Ref. No. TTD-2008-1011
November, 2008

TAJIMA TECHNICAL DOCUMENT

TFMX SERIES 2-8 HEAD
TEMX-C MULTI-HEAD
MACHINES

TECHNICAL DOCUMENT
(ELECTRICAL SYSTEMS)

(2008.11)

FOREWORD

This document deals with the electrical component parts of TFMX series 2-8 head and TEMX-C Multi-head machines. It describes the functions, setting method and electrical block diagrams for cards and other devices.

Please use this manual effectively for your after-sale services.

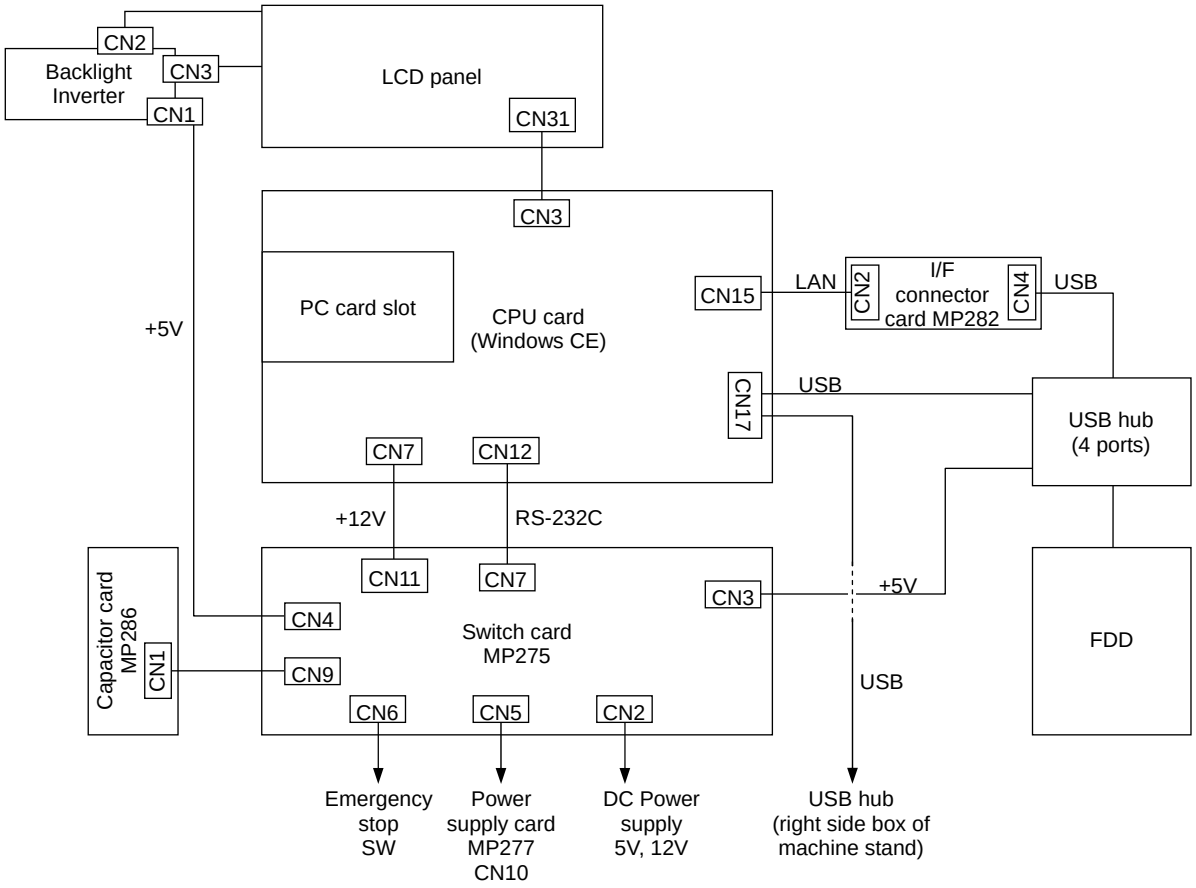
Contents

1. Controller (Operation panel)

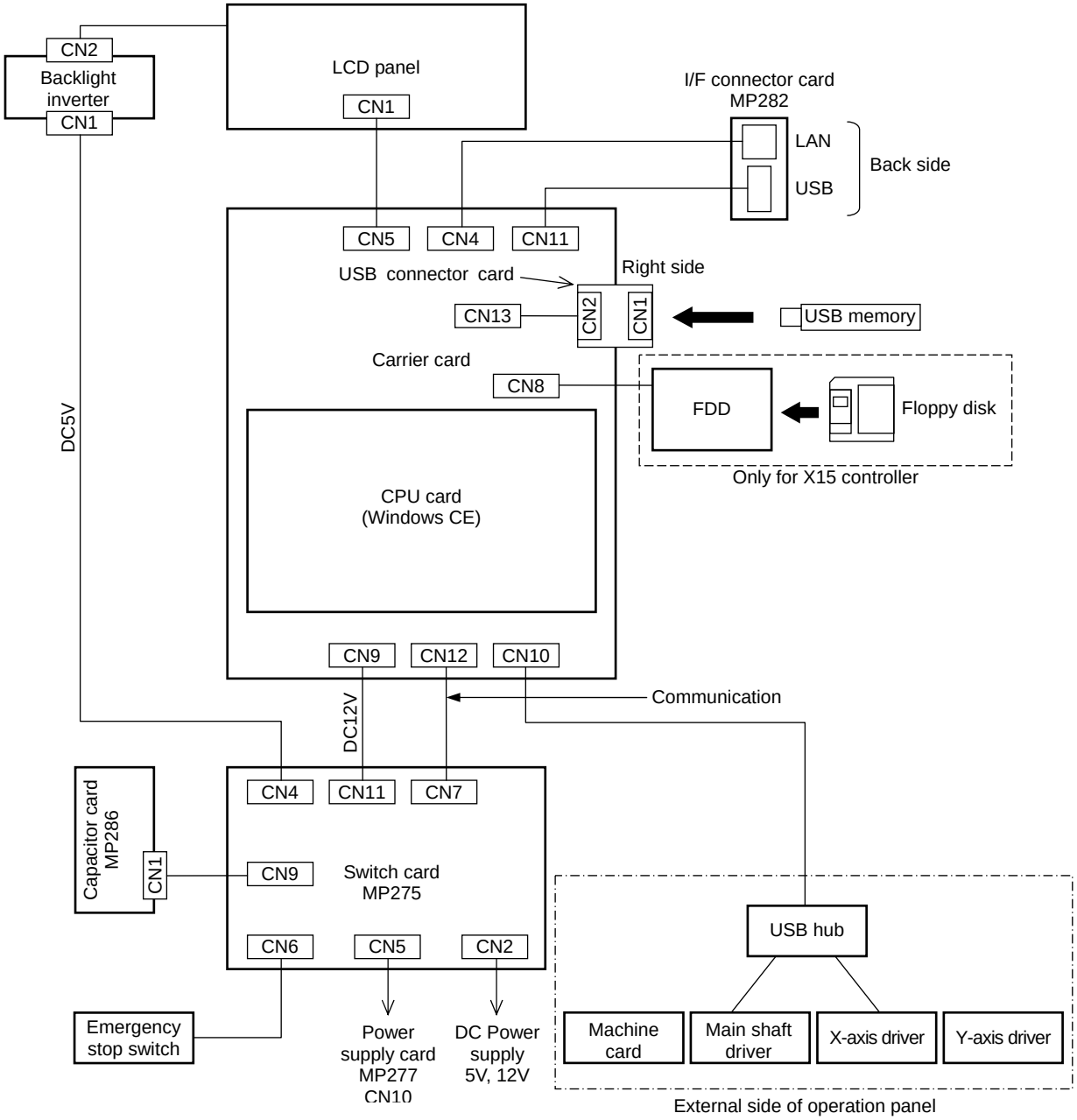
We have ever adopted 3 kinds of the controller (operation panel) for TFMX series 2-8 head and TEMX-C Multi-head machines.
Please refer to the below table for the major differences among the controllers.

