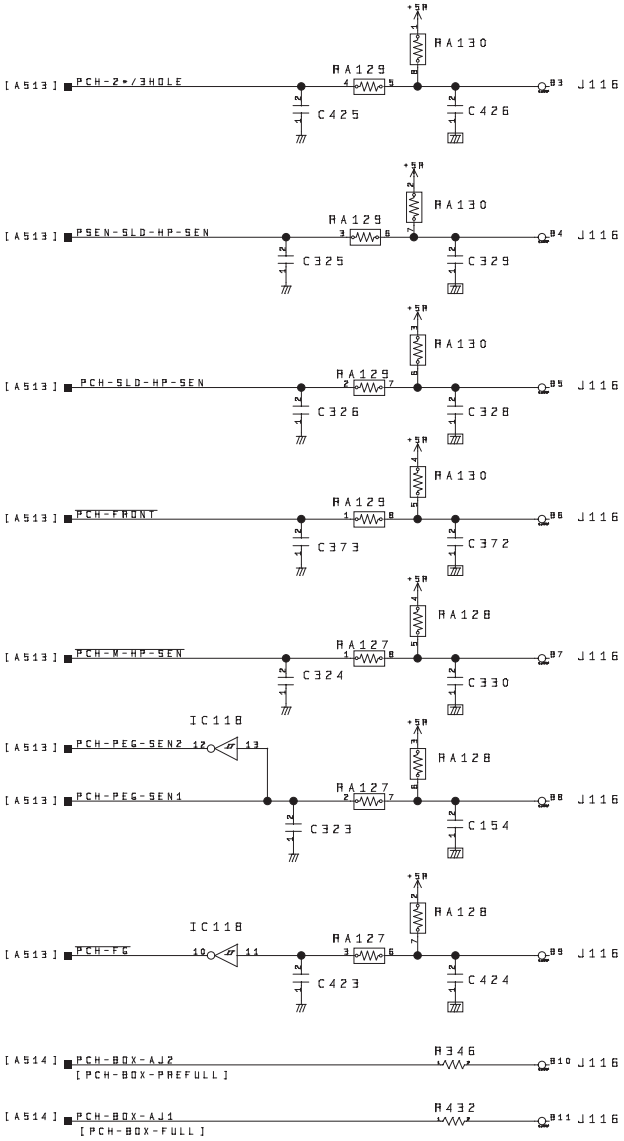


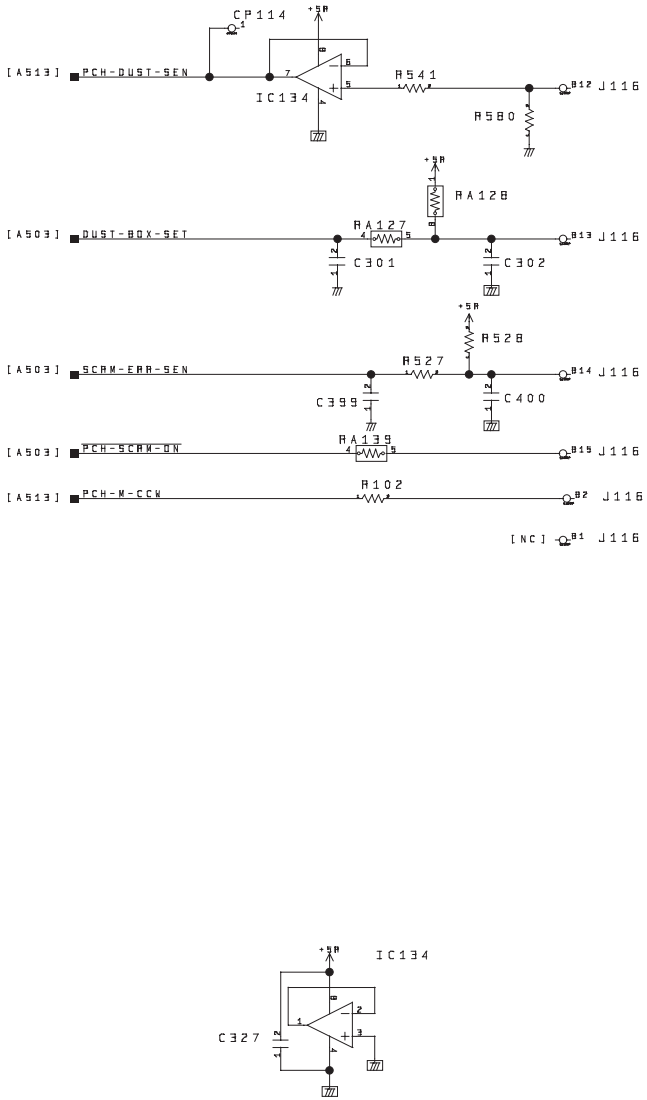

+5V
L108
R294
R182
R183
R296
R297
R295
C251
[A501] BUSY-L
[A501] MDPRAM-CS
[A504][A503][A502][A501] MWWR
[A504][A503][A502][A501] MRD
BUSY-R [A513]
SDPRAM-CS [A513]
SWR [A513]
MABUS10
MABUS0
MABUS1
MABUS2
MABUS3
MABUS4
MABUS5
MABUS6
MABUS7
MABUS8
MABUS9
MABUS[18:0]
IC127
SABUS10
SRD [A513]
SABUS0
SABUS1
SABUS2
SABUS3
SABUS4
SABUS5
SABUS6
SABUS7
SABUS8
SABUS9
[NC]
SABUS[10:0] [A513]
MDBUS8
MDBUS9
MDBUS10
MDBUS11
MDBUS12
MDBUS13
MDBUS14
MDBUS15
[NC]
MDBUS[15:0]
SDBUS0
SDBUS1
SDBUS2
SDBUS3
SDBUS4
SDBUS5
SDBUS6
SDBUS7
SDBUS[7:0] [A513]


+5V
[A501] SRESET
Q169
IC128
[A509] BUFF-PASS-AJ
[A510] PCH-PASS-AJ
[A513] D/A-DO
[A513] D/A-CLK
[A513] D/A-LOAD
[NC]
[A519] BTRY-M-IAJ
[A518] ATRY-M-IAJ
DN-PASS-AJ [A509]
PSEN-SLDM-ON [A516]
ATRY-IAS-AJ [A517]
BTRY-IAS-AJ [A517]
YDG-AJ [A508]
PCH-BOX-AJ1 [A516]
PCH-BOX-AJ2 [A516]
C250
R472
C401

