

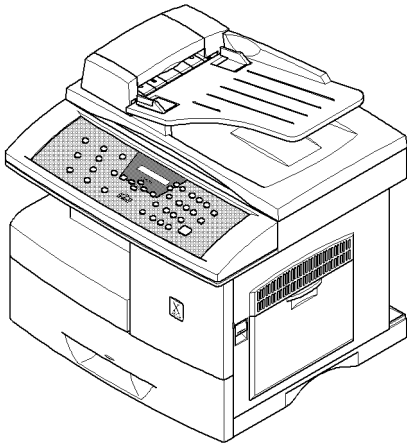
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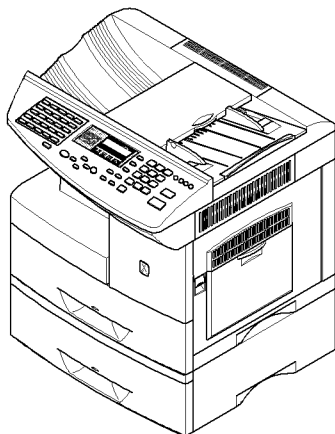
# WorkCentre Pro 412, FaxCentre F12 & WorkCentre M15/M15i

# **SERVICE** MANUAL

**WorkCentre Pro 412 &  
WorkCentre M15/M15i**



**FaxCentre F12**



## Contents

1. Introduction
2. Service Call Procedures
3. Precautions
4. Specifications
5. Circuit Description
6. Disassembly
7. Maintenance & Troubleshooting
8. Exploded Views and Parts List
9. Block Diagram
10. Connection Diagram
11. Schematic Diagrams

Part Number 708P87117

WorkCentre Pro 412, FaxCentre F12 & WorkCentre M15/M15i

Service Documentation

WorkCentre Pro 412, FaxCentre F12 & WorkCentre M15/M15i Service Manual.

03/03

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# Table of Contents

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1. Introduction .....	1-1
1-1 Organisation .....	1-1
1-2 Warnings, Cautions and Notes .....	1-2
1-3 Safety Procedures and Information .....	1-2
1-4 Health and Safety Incident Reporting .....	1-5
1-5 Translation of Warnings and Precautions .....	1-6
2. Service Call Procedures .....	2-1
SCP 1 Initial Actions .....	2-1
SCP 2 First Call Actions .....	2-1
SCP 3 Normal Call Actions .....	2-2
SCP 4 Fault Analysis .....	2-2
SCP 5 Final Actions .....	2-2
3. Precautions .....	3-1
4. Specifications .....	4-1
4-1 WorkCentre Pro 412 Specifications .....	4-1
4-1-1 Printer .....	4-1
4-1-2 Facsimile .....	4-2
4-1-3 Scanner .....	4-2
4-1-4 Copier .....	4-3
4-1-5 Power Supply .....	4-3
4-1-6 Dimension .....	4-4
4-1-7 Packaging .....	4-4
4-1-8 Environmental Condition .....	4-4
4-1-9 Machine Life .....	4-4
4-2 FaxCentre F12 Specifications .....	4-5
4-2-1 General Specifications .....	4-5
4-2-3 Facsimile Specification .....	4-6
4-2-4 Scanner Specification .....	4-7
4-2-5 Copy Specification .....	4-7
4-2-6 Telephone Specification .....	4-8
4-2-7 Consumables .....	4-8
4-3 WorkCentre M15/M15i Specifications .....	4-9
4-3-1 General Specifications .....	4-9
4-3-2 Printer Specifications .....	4-10
4-3-3 Facsimile Specification .....	4-11
4-3-4 Scanner Specification .....	4-11
4-3-5 Copy Specification .....	4-12
4-3-6 Telephone Specification .....	4-12
4-3-7 Consumables .....	4-12

5. Circuit Description .....	5-1
5-1 Main PBA (WorkCentre Pro 412 & FaxCentre F12) .....	5-1
5-2 Main PBA (WorkCentre M15/M15i) .....	5-2
5-3 Circuit Operation .....	5-3
5-4 Scanner .....	5-41
5-6 Host Interface .....	5-54
5-7 Engine Controller .....	5-58
5-8 OPE PBA .....	5-66
5-9 LIU PBA .....	5-68
5-10 SMPS (Switching Mode Power Supply) Unit. ....	5-70
6. Disassembly and Reassembly .....	6-1
6-1 WorkCentre Pro 412 & WorkCentre M15/M15i .....	6-1
6-1-1 Rear Cover .....	6-2
6-1-2 Scanner Assembly .....	6-3
6-1-3 ADF Assembly .....	6-7
6-1-4 OPE Assembly .....	6-9
6-1-5 Side Cover Assembly .....	6-10
6-1-6 Fuser Assembly .....	6-12
6-1-7 Exit Assembly .....	6-13
6-1-8 Cover Paper Exit Assembly .....	6-14
6-1-9 Drive Assembly .....	6-15
6-1-10 SMPS .....	6-16
6-1-11 LSU .....	6-17
6-1-12 Main Frame Assembly .....	6-18
6-1-13 Cover Exit Rear .....	6-19
6-1-14 MP Assembly .....	6-20
6-1-15 Feed Assembly .....	6-21
6-1-16 Pick Up Assembly .....	6-22
6-1-17 Main PBA .....	6-23
6-2 FaxCentre F12 .....	6-24
6-2-1 Cover Rear Assembly .....	6-25
6-2-2 Rear Cover .....	6-26
6-2-3 Scanner Assembly .....	6-27
6-2-4 OPE Assembly .....	6-29
6-2-5 ADF Upper Assembly .....	6-31
6-2-6 Guide Lower Assembly .....	6-32
6-2-7 Housing Lower Assembly .....	6-34
6-2-8 Side Cover Assembly .....	6-36
6-2-9 Fuser Assembly .....	6-40
6-2-10 Exit Assembly .....	6-42
6-2-11 Cover Paper Exit Assembly .....	6-43
6-2-12 Drive Assembly .....	6-44
6-2-13 SMPS .....	6-45
6-2-14 LSU .....	6-46
6-2-15 Main Frame Assembly .....	6-47
6-2-16 SCF Assembly .....	6-54



7. Maintenance & Troubleshooting	7-1
7-1 Preventative Maintenance	7-1
7-2 Diagnostics	7-1
7-3 Scanner	7-12
7-4 FAX	7-14
7-5 Print Quality	7-15
7-6 Malfunction	7-31
7-7 Other Faults	7-39
8. Exploded View & Parts List	8-1
8-1. Main Exploded View & Parts List	8-1
8-2. Platen Assembly Exploded View & Parts List (WorkCentre Pro 412 and WorkCentre M15/M15i)	8-5
8-3. ADF Assembly Exploded View & Parts List (WorkCentre Pro 412 & WorkCentre M15/M15i)	8-9
8-4. Side Cover Assembly Exploded View & Parts List	8-13
8-5. Cassette Assembly Exploded View & Parts List	8-17
8-6. Exit Assembly Exploded View & Parts List	8-19
8-7. Feeder Assembly Exploded View & Parts List	8-21
8-8. MP Assembly Exploded View & Parts List	8-23
8-9. Base Frame Exploded View & Parts List	8-25
8-10. Pick-up Assembly Exploded View & Parts List	8-27
8-11. Drive Assembly Exploded View & Parts List	8-29
8-12. Main Frame Assembly Exploded View & Parts List	8-31
8-13. Fuser Assembly Exploded View & Parts List	8-33
8-14. Main Exploded View & Parts List (FaxCentre F12)	8-35
8-15. Scanner Assembly Exploded View & Parts List (FaxCentre F12)	8-37
8-16. ADF Upper Ass'y Exploded View & Parts List (FaxCentre F12)	8-39
8-17. Scan Lower Ass'y Exploded View & Parts List (FaxCentre F12)	8-41
8-18. OPE Assembly Exploded View & Parts List (FaxCentre F12)	8-45
8-19. Exit Assembly Exploded View & Parts List (FaxCentre F12)	8-47
8-20. Base Frame Exploded View & Parts List (FaxCentre F12)	8-49
8-21. SCF Assembly Exploded View & Parts List (FaxCentre F12)	8-51
8-22. Main Exploded View & Parts List (WorkCentre M15/M15i)	8-53
8-23. Platen Assembly Exploded View & Parts List (WorkCentre M15/M15i)	8-57
8-24. ADF Ass'y & Platen Cover Ass'y Exploded View & Parts List (WorkCentre M15/M15i)	8-59
8-25. Side Cover Assembly Exploded View & Parts List (WorkCentre M15/M15i)	8-61
8-26. Drive Assembly Exploded View & Parts List (WorkCentre M15/M15i)	8-63
8-27. Screws	8-65
9. Block Diagram (WorkCentre Pro 412)	9-1
Block Diagram (FaxCentre 12)	9-2
Block Diagram (WorkCentre M15/M15i)	9-3
10. Connection Diagram (WorkCentre Pro 412)	10-1
Connection Diagram (FaxCentre 12)	10-2
Connection Diagram (WorkCentre M15/M15i)	10-3