Controller	Applicable Model	Applicable recording media	Description	TTI No.
X14	TFMX series 2-8 head	Compact flash Floppy disk	This controller is adopted to TFMX series 2-8 head machine from the beginning of mass- production. DOM (Disk On Module) is mounted for the storage device of OS and the system software.	--
X15	TFMX series 2-8 head, TEMX-C Multi-head	USB memory Floppy disk	This controller is introduced according to the introduction of Rotary disk that has changed the number of slits from100 to 50 for the thread breakage detection. Compact flash is mounted for the storage device of OS and system software and CPU performance is increased, compared with X14 controller.	3359
X16		USB memory Floppy disk (FDD is the option)	Controller where the FDD is removed from the X15 controller.	3400

- Electrical block diagram for X14 controller



- Electrical block diagram for X15/X16 controller

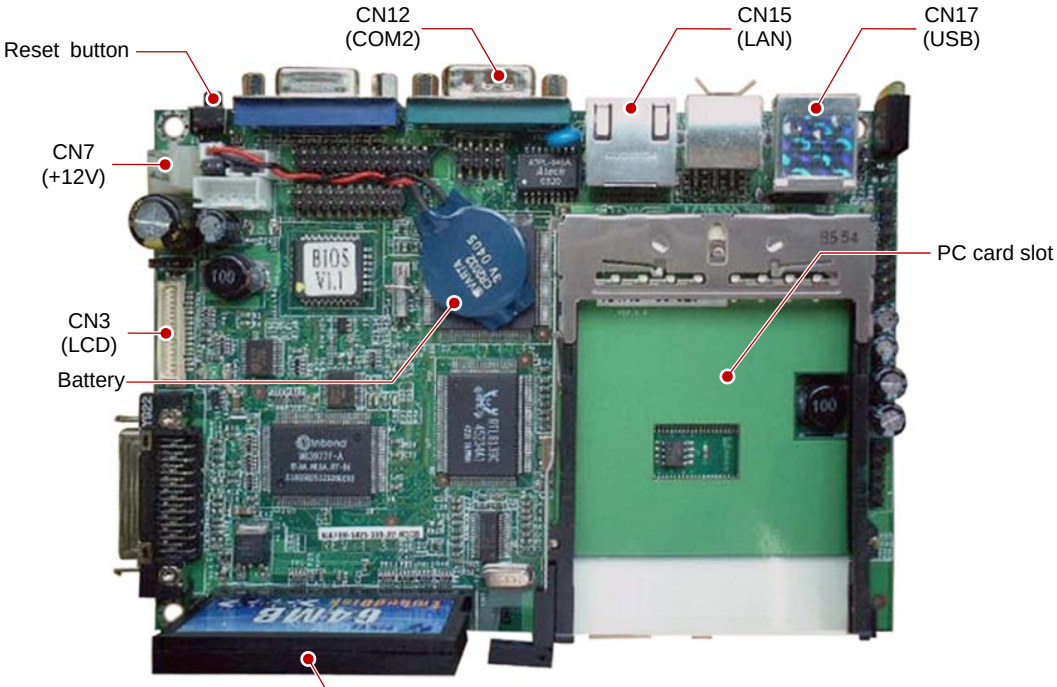


2. CPU card

CPU card provides the area where the OS and system software are stored, and deals with overall machine control.
CPU card to be mounted to the controller differs depending on the type of controller.

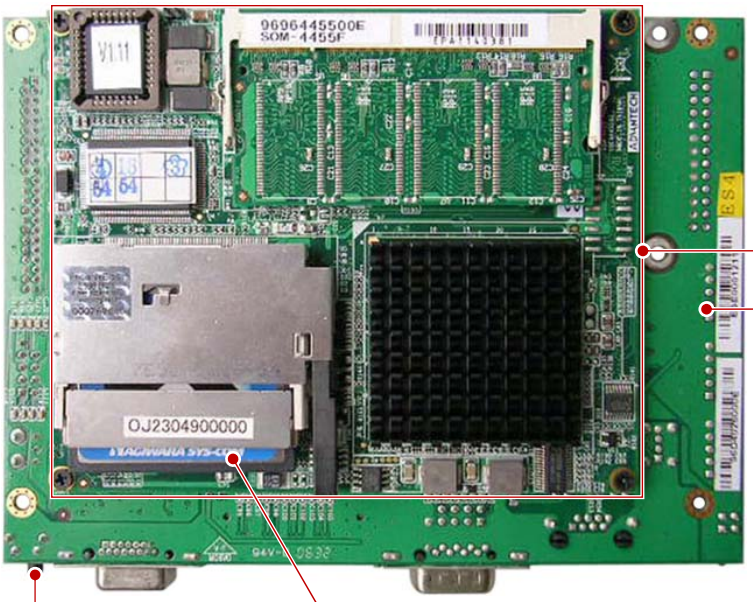
2-1. CPU card for X14 controller

- External view and connector allocation

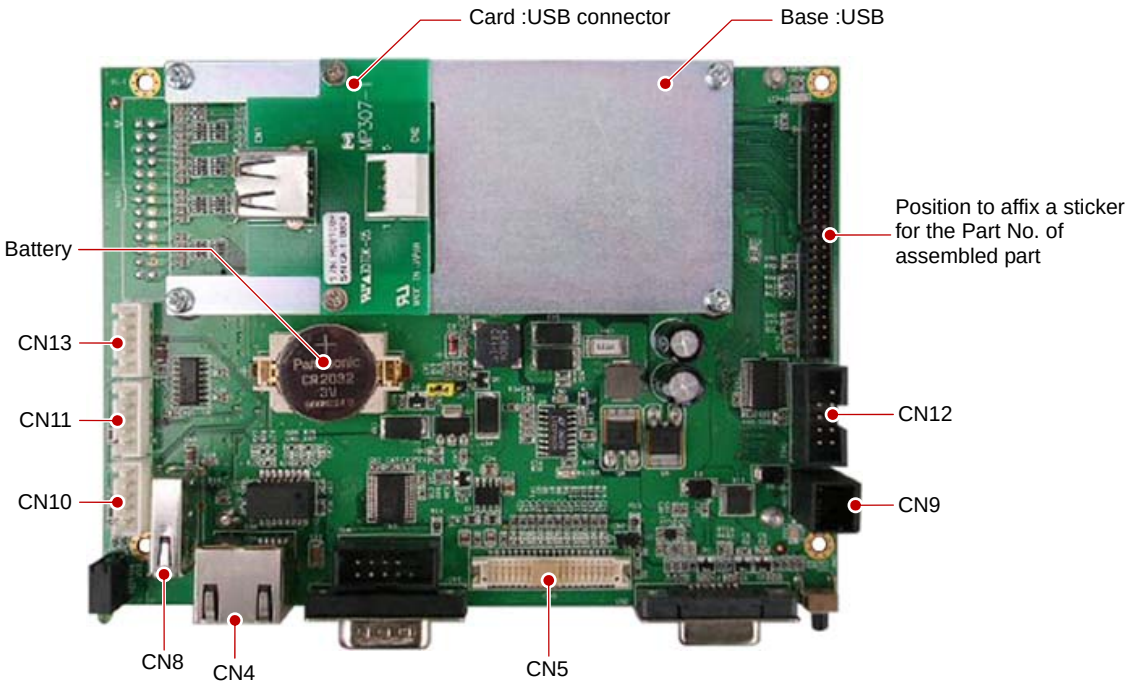


2-2. CPU card for X15/X16 controller

- External view and connector allocation
  - Card :CPU side



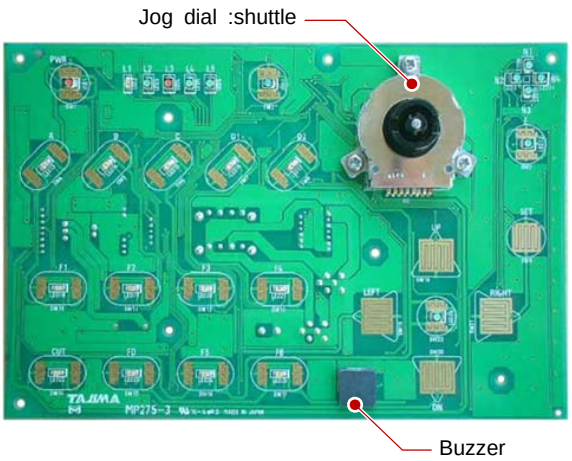
  - Card :USB connector side



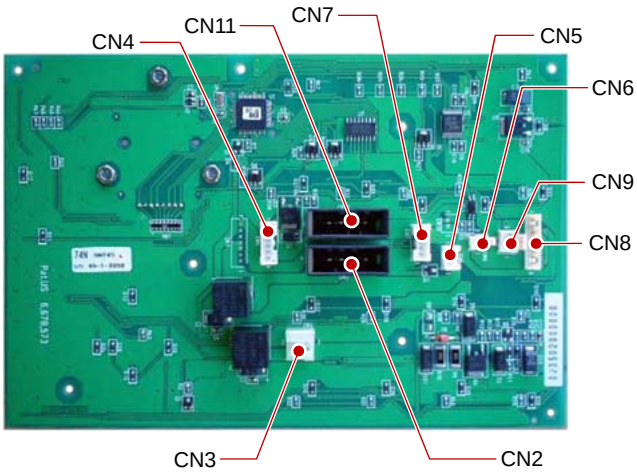
3. Switch card (MP275), Capacitor card (MP286)

- Exterior view and connector allocation of Switch card (MP275)

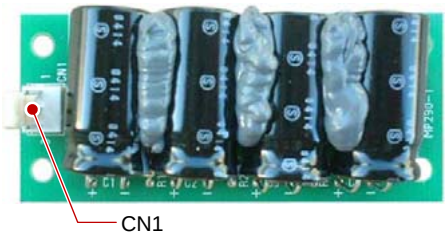
[Front face]



[Rear face]



- Exterior view and Connector allocation of Capacitor card (MP286)