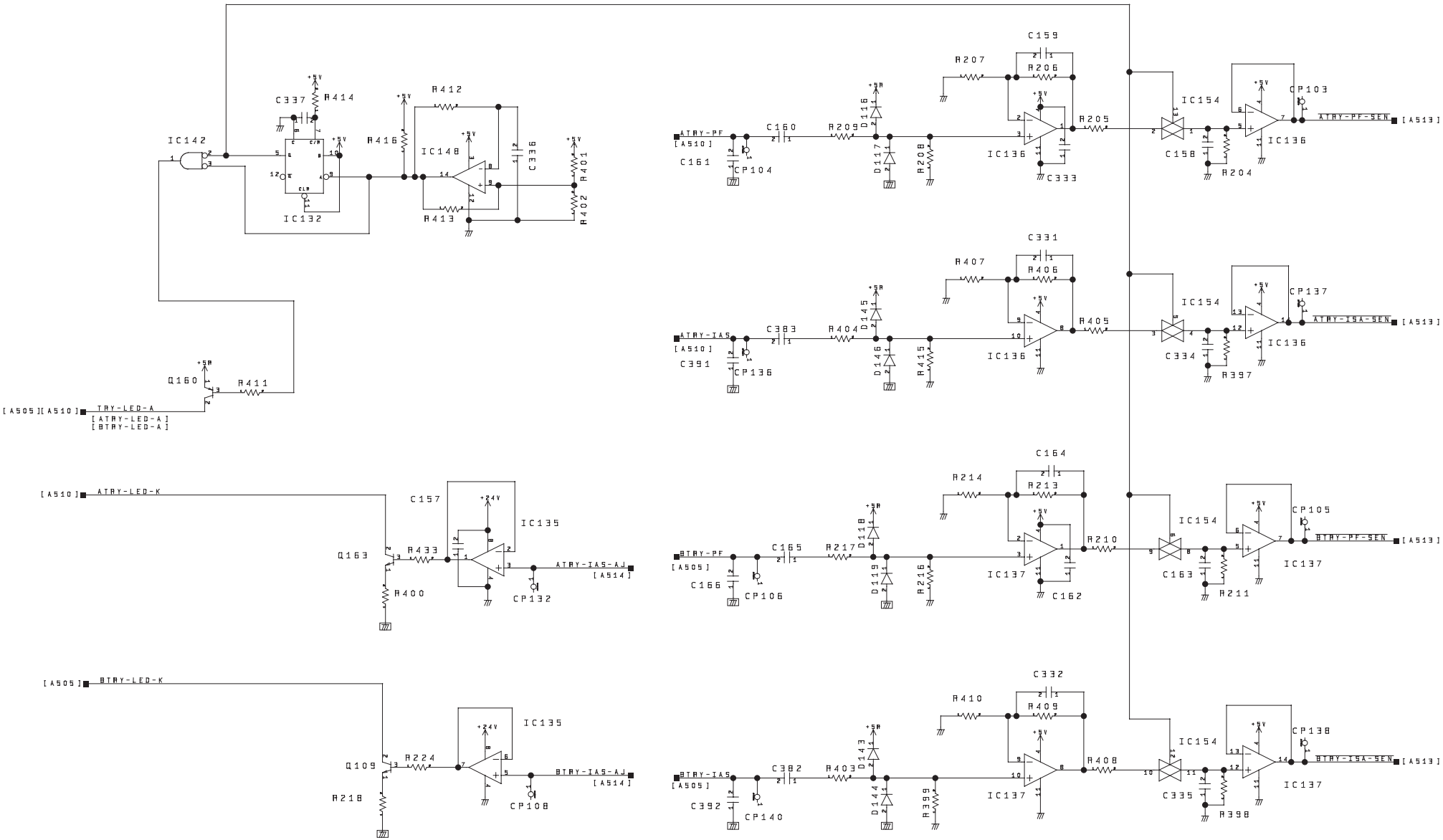


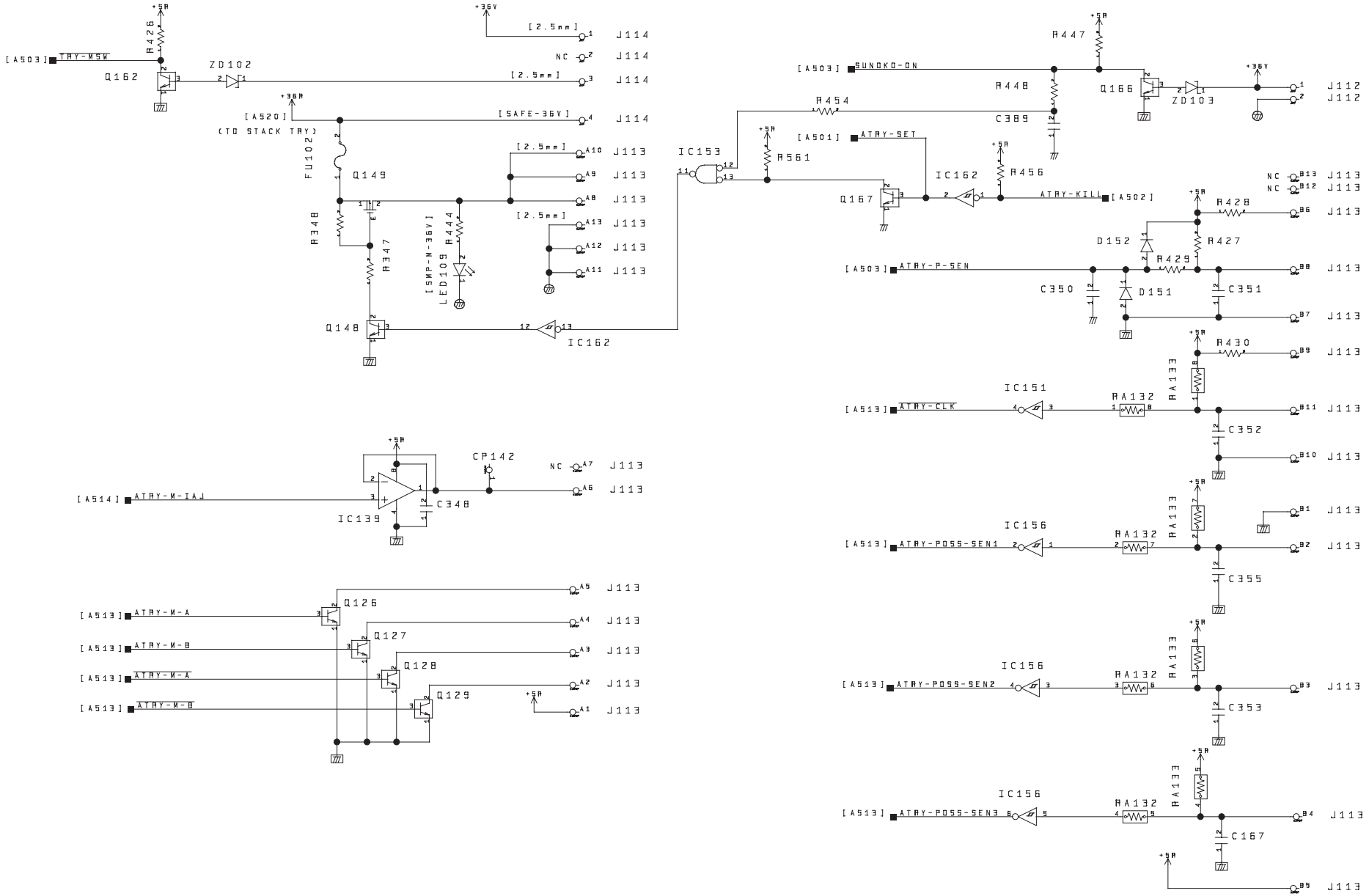

[A513] PCH-M-PWM
RA131
A9 J116
[A513] PCH-M-CW
RA131
A10 J116
RA131
A1 J116
IC151
[A513] PSEN-SLDM-B
Q189
A2 J116
RA131
A3 J116
IC151
[A513] PSEN-SLDM-A
Q188
A4 J116
IC118
A5 J116
[A514] PSEN-SLDM-ON
Q210
Q118
[A514] PCH-SLDM-ON
Q117
[A513] PCH-SLDM-AC
RA139
R197
R196
R199
A6 J116
[1300mA]
[1100mA]
[500mA]
[200mA]
[A513] PCH-SLDM-CLK
RA139
A7 J116
[A513] PCH-SLDM-CW
RA139
A8 J116
R476
R475
[A503] PCH-U-DN
C300
C299
A11 J116
[A502] PCH-KILL
A12 J116
A13 J116
[A503] PCH-POWER-ON
Q170
A14 J116
A15 J116


RA130
[A513] PCH-2ND/3RDHOLE
RA129
C425
C426
B3 J116
RA130
[A513] PSEN-SLD-HP-SEN
RA129
C325
C329
B4 J116
RA130
[A513] PCH-SLD-HP-SEN
RA129
C326
C328
B5 J116
RA130
[A513] PCH-FRONT
RA129
C373
C372
B6 J116
RA128
[A513] PCH-M-HP-SEN
RA127
C324
C330
B7 J116
IC118
[A513] PCH-PEG-SEN2
[A513] PCH-PEG-SEN1
RA128
RA127
C323
C154
B8 J116
IC118
[A513] PCH-FG
RA128
RA127
C423
C424
B9 J116
[A514] PCH-BOX-AJ2
[PCH-BOX-PREFULL]
R346
B10 J116
[A514] PCH-BOX-AJ1
[PCH-BOX-FULL]
R432
B11 J116

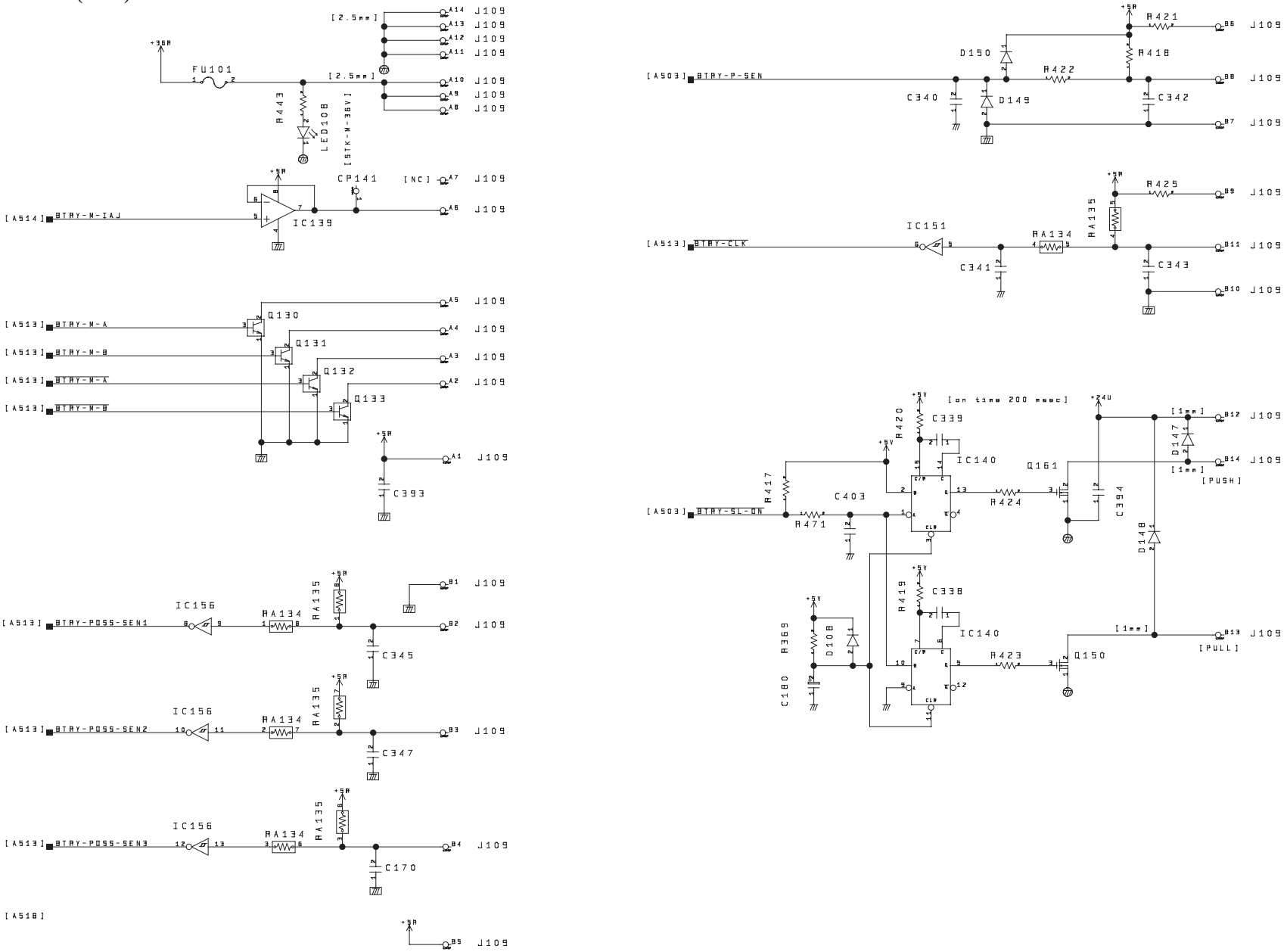

CP114
[A513] PCH-DUST-SEN
IC134
R541
R580
B12 J116
RA128
[A503] DUST-BOX-SET
RA127
C301
C302
B13 J116
R528
[A503] SCAM-ERR-SEN
R527
C399
C400
B14 J116
[A503] PCH-SCAM-ON
RA139
B15 J116
[A513] PCH-M-CCW
R102
B2 J116
[NC]
B1 J116

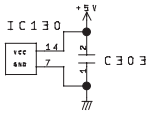
IC134
C327

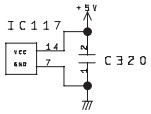


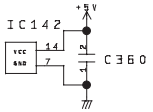

+5R
R426
[A503]
TRY-MSW
Q162
ZD102
+36V
[2.5mm]
J114
NC
[2.5mm]
[A520]
[SAFE-36V]
(TO STACK TRY)
FU102
Q149
R348
R347
[SMP-M-36V]
LED109
R444
[2.5mm]
J113
Q148
IC162
IC153
R561
[A501]
ATRY-SET
R454
R448
R447
Q166
ZD103
C389
[A503]
SUNOKO-ON
Q167
IC162
R456
ATRY-KILL
[A502]
R428
R427
D152
R429
[A503]
ATRY-P-SEN
C350
D151
C351
R430
IC151
[A513]
ATRY-CLK
RA132
RA133
C352
IC156
[A513]
ATRY-POSS-SEN1
C355
[A513]
ATRY-POSS-SEN2
C353
[A513]
ATRY-POSS-SEN3
C167
CP142
NC
[A514]
ATRY-M-IAJ
IC139
C348
Q126
Q127
Q128
Q129
[A513]
ATRY-M-A
ATRY-M-B
ATRY-M-A
ATRY-M-B

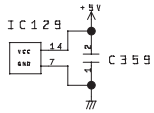
Finisher Controller PCB (19/20)