11. Schematic Diagrams	11-1
11-1 Main Circuit Diagram (1 of 14, WorkCentre Pro 412)	11-1
11-2 Main Circuit Diagram (2 of 14, WorkCentre Pro 412)	11-2
11-3 Main Circuit Diagram (3 of 14, WorkCentre Pro 412)	11-3
11-4 Main Circuit Diagram (4 of 14, WorkCentre Pro 412)	11-4
11-5 Main Circuit Diagram (5 of 14, WorkCentre Pro 412)	11-5
11-6 Main Circuit Diagram (6 of 14, WorkCentre Pro 412)	11-6
11-7 Main Circuit Diagram (7 of 14, WorkCentre Pro 412)	11-7
11-8 Main Circuit Diagram (8 of 14, WorkCentre Pro 412)	11-8
11-9 Main Circuit diagram (9 of 14, WorkCentre Pro 412)	11-9
11-10 Main Circuit Diagram (10 of 14, WorkCentre Pro 412)	11-10
11-11 Main Circuit Diagram (11 of 14, WorkCentre Pro 412)	11-11
11-12 Main Circuit Diagram (12 of 14, WorkCentre Pro 412)	11-12
11-13 Main Circuit Diagram (13 of 14, WorkCentre Pro 412)	11-13
11-14 Main Circuit Diagram (14 of 14, WorkCentre Pro 412)	11-14
11-15 LIU Circuit Diagram, (WorkCentre Pro 412)	11-15
11-16 OPE Circuit Diagram, (WorkCentre Pro 412)	11-16
11-17 HVPS Circuit Diagram (1 of 2, WorkCentre Pro 412)	11-17
11-18 HVPS Circuit Diagram (2 of 2, WorkCentre Pro 412)	11-18
11-19 SMPS (110) Circuit Diagram, (WorkCentre Pro 412)	11-19
11-20 SMPS (220) Circuit Diagram, (WorkCentre Pro 412)	11-20
11-21 ADF Circuit Diagram, (WorkCentre Pro 412)	11-21
11-22 Flat Circuit Diagram, (WorkCentre Pro 412)	11-22
11-23 PTL Circuit Diagram, (WorkCentre Pro 412)	11-23
11-24 Sensor Circuit Diagram, (WorkCentre Pro 412)	11-24
11-25 Toner RX Circuit Diagram, (WorkCentre Pro 412)	11-25
11-26 Toner TX Circuit Diagram, (WorkCentre Pro 412)	11-26
11-27 Main Circuit Diagram (1 of 17, FaxCentre F12)	11-27
11-28 Main Circuit Diagram (2 of 17, FaxCentre F12)	11-28
11-29 Main Circuit Diagram (3 of 17, FaxCentre F12)	11-29
11-30 Main Circuit Diagram (4 of 17, FaxCentre F12)	11-30
11-31 Main Circuit Diagram (5 of 17, FaxCentre F12)	11-31
11-32 Main Circuit Diagram (6 of 17, FaxCentre F12)	11-32
11-33 Main Circuit Diagram (7 of 17, FaxCentre F12)	11-33
11-34 Main Circuit Diagram (8 of 17, FaxCentre F12)	11-34
11-35 Main Circuit Diagram (9 of 17, FaxCentre F12)	11-35
11-36 Main Circuit Diagram (10 of 17, FaxCentre F12)	11-36
11-37 Main Circuit Diagram (11 of 17, FaxCentre F12)	11-37
11-38 Main Circuit Diagram (12 of 17, FaxCentre F12)	11-38
11-39 Main Circuit Diagram (13 of 17, FaxCentre F12)	11-39
11-40 Main Circuit Diagram (14 of 17, FaxCentre F12)	11-40
11-41 Main Circuit Diagram (15 of 17, FaxCentre F12)	11-41
11-42 Main Circuit Diagram (16 of 17, FaxCentre F12)	11-42
11-43 Main Circuit Diagram (17 of 17, FaxCentre F12)	11-43
11-44 LIU Circuit Diagram (FaxCentre F12)	11-44
11-45 OPE Circuit Diagram (FaxCentre F12)	11-45
11-46 Scan Circuit Diagram (FaxCentre F12)	11-46
11-47 Sensor Circuit Diagram (FaxCentre F12)	11-47
11-48 HVPS Circuit Diagram (1 of 2, FaxCentre F12)	11-48
11-49 HVPS Circuit Diagram (2 of 2, FaxCentre F12)	11-49
11-50 SMPS Circuit Diagram (110V, FaxCentre F12)	11-50
11-51 SMPS Circuit Diagram (220V, FaxCentre F12)	11-51
11-52 PTL Circuit Diagram (FaxCentre F12)	11-52
11-53 Toner-RX Circuit Diagram (FaxCentre F12)	11-53

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11-54 Toner-TX Circuit Diagram (FaxCentre F12) .....	11-54
11-55 Main Circuit Diagram (1 of 16, WorkCentre M15/M15i) .....	11-55
11-56 Main Circuit Diagram (2 of 16, WorkCentre M15/M15i) .....	11-56
11-57 Main Circuit Diagram (3 of 16, WorkCentre M15/M15i) .....	11-57
11-58 Main Circuit Diagram (4 of 16, WorkCentre M15/M15i) .....	11-58
11-59 Main Circuit Diagram (5 of 16, WorkCentre M15/M15i) .....	11-59
11-60 Main Circuit Diagram (6 of 16, WorkCentre M15/M15i) .....	11-60
11-61 Main Circuit Diagram (7 of 16, WorkCentre M15/M15i) .....	11-61
11-62 Main Circuit Diagram (8 of 16, WorkCentre M15/M15i) .....	11-62
11-63 Main Circuit Diagram (9 of 16, WorkCentre M15/M15i) .....	11-63
11-64 Main Circuit Diagram (10 of 16, WorkCentre M15/M15i) .....	11-64
11-65 Main Circuit Diagram (11 of 16, WorkCentre M15/M15i) .....	11-65
11-66 Main Circuit Diagram (12 of 16, WorkCentre M15/M15i) .....	11-66
11-67 Main Circuit Diagram (13 of 16, WorkCentre M15/M15i) .....	11-67
11-68 Main Circuit Diagram (14 of 16, WorkCentre M15/M15i) .....	11-68
11-69 Main Circuit Diagram (15 of 16, WorkCentre M15/M15i) .....	11-69
11-70 Main Circuit Diagram (16 of 16, WorkCentre M15/M15i) .....	11-70
11-71 LIU Circuit Diagram (WorkCentre M15/M15i) .....	11-71
11-72 OPE Circuit Diagram (WorkCentre M15/M15i) .....	11-72
11-73 HVPS Circuit Diagram (1 of 2, WorkCentre M15/M15i) .....	11-73
11-74 HVPS Circuit Diagram (2 of 2, WorkCentre M15/M15i) .....	11-74
11-75 SMPS Circuit Diagram (110V) (WorkCentre M15/M15i) .....	11-75
11-76 SMPS Circuit Diagram (220V) (WorkCentre M15/M15i) .....	11-76
11-77 ADF Circuit Diagram (WorkCentre M15/M15i) .....	11-77
11-78 Flat Circuit Diagram (WorkCentre M15/M15i) .....	11-78
11-79 PTL Circuit Diagram (WorkCentre M15/M15i) .....	11-79
11-80 Sensor Circuit Diagram (WorkCentre M15/M15i) .....	11-80
11-81 Toner_Rx Circuit Diagram (WorkCentre M15/M15i) .....	11-81
11-82 Toner_Tx Circuit Diagram (WorkCentre M15/M15i) .....	11-82



# 1. Introduction

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This service manual is part of a multinational service documentation system, but is not structured in the standard Xerox service manual format.

## 1-1 Organisation

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### Section 1 Introduction

This section describes the contents of the service manual, describes the Health & Safety Incident Reporting and gives translations of all warnings within the service manual in French, Italian, German and Spanish languages.

### Section 2 Service Call Procedures

This section is used to start and complete a service call. This section will either direct you to the Maintenance and Troubleshooting section, or identify a faulty component or sub-assembly.

### Section 3 Precautions

This section contains ESD precautions.

### Section 4 Specifications

This section contains the specifications for the various modules of the machine.

### Section 5 Circuit Description

This section describes the control system of the machine.

### Section 6 Disassembly and Reassembly

This section gives instructions for dismantling and assembling the machine.

### Section 7 Maintenance & Troubleshooting

This section contains instructions for preventative maintenance and diagnosis of machine fault

### Section 8 Exploded Views and Parts Lists

This section shows all parts of the machine in exploded views with lists of spared parts.

### Section 9 Electrical Parts Lists.

This section lists all of the spared electrical components.

### Section 10 Block Diagram

This section contains a block diagram of the machine functions.

### Section 11 Connection Diagram

This section contains an electrical connection diagram for the whole machine.

### Section 12 Schematic Diagrams

This section contains the schematic diagrams for the machine.

## 1-2 Warnings, Cautions and Notes

---

Translated versions of all warnings are in Translation of Warnings at the end of this section.

### WARNING

**A warning is used whenever an operating or maintenance procedure, practice, condition or statement, if not strictly observed, could result in personal injury.**

### CAUTION

*A caution is used whenever an operation or maintenance procedure, practice, condition or statement, if not strictly observed, could result in damage to the equipment*

*NOTE: A note is used where it is essential to highlight a procedure, practice, condition or statement*

## 1-3 Safety Procedures and Information

---

The Xerox WorkCentre Pro 412, FaxCentre F12 & WorkCentre M15/M15i products and supplies are manufactured, tested and certified to strict safety regulations, electromagnetic regulations and established environmental standards.

### WARNING

**Any unauthorised alteration, which may include the addition of new functions, the connection of external devices or the use of components not specified by Xerox may impact the products certification, safety performance or compliance with legislation.**

### Warning markings

All warning instructions marked on or supplied with the product should be followed.



### WARNING

**A warning is used whenever an operating, service or maintenance procedure, practice, condition or statement, if not strictly observed could result in personal injury.**



### WARNING

**Alerts to areas of the product where there are heated surfaces which must be avoided during service or maintenance operations.**



### WARNING

**The following are general warning statements which apply in various service or maintenance situations.**

**General Safety Warning**

Switch off the power to the machine and disconnect the power cord from the outlet while performing tasks that do not need the electricity on. Contact with electricity can cause death or injury.

**Power Supply**

This product must be operated from the type of power supply indicated on the product's data plate label. This product must be connected to a protective earth circuit.

**Safe Working**

Throughout this procedure prior to working on any electrical circuit or any mechanical drive component disconnect all electrical power to the product. The disconnect device is the power cord. Remove the plug from the power outlet.

**Ventilation**

This product should not be placed in a built-in installation unless proper ventilation is provided.

**Operator Accessible Areas**

This product has been designed to restrict operator access to safe areas only. Operator access to hazardous areas is restricted with covers or guards, which require a tool to remove. Ensure that these covers or guards are correctly replaced after every service or maintenance task.

**Maintenance/Service**

Do not to carry out any maintenance or service on the product, which is not described this service documentation.

**Cleaning**

Before cleaning this product, unplug the product from the power outlet. Always use materials specifically designated for this product, the use of other materials may result in poor performance and may create a hazardous situation. Do not use aerosol cleaners, they may become flammable under certain circumstances.

**Precautions**

1. Be sure that all built-in protective devices are in place. Restore any missing protective covers.
2. When re-installing chassis and assemblies, be sure to restore all protective devices, including control knobs and compartment covers.
3. Design Alteration Warning: Never alter or add to the mechanical or electrical design of this equipment, such as auxiliary connectors, etc. Such alterations and modifications will void the manufacturer's warranty.
4. Components, parts, and wiring that appear to have overheated or are otherwise damaged should be replaced with Xerox spare parts. Always determine the cause of damage or overheating, and correct any potential hazards.
5. Observe the original harness routing, especially near sharp edges, AC, and high voltage power supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board.
6. Product Safety Notice: Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they provide could be lost if a replacement component differs from the original. This holds true, even though the replacement may be rated for higher voltage, wattage, etc.

### Lithium battery precautions

The Main PBA is provided with a lithium Cell designated BAT1. Observe the following precautions:

- There could be a danger of explosion if the battery is subject to forced discharge or reverse voltage.
- The battery must only be replaced with the same type.
- The battery should only be replaced at a service centre not at a customer location
- The replacement battery must be the same type and manufacturer as the original.
- Lithium batteries contain substances which are subject to control and should not be opened, crushed or burned during disposal.

### Laser Safety



### Invisible laser radiation

#### WARNING

Invisible laser radiation. avoid exposure to beam.

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This product contains laser warning labels. These labels are intended for use by Service and Maintenance Representatives and are placed on the top surface of the Laser Unit. Do not attempt to open the laser unit. There are no serviceable components or areas inside the unit. Operation of the laser unit with machine or laser covers removed could cause eye damage if the laser beam is viewed directly.

### Electrostatic Damage Caution

The following is an example of the terminology and symbols used in this manual for an electrostatic damage caution:



#### Caution

*Certain components in this product are susceptible to damage from electrostatic discharge. Observe all ESD procedures to avoid component damage.*



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## 1-4 Health and Safety Incident Reporting

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### I. Summary

This standard defines requirements for notification of health and safety incidents involving Xerox products (equipment and materials) at customer locations.

### II. Scope

Xerox Corporation and subsidiaries worldwide.

### III. Objective

To enable prompt resolution of health and safety incidents involving Xerox products and to ensure Xerox regulatory compliance.