●Major functions of Switch card

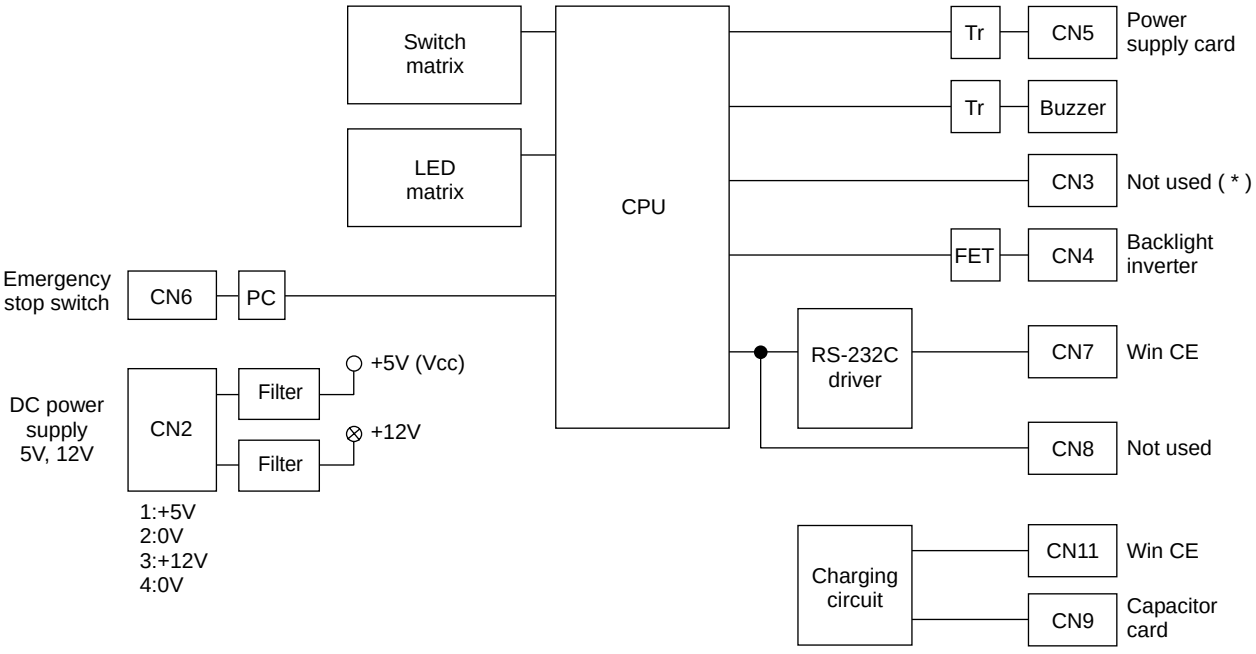
Switch card communicates with the CPU card and controls the followings.

- To input key signal from the Operation panel.
- To turn ON/OFF the LED.
- To input Emergency stop switch signal.
- To control the sleep mode relay of the Power supply card.
- To control the buzzer.
- To charge the Capacitor card.

●Major function of Capacitor card

Capacitor card supplies power until writing to the flash memory is completed when turning OFF the power.

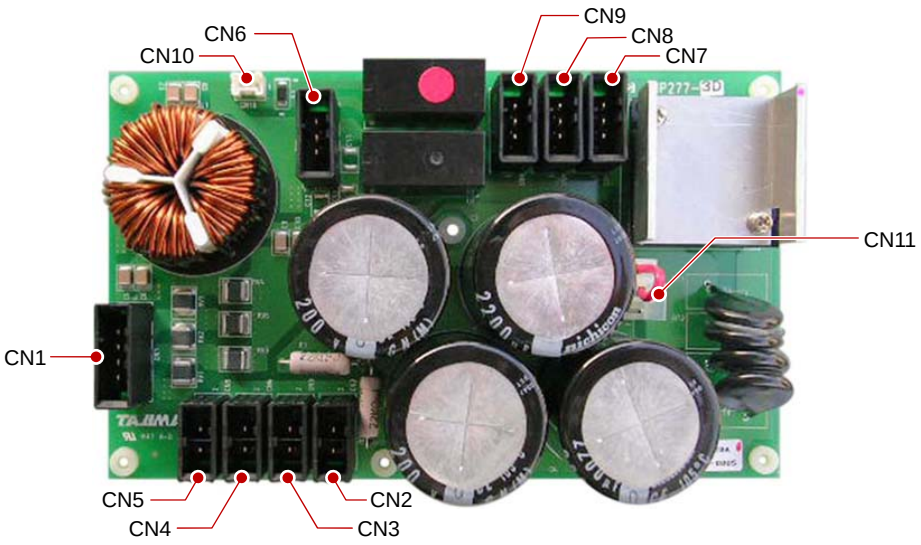
- Electrical block diagram



(*) On TFMX series 2-8 head machine where the X14 controller is equipped, CN3 is connected wih the USB hub inside the controller.

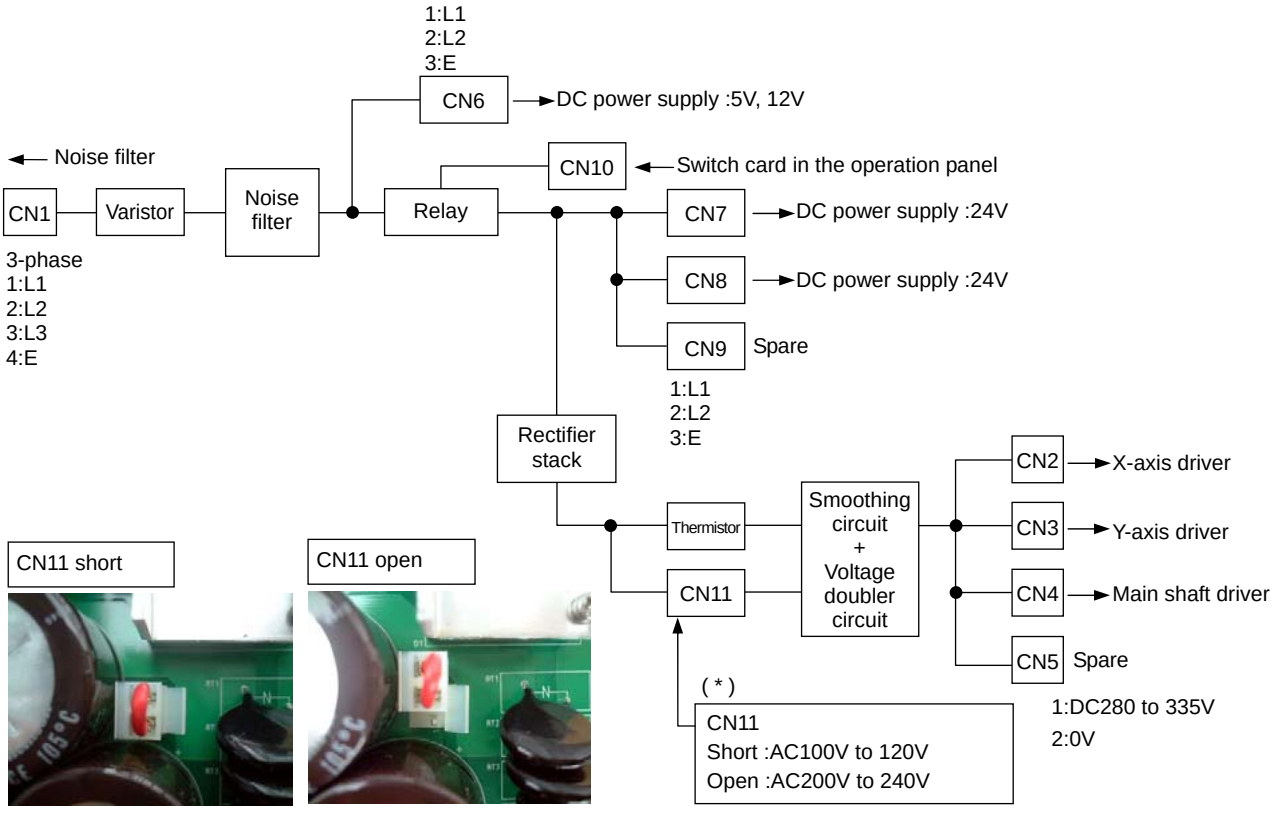
4. Power supply card (MP277)

- Exterior view and connector allocation



- Major functions
  - To remove the noise from AC power supply.
  - To distribute AC power.
  - To control ON/OFF of high-voltage DC power supply. (for the sleep mode)
  - To generate high-voltage DC power supply for the Main shaft/X-axis/Y-axis motor.

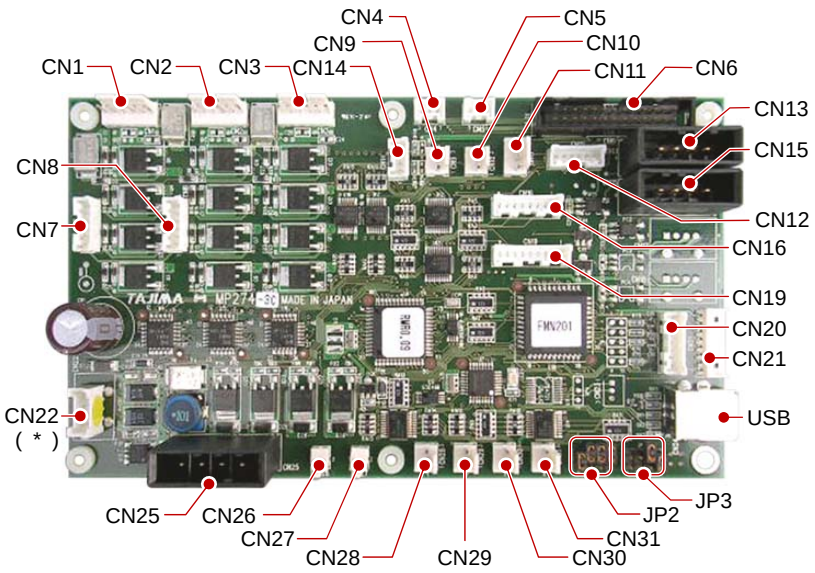
- Electrical block diagram



(*) Be sure to open the CN11 for TEMX-C Multi-head machine.