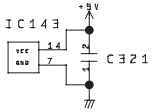


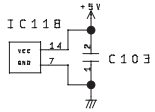


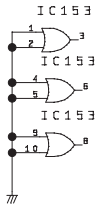


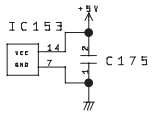


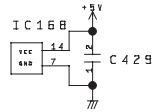


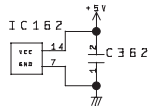


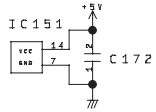


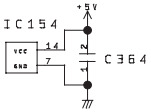


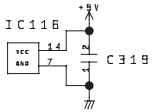


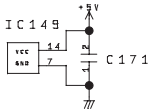


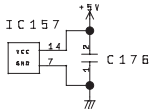


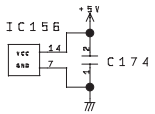


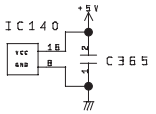


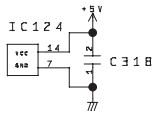


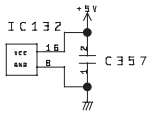


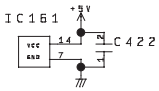


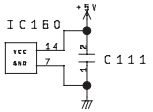


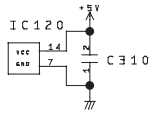


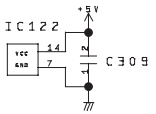




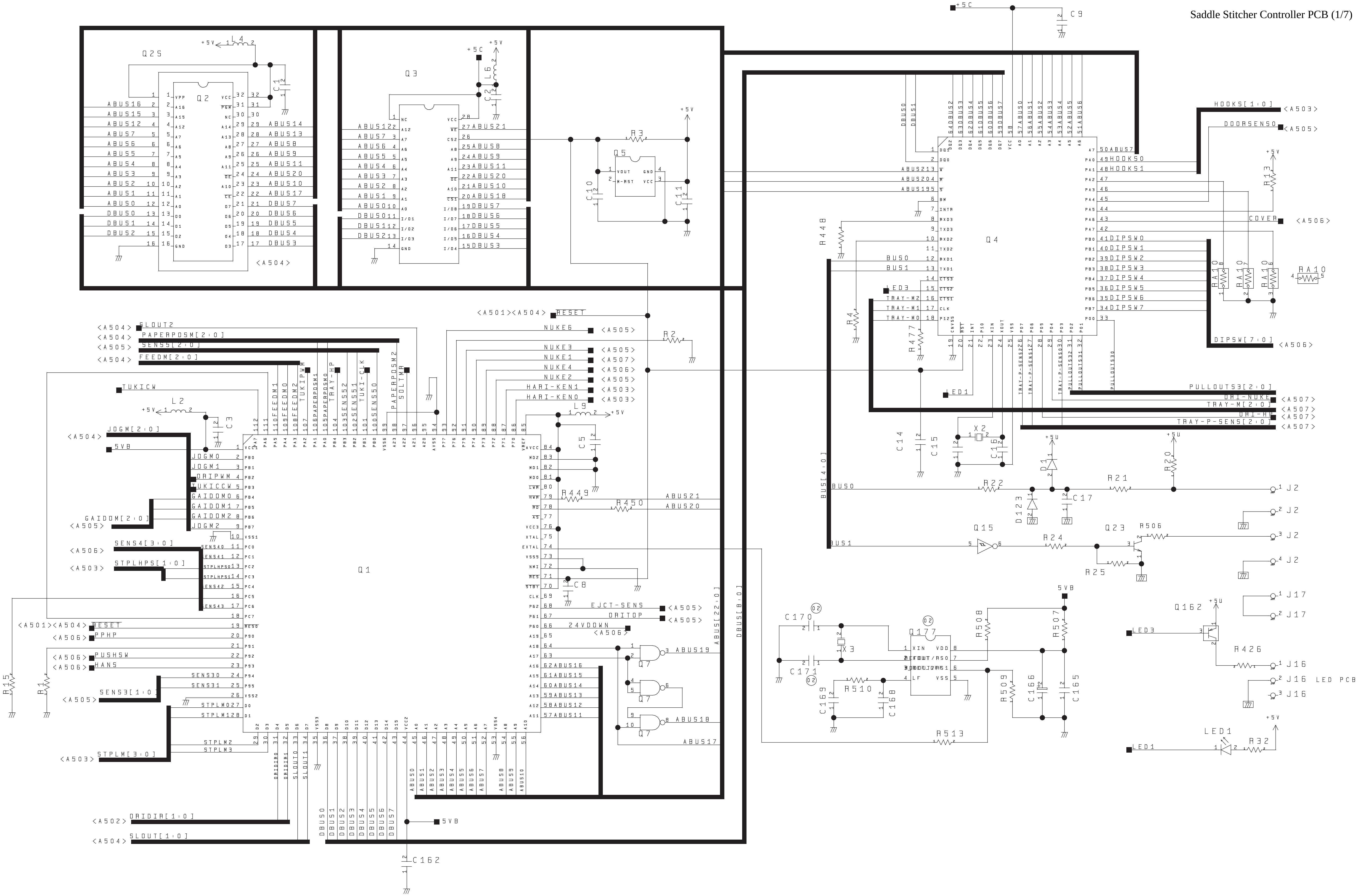


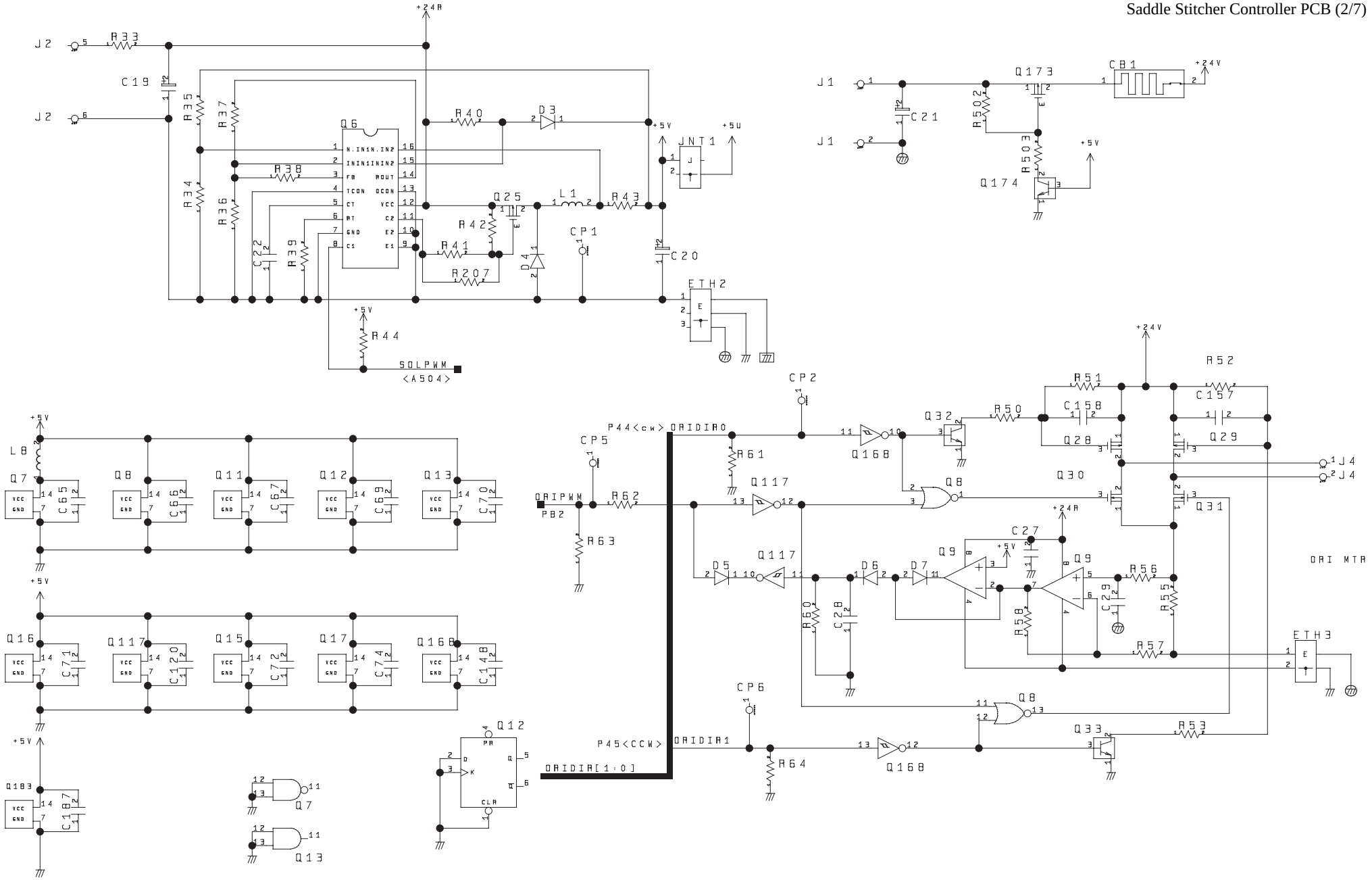




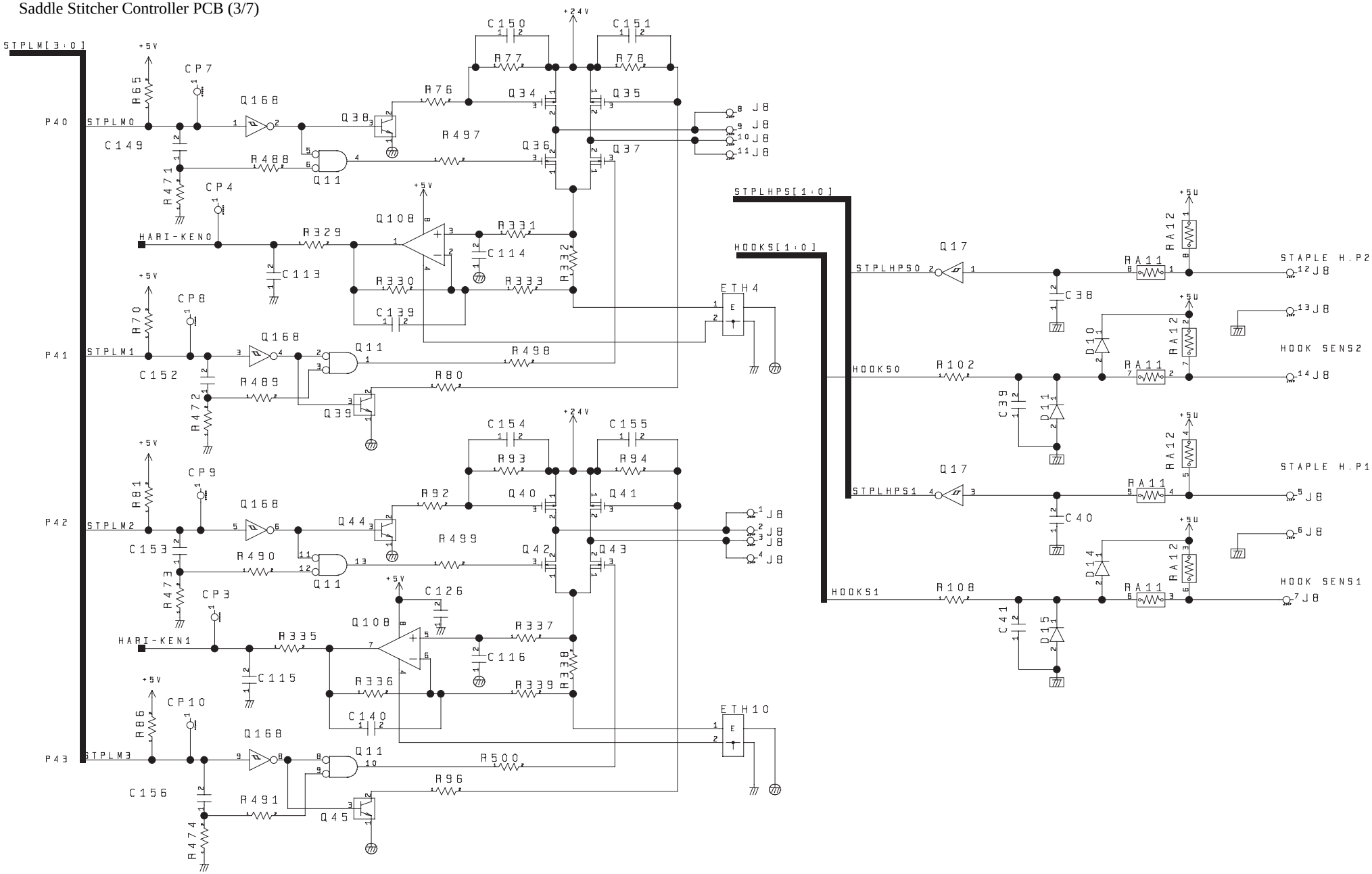


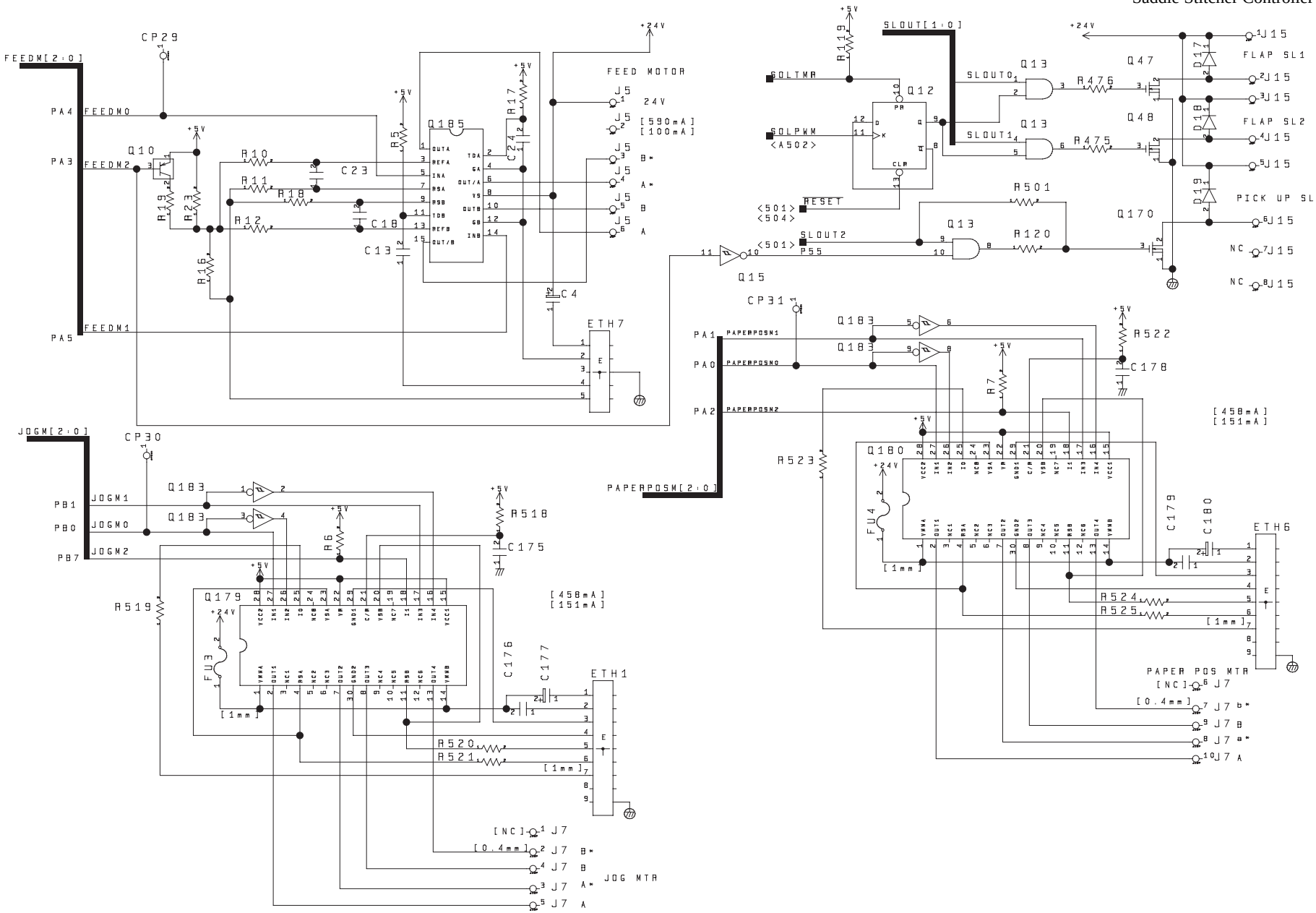
Saddle Stitcher Controller PCB (1/7)