### IV. Definitions

Incident:

An event or condition occurring in a customer account that has resulted in injury, illness or property damage. Examples of incidents include machine fires, smoke generation, physical injury to an operator or service representative. Alleged events and product conditions are included in this definition.

### V. Requirements

#### Initial Report:

1. Xerox organisations shall establish a process for individuals to report product incidents to EH&S within 24 hours of becoming aware of the event.
2. The information to be provided at the time of reporting is contained in Appendix A (Health and Safety Incident Report involving a Xerox product).
3. The initial notification may be made by any of the following methods:
  - For incidents in North America and Developing Markets West (Brazil, Mexico, Latin American North and Latin American South):

Phone\* EH&S at: 1-800-828-6571.

- Electronic mail EH&S at: Doris.Bush@usa.xerox.com.
- Fax EH&S at: 1-585-422-6449 [internet 8\*222 6449].
- For incidents in Europe and Developing Markets East (Middle East, Africa, India, China and Hong Kong):
  - Phone\* EH&S at: +44 (0) 1707 353434.
  - Electronic mail EH&S at: Elaine.Grange@GBR.xerox.com.
  - Fax EH&S at: +44 (0) 1707 353914 [internet 8\*668 3914].

\*Initial notification made by phone must be followed within 24 hours by a completed incident report and sent to the indicated electronic mail address or fax number.

*NOTE:* If sending a fax, please also send the original via internal mail.

#### Responsibilities for resolution:

1. Business Groups/Product Design Teams responsible for the product involved in the incident shall:
  - a. Manage field bulletins, customer correspondence, product recalls, safety retrofits.
  - b. Fund all field retrofits.
2. Field Service Operations shall:
  - a. Preserve the Xerox product involved and the scene of the incident inclusive of any associated equipment located in the vicinity of the incident.
  - b. Return any affected equipment/part(s) to the location designated by EH&S and/or the Business Division.
  - c. Implement all safety retrofits.

3. EH&S shall:
  - a. Manage and report all incident investigation activities.
  - b. Review and approve proposed product corrective actions and retrofits, if necessary.
  - c. Manage all communications and correspondence with government agencies.
  - d. Define actions to correct confirmed incidents.

## VI. Appendices

The Health and Safety Incident Report involving a Xerox Product (Form # EH&S-700) is available at the end of this Service Manual.

## 1-5 Translation of Warnings and Precautions

---

### WARNING

A warning is used whenever an operating or maintenance procedure, practice, condition or statement, if not strictly observed, could result in personal injury.

### AVERTISSEMENT

Un avertissement est utilisé chaque fois qu'une procédure d'utilisation ou de maintenance peut provoquer des blessures si elle n'est pas strictement respectée.

### AVVERTENZA

Un' avvertenza viene utilizzata per segnalare procedure, operazioni, condizioni o istruzioni operative e di manutenzione, la cui mancata osservanza può causare infortuni.

### VORSICHT

Warnhinweise dieser Art gelten für Anweisungen und Situationen, bei deren Nichtbeachtung bzw. Auftreten Verletzungsgefahr besteht.

### AVISO

Los avisos se utilizan cuando un procedimiento, ejercicio, condición o declaración de funcionamiento o mantenimiento puede producir lesiones personales, si no se sigue estrictamente.

### WARNING

Any unauthorised alteration, which may include the addition of new functions, the connection of external devices or the use of components not specified by Xerox may impact the products certification, safety performance or compliance with legislation.

### AVERTISSEMENT

Toute modification non autorisée, qu'il s'agisse de l'ajout de nouvelles fonctions, de la connexion de dispositifs externes ou de l'utilisation de composants non recommandés par Xerox, peut entraîner l'annulation de la garantie.

### AVVERTENZA

Qualunque modifica che implichi l'aggiungimento di nuove funzioni, il collegamento ad un dispositivo esterno o l'utilizzo di componenti non autorizzati da Xerox può invalidare la certificazione e le dichiarazioni di conformità del prodotto, nonché compromettere la sicurezza operativa di questo.

### VORSICHT

Warnhinweise dieser Art gelten für Anweisungen und Situationen, bei deren Nichtbeachtung bzw. Auftreten Verletzungsgefahr besteht.

### **AVISO**

Cualquier modificación no autorizada, que puede incluir la adición de nuevas funciones, la conexión de dispositivos externos o el uso de componentes no especificados por Xerox, puede afectar a la certificación del producto, el funcionamiento seguro o el cumplimiento de la legislación.

### **WARNING**

A warning is used whenever an operating, service or maintenance procedure, practice, condition or statement, if not strictly observed could result in personal injury

### **AVERTISSEMENT**

Un avertissement est utilisé à chaque fois qu'une procédure de maintenance ou qu'une manipulation présente un risque de blessure si elle n'a pas été strictement observée.

### **AVVERTENZA**

Un' avvertenza viene utilizzata per segnalare procedure, operazioni, condizioni o istruzioni operative e di manutenzione, la cui mancata osservanza può causare infortuni.

### **VORSICHT**

Warnhinweise dieser Art gelten für Anweisungen und Situationen, bei deren Nichtbeachtung bzw. Auftreten Verletzungsgefahr besteht.

### **AVISO**

Los avisos se utilizan cuando un procedimiento, ejercicio, condición o declaración de funcionamiento, servicio o mantenimiento puede producir lesiones personales, si no se sigue estrictamente.

### **WARNING**

Alerts to areas of the product where there are heated surfaces which must be avoided during service or maintenance operations.

### **AVERTISSEMENT**

Prévient des risques encourus lors d'une intervention dans des zones chaudes qui peuvent provoquer des blessures.

### **AVVERTENZA**

Evitare le superfici calde del prodotto, indicate da etichette di avvertenza, durante le operazioni di manutenzione o di assistenza.

### **VORSICHT**

Weist auf heiße Gerätebereiche hin, die bei der Wartung und Pflege nicht angefasst werden dürfen.

### **AVISO**

Llama la atención sobre áreas del producto donde hay superficies calientes que deben evitarse durante las tareas de servicio o mantenimiento.

### **WARNING**

The following are general warning statements which apply in various service or maintenance situations.

### **General safety warning**

Switch off the power to the machine and disconnect the power cord from the outlet while performing tasks that do not need the electricity on. Contact with electricity can cause death or injury.

### **Power Supply**

This product must be operated from the type of power supply indicated on the product's data plate label. This product must be connected to a protective earth circuit.

### **Safe Working**

Throughout this procedure prior to working on any electrical circuit or any mechanical drive component disconnect all electrical power to the product. The disconnect device is the power cord. Remove the plug from the power outlet.

### **Ventilation**

This product should not be placed in a built-in installation unless proper ventilation is provided.

### **Operator Accessible Areas**

This product has been designed to restrict operator access to safe areas only. Operator access to hazardous areas is restricted with covers or guards, which require a tool to remove. Ensure that these covers or guards are correctly replaced after every service or maintenance task.

### **Maintenance/Service**

Do not to carry out any maintenance or service on the product, which is not described this service documentation.

### **Cleaning**

Before cleaning this product, unplug the product from the power outlet. Always use materials specifically designated for this product, the use of other materials may result in poor performance and may create a hazardous situation. Do not use aerosol cleaners, they may become flammable under certain circumstances.

## **AVERTISSEMENT**

**Cette mention indique des informations relatives à différentes situations de maintenance.**

### **Sécurité générale - Avertissement**

Mettre la machine hors tension et débrancher le cordon d'alimentation de la prise murale lors d'interventions qui ne nécessitent pas que l'alimentation soit maintenue. Un contact avec une zone sous tension peut mettre en danger la sécurité des personnes.

### **Alimentation**

Ce produit doit être utilisé avec l'alimentation indiqué sur la plaque de la machine.  
Ce produit doit être connecté à un circuit avec mise à la terre.

### **Sécurité**

Pendant toute cette procédure d'intervention dans des circuits électriques ou des entraînements mécaniques, débranchez la machine. Le système de déconnexion est le cordon d'alimentation. Retirer le connecteur de la prise murale.

### **Aération**

Cet équipement ne doit pas être encastré, sans une ventilation appropriée.

**Zones accessibles aux utilisateurs**

Ce produit a été conçu de façon à ce que les zones accessibles par les utilisateurs soient sans danger. Les zones qui peuvent être dangereuses sont protégées par des panneaux ou des sécurités qui nécessitent l'utilisation d'un outil pour être retirés. Veiller à ce que ces panneaux et sécurités sont correctement remis en place après toute intervention technique ou de maintenance.

**Maintenance**

N'effectuez aucune procédure de maintenance non décrite dans la documentation.

**Nettoyage**

Avant toute procédure de nettoyage, débranchez l'équipement de la prise murale. Utilisez toujours les produits d'entretien conçus spécifiquement pour l'appareil. L'utilisation d'autres produits risque de nuire au bon fonctionnement de l'appareil et peut s'avérer dangereuse. N'utilisez jamais d'aérosols, ils peuvent s'enflammer sous certaines circonstances.

**AVVERTENZA**

**Le seguenti avvertenze sono applicabili a svariate situazioni di manutenzione o di assistenza.**

**Avvertenza sicurezza generale**

Spegnere l'apparecchio e scollegare il cavo di alimentazione dalla presa durante l'esecuzione di operazioni che non richiedono l'utilizzo di elettricità. Scosse elettriche accidentali possono causare lesioni personali o morte.

**Alimentazione**

Utilizzare il prodotto esclusivamente con il tipo di energia indicato e collegarlo a un circuito protettivo con messa a terra.

**Sicurezza elettrica**

Accertarsi che il prodotto non riceva elettricità durante le operazioni di intervento sui circuiti elettrici o sulle parti meccaniche. Il dispositivo di disattivazione del prodotto è costituito dal cavo di alimentazione, il quale deve essere scollegato dalla presa.

**Ventilazione**

Non installare l'apparecchio in un alloggiamento a incasso, a meno che non sia garantita una ventilazione adeguata.

**Aree accessibili per l'operatore**

Questo prodotto è stato progettato in modo da impedire l'accesso dell'operatore ad aree non sicure; queste sono protette da coperture o schermi che richiedono l'utilizzo di attrezzi per la rimozione. Accertarsi che le coperture o gli schermi siano reinseriti in seguito a qualunque operazione di manutenzione o di assistenza del prodotto.

**Manutenzione e assistenza**

Non effettuare alcuna operazione di manutenzione o di assistenza non descritta nella documentazione del prodotto.

**Pulizia del prodotto**

Prima di eseguire operazioni di pulizia, scollegare il cavo di alimentazione dalla presa a muro. Utilizzare sempre prodotti specifici per questo apparecchio: l'utilizzo di prodotti diversi da quelli consigliati può comportare un deterioramento delle prestazioni e causare situazioni di pericolo. Non utilizzare detergenti aerosol, che in alcune circostanze possono risultare infiammabili.

## **VORSICHT**

**Die folgenden Warnhinweise gelten für diverse Wartungs- und Pflegearbeiten.**

### **Allgemeine Sicherheitshinweise**

Bei Arbeiten, bei denen kein Strom erforderlich ist, das Gerät ausschalten und den Netzstecker abziehen.