5. Machine card (MP274)

● Exterior view and connector allocation



(*) A yellow sticker is affixed to CN22 on the Machine card for TEMX-C Multi-head machine.

JP	No.	Contents	ON	OFF
JP3	1	Head card	Equipped	Not Equipped
	2	Extension machine card	Equipped	Not Equipped
	3	Not used	–	–
	4	Sequin device 3 (*)	Equipped	Not Equipped
JP2	5	Spare	Equipped	Not Equipped
	6		Equipped	Not Equipped
	7		Equipped	Not Equipped
	8	Beam sensor	Equipped	Not Equipped

(*) Only for TFMX-C series 2-8 head machine

Settings for shipment

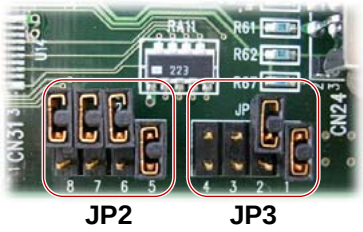
● Major functions

- To relay communication with Head card.
- To control and output to the small size motors listed below.
  - -Color change motor
  - -ATH motor (only for TEMX-C Multi-head machine)
- To control and output to the solenoids listed below.
  - -ATH solenoid (only for TFMX series 2-8 head machine)
  - -Picker solenoid
  - -Sequin air valve (option)
- To Input the signals from the devices listed below.
  - -ATH knife retracting sensor (Magnetic sensor card)
  - -Color change potentiometer
  - -Closed sensor
  - -Start/stop switch
  - -Beam sensor (option)
  - -Sequin air sensor (option)
  - -Jog remote-controller (option)

● Where to supply power

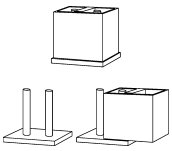
DC5V is generated from DC24V on the Machine card.

- DC24V : Driving power for small size motors, solenoids etc.
- DC5V : Power for IC related parts

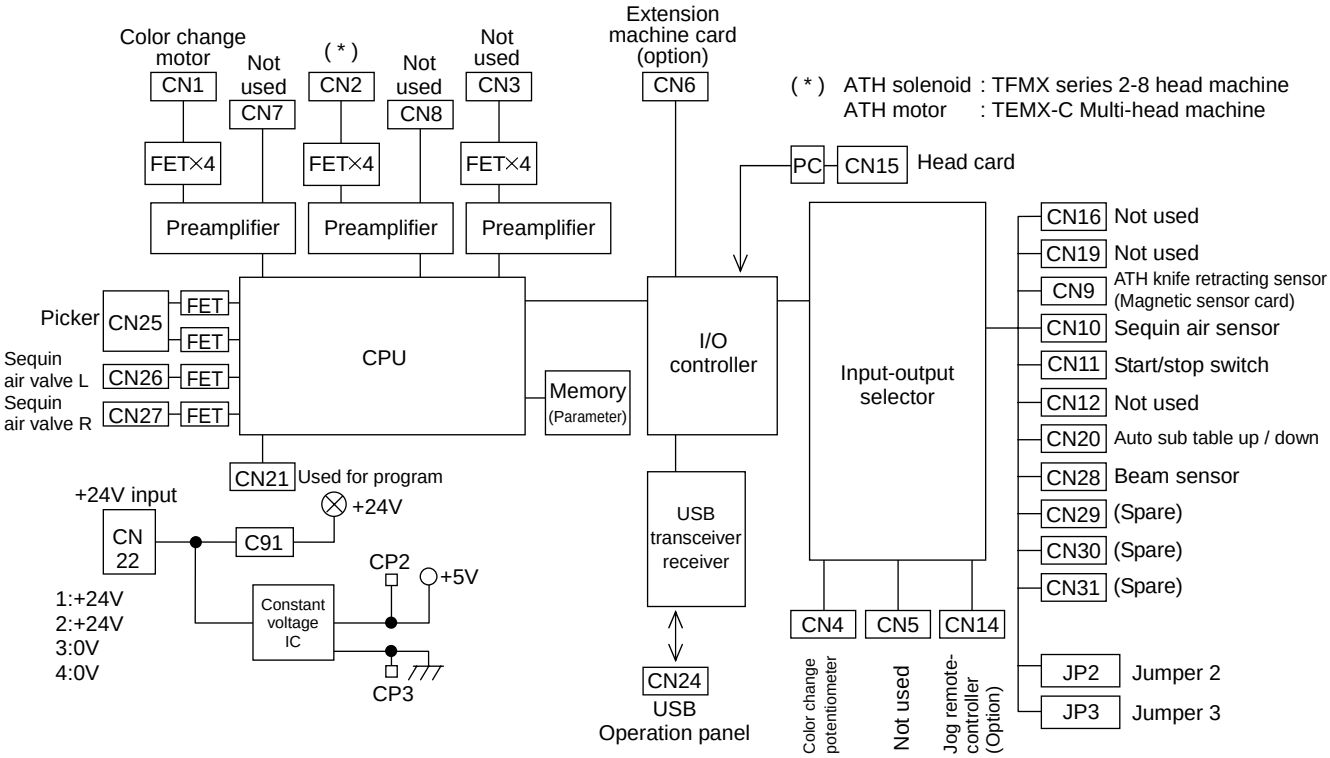


[ON]

[OFF]

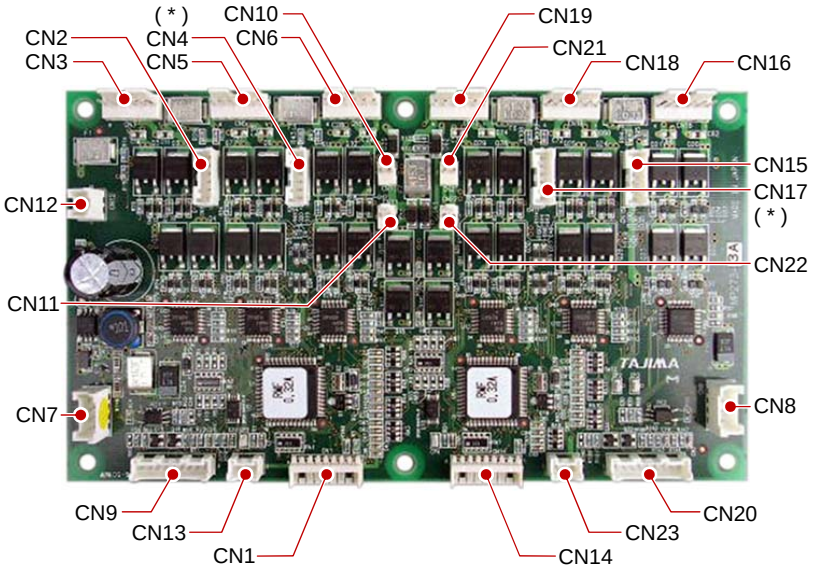


● Electrical block diagram

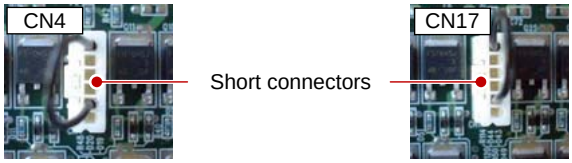


6. Head card (MP273)

● Exterior view and connector allocation



(*) To CN4 and CN17 on the Head card for TEMX-C Multi-head machine, Short connectors are connected to set the communication speed. Do not disconnect these short connectors.