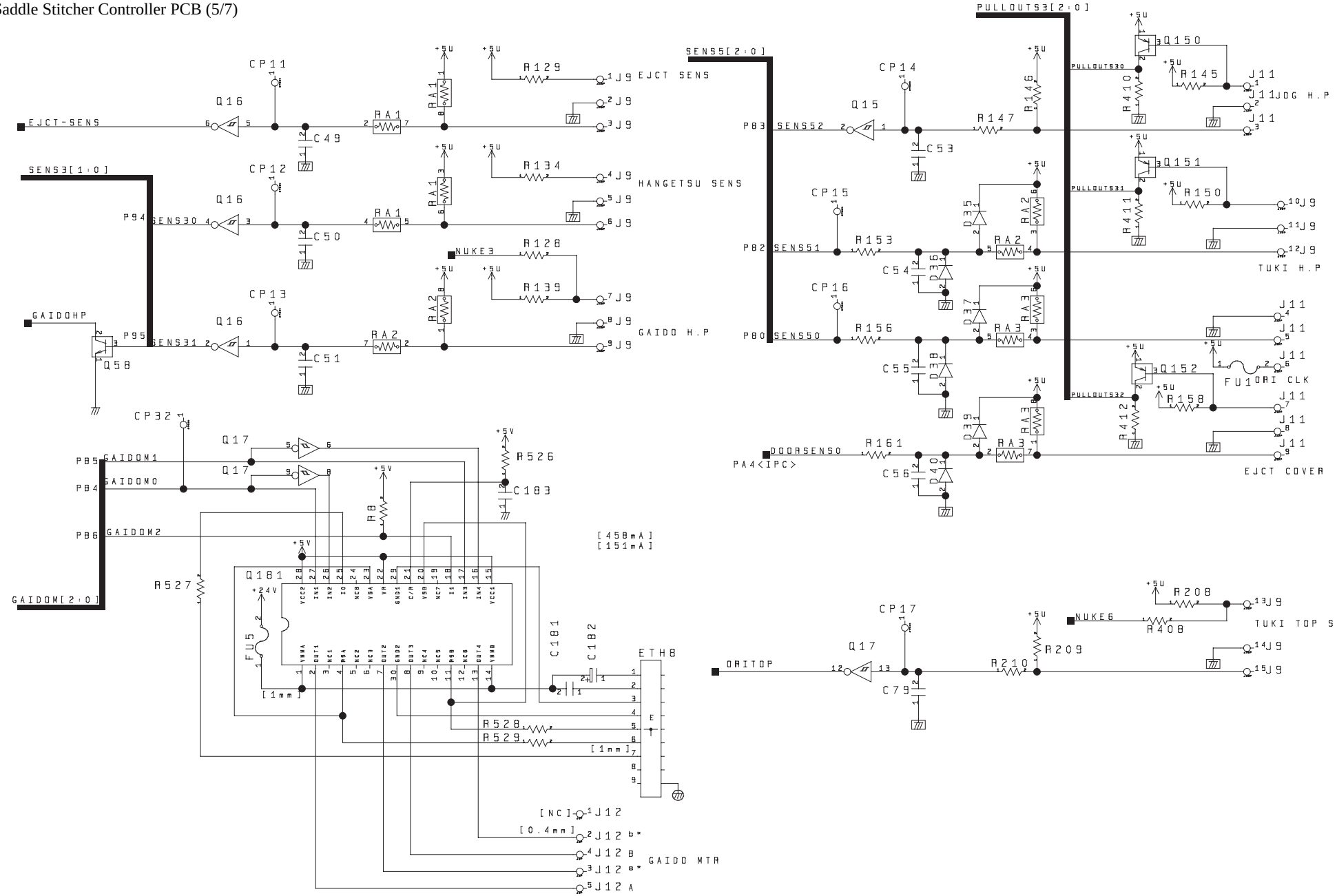

+24R
J2
R33
C19
R35
R37
R34
R36
R38
C22
R39
Q6
R40
D3
+5V
+5U
JNT1
Q25
L1
R43
R42
R41
D4
CP1
C20
R207
ETH2
R44
SOLPWM
<A504>
J1
C21
Q173
CB1
+24V
R502
R503
Q174
L8
Q7
Q8
Q11
Q12
Q13
C65
C66
C67
C69
C70
Q16
Q117
Q15
Q17
Q168
C71
C120
C72
C74
C148
Q183
C187
Q12
Q7
Q13
CP2
CP5
CP6
P44<cw>
ORIDIR0
ORIPWM
PB2
R61
R62
R63
Q117
Q168
Q32
R50
R51
R52
C157
C158
Q28
Q29
Q30
Q31
J4
Q8
D5
D6
D7
Q9
C27
C28
C29
R56
R55
R58
R57
R60
ETH3
ORI MTR
P45<CCW>
ORIDIR1
ORIDIR[1:0]
R64
R53
Q33

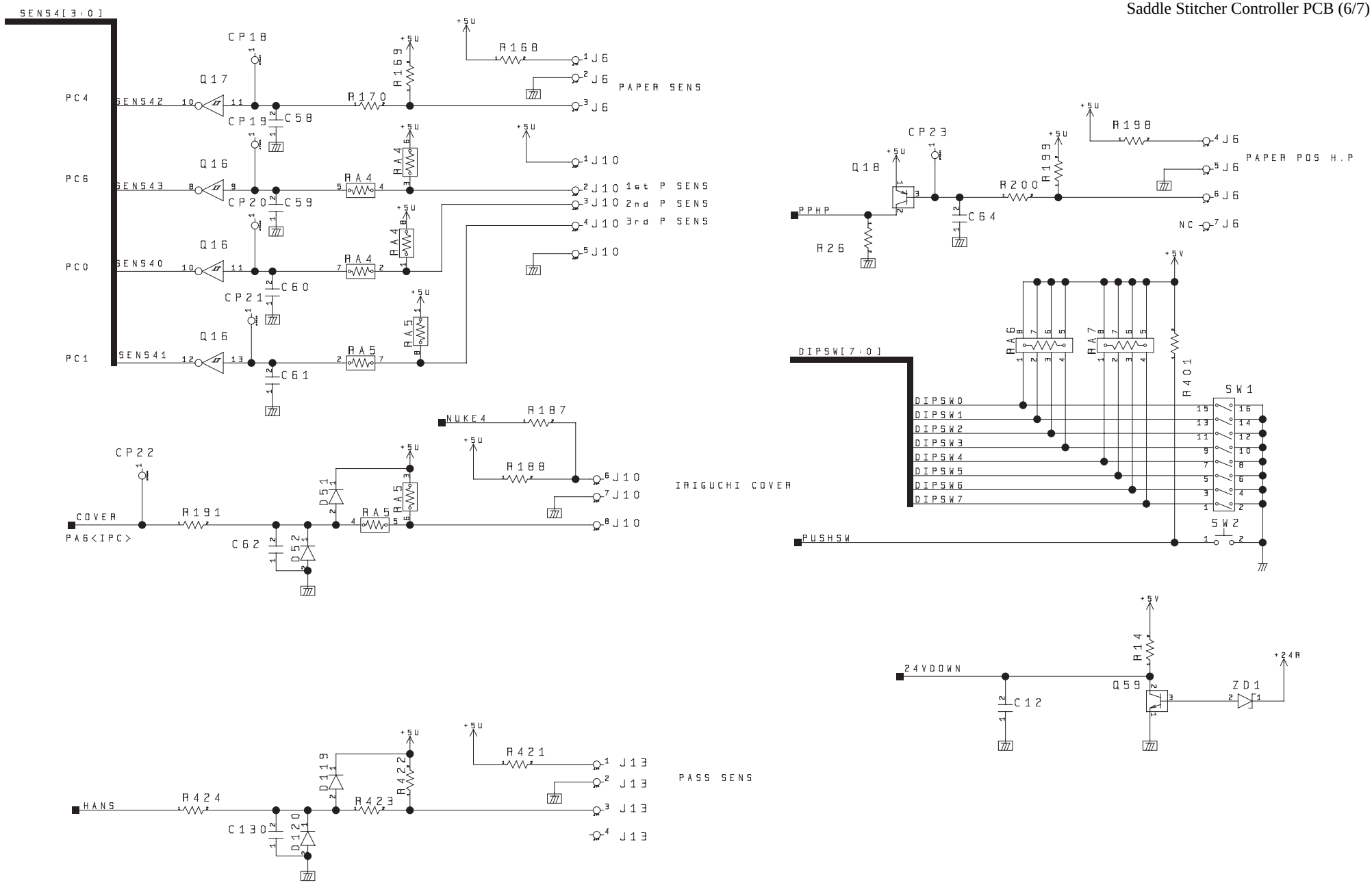
Saddle Stitcher Controller PCB (3/7)



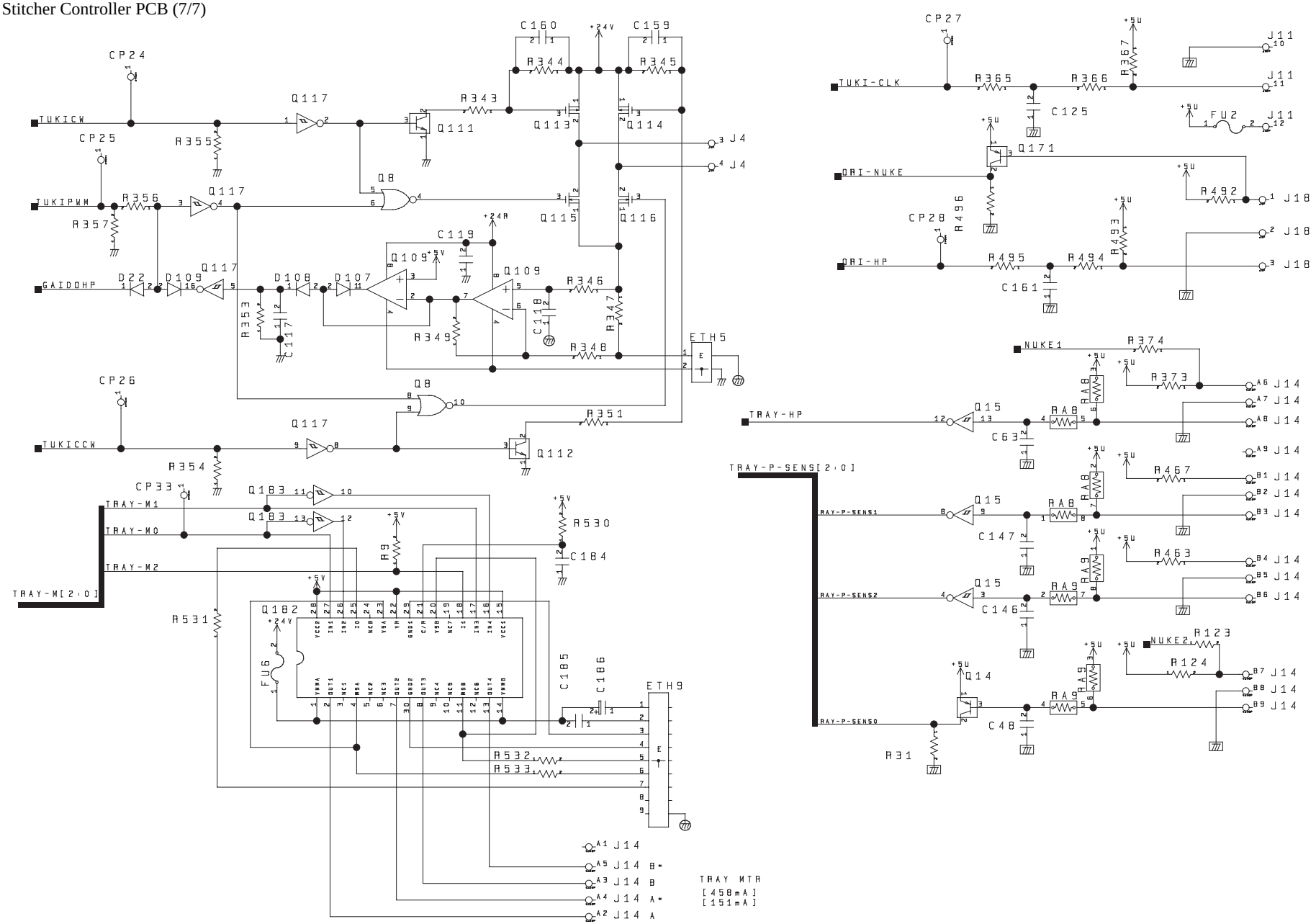

FEEDM[2:0]
JOGM[2:0]
PAPERPOSM[2:0]
SLOUT[1:0]
FEED MOTOR
JOG MTR
PAPER POS MTR
FLAP SL1
FLAP SL2
PICK UP SL
SOLTMR
SOLPWM
RESET
SLOUT2
NC
[458mA]
[151mA]
[590mA]
[100mA]
[1mm]
[0.4mm]

Saddle Stitcher Controller PCB (5/7)