### **Netzanschluss**

Das Gerät muss an eine einwandfrei funktionierende Steckdose angeschlossen sein. Das Gerät muss geerdet sein.

### **Arbeitssicherheit**

Vor jeglichen Arbeiten an einem Stromkreis oder einem mechanischen Antrieb ist immer der Netzanschluss zu trennen. Das Gerät wird durch Abziehen des Netzsteckers abgeschaltet.

### **Belüftung**

Das Gerät darf nur dann in einer Einbauposition installiert werden, wenn für ausreichende -Lüftung gesorgt ist.

### **Gefahrenbereiche im Gerät**

Der Zugang zum Gerät ist durch Abdeckungen und mechanische Verriegelungen auf sichere Bereiche eingegrenzt. Gefahrenbereiche sind mit Abdeckungen versehen, die nur mit Werkzeug entfernt werden können. Diese Abdeckungen müssen nach Reparaturarbeiten durch den Kundendienst wieder ordnungsgemäß eingebaut werden.

### **Wartung/Kundendienst**

Keine Wartungsarbeiten, die nicht in der Dokumentation beschrieben sind, ausführen.

### **Reinigung**

Vor der Reinigung des Geräts den Netzstecker abziehen. Nur die speziell für das Gerät empfohlenen Teile und Verbrauchsmaterialien benutzen, da im anderen Fall schlechte Laufleistung und Sicherheitsrisiken möglich sind. Keine Reinigungssprays verwenden, da diese sich ggf. entzünden können.

## **AVISO**

**Los siguientes son declaraciones generales de aviso aplicables en varias situaciones de servicio o mantenimiento.**

### **Aviso de seguridad general**

Apague la máquina y desenchufe el cable de alimentación de la toma de corriente para realizar tareas que no necesiten que se tenga corriente eléctrica en la máquina. El contacto con la corriente eléctrica puede causar lesiones e incluso la muerte.

### **Fuente de alimentación eléctrica**

Este producto debe utilizarse con el tipo de alimentación eléctrica que se indique en la etiqueta o placa de datos técnicos del producto. Este producto debe conectarse a un circuito con puesta a tierra de protección.

### **Seguridad en el trabajo**

Durante este procedimiento antes de trabajar en algún circuito eléctrico o componente impulsor mecánico desconecte el producto de la corriente eléctrica. El dispositivo de desconexión es el cable de alimentación. Desconecte el enchufe de la toma de corriente.

**Ventilación**

Este producto no debe colocarse en un lugar empotrado al menos que se tenga la ventilación apropiada.

**Áreas accesibles por el operador**

Este producto está diseñado para limitar el acceso del operador solamente a áreas seguras. El acceso del operador a áreas de peligro se limita mediante cubiertas y protectores que para quitarlos es necesario utilizar alguna herramienta. Asegúrese de volver a colocar las cubiertas y los protectores correctamente después de cada tarea de servicio o mantenimiento.

**Mantenimiento/Servicio**

No realice ninguna operación de mantenimiento o servicio en este producto si no está descrita en esta documentación de servicio.

**Limpieza**

Antes de limpiar este producto, desenchúfelo de la toma de corriente. Utilice siempre materiales designados específicamente para este producto; el uso de otros materiales puede producir un funcionamiento defectuoso o crear situaciones de peligro. No utilice limpiadores de aerosol; en ciertas circunstancias pueden llegar a ser inflamables.

**Precautions**

1. Be sure that all built-in protective devices are in place. Restore any missing protective covers.
2. When re-installing chassis and assemblies, be sure to restore all protective devices, including control knobs and compartment covers.
3. Design Alteration Warning: Never alter or add to the mechanical or electrical design of this equipment, such as auxiliary connectors, etc. Such alterations and modifications will void the manufacturer's warranty.
4. Components, parts, and wiring that appear to have overheated or are otherwise damaged should be replaced with Xerox spare parts. Always determine the cause of damage or overheating, and correct any potential hazards.
5. Observe the original harness routing, especially near sharp edges, AC, and high voltage power supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board.
6. Product Safety Notice: Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they provide could be lost if a replacement component differs from the original. This holds true, even though the replacement may be rated for higher voltage, wattage, etc.
7. Components critical for safety are indicated in the parts list with symbols shown below. Use only replacement components that have the same ratings, especially for flame resistance and dielectric specifications. A replacement part that does not have the same safety characteristics as the original may create shock, fire, or other safety hazards.

**Lithium battery precautions**

The Main PWBA is provided with a lithium Cell designated BAT1. Observe the following precautions:

There could be a danger of explosion if the battery is subject to forced discharge or reverse voltage.

The battery must only be replaced with the same type.

The battery should only be replaced at a service centre not at a customer location

The replacement battery must be the same type and manufacturer as the original.

Lithium batteries contain substances which are subject to control and should not be opened, crushed or burned during disposal.

## Précautions

1. Vérifier que tous les dispositifs de protection intégrés sont en place. Replacer les panneaux de protection manquants.
2. Lors de la réinstallation du châssis et des différentes pièces, veiller à bien replacer tous les dispositifs de protection, y compris les boutons de contrôle et les couvercles de compartiment.
3. Avertissement relatif aux modifications de conception : Ne jamais modifier la structure mécanique ou électrique de cet équipement (en ajoutant, par exemple, des connecteurs auxiliaires, etc.). De telles transformations et modifications annuleraient la garantie du constructeur.
4. Tout composant, pièce ou câblage ayant été exposé à une surchauffe ou endommagé d'une quelconque autre façon doit être remplacé par une pièce Xerox. Toujours déterminer la cause du dommage ou de la surchauffe et éliminer les risques potentiels.
5. Examiner le câblage initial, aux abords notamment des arêtes coupantes, de l'alimentation en courant alternatif et haute tension et toujours s'assurer qu'aucun fil n'est coincé, déplacé ou endommagé. Ne pas modifier l'espacement des composants et de la carte de circuit imprimé.
6. Sécurité produit : Certaines pièces mécaniques et électriques présentent des caractéristiques de sécurité particulières qui peuvent ne pas être évidentes à l'œil nu. Ces caractéristiques de sécurité et la protection qu'elles assurent risquent de disparaître si un composant de rechange différent du composant d'origine est utilisé. Ceci est vrai même dans le cas où la pièce de rechange serait destinée à un voltage, à un ampérage, etc., supérieur.
7. Les composants essentiels pour la sécurité sont indiqués dans la liste des pièces par les symboles décrits ci-dessous. Utiliser uniquement des composants de rechange présentant les mêmes caractéristiques assignées, surtout en matière de tenue à la flamme et de spécifications diélectriques. Une pièce de rechange ne présentant pas les mêmes caractéristiques de sécurité que la pièce d'origine peut provoquer des accidents : électrocution, incendie, et autres dangers pour la sécurité.

### Précautions relatives aux piles au Lithium

La carte PWBA est équipée d'une pile au lithium identifiée BAT1. Observez les précautions suivantes : Il existe un risque d'explosion si la pile est l'objet d'une alimentation forcée ou d'un voltage inversé. Une pile ne doit être remplacée que par une de même type. La pile ne doit être remplacée que dans un Centre de maintenance et non chez le client. Les piles de remplacement doivent être de même type et fabrication que celles d'origine. Les piles au Lithium contiennent des substances qui nécessitent des contrôles et ne doivent pas être ouvertes, écrasées ou brûlées.

## Precauzioni

1. Accertarsi che non manchino dispositivi di protezione. Rimettere in sede eventuali coperture di protezione mancanti.
2. Durante l'installazione di coperture e gruppi, accertarsi che siano presenti tutti i dispositivi di protezione, comprese manopole di controllo e coperture nelle diverse aree.
3. Avvertenza: non modificare la struttura meccanica o elettrica della macchina, quali connettori ausiliari, ecc. Eventuali modifiche o alterazioni renderanno nullo il certificato di garanzia del produttore.
4. Componenti, parti e cablaggio che appaiono surriscaldati o danneggiati vanno sostituiti da parti di ricambio Xerox. Stabilire la causa del problema e intervenire in modo adeguato per evitare che si ripresenti.
5. Mantenere il percorso originale del cablaggio, in particolare in prossimità di bordi, per CA e alimentazione elettrica ad alta tensione. Verificare che il cablaggio non sia strozzato, fuori sede o consumato. Non alterare lo spazio tra i componenti e la scheda del circuito stampato.
6. Avviso sulla sicurezza del prodotto: alcuni componenti elettrici e meccanici possiedono delle funzioni di sicurezza non sempre ovvie durante l'ispezione visiva. Queste funzioni possono non essere più attive se un componente viene sostituito con uno diverso dall'originale. Questo vale anche se le parti di ricambio hanno specifiche più elevate, ad esempio, di alta tensione, potenza nominale, ecc.
7. I componenti per la sicurezza più importanti sono riportati nell'elenco delle parti di ricambio con i simboli illustrati qui di seguito. Utilizzare solo componenti con gli stessi valori, in particolare per quanto



riguarda i valori di resistenza al calore e le specifiche dielettriche. Una parte di ricambio con funzioni di sicurezza diverse dalla parte originale può causare condizioni di pericolo quali scosse elettriche e incendi.

### **Precauzioni della batteria al litio**

La PWBA (scheda a circuito stampato) principale è fornita di una batteria al litio (BAT1).

Osservare le precauzioni riportate di seguito.

La batteria può esplodere se soggetta ad una forzata scarica o tensione inversa.

Sostituire la batteria **ESCLUSIVAMENTE** con una dello stesso tipo.

Sostituire la batteria presso un centro di assistenza tecnica e accertarsi che la batteria di sostituzione sia dello stesso tipo e marca dell' originale.

Le batterie al litio contengono sostanze soggette a controllo e non devono essere aperte, frantumate o bruciate durante l' eliminazione.

### **Vorsichtsmaßnahmen**

1. Darauf achten, dass alle Sicherheitsvorrichtungen vorhanden sind. Evtl. fehlende Sicherheitsabdeckungen einbauen.
2. Beim Zusammenbau von Komponenten und Gehäuse alle Sicherheitsvorrichtungen sowie Steuerknöpfe und Abdeckungen installieren.
3. Bauartänderungen: keinerlei Änderung an der mechanischen oder elektrischen Bauart des Geräts, z. B. durch Installation von Zusatzanschlüssen, durchführen. Bei solchen Änderungen wird die Garantie des Herstellers ungültig.
4. Komponenten oder Kabel/Drähte, die überhitzt oder anderweitig beschädigt sind, müssen durch Ersatzteile von Xerox ersetzt werden. Die Ursache einer Überhitzung muss immer gesucht und entsprechende Gefahrenquellen beseitigt werden.
5. Kabelbaum, Netzkabel und Hochspannungskabel besonders in der Nähe scharfer Kanten auf Schäden und Positionsänderungen überprüfen. Der Abstand zwischen Komponenten und der Leiterplatte darf nicht geändert werden.
6. Gerätesicherheit: Einige elektrische und mechanische Komponenten verfügen über bestimmte, nicht sichtbare, Sicherheitsmerkmale. Werden Komponenten durch solche anderer Bauart ersetzt, bieten diese ggf. nicht denselben Gefahrenschutz wie die Originalkomponenten. Das gilt auch dann, wenn die Ersatzteile für eine höhere Spannung ausgelegt sind, o. Ä.
7. Für die Betriebssicherheit wichtige Komponenten sind in der Teileliste mit dem unten gezeigten Symbol gekennzeichnet. Es dürfen nur Ersatzteile mit der gleichen Sicherheitsauslegung, insbesondere mit den gleichen dielektrischen und flammhemmenden Spezifikationen, verwendet werden. Bei Einbau einer Komponente mit einer anderen Sicherheitsauslegung als der des Originals bestehen Stromschlag-/Brand- und weitere Sicherheitsrisiken.