● Major functions

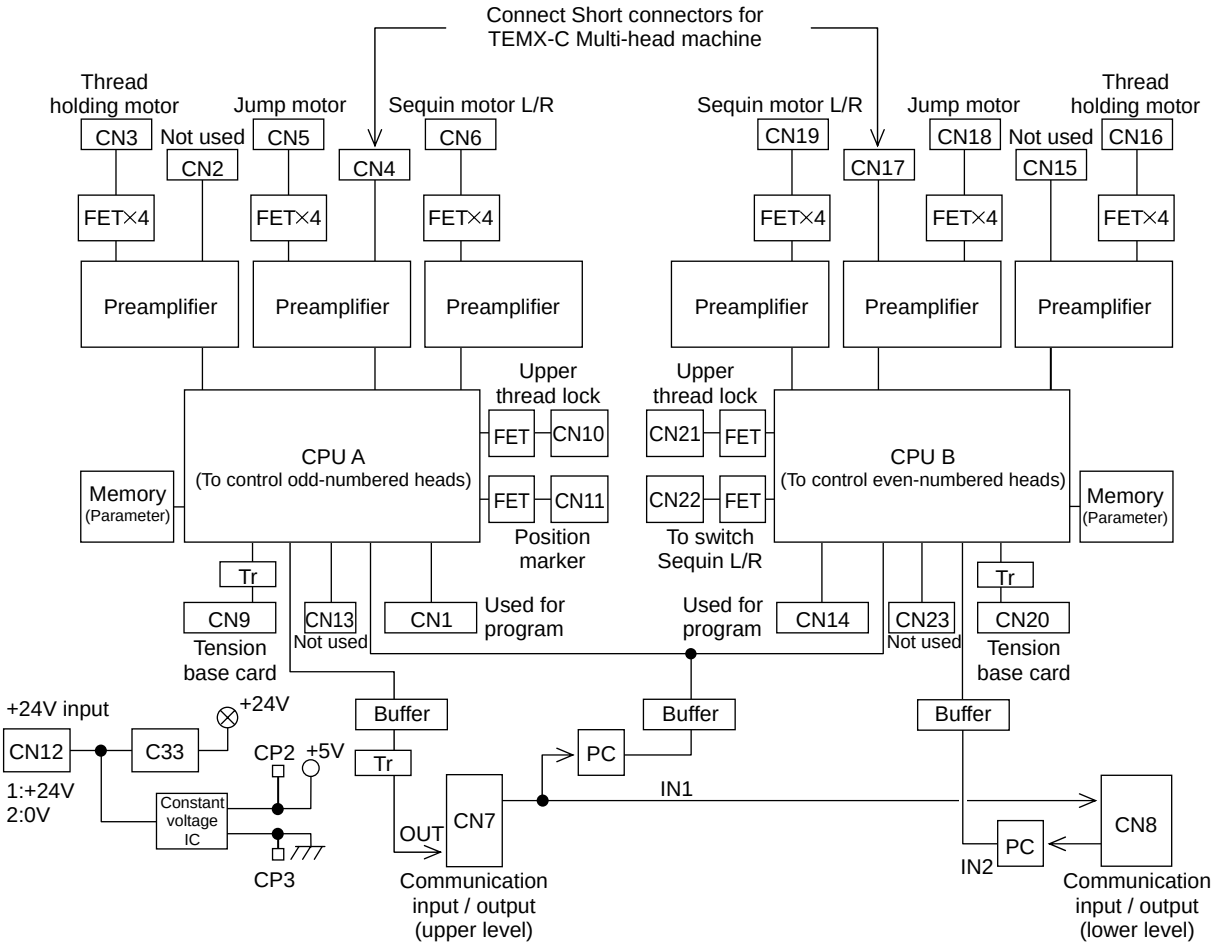
- 1 head card controls 2 heads.
- To control and output to the small size motors listed below.
  -Thread holding motor
  -Jump motor
  -Sequin motor (*)
  (*)
  Sequin L or R : Direct output.
  Sequin L+R :To output the power after switching the device to L or R on the Extension head card.
- To control and output for the Upper thread lock solenoid.
- Switching Sequin (L/R)
  For the sequin L+R, L/R switching signal is transmitted to Extension head card.
- To control and input the signals listed below to the Tension base card.
  -To input the signal to the Tension base switch.
  -To control lighting of LED on the Tension base card.
  -To detect upper/under thread breakage using the signal input from TC sensor card.
- To light Position marker. (option)

● Where to supply power

DC5V is generated from DC24V on the Head card.

- DC24V : Driving power for small size motors, solenoids etc.
- DC5V : Power for IC and related parts.

● Electrical block diagram

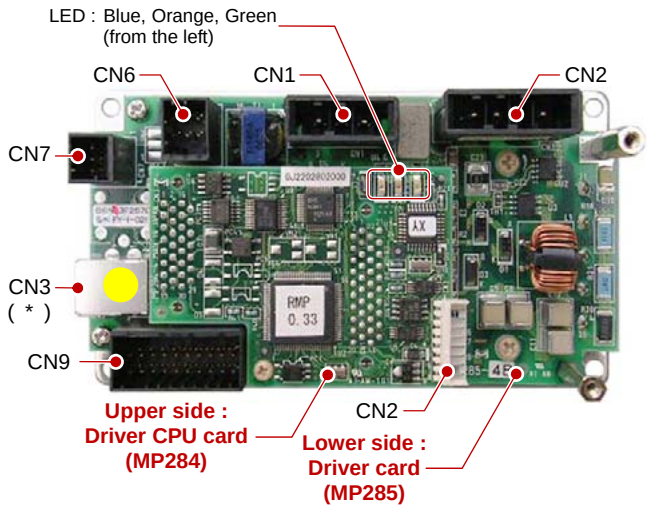


7. Driver (MP284 + MP285, MP284 + MP291)

Driver consists of Driver CPU card (MP284) and Driver card (MP285 or MP291) to control Main shaft and X/Y- axis drive.

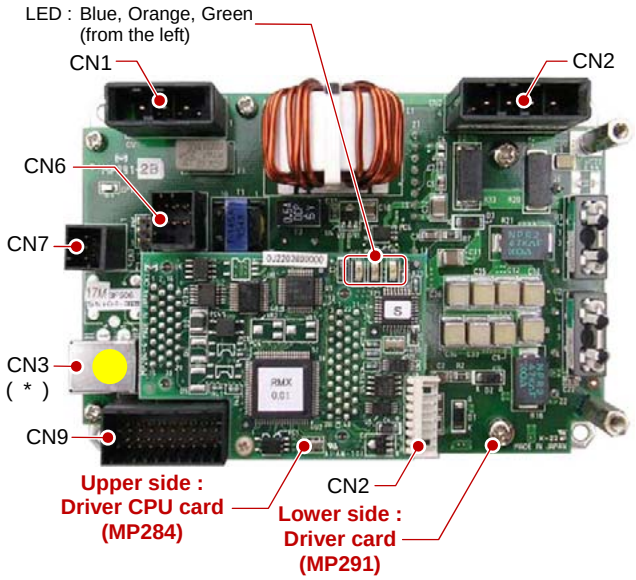
- Exterior view and connector allocation

X/Y-axis driver
Main shaft driver for TFMX series 2-8 head machine
(MP284+MP285)



(*) A yellow sticker is affixed to CN3 on the Driver for TEMX-C Multi-head machine.

Main shaft driver for TEMX-C Multi-head machine
(MP284+MP291)



Note 1) Do not open and adjust the motor sensors.
Note 2) Do not remove the cover of the card. (Card Covers are removed in the above photos.)

●Major functions

Main shaft driver

- Servo control for the main shaft motor.
  - To send Asig (Main shaft synchronizing pulse) to the Machine card and X/Y-axis drivers.
  - The value of Asig is 100 pulses per revolution of the Main shaft motor.
    However, depending on the pulley ratio of the Main shaft, value of Asig varies as follows.

Model	Number of heads	Value of Asig (per revolution of Main shaft motor)
TFMX series 2-8 head machine	2	250 pulses
	4 to 8	375 pulses
TEMX-C Multi-head machine		333 pulses

  - To input the signal of Main shaft fixed position sensor.
  - To control Main shaft stop at the fixed position and transmit the signal to the operation panel.

X/Y-axis driver

- Closed control for the X/Y-axis motor.
- Number of teeth of Sensor gear for closed control of the X/Y-axis motors is 50.
- Motor resolution: 8000 steps (Default)
- To input Frame origin sensor, and search operation.
- To recognize the coordinate of the frame position.
- To input frame limit.
  (Only for TFMX series L spec. models, TEMX-C Multi-head machine)

●Where to supply power

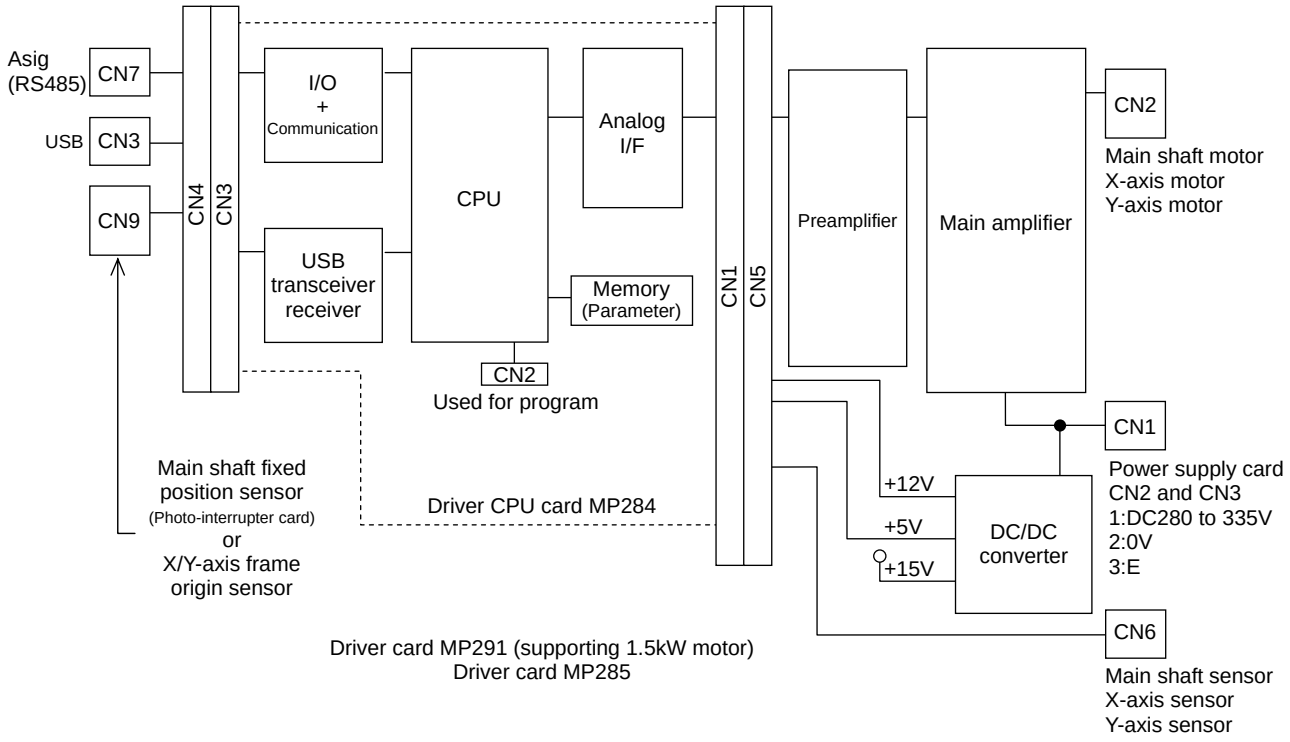
DC5V, 12V and 15V are generated from DC240V on the Driver.