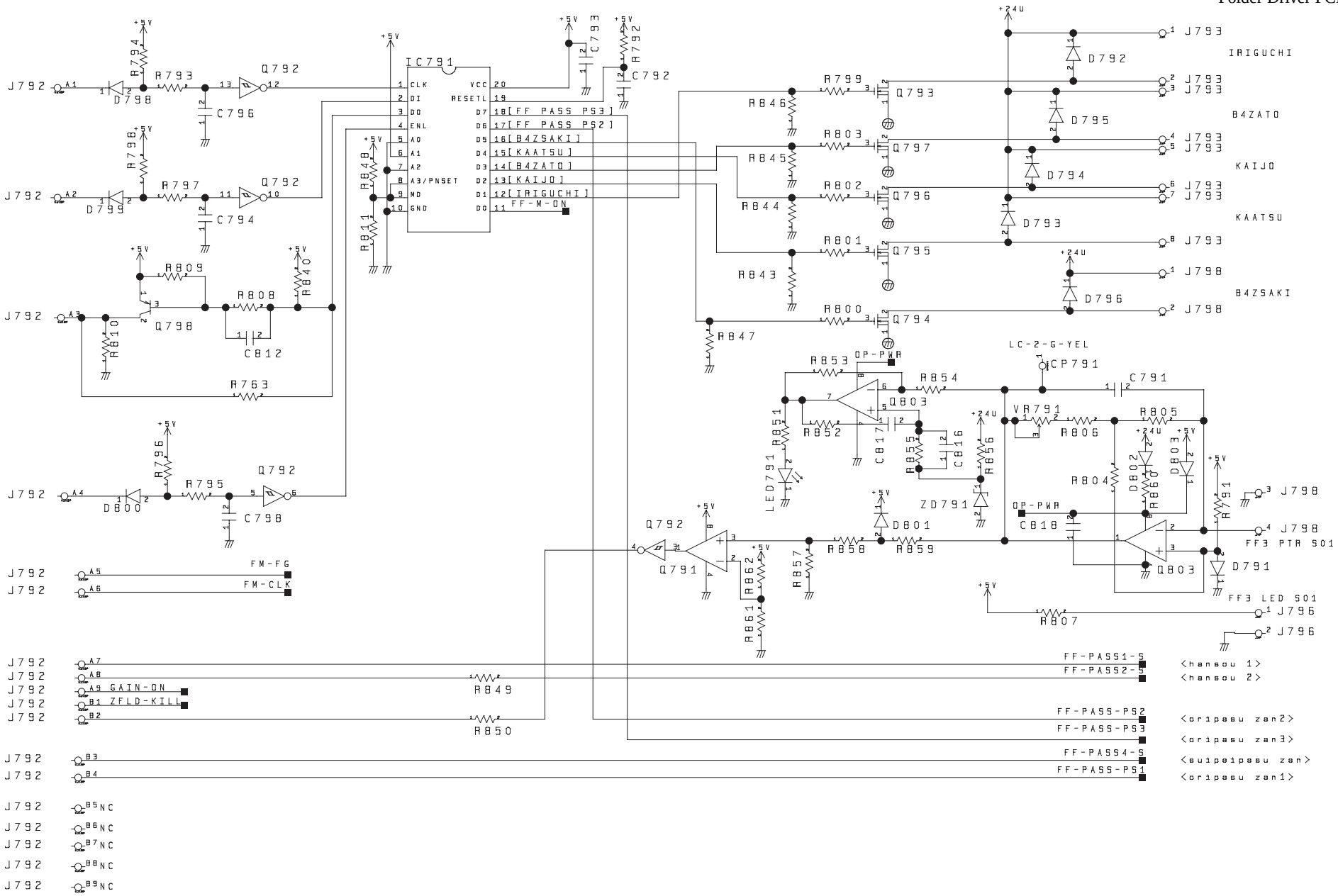




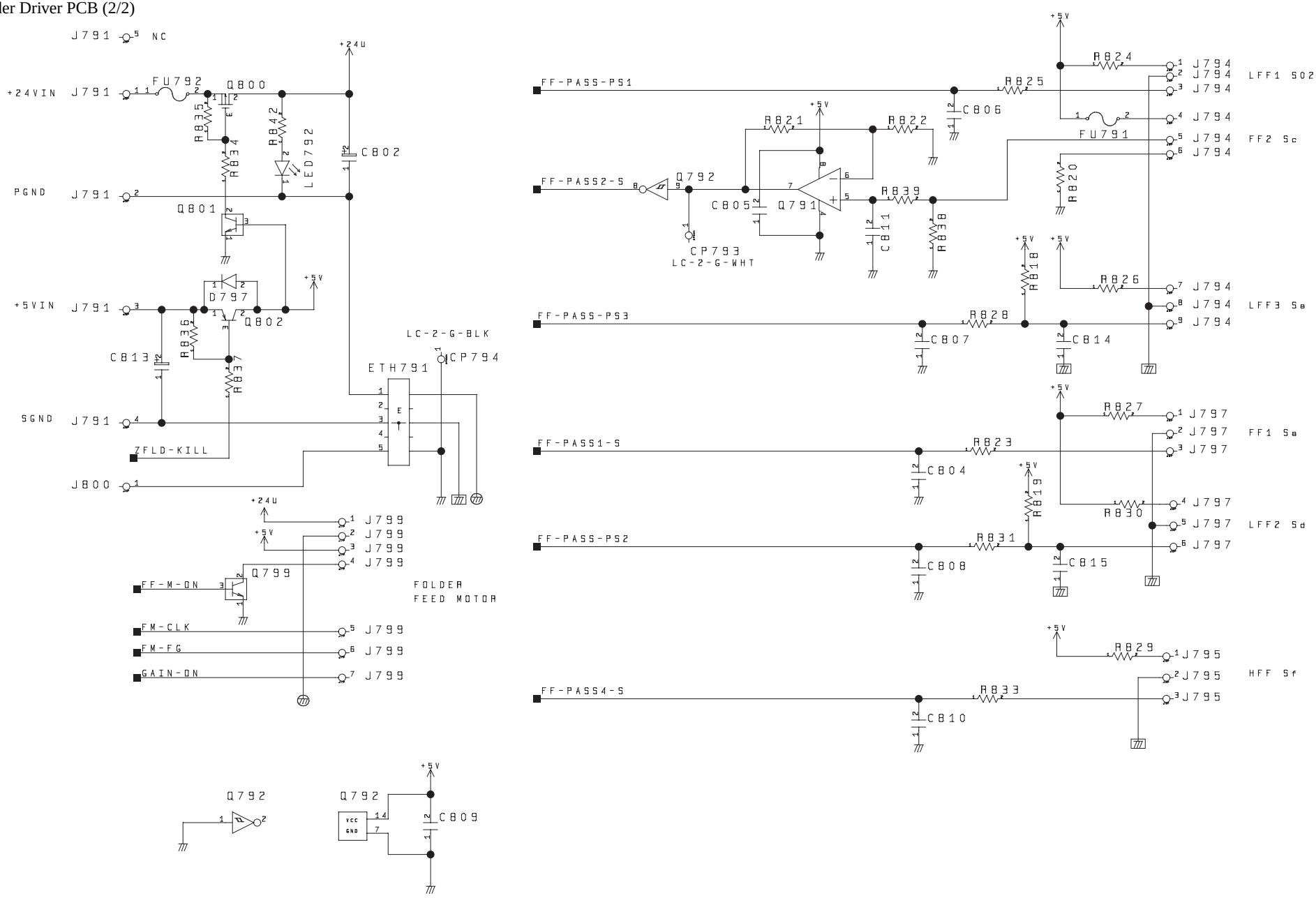
Saddle Stitcher Controller PCB (7/7)



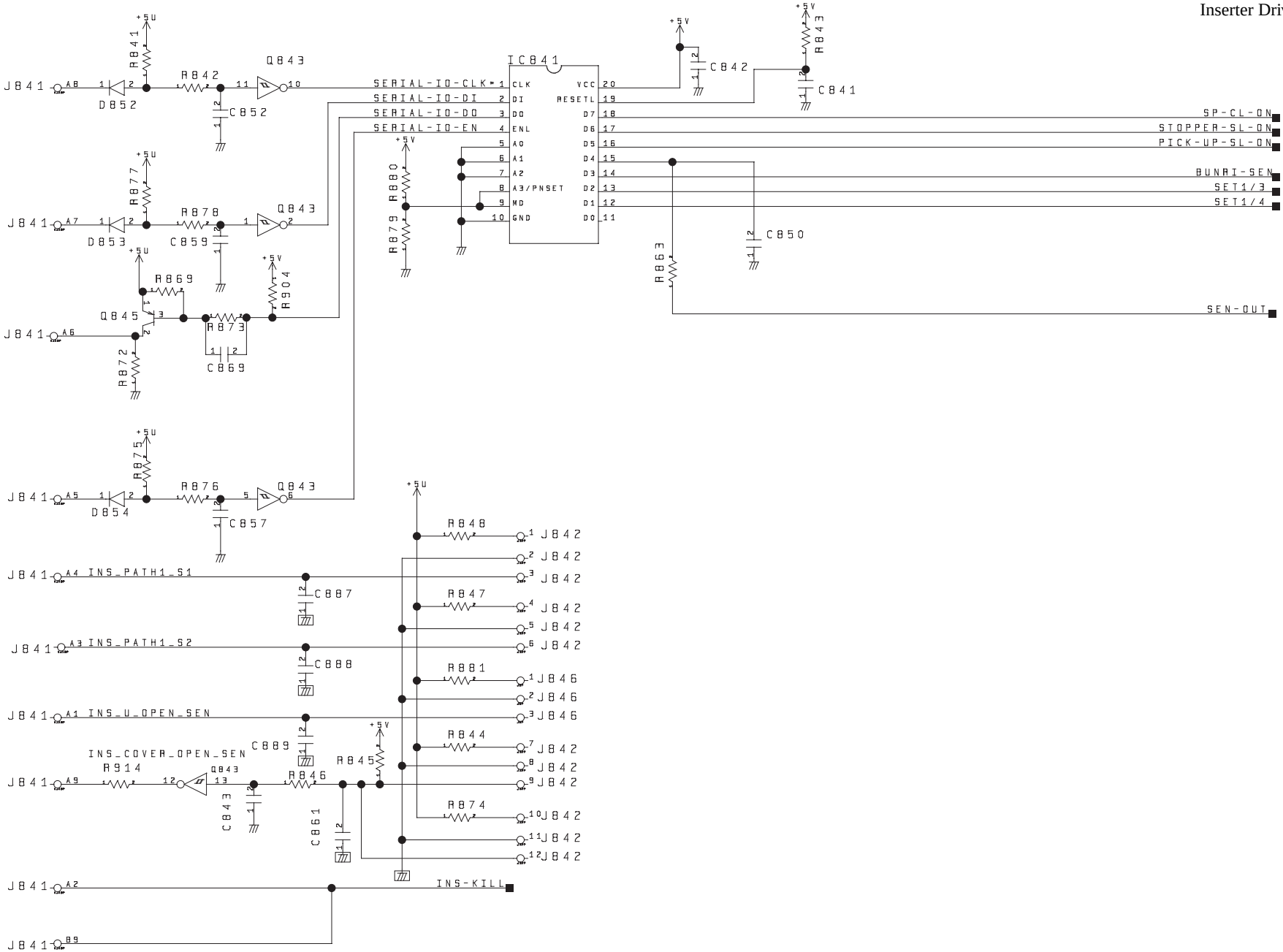
Folder Driver PCB (1/2)