### **Lithiumbatterie**

Das Haupt-PWBA enthält eine Lithiumbatterie (BAT1). Folgende Hinweise beachten:

Bei Rückspannung oder erzwungener Entladung besteht Explosionsgefahr.

Die Batterie darf nur durch eine Batterie gleichen Typs ersetzt werden.

Die Batterie darf nur im Kundendienstzentrum, nicht aber im Haus des Kunden, ersetzt werden.

Die Ersatzbatterie muss vom gleichen Typ und Hersteller sein, wie das Original.

Lithiumbatterien müssen den vorschriftmäßig entsorgt werden.

### **Precauciones**

1. Asegúrese de que todos los dispositivos de protección incorporados están en su sitio. Restaure las cubiertas protectoras que falten.
2. Al reinstalar el chasis y los ensamblajes, asegúrese de restaurar todos los dispositivos de protección, incluyendo mandos de control y cubiertas de compartimientos.

3. Aviso de alteración del diseño: Nunca altere o agregue nada al diseño mecánico o eléctrico de este equipo, como conectores auxiliares, etc. Tales alteraciones y modificaciones anularán la garantía del fabricante.
4. Los componentes, piezas y cables que parezcan haber sufrido sobrecalentamiento o daños de otro tipo deben reemplazarse por piezas de repuesto de Xerox. Siempre determine la causa del daño o sobrecalentamiento y corrija cualquier tipo de riesgo potencial.
5. Observe la ruta original de los mazos de cables, especialmente cerca de bordes afilados, CA y alimentaciones eléctricas de alto voltaje. Siempre inspeccione si los cables están pellizcados, fuera de lugar o pelados. No cambie el espacio entre los componentes y la tarjeta de circuito impreso.
6. Aviso de seguridad del producto: Algunas piezas eléctricas y mecánicas tienen características especiales relacionadas con la seguridad que pueden pasar desapercibidas a una inspección visual. Estas funciones de seguridad y la protección que proporcionan podría perderse si un componente de repuesto difiere del original. Esto es verdadero, aunque la pieza de repuesto admita un voltaje o vatios más altos, etc.
7. Los componentes críticos para la seguridad se indican en la lista de piezas con símbolos mostrados debajo. Use sólo componentes de repuesto que tengan los mismos valores, sobre todo en cuanto a resistencia al fuego y especificaciones dieléctricas. Una pieza de recambio que no tenga las mismas características de seguridad que la original puede producir una descarga, fuego u otros riesgos de seguridad.

**Precauciones con la batería de litio.**

El PWBA principal tiene una batería de litio denominada BAT1. Observe las precauciones siguientes:

Podría producirse peligro de explosión si la batería se ve sometida a descarga forzada o tensión inversa.

La batería solamente debe cambiarse por otra del mismo tipo.

La batería debe cambiarse solamente en un centro de servicio y no donde el cliente.

Las baterías de litio contienen sustancias sujetas a control y no deben abrirse, aplastarse ni quemarse para deshacerse de ellas.

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## 2. Service Call Procedures

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### SCP 1 Initial Actions

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The Service Call Procedures section is used to identify a suspected problem with the machine.

Start a service call with Initial Actions and end with SCP 6 Final Actions.

Initial Actions are used to gather information of the machine performance.

#### Procedure

#### Warning

**Switch off the power to the machine and disconnect the power cord from the outlet while performing tasks that do not need the electricity on. Electricity can cause death or injury.**

*NOTE: Ignore any references in this manual to options not installed on the machine.*

*NOTE: If the machine is equipped with FAX, do not service or interrupt power until the jobs in the FAX Queue are completed, or the FAXs in the queue may be lost.*

1. Take note of symptoms, error messages or error codes.
2. Ask the operator to describe or demonstrate the problem.
3. If the problem is the result of incorrect operator action, refer the operator to the user documentation.
4. Make sure that:
  - a. The power cord is connected to the wall outlet and to the machine.
  - b. Documents are not loaded.
  - c. Paper is loaded correctly and all paper trays and covers are closed.
  - d. The telephone line cable is connected correctly between the line socket and the wall jack.
  - e. The telephone line is good.
  - f. Connection cable between the machine and any computer or computer network is correctly connected and in good condition.
5. Check the machine service log book for any previous actions that may be relevant to the call.
6. Either perform SCP 2 First Call Actions or SCP 3 Normal Call Actions.

### SCP 2 First Call Actions

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First Call Actions are used for the first service call.

#### Procedure

Perform the following:

1. Check the machine configuration with the customer. Check that all required hardware and software is installed and / or enabled.
2. Check that all the relevant machine settings are correctly entered.
3. If a fault is present, go to SCP 3 Normal Call Actions. If there is no fault present, go to SCP 6 Final Actions.

## SCP 3 Normal Call Actions

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Normal Call Actions are used to determine the reason for the service call.

### Procedure

*NOTE: If an error message appears at any time. Refer directly to the error code tables in 1-1 Error Codes RAP, and perform the procedure.*

Perform the Following:

1. Review any defective print or copy samples.
2. If the LCD is completely blank, switch off the machine. Wait 10 seconds. Switch on the machine. If the LCD is still blank, go to 7-6 Malfunction, No Power (LCD or LED).
3. If connected to a network, verify with the customer, that it is permissible to disconnect the machine from the network.
4. Check and record the total number of images made by the machine.
5. Make a note of any parts requiring cleaning or replacement, refer to 7-1 Preventative Maintenance.
6. Go to SCP4 Fault Analysis.

## SCP 4 Fault Analysis

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Fault Analysis is used to identify a fault.

### Procedure

Exercise the machine in all modes until the fault is determined.

Perform the following:

- If an error message is displayed, go to 7-2 Diagnostics.
- If an image defect is evident, go to 7-3 Scanner.
- If there are problems in sending or receiving FAXs, go to 7-4 FAX.
- If a print defect is evident, go to 7-5 Print Quality.
- If the machine is malfunctioning, go to 7-6 Malfunction.
- When the fault is corrected, go to SCP 5 Final Actions.

## SCP 5 Final Actions

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Final Actions are used to evaluate the total operation of the system and to identify the actions required to complete the service call.

### Procedure

Complete the following:

- Perform any remaining cleaning or replacement actions, referred to in SCP 3.
- Exercise the machine in all modes, making copies and / or prints from all trays, utilising the ADF and the document glass.
- If necessary, make a proof copy of a customer document.
- Remove and destroy any copies of test patterns.
- Provide customer training if required.
- If any of the customers selections were changed, return them to the customers preferred settings.
- Complete all administrative tasks.

Ensure the machine and service area are clean before leaving the customer premises.

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## 3. Precautions

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Follow these ESD precautions to prevent equipment damage.

1. Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called “Electrostatically Sensitive (ES) Devices”, or ESDs. Examples of typical ESDs are: integrated circuits, some field effect transistors, and semiconductor “chip” components.

The techniques outlined below should be followed to help reduce the incidence of component damage caused by static electricity.

### CAUTION

*Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.*

2. Before handling a semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by using the standard Xerox ESD protection kit, which should be removed for your personal safety reasons prior to applying power to the machine.
3. After removing an electrical assembly equipped with ESDs, place the assembly on the conductive mat of the ESD kit, to prevent electrostatic charge buildup in the vicinity of the assembly.
4. Use only a grounded tip soldering iron to solder or de-solder ESDs. Use only an “anti-static” solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ESDs.
5. Do not use Freon-propelled chemicals. When sprayed, these can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective packaging until immediately before installing it. Most replacement ESDs are packaged with all leads shorted together by conductive foam, aluminum foil, or a comparable conductive material.
7. Immediately before removing the protective shorting material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
8. Maintain continuous electrical contact between the ESD and the assembly into which it will be installed, until completely plugged or soldered into the circuit.
9. Minimize bodily motions when handling un-packed replacement ESDs. Normal motions, such as the brushing together of clothing fabric and lifting one’s foot from a carpeted floor, can generate static electricity sufficient to damage an ESD.

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## 4. Specifications

### 4-1 WorkCentre Pro 412 Specifications

#### 4-1-1 Printer

Printing method	Laser scanning unit + electro photography
Print speed	12 PPM (Letter size, 5% area coverage)
Resolution	True 600 X 600 DPI
Emulation	PCL6
Operation system	Windows 95/98/2000/NT 4.0/Win-ME/XP
Interface	IEEE1284 (Nibble/ECP)
	USB (Windows 98/2000 only, without HUB mode)
Source of Light	Laser diode (LSU)
Feed method	Cassette type and multi-purpose tray
Feed direction	FISO (front-in side-out)
Paper	Size
	Normal paper: A4, letter, legal, B5
	Executive, A5
	Envelope: normal envelope
	Length: 149 to 356mm (5.87 to 14 inches)
	Width: 100 to 216mm (3.94 to 8.5 inches)
	Weight: For MPF, 60 to 90gsm (16 to 24 bond/xerographic)
	For cassette, 60-163 gsm (16 to 40 bond/xerographic)
Paper capacity	MPF: 100 sheets (based on 80gsm, 20 lb.)
	Cassette: 550 sheet (based on 80gsm, 20 lb.)
Paper stacker capacity	Face Down: 250 Sheets (80gsm, 20 lb.)
Warming up time	Stand-by: 20 seconds
First printing time	Power save mode: 30 seconds
Minimum PC spec	Pentium II 300 MHz, 64MB RAM
Duplex printing	Yes

## 4-1-2 Facsimile

Machine type	Desk top
Applicable line	G3 PSTN
Compatibility	ITU Group 3
Data coding	MH/MR/MMR/JPEG (colour FAX transfer)
FAX Mode	Standard, fine, super fine, halftone
Modem speed	33,600 bps
Transmission speed	Approx. 3 sec.
Effective scanning width	208 mm (8.2 inches)
Memory	4 M Byte
Halftone	256 levels
Automatic document feeder	30 pages (75gsm)
LCD	16 characters x 2 lines

## 4-1-3 Scanner

Operation System	Windows 95/98/2000/NT 4.0/Win-ME
Interface	IEEE 1284 (ECP Support), USB (without HUB Mode)
Compatibility	TWAIN standard, WIA
Device	Color CCD (charge coupled device) module
Scan width	Max.: 216 mm (8.5 inches), effective: 208 mm (8.2 inches)
Color depth	Internal 36 bit, external 24 bit
Optical resolution (H x V)	600 x 600 dpi
Interpolation resolution	Max. 4800 dpi
Pre-scan mode	Yes, 75 dpi
Scan speed	Mono: 1.25 msec/line, Color: 5 msec/line
	(Pentium II 300MHz, 64MB Memory)



## 4-1-4 Copier

Copy mode	B/W
Scanner type	CCD, Flat-bed with automatic document feeder
Maximum original size	A4/letter
Maximum paper size	A4/letter/legal
Maximum scan width	216 mm (8.5 inches)
Optical resolution	600 x 600 dpi
Copy quality	Text/photo/mixed
Paper type selection	Plain, label, card stock, index, transparency
Mono copy speed (Note 1)	Platen (SDMP): 12 cpm
	ADF (SDMP): 12 cpm
	ADF (MDPS): text/mixed:6.6 cpm, photo: 3.3cpm
Effective print-edge margin	Top: 4mm, bottom: 4mm, each side: 4mm (0.16 inches)
Multi copy	999 pages (memory multi copy: mono fast mode only)
Zoom Rate	Platen: 25% ~ 400% (1% step)
	ADF: 25% ~ 100% (1% step)
Fixed reduction/enlargement settings	100%, autofit, clone
Contrast control	5 steps
FCOT (platen/ADF)	9.8sec(300 dpi), 18sec(600dpi)

**Note 1:**

Speed claims based on the test chart: Printed spdtst.sam(mono)/letter size.