- DC240 to 335V : Main shaft motor and X/Y-axis motors.
- DC5V : IC, sensors etc.
- DC12V : Not used.
- DC15V : Power for preamplifier.

●Status of drivers by LED

LED	Status
Blue	Driver is operating
Orange	Error (overcurrent, overload etc.)
Green	Transmitting/receiving data via USB

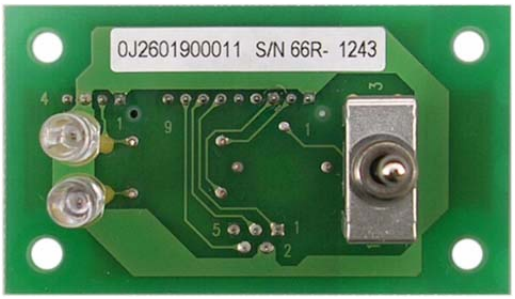
- Electrical block diagram



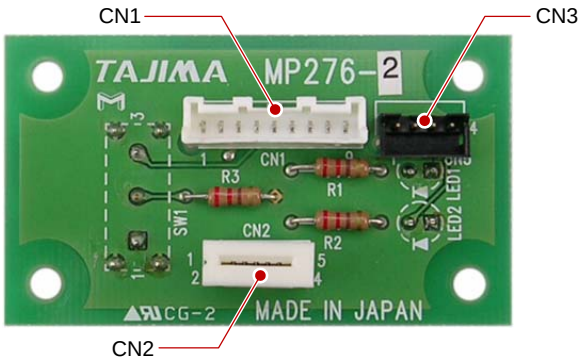
8. Tension base card (MP276)

- Exterior view and connector allocation

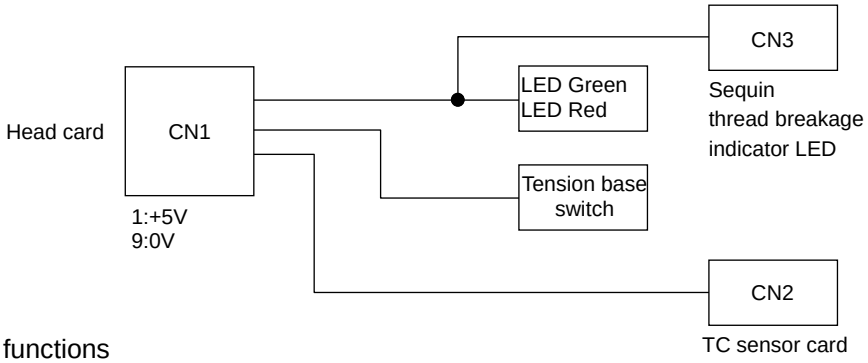
[Front side]



[Rear side]



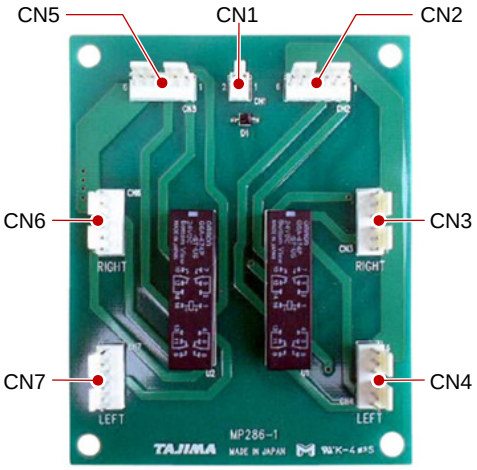
- Electrical block diagram



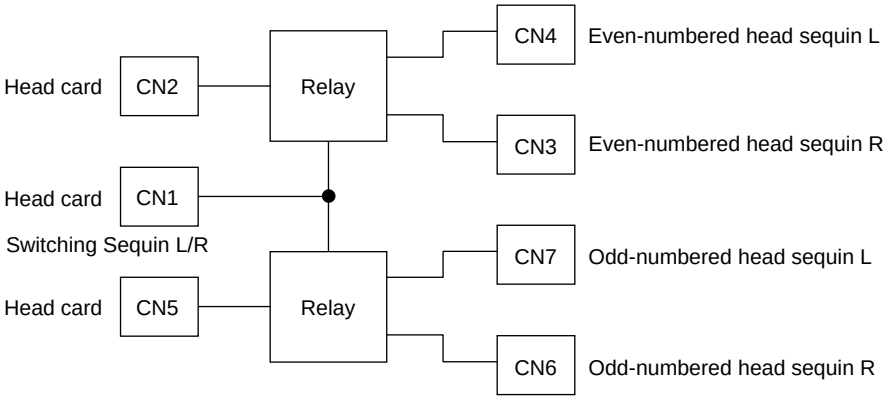
- Major functions
  - To switch ON/OFF of Tension base switch.
  - To light Tension base LED.
  - To relay signals with TC sensor card.

9. Extension head card (MP286)

- Exterior view and connector allocation



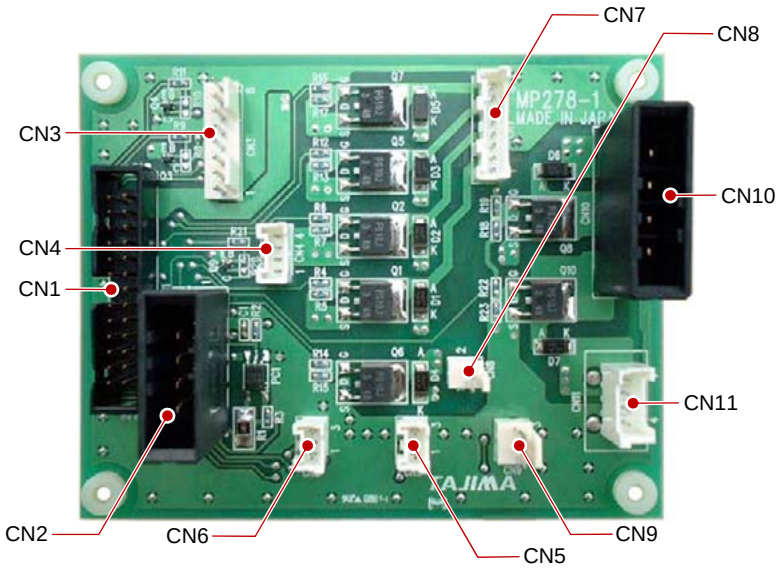
- Electrical block diagram



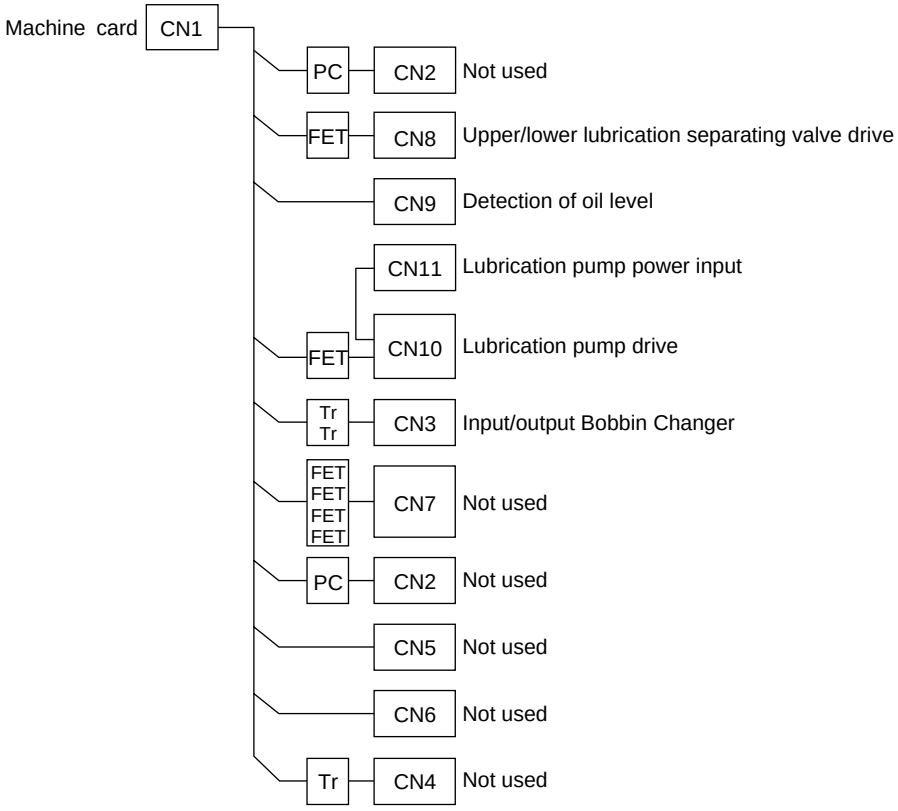
- Major functions
  - When Sequin device L+R is equipped, Extension head card outputs the power to the sequin motor L or R, according to the sequin L/R switching signal (CN1) from the Head card.
  - 1 Extension head card controls 2 heads.