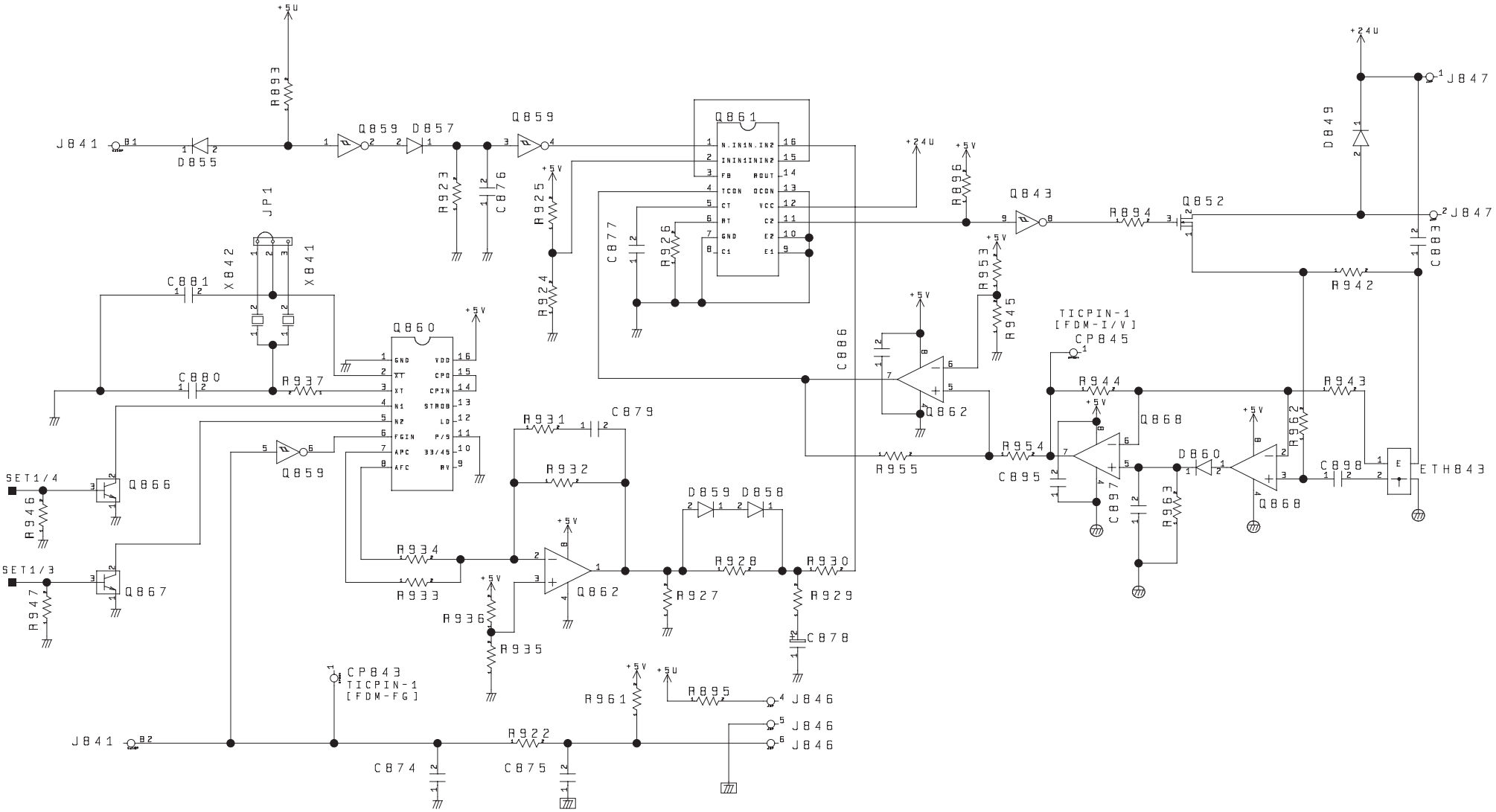
Folder Driver PCB (2/2)

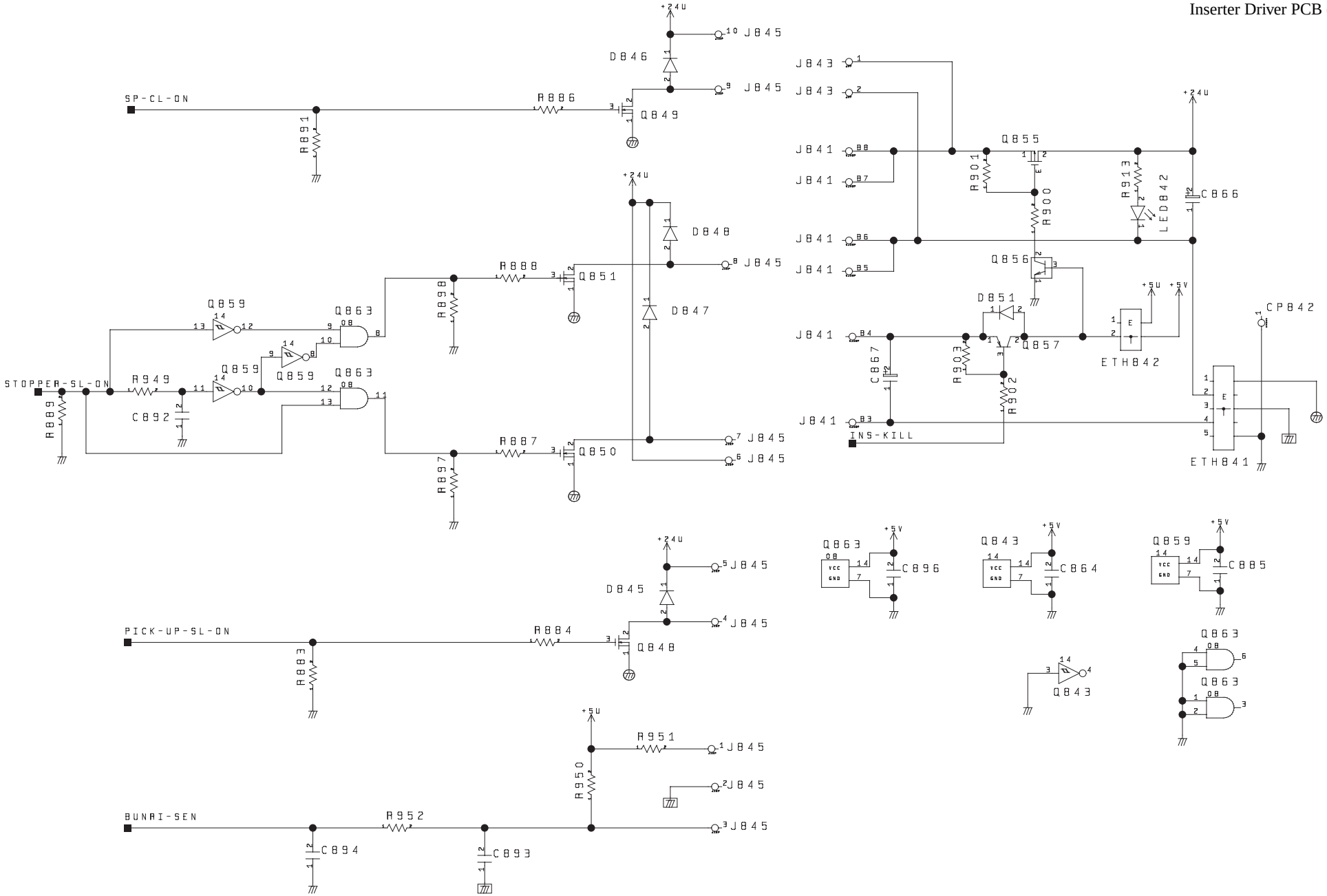


Inserter Driver PCB (1/4)

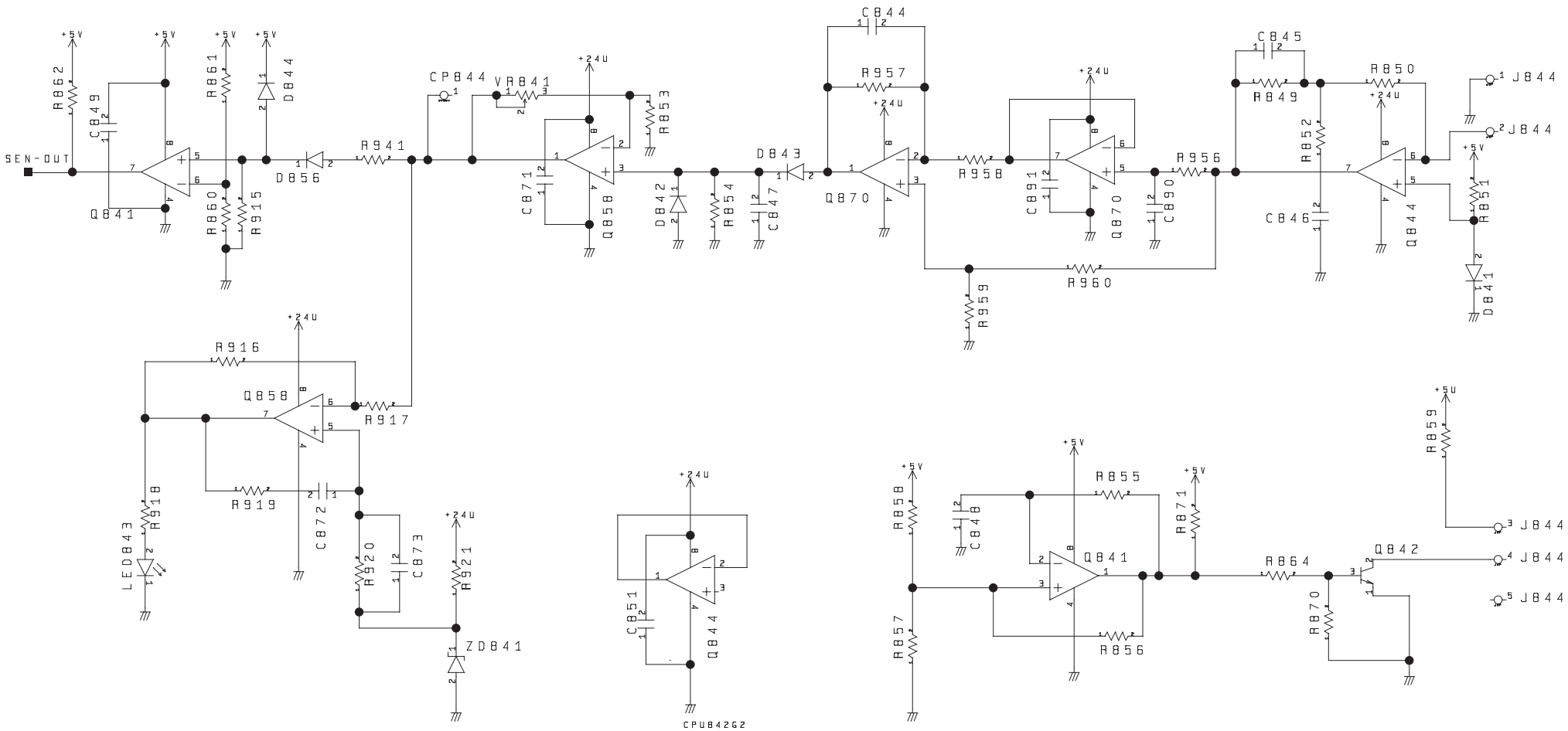


Inserter Driver PCB (2/4)