SDMP = single document multiple printout

MDSP = multiple document single printout

## 4-1-5 Power Supply

Power rating	AC 110V to 127V $\pm$ 15% 50/60Hz $\pm$ 3Hz,
	AC 220V to 240V $\pm$ 15% 50/60Hz $\pm$ 3Hz
Power consumption	Average. 300W
Power saving consumption	Average. 30W

### 4-1-6 Dimension

---

Machine size (W x D x H)	554.5x 433.9 x 459.1 mm (21.8 x 17 x 18 inches)
Machine weight	About 23 Kg (50.6 pounds) with CRU

### 4-1-7 Packaging

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Power cord	1ea (USA standard, ivory)
IEEE 1284 cable	No
USB cable	1ea
CD-ROM	1ea
Cartridge	Drum CRU 1EA, toner CRU 1EA
Manual	1vol.

### 4-1-8 Environmental Condition

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Absolute storage	Temperature-	20 to 40 degrees C (68 to 104 degrees F)
	Humidity	10% RH to 95% RH
Recommended operating condition	Temperature	6 to 30 degrees C (43 to 86 degrees F)
	Humidity	30% RH to 70% RH

### 4-1-9 Machine Life

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Product life	5 years
Product life in pages	150,000 printing pages (A4 size, 5% area coverage)
Maximum monthly duty cycle	2,500 printing pages (A4 size, 5% area coverage)

## 4-2 FaxCentre F12 Specifications

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

### 4-2-1 General Specifications

Type of Unit	Desktop
Operation System	Win95/98/ME/ NT /2000/XP
Duplex Printing	Yes (Default)
Interface	IEEE1284 (Nibbel/ECP)
	USB (without HUB mode)
CPU	66 MHz (KS32C61200)
Emulation	PCL6
Warming up Time	41 Sec. (Stand-By), 25°C
Absolute Storage Condition	Temperature: -20°C ~ 40°C, Humidity: 10% RH ~ 95% RH
Operating Condition	Temperature: 10°C ~ 32°C, Humidity: 20% RH ~ 80% RH
Recommended Operating Condition	Temperature: 16°C ~ 30°C, Humidity: 30% RH ~ 70% RH
Dimension (W X D X H)	560 X 433 X 459 mm (22 x 17 X 18 inches)
Weight	About 22.5 Kg (49.5 pounds) with CRU
Acoustic Noise	Less than 56/47 dB (Copy/Printing mode)
Power Rating	AC 100VAC ~ 127VAC ± 15%, 50/60Hz ± 3Hz
Power Consumption	Average. 320W (No load Condition)
Power Save Consumption	Average. 25W
Minimum System Requirement	Pentium II 233 Mhz, 64 MB RAM, 120MB (Hard Disk)
Recommended System Requirement	Pentium II 400Mhz, 128 MB RAM, 220MB (Hard Disk)
LCD	16 characters X 2 lines
Memory	4 Mbyte for flash Memory, 20 Mbyte for DRAM
Maximum Monthly Duty Cycle	2500 pages/month
Engine Life	150,000 pages

## 4-2-2 Printer Specifications

Printing Method	Laser Scanning Unit + Electro Photography
Speed	Single Side: 12 PPM (Letter Size, 5% Character Pattern)
	Duplex: 7.5 Images/Min. (Letter Size, 5% Character Pattern)
Source of Light	LSU (Laser Scanning Unit)
Duplex Printing	Yes (Default)
Resolution (Horizontal X Vertical)	True 600 X 600 DPI, 1200 DPI Class
Feed Method	Cassette Type, By Pass Tray, ADF (Automatic Document Feeder)
Feed Direction	FISO (Front-In Side-Out)
Paper Capacity (Input)	Cassette: 550 Sheets By Pass Tray: 100 Sheets (based on 80gsm, 20lb) Optional Paper Tray: 550 Sheets
Paper Capacity (Output)	Face Down: 250 Sheets
Effective Print Width	203 ± 1mm (8 inch)

## 4-2-3 Facsimile Specification

Standard Recommendation	ITU-T Group3 (ITU: International Telecommunications Union)
Application Circuit	PSTN or behind PABX (PSTN: Public Switched Telephone Network. PABX: Private Automatic Branch Exchange)
Data coding (Compression)	MH/MR/MMR/JBIG (transmission) JPEG (transmission)
Modem speed	33600/28800/14400/12000/9600/7200/4800/2400 bps
Transmission Speed	Approximately 3 sec. (33,600 bps)
Effective Scanning Width	208 mm (8.2 inches)
Halftone	256 Levels
Paper Capacity (Input)	ADF (Automatic Document Feeder): 50Sheets (80gsm)
FAX Mode	Standard /Fine/Super Fine
Memory	6.5 MB

## 4-2-4 Scanner Specification

Type	Sheet fed (with ADF)
Speed	Mono: 1.25 msec/line, Color: 5 msec/line
Device	Color CIS (Contact Image Sensor) Module
Interface	IEEE1284 (ECP Support) USB (without HUB Mode)
Compatibility	TWAIN Standard, WIA
Optical Resolution (H X V)	300 X 300 dpi
Halftone	256 Levels
Effective Scan width	208 mm (8.2 inches)

## 4-2-5 Copy Specification

Mode	B/W
Quality	Text/Photo/Mixed
Mono Copy Speed <sup>(1)</sup>	ADF (MDSP): Text/mixed: Approx. 7 cpm : Photo: Approx. 3 cpm
Optical Resolution (H x V)	300 X 300 dpi
Multi Copy	999 pages
Maximum Original Size	Legal
Maximum Page Size	Legal
Paper Type Selection	Plain, Legal, Card stock, Transparency
Zoom Range	ADF: 25~200% (1% step)

**NOTE:**

- (1) Speed claims based on the test chart: Letter size.  
 SDMP: Single Document Multiple Printout  
 MDSP: Multiple Document Single Printout

## 4-2-6 Telephone Specification

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1Touch Dial	50 EA (1~25, shift key + 26~50)
Speed Dial	200 EA
Tone/Pulse	Tone only user mode Tone/Pulse selectable in tech mode.

## 4-2-7 Consumables

---

Type		Separate type (Toner Cartridge / Drum Cartridge)
Life	Toner Cartridge	6,000 sheets (5% coverage pattern, simplex normal mode)
	Drum Cartridge	15,000 sheets (simplex normal mode)

## 4-3 WorkCentre M15/M15i Specifications

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

### 4-3-1 General Specifications

Type of Unit	Desktop
Operation System	Win95/98/ME/ NT4.0/2000/XP
Duplex Printing	Yes(Default)
Interface	IEEE1284(Nibbel/ECP)
	USB(without HUB mode)
CPU	120 MHz(ARM 946ES)
Emulation	PCL6
Warming up Time	30 Sec (Stand-By), 25°C
Absolute Storage Condition	Temperature : -20°C ~ 40°C, Humidity : 10% RH ~ 95% RH
Operating Condition	Temperature : 10°C ~ 32°C, Humidity : 20% RH ~ 80 % RH
Recommended Operating Condition	Temperature : 16°C ~ 30°C, Humidity : 30% RH ~ 70% RH
Dimension(W X D X H)	560 X 433 X 459 mm
Weight	About 22.5 Kg(with CRU)
Acoustic Noise	Less than 56/50 dB(Copy/Printing mode)
Power Rating	AC 100VAC ~ 127VAC ± 15 %, 50/60Hz ± 3Hz AC 220VAC ~ 240VAC ± 15 % , 50/60Hz ± 3Hz
Power Consumption	Avg. 320Wh
Power Save Consumption	Avg. 35Wh
Recommended System Requirement	Pentium IV 1.2Ghz, 128 MB RAM, 220MB(Hard Disk)
Minimum System Requirement	Pentium II 400Mhz, 64 MB RAM, 120MB(Hard Disk)
LCD	16 characters X 2 lines
Memory	4 Mbyte for flash Memory , 16 Mbyte for SDRAM

## 4-3-2 Printer Specifications

Printing Method	Laser Scanning Unit + Electro Photography
Speed	Single Side : 15 PPM (Letter Size, 5% Character Pattern)
	Duplex : 7.5 IPM (Images/Min) (Letter Size, 5% Character Pattern)
Source of Light	LSU(Laser Scanning Unit)
Duplex Printing	Yes(Default)
Resolution(Horizontal X Vertical)	True 600 X600 DPI , 1200 DPI Class
Feed Method	Cassette Type , By Pass Tray, ADF(Automatic Document Feeder)
Feed Direction	FISO(Front-In Side-Out)
Paper Capacity(Input)	Cassette : 550 Sheets By Pass Tray : 100 Sheets(based on 80gsm, 20lb)
Paper Capacity(Output)	Face Down : 250 Sheets
Effective Print Width	203 ± 1mm (8 inch)



### 4-3-3 Facsimile Specification

Standard Recommendation	ITU-T Group3(ITU : International Telecommunications Union)
Application Circuit	PSTN or behind PABX (PSTN : Public Switched Telephone Network. PABX : Private Automatic Branch Exchange)
Data coding(Compression)	MH/MR/MMR/JPEG(Transmission)
Modem speed	33600 /14400/12000/9600/7200/4800/2400 bps
Transmission Speed	Approximately 3 sec(33,600 bps)
Effective Scanning Width	8.2 inches(208 mm)
Halftone	256 Levels
Paper Capacity(Input)	ADF(Automatic Document Feeder) : 30Sheets(80gsm/20lb)
FAX Mode	Standard /Fine/Super Fine/Halftone
Memory	4MB

### 4-3-4 Scanner Specification

Type	Flatbed(with ADF)
Speed	Mono : 1.2 msec/line, Color : 2.5 msec/line
Device	Color CCD(Charge Coupled Device) Module
Interface	IEEE1284(ECP Support) USB(without HUB Mode)
Compatibility	TWAIN Standard
Optical Resolution(H X V)	600 X 600 dpi
Interpolation Resolution	Max. 4800 dpi
Halftone	256 Levels
Effective Scan width	8.2 inches(208 mm)