10.Extension machine card (MP278, only for TFMX series 2-8 head machine)

- Exterior view and connector allocation



- Electrical block diagram



- Major functions

Extension machine card is equipped for the optional devices listed below to perform input/output operation.

- Automatic lubrication system
- Bobbin changer (Currently not supported)

11.Compatibility of cards and sensors (As of November 2008)

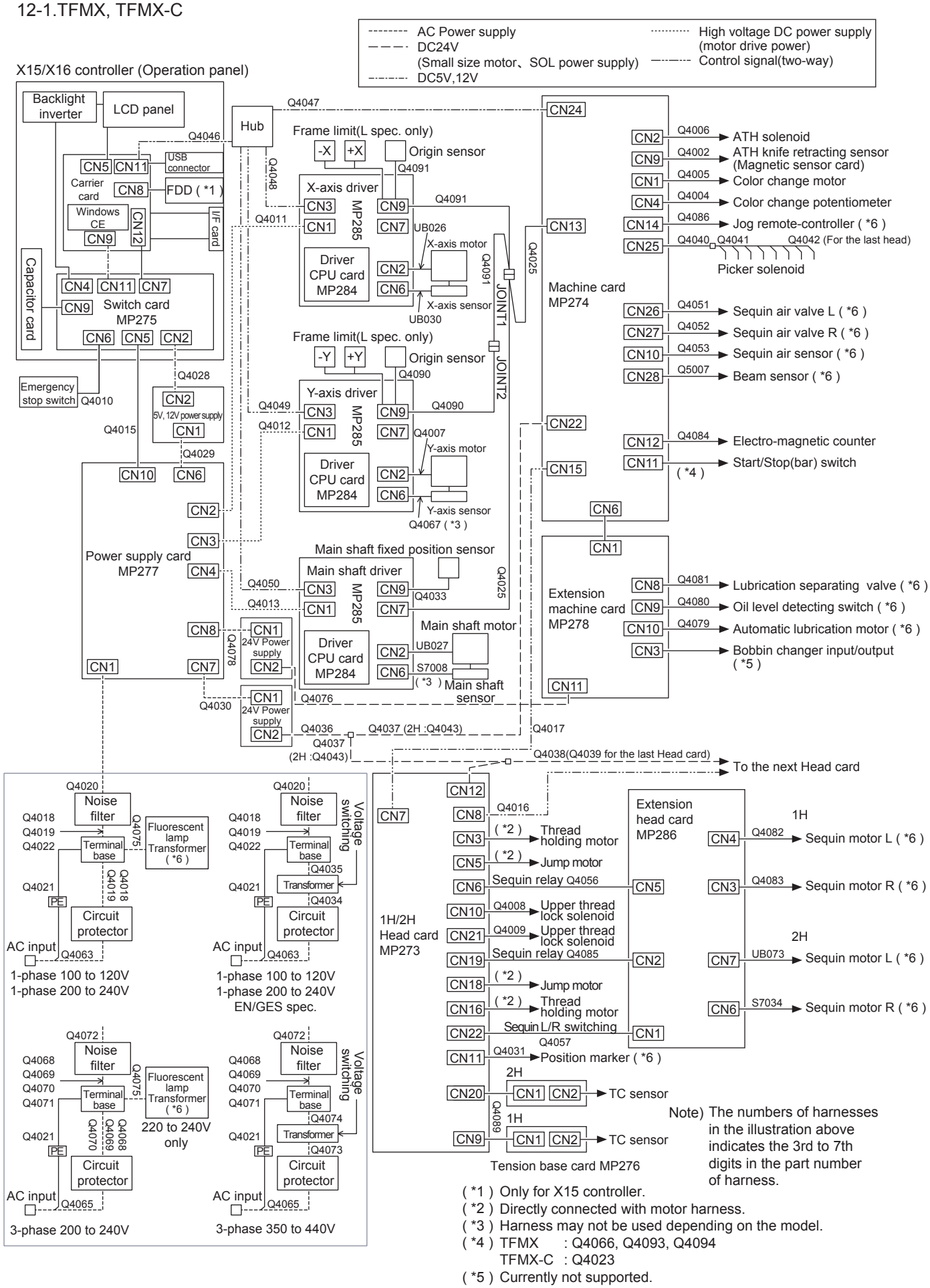
◎ : Complete compatibility
○ : These cards are available with upgraded system software
→ : This card is available between the machine (B) and (C)
× : No compatibility
-- : Not used

Part name	TEMX-C Multi-head machine (A) Part No.	Compatibility between machine (A) and (B)	TFMX series 2-8 head machine (B) Part No.	Compatibility between machine (B) and (C)	TFMX-C Single head machine (C) Part No.	Compatibility between machine (C) and (D)	TEMX-C Single head machine (D) Part No.	Compatibility between machine (D) and (A)	Type, remark
Card :CPU-A		--	**0J2304200011**	○	**0J2304200011**	--		--	With Japanese OS (*1)
Card :CPU-J [A]	**0J2304800A13**	○	**0J2304800A13**	○	**0J2304800A13**	○	**0J2304800A13**	○	With Japanese OS (*2)
Card :CPU-J :X16 [A]	**0J2304802A13**	○	**0J2304802A13**	○	**0J2304802A13**	○	**0J2304802A13**	○	With Japanese OS (*3)
Card :CPU-B		--	**0J2304201011**	○	**0J2304201011**	--		--	With English OS (*1)
Card :CPU-E [A]	**0J2304801A13**	○	**0J2304801A13**	○	**0J2304801A13**	○	**0J2304801A13**	○	With English OS (*2)
Card :CPU-E :X16 [A]	**0J2304803A13**	○	**0J2304803A13**	○	**0J2304803A13**	○	**0J2304803A13**	○	With English OS (*3)
Card :Switch	**0J3502000012**	◎	**0J3502000012**	◎	**0J3502000012**	◎	**0J3502000012**	◎	MP275-4
Card :I/F Connector	**0J3200700011**	◎	**0J3200700011**	◎	**0J3200700011**	◎	**0J3200700011**	◎	MP282-2
Card :Capacitor	**0J3502600011**	◎	**0J3502600011**	◎	**0J3502600011**	◎	**0J3502600011**	◎	MP290-2
Card :Power supply : Single-phase		--	**0J2101601011**	→	**0J2101602011**	◎	**0J2101602011**	--	(B) MP277-3B (C) MP277-3C (D) MP277-3C
Card :Power supply : 3-phase		--	**0J2101600011**	--		--		--	MP277-3A
Card :Power supply : 3-phase :A	**0J2102200011**	--		--		--		--	MP277-3D
DC Power Supply : 5V, +/-12V	**645300030000**	◎	**645300030000**	◎	**645300030000**	◎	**645300030000**	◎	LDC60F-1
DC Power Supply :24V	**645300191011**	×	**645300190011**	×	**645300191011**	◎	**645300191011**	◎	(B) LEP150F-24-XMUSB (C) LEP150F-24-XMUS2 (D) LEP150F-24-XMUS2
DC Power Supply :24V :240W	**645300220011**	--		--		--		--	LEP240F-24-XMUS2
Card :Machine		--	**0J2502300022**	×	**0J2502301033**	--		--	(B) MP274-3A (C) MP274-3B
		--	**0J2502300033**	×	**0J2502301055**	◎	**0J2502301055**	--	(B) MP274-3A2 (*5) (C) MP274-3B3 (*5) (D) MP274-3B3 (*5)
Card :Machine : Single head P3		--		×	**0J2503401000**	×			MP274-3H (*4)
Card :Machine :S5A	**0J2503300000**	--		--		--		--	MP274-3E (*5)
Card :Head		--	**0J2702600022**	×	**0J2702301044**	--			(B) MP273-3A (C) MP273-3B
		--	**0J2703300000**	×	**0J2702301055**	◎	**0J2702301055**		(B) MP273-3A2 (*5) (C) MP273-3B2 (*5) (D) MP273-3B2 (*5)
Card :Head :S5B	**0J2703300000**	◎	**0J2703300000**	--		--		--	MP273-3A2 (*5)
Card :Tension base	**0J2601900012**	◎	**0J2601900012**	◎	**0J2601900012**	◎	**0J2601900012**		MP276-2
Driver :X12-F [A]		○	**0J0302500A22**	○	**0J0302500A22**	○	**0J0302500A22**		To control Main shaft (200W)
Driver :X12-G [A]		--	**0J0302600A22**	--		--			To control Main shaft (400W)
Driver :X12-H [A]		--	**0J0302400A33**	--		--			To control X/Y-axis
Driver :X12-K [A]	**0J0302800A00**	--		--		--		--	To control Main shaft (1.5kW)
Driver :X12-L [A]	**0J0302900A00**	--		--		--		--	To control X/Y-axis
Card :Photo-interrupter	**0J4201600022**	◎	**0J4201600022**	◎	**0J4201600022**	◎	**0J4201600022**		To detect Main shaft fixed position
Card :TC sensor	**0J2602100012**	◎	**0J2602100012**	◎	**0J2602100012**	◎	**0J2602100012**		To detect thread breakage
Potentiometer	**640900010001**	◎	**640900010001**	◎	**640900010001**	◎	**640900010001**		M22S10-029-102
Potentiometer		--		--	**640900030001**	--		--	VP-12
Potentiometer	**640900040001**	--		--		--		--	JC22E-1K
Card :Magnetic sensor A	**0J4200800012**	◎	**0J4200800012**	◎	**0J4200800012**	◎	**0J4200800012**		For ATH knife retraction To detect X/Y-axis origin
Card :Magnetic sensor B	**0J4200801022**	◎	**0J4200801022**	--		--			To detect frame limit

(*1) Cards, mounted to X14 controller.
(*2) Cards, mounted to X15 controller.
(*3) Cards, mounted to X16 controller.
(*4) Card, mounted to the machine with the Sequin device 3.
(*5) Cards, supporting 50-slit rotary disk.