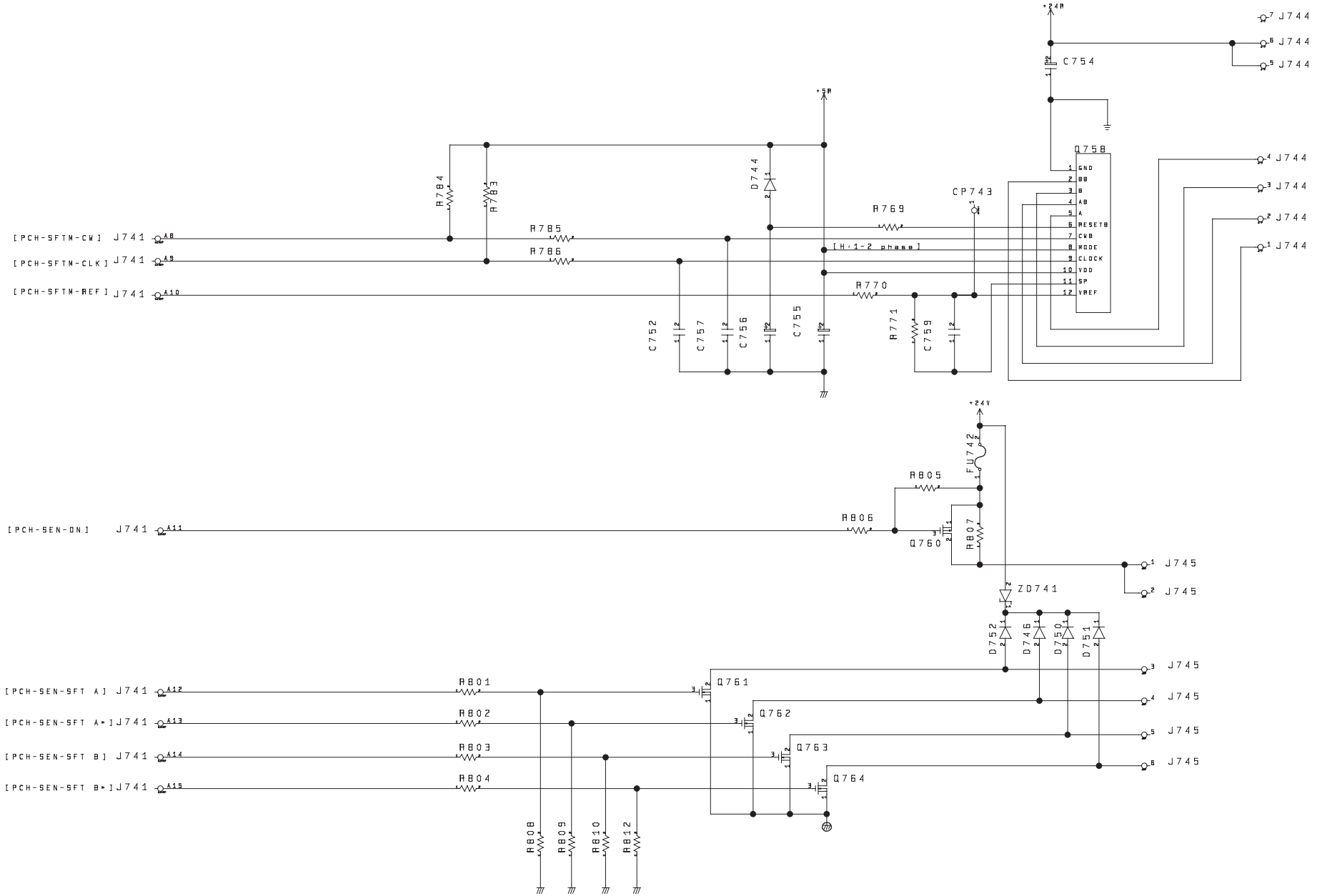



+24U
J845 10
D846
J845 9
SP-CL-ON
R886
R891
Q849
+24U
D848
J845 8
R888
Q851
R898
Q859
Q863
D847
STOPPER-SL-ON
R949
Q859
Q863
R889
C892
R887
Q850
J845 7
J845 6
R897
+24U
J845 5
D845
J845 4
PICK-UP-SL-ON
R884
R883
Q848
+5U
R951
J845 1
J845 2
R950
BUNRI-SEN
R952
J845 3
C894
C893
J843 1
J843 2
J841 B8
J841 B7
J841 B6
J841 B5
J841 B4
J841 B3
INS-KILL
Q855
R901
R900
+24U
R913
LED842
C866
Q856
D851
+5U
+5V
E
ETH842
CP842
Q857
C867
R903
R902
ETH841
Q863
+5V
C896
Q843
C864
Q859
C885
Q863
Q843
Q863

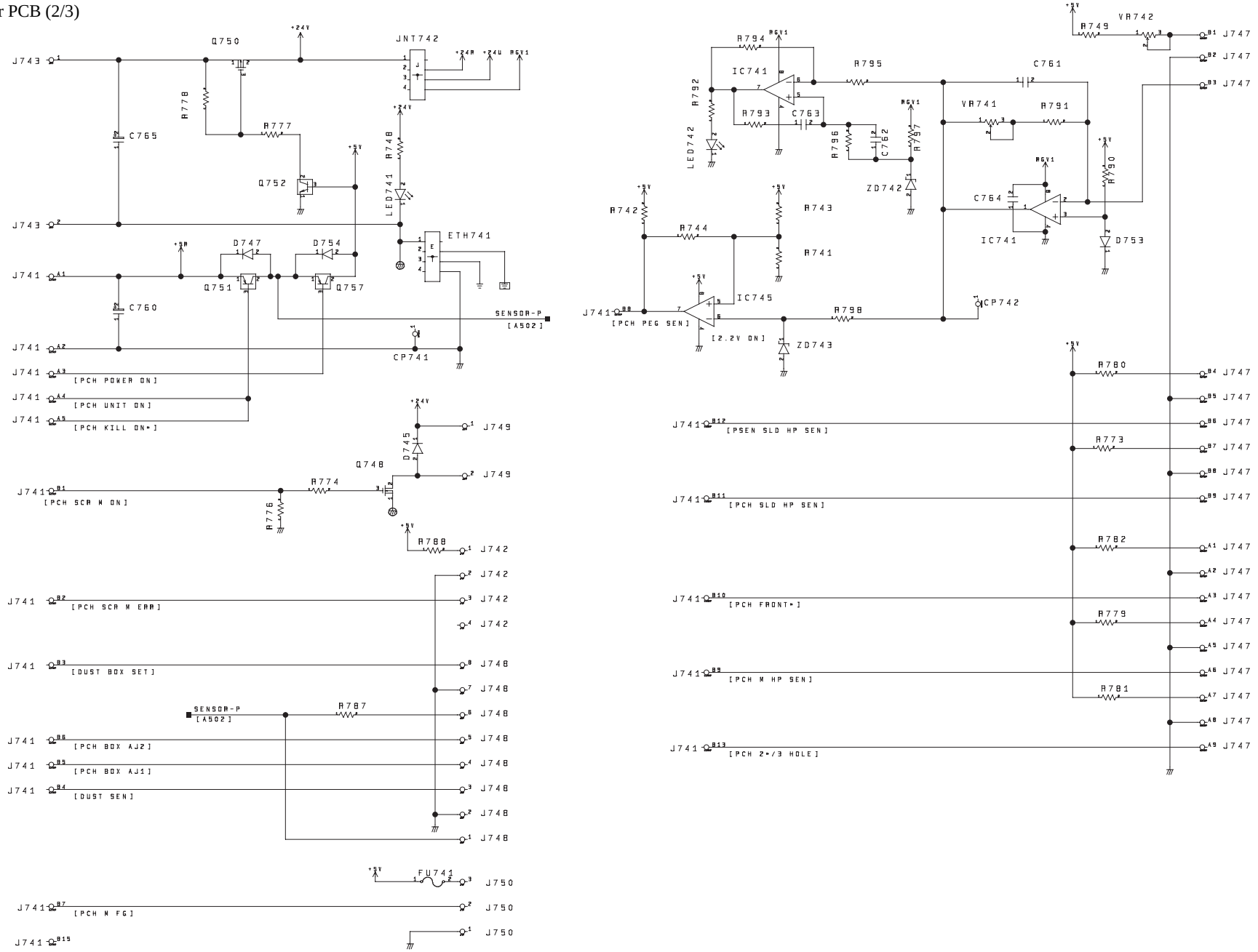
Inserter Driver PCB (4/4)

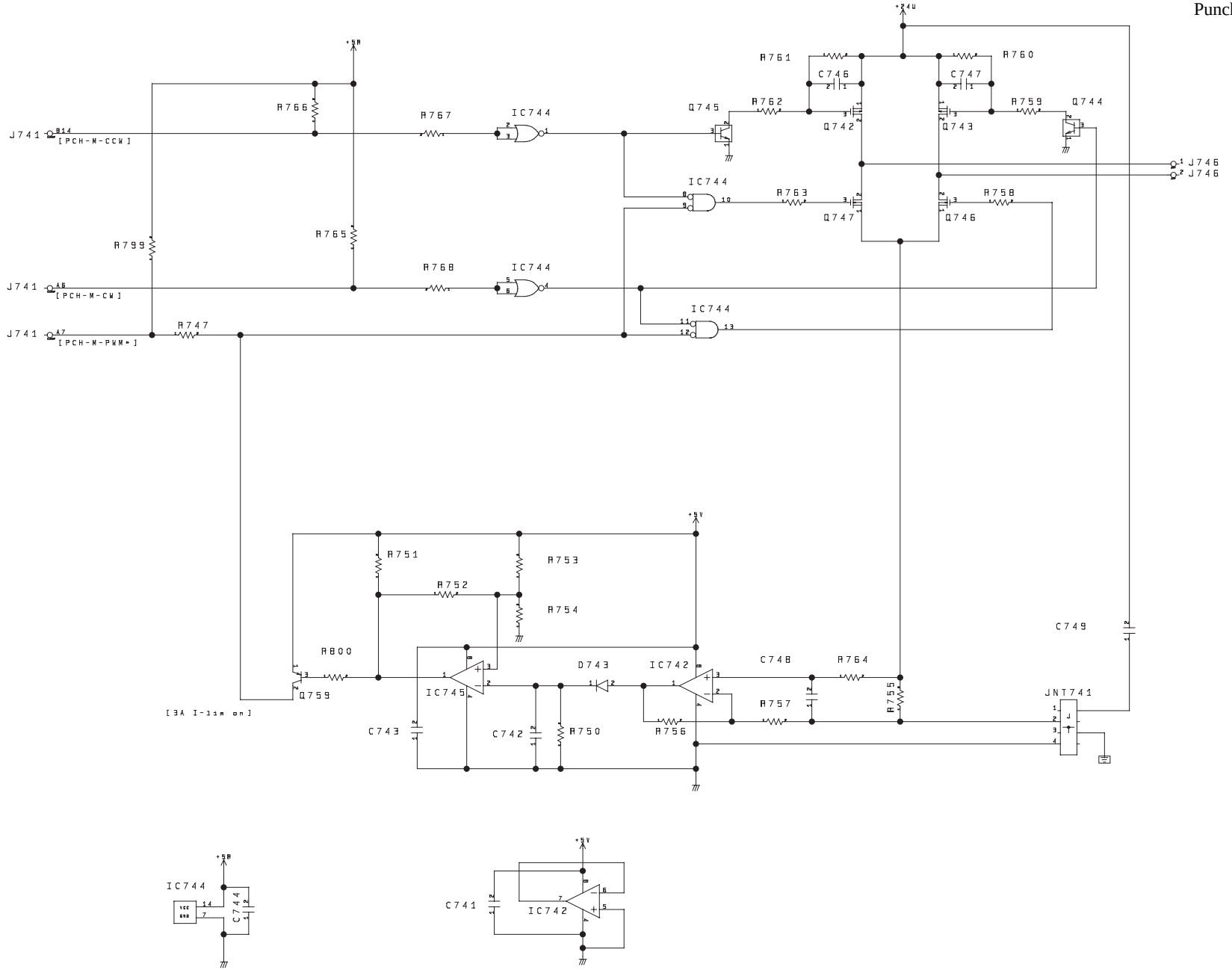


Punch Driver PCB (1/3)