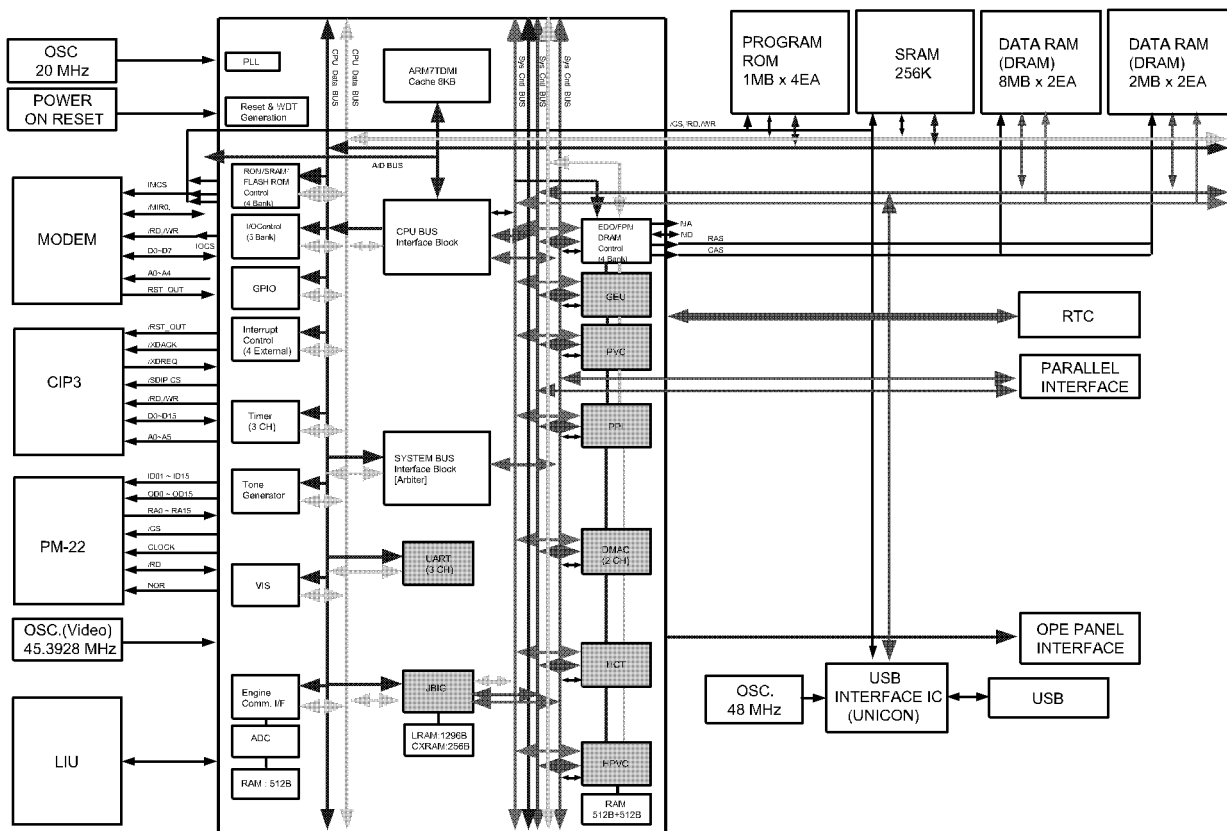


# 5. Circuit Description

## 5-1 Main PBA (WorkCentre Pro 412 & FaxCentre F12)

### 5-1-1 Summary

The main circuit that consists of CPU, MFP controller (built-in 32bit RISC processor core: ARM7TDMI) including various I/O device drivers, system memory, scanner, printer, motor driver, PC I/F, and FAX transceiver controls the whole system. The entire structure of the main circuit is on the following page.

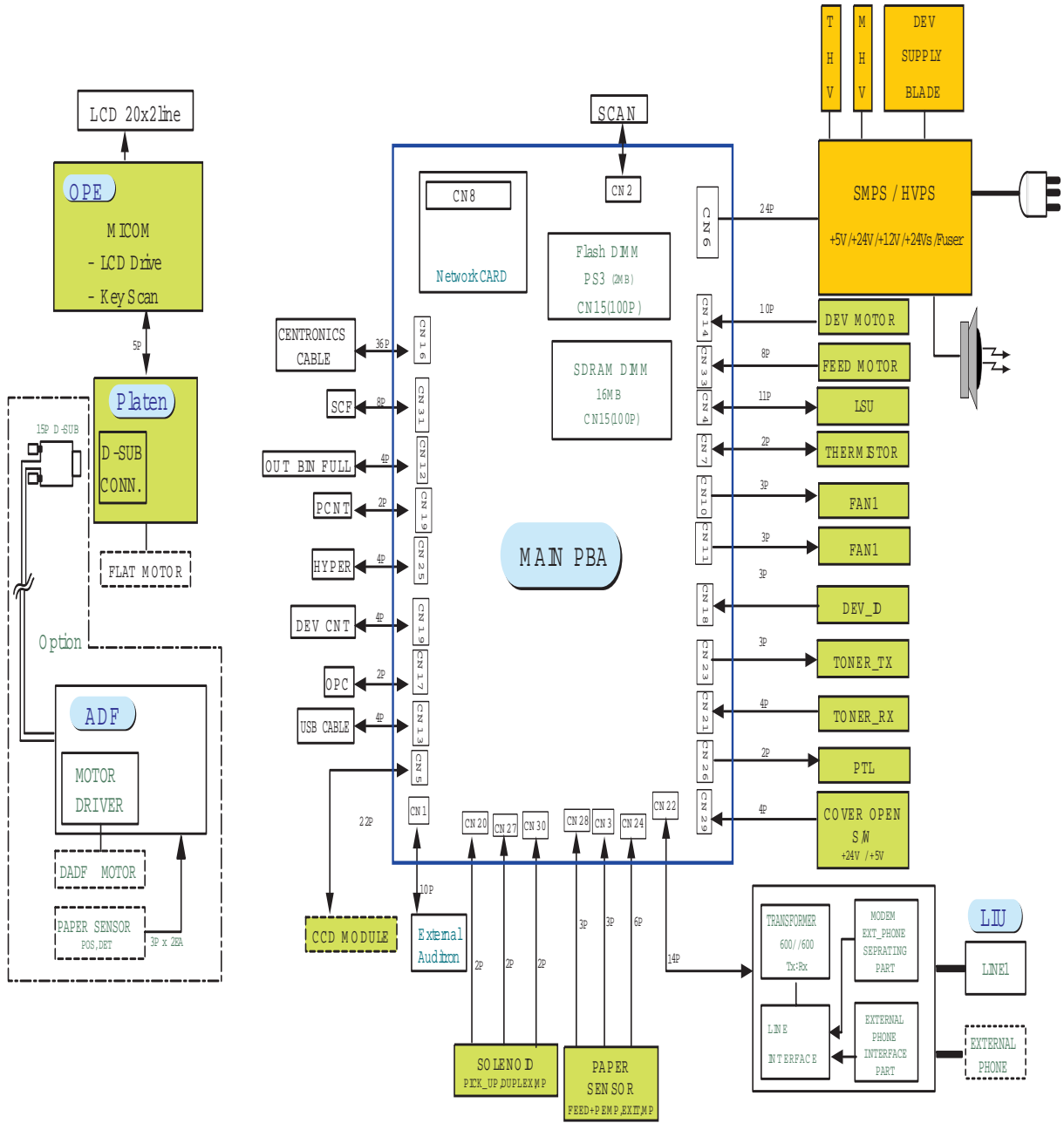


Block Diagram

## 5-2 Main PBA (WorkCentre M15/M15i)

### 5-2-1 Summary

The main circuit that consists of CPU, MFP controller (built-in 32bit RISC processor core: ARM7TDMI) including various I/O device drivers, system memory, scanner, printer, motor driver, PC I/F, and FAX transceiver controls the whole system. The entire structure of the main circuit is on the following page.



Block Diagram

## 5-3 Circuit Operation

### 5-3-1 Clock

#### 1) System Clock (WorkCentre Pro 412 & FaxCentre 12)

Device	Oscillator
Frequency	20MHz

- KS32C61200 RISC PROCESSOR: drives PLL internally and uses 60MHz.

#### 1) System Clock (WorkCentre M15/M15i)

Device	Oscillator
Frequency	12MHz

- ARM946ES RISC PROCESSOR: drives PLL internally uses 120MHz and external Bus uses 60 MHz.

#### 2) Video Clock (WorkCentre Pro 412 & FaxCentre 12)

Device	Oscillator
Frequency	45.3928 MHz

- $F_{vd} = ((\text{PAPER 1SCAN LINE sending time} * \text{SCAN effective late} / \text{1SCAN LINE DOT \#}) * 4$   
 $= (600\text{dpi} * 600\text{dpi} * 58.208\text{mm/s} * 216\text{mm} * 4) / (25.4\text{mm} * 25.4\text{mm} * 76.1\%) = 28.697\text{MHz}$ .
- PAPER 1SCAN LINE sending time = SCAN LINE interval / DOCUMENT SPEED (58.208mm/S)
- 1SCAN LINE DOT # = MAZ SCAN distance (216mm) \* DOT # per 1mm.

#### 2) Video Clock (WorkCentre M15/M15i)

Device	Oscillator
Frequency	57.0167MHz

- $F_{vd} = ((\text{PAPER 1SCAN LINE sending time} * \text{SCAN effective late} / \text{1SCAN LINE DOT \#}) * 4$   
 $= (600\text{dpi} * 600\text{dpi} * 58.208\text{mm/s} * 216\text{mm} * 4) / (25.4\text{mm} * 25.4\text{mm} * 76.1\%) = 28.697\text{MHz}$
- PAPER 1SCAN LINE sending time = SCAN LINE interval / DOCUMENT SPEED (58.208mm/S)
- 1SCAN LINE DOT # = MAZ SCAN distance (216mm) \* DOT # per 1mm

#### 3) USB Clock

Device	Oscillator
Frequency	48MHz

#### 4) PM-22 Clock (WorkCentre Pro 412 & FaxCentre 12)

Device	Oscillator
Frequency	66MHz

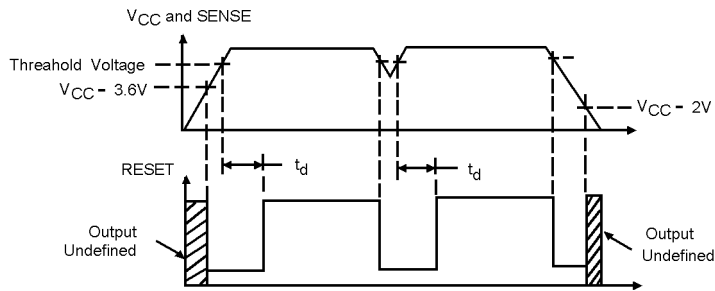
### 5-3-2 Power on/off Reset (WorkCentre Pro 412 & FaxCentre 12)

#### 1) Signal Operation

Input Signal                    +5V Power Line (VCC)  
 Output Signal                KS32C61200 nRESET 29F800B nRESET  
 • Power on/off detect      VCC RISING/FALLING 4.5%4.6V

Reset time (Td)                1.48 to 1.52ms  
 •  $T_d = (C_t \cdot V_{\text{sensing}}) / I_{\text{charge}}$  (... $C_t = 33\mu\text{F}$ ,  $I_s = 100\mu\text{A}$ )