12.Electrical system diagram

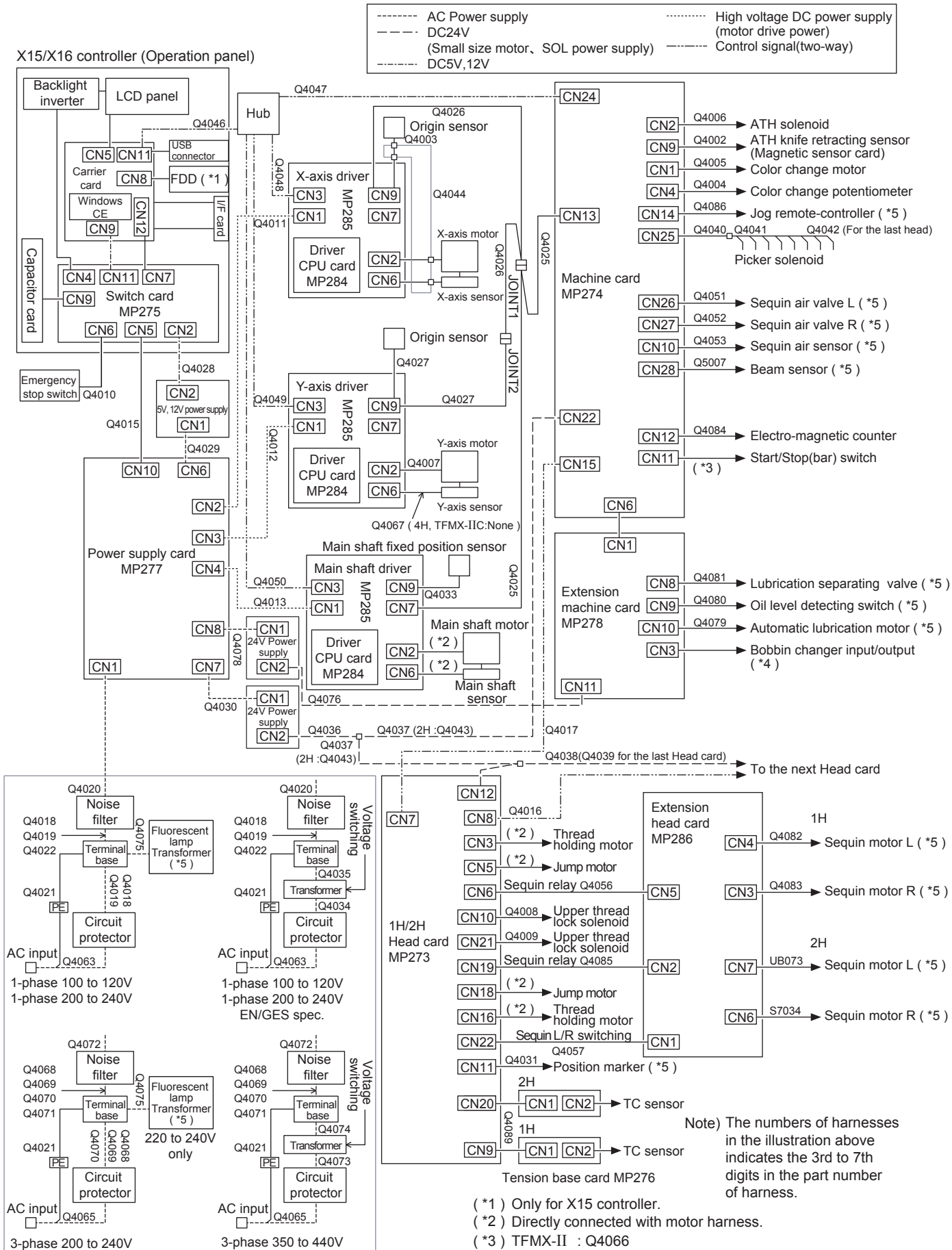
12-1.TFMX, TFMX-C



Note) The numbers of harnesses in the illustration above indicates the 3rd to 7th digits in the part number of harness.

(*1) Only for X15 controller.
(*2) Directly connected with motor harness.
(*3) Harness may not be used depending on the model.
(*4) TFMX : Q4066, Q4093, Q4094
TFMX-C : Q4023
(*5) Currently not supported.
(*6) Option.

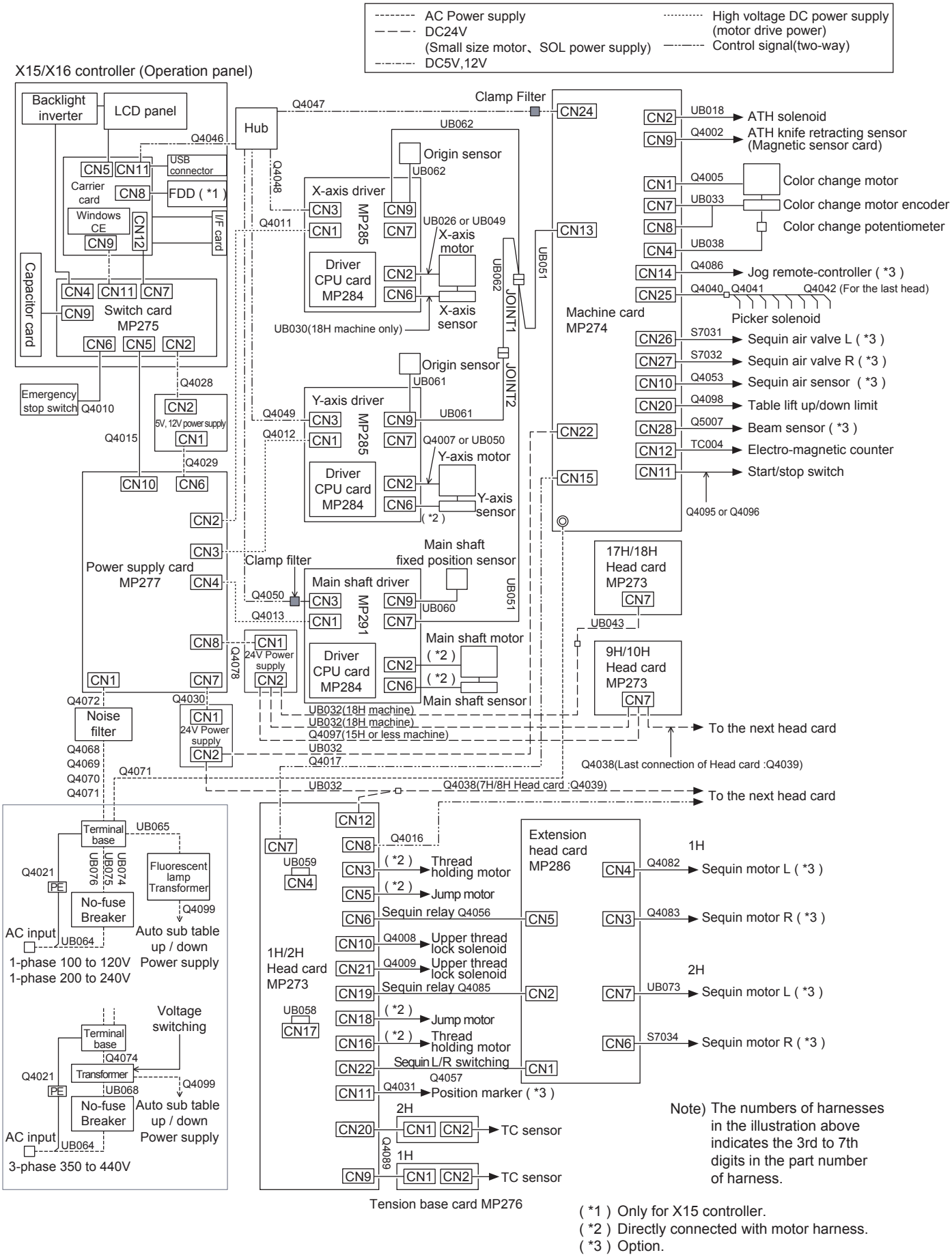
12-2.TFMX-II, TFMX-IIC



Note) The numbers of harnesses in the illustration above indicates the 3rd to 7th digits in the part number of harness.

(*1) Only for X15 controller.
(*2) Directly connected with motor harness.
(*3) TFMX-II : Q4066
TFMX-IIC: Q4014, Q4023, Q4024, Q4095
(*4) Currently not supported.
(*5) Option.

12-3.TEMX-C Multi-head machine



Note) The numbers of harnesses in the illustration above indicates the 3rd to 7th digits in the part number of harness.

(*1) Only for X15 controller.
(*2) Directly connected with motor harness.
(*3) Option.