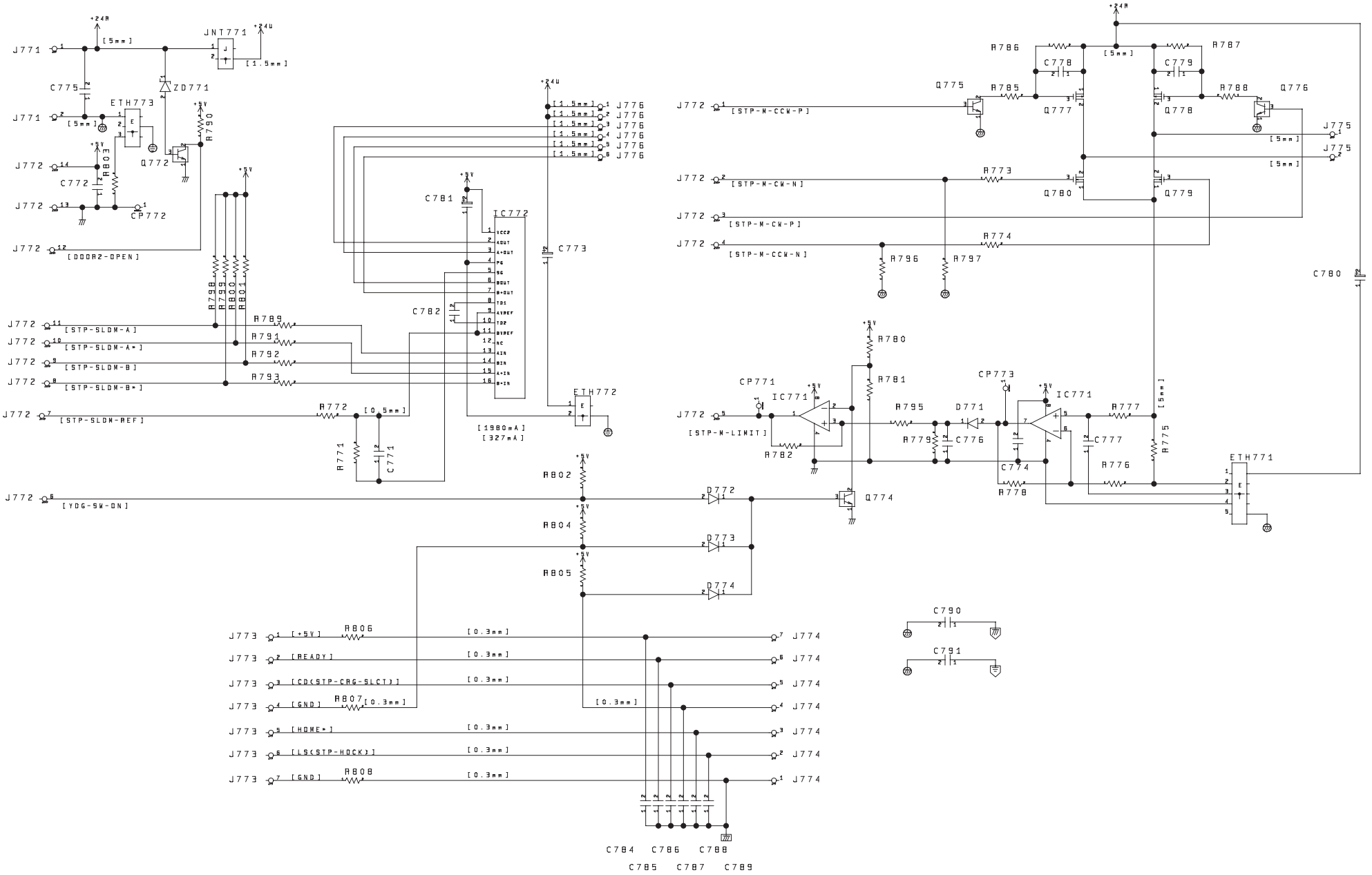


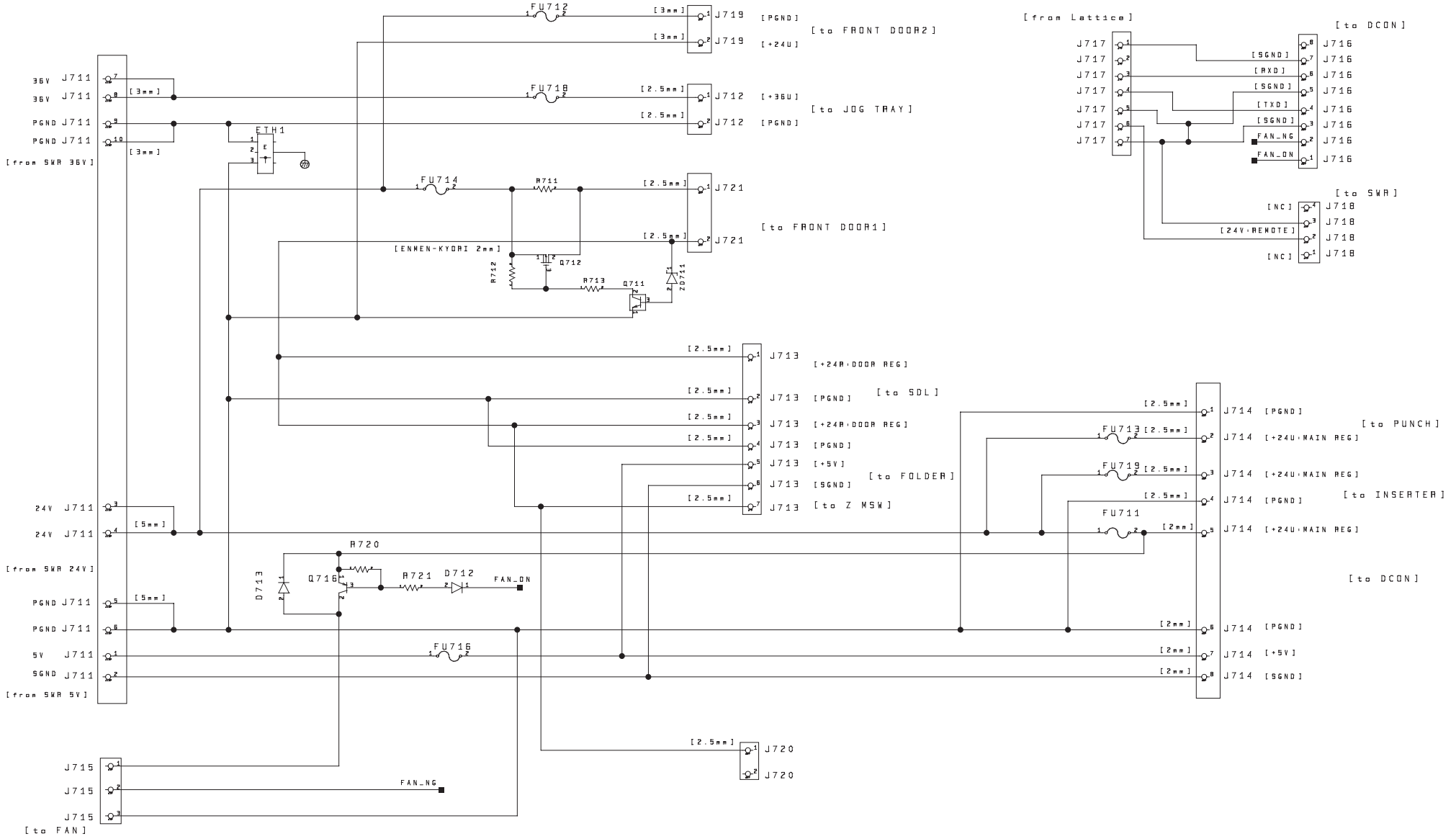
Punch Driver PCB (2/3)

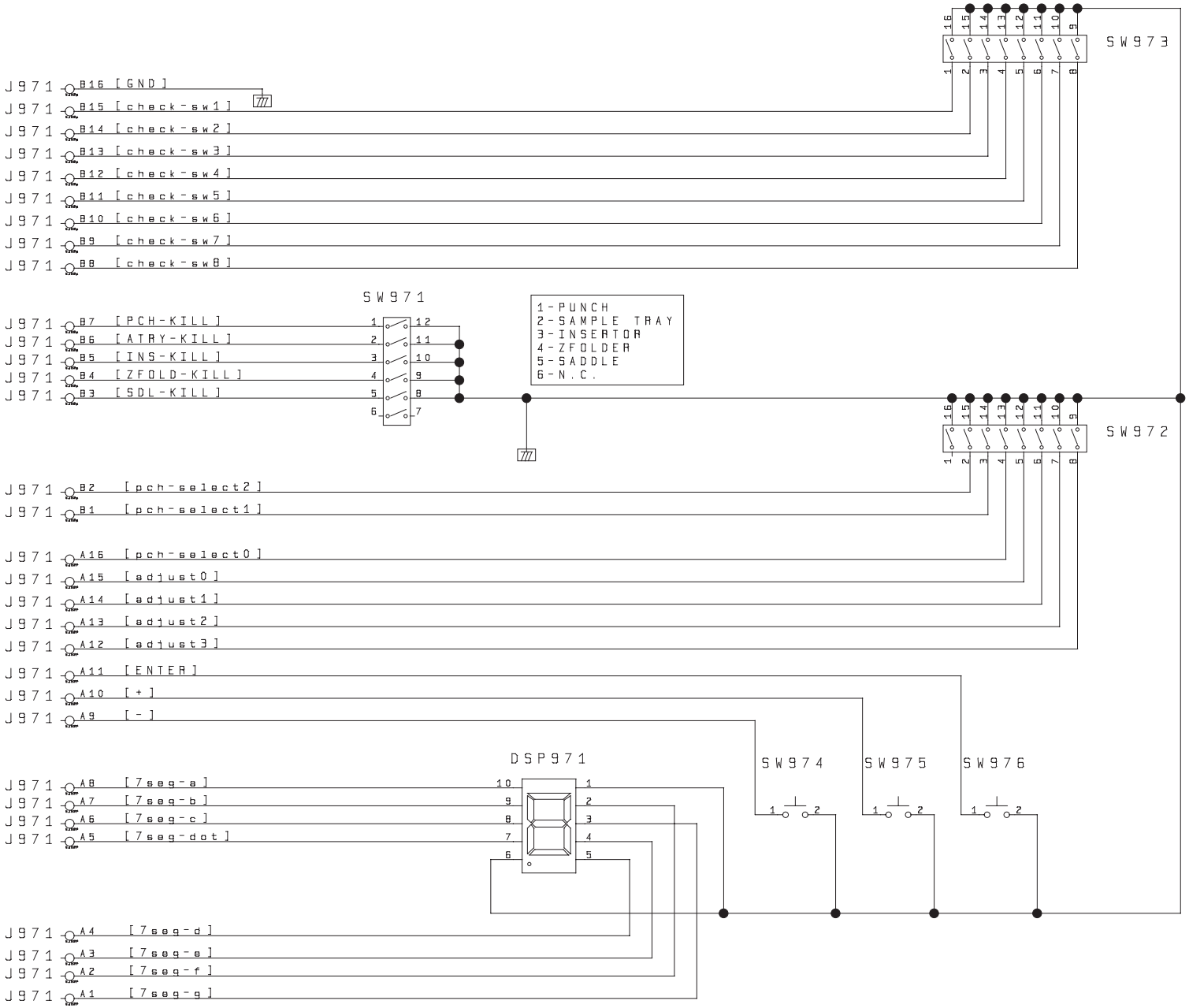



J741
[PCH-M-CCW]
[PCH-M-CW]
[PCH-M-PWM]
R766
R767
R765
R799
R768
R747
IC744
Q745
Q742
Q743
Q744
Q747
Q746
R761
R760
R762
R759
R763
R758
C746
C747
J746
R751
R753
R752
R754
R800
Q759
IC745
D743
IC742
C748
R764
R755
R757
R756
R750
C743
C742
C749
JNT741
C741

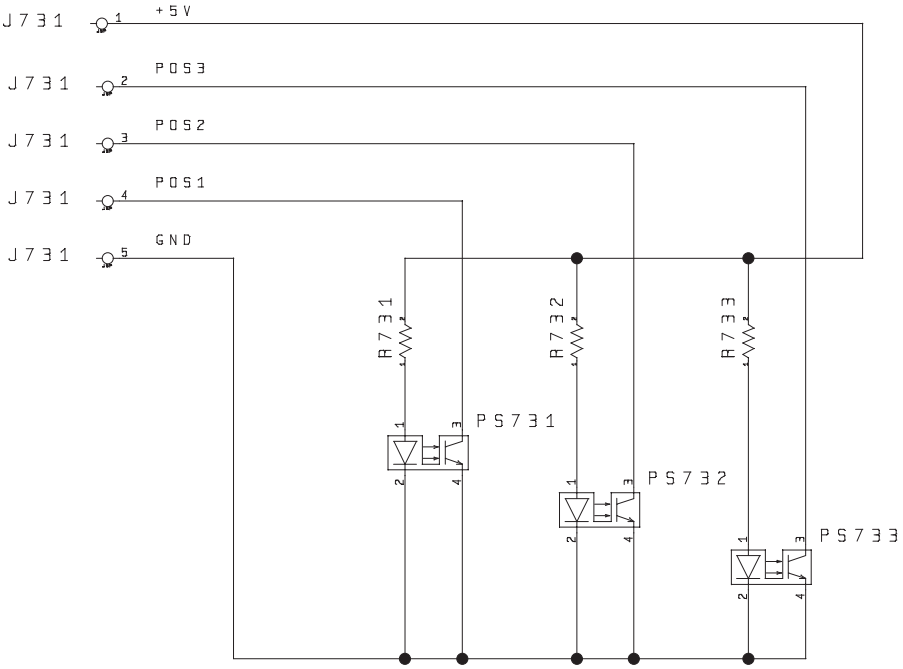
11 STAPLER DRIVER PCB




[from Lattice]
[to DCON]
[to SWR]
[to FRONT DOOR2]
[to JOG TRAY]
[to FRONT DOOR1]
[to SDL]
[to FOLDER]
[to PUNCH]
[to INSERTER]
[to DCON]
[to FAN]
[from SWR 36V]
[from SWR 24V]
[from SWR 5V]
[ENMEN-KYORI 2mm]
FU712
FU718
FU714
FU713
FU719
FU711
FU716
ETH1
R711
R712
R713
R720
R721
Q712
Q711
Q716
D712
D713
ZD711
FAN_ON
FAN_NG
[PGND]
[+24U]
[+36U]
[SGND]
[RXD]
[TXD]
[NC]
[24V-REMOTE]
[+24R-DOOR REG]
[+5V]
[to Z MSW]
[+24U-MAIN REG]



14 AREA SENSOR PCB

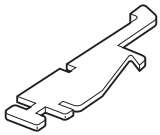
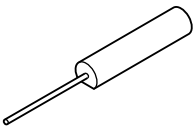
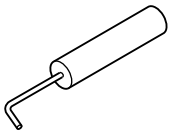


15 SOLVENTS AND OILS LIST

No.	Name	Uses	Composition	Remarks
1	Alcohol	Cleaning; e.g., glass, plastic, rubber (external covers).	Fluorine-family hydrogen carbon, alcohol, surface activating agent	• Do not bring near fire. • Procure locally. • IPA (isopropyl alcohol)
2	Lubricant	Driving parts, friction parts	Silicone oil	• CK-0551 (20g)

16 SPECIAL TOOLS

You will need the following special tools when servicing the machine in addition to the standard tools set.

No.	Tool name	Tool No.	View	Rank	Remarks
1	Door Swich Actuator	TKN-0093		A	
2	Tester Extension pin	FY9-3038-000		A	For making electrical checks; i.e., serving as an attachment to a meter.
3	Tester Extention pin (L-shaped tip)	FY9-3039-000		A	For making electrical checks; i.e., serving as an attachment to a meter.

Rank:

A: Each service person is expected to carry one.

B: Each group of or so sevice persons is expected to carry one.

C: Each workshop is expected to keep one.

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