#### 2) Timing Chart



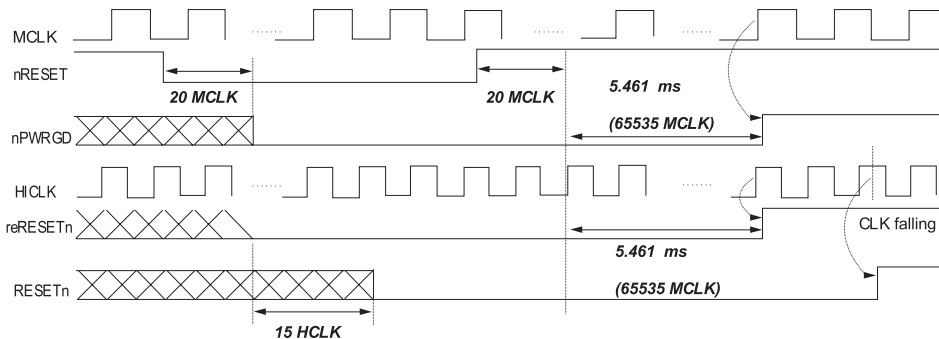
### 5-3-3 Power on/off Reset (WorkCentre M15/M15i)

#### 1) Signal Operation

Input Signal                    +3.3V Power Line (VCC)  
 Output Signal                ARM946ES nRESET and 29LU16ø  
 • POWER ON/OFF DETECT VCC RISING/FALLING 4.5%4.6V

Reset Time (Td)                1.48 to 1.52ms  
 •  $T_d = (C_t \cdot V_{\text{sensing}}) / I_{\text{charge}}$  (... $C_t=33\mu\text{F}$ ,  $I_s=100\mu\text{A}$ )

#### 2) Timing Chart



### 5-3-4 RISC Microprocessor (WorkCentre Pro 412 & FaxCentre F12)

#### 1) RISC microprocessor pin & interface

No	Pin Name	I/O	Reset Value	Description	PAD
1	DATA0	I/O	Input	CPU Data Bus 0	PHBTT8, 8 mA
2	DATA1	I/O	"	CPU Data Bus 1	"
3	DATA2	I/O	"	CPU Data Bus 2	"
4	DATA3	I/O	"	CPU Data Bus 3	"
5	Vsso	Vss	-	5 V Gnd	
6	DATA4	I/O	Input	CPU Data Bus 4	PHBTT8, 8 mA
7	Vddo	Vdd	-	5 V	
8	DATA5	I/O	Input	CPU Data Bus 5	PHBTT8, 8 mA
9	DATA6	I/O	"	CPU Data Bus 6	"
10	DATA7	I/O	"	CPU Data Bus 7	"
11	DATA8	I/O	"	CPU Data Bus 8	"
12	Vssi	Vss	-	3.3 V Gnd	
13	DATA9	I/O	Input	CPU Data Bus 9	PHBTT8, 8 mA
14	Vddi	Vdd		3.3 V	
15	DATA10	I/O	Input	CPU Data Bus 10	PHBTT8, 8 mA
16	DATA11	I/O	"	CPU Data Bus 11	"
17	DATA12	I/O	"	CPU Data Bus 12	"
18	DATA13	I/O	"	CPU Data Bus 13	"
19	Vsso	Vss	-	5 V Gnd	
20	DATA14	I/O	Input	CPU Data Bus 14	PHBTT8, 8 mA
21	DATA15	I/O	"	CPU Data Bus 15	"
22	DATA16	I/O	"	CPU Data Bus 16	"
23	DATA17	I/O	"	CPU Data Bus 17	"
24	Vsso	Vss	-	5 V Gnd	
25	DATA18	I/O	Input	CPU Data Bus 18	PHBTT8, 8 mA
26	DATA19	I/O	"	CPU Data Bus 19	"
27	DATA20	I/O	"	CPU Data Bus 20	"
28	DATA21	I/O	"	CPU Data Bus 21	"
29	Vddi	Vdd	-	3.3 V	
30	DATA22	I/O	Input	CPU Data Bus 22	PHBTT8, 8 mA

No	Pin Name	I/O	Reset Value	Description	PAD
31	Vssi	Vss	-	3.3 V Gnd	
32	DATA23	I/O	Input	CPU Data Bus 23	PHBTT8, 8 mA
33	DATA24	I/O	"	CPU Data Bus 23	"
34	Vddp	Vdd	-	5 V	
35	DATA25	I/O	Input	CPU Data Bus 23	PHBTT8, 8 mA
36	Vssp	Vss	-	5 V Gnd	
37	DATA26	I/O	Input	CPU Data Bus 23	PHBTT8, 8 mA
38	DATA27	I/O	"	CPU Data Bus 23	"
39	Vddo	Vdd	-	5 V	
40	DATA28	I/O	Input	CPU Data Bus 23	PHBTT8, 8 mA
41	Vsso	Vss	-	5 V Gnd	
42	DATA29	I/O	Input	CPU Data Bus 23	PHBTT8, 8 mA
43	DATA30	I/O	"	CPU Data Bus 23	"
44	DATA31	I/O	"	CPU Data Bus 23	"
45	Vssi	Vss	-	3.3 V Gnd	
46	LFIA0 / OP4	O	H	Line Feed Motor Phase A	PHOB4, 4mA
47	Vddi	Vdd	-	3.3 V	
48	LFIA1 / OP5	O	H	Line Feed Motor Phase /A	PHOB4, 4mA
49	LFIB0 / OP6	O	"	Line Feed Motor Phase B	"
50	LFIB1 / OP7	O	"	Line Feed Motor Phase /B	"
51	TnRST	I		TAP Controller Reset	PHIT
52	TMS	I		TAP Controller Mode Sel	PHIT
53	TDI	I		TAP Controller Data In	"
54	TCK	I		TAP Controller Clock	"
55	TDO	O		TAP Controller Data Out	PHOB4
56	AVdd	Vcca	-	Analog 3.3 V	
57	AVin[0]	I	-	Analog Input 0	PICA
58	AVin[1]	I	-	Analog Input 1	"
59	AVss	Vssa	-	Analog Gnd	
60	AVssAVin[2]	I	-	Analog Input 2	PICA



No	Pin Name	I/O	Reset Value	Description	PAD
61	AVref	I	-	Analog Positive Reference	PICA
62	nIOCS0	O	H	IO Chipselect 0	PHOB4, 4 mA
63	nIOCS2/ToneOut	O	"	IO Chipselect 2 / ToneOut	"
64	nIOCS3/BufferSel	O	"	IO Chipselect 2 / BufferSel	"
65	Vssi	Vss	-	3.3 V Gnd	
66	nSELECTIN	I	-	Select Input	PHIL, ST
67	nFAULT	O	H	Fault for Error Condition	PHOB8, 8 mA
68	nAUTOFD	I	-	Auto Feed	PHIL, ST
69	nINIT	I	-	Initialization	"
70	SELECT	O	L	Parallel Port Select	PHOB8, 8 mA
71	Vddp	Vdd	-	5 V	
72	PERROR	O	L	Paper Error	PHOB8, 8 mA
73	BUSY	O	"	Parallel Port Busy	PHOB8, 8 mA
74	nACK	O	H	Parallel Port Acknowledge	PHOB8, 8 mA
75	Vssp	Vss	-	5 V Gnd	
76	PD0	I/O	Input	Parallel Port Data 0	PHBTT8, 8 mA
77	PD1	I/O	"	Parallel Port Data	"
78	Vddi	Vcca	-	3.3 V	for Ring OSC
79	PD2	I/O	Input	Parallel Port Data	PHBTT8, 8 mA
80	PD3	I/O	"	Parallel Port Data	"
81	Vssi	Vssa	-	3.3 V Gnd	for Ring OSC
82	PD4	I/O	Input	Parallel Port Data	PHBTT8, 8 mA
83	PD5	I/O	"	Parallel Port Data	"
84	Vddo	Vdd	-	5 V	
85	PD6	I/O	Input	Parallel Port Data	PHBTT8, 8 mA
86	PD7	I/O	"	Parallel Port Data	"
87	nSTROBE	I	-	Data Strobe	PHIL, ST
88	Vsso	Vss	-	5 V Gnd	
89	RxD1 / CTin[2]	I	-	Uart 1 Rx Data	PHIL, ST
90	TxD1	O	H	Uart 1 Tx Data	PHOB4, 4 mA

No	Pin Name	I/O	Reset Value	Description	PAD
91	nDREQ1/RxD2/CTin[1]	I	-	DMA Request1/Uart 2 RxD	PHIL, ST
92	nDMACK1 / TxD2	O	H	DMA Ack1/Uart 2 TxD	PHOB4, 4 mA
93	nIOCS1 / nIOCS5	O	"	IO CS1 / DMA IO1 CS	"
94	Vddi	Vdd	-	3.3 V	
95	nDREQ0 /IP1/CTin[0]	I	-	DMA Request0 / Input Port	PHIL, ST
96	nDMACK0 / OP1	O	H	DMA Ack1 / Out Port	PHOB4, 4 mA
97	nIOCS4 / OP2	O	"	DMA IO0 CS / Out Port	"
98	EIRQ0	I	-	External Interrupt 0	PHILU50, ST
99	EIRQ1	I	-	External Interrupt 1	"
100	EIRQ2	I	-	External Interrupt 2	"
101	nWait / EIRQ3	I	-	Wait Request / Ex. IRQ 3	"
102	Vssi	Vss	-	3.3 V Gnd	
103	VCLK	I	-	Video Clock Input	PHIC
104	Vddi	Vdd	-	3.3 V	
105	IP[7] / nFSYNC	I	-	Input Port / Frame Sync	PHIL, ST
106	nLSYNC	I	-	Line Sync	"
107	OP[8] / nPRINT	O	H	Out Port / Print Start	PHOB4, 4 mA
108	Vssi	Vss	-	3.3 V Gnd	
109	VDO	O	H	Video Data Output	PHOB16, 16mA
110	Vsso	Vss	-	5 V Gnd	
111	CCLK / PWM[0]	O	H	Com. Clock / PWM [0]	PHOB4, 4 mA
112	nEPRDY / RxD0	I	-	Engine Power Ready / Uart 0 Rx Data	PHIL, ST
113	nCBSY / TxD0	O	H	Command Busy / Uart 0 Tx Data	PHOB4, 4 mA
114	nEMSG / PWM[1]	I/O	Input	Eng. Message / PWM [1]	PHBLT4,ST,4mA
115	nEBSY / nLsuReady	I	-	Eng. Busy / LSU Ready	PHIL, ST
116	nCMMSG / PWM[2]	O	H	Com. Busy / PWM [2]	PHOB4, 4 mA
117	Vddo	Vdd	-	5 V	
118	nDRAMCAS0	O	L	DRAM Cas Strobe 0	PHOB8, 8 mA
119	nDRAMCAS1	O	"	DRAM Cas Strobe 1	"
120	nDRAMCAS2	O	"	DRAM Cas Strobe 2	"

No	Pin Name	I/O	Reset Value	Description	PAD
121	nDRAMCAS3	O	L	DRAM Cas Strobe 3	PHOB8, 8 mA
122	Vsso	Vss	-	5 V Gnd	
123	nDRAMOE	O	H	DRAM Data Out Enable	"
124	nDRAMWE	O	H	DRAM Data Write Enable	"
125	Vssi	Vss	-	3.3 V Gnd	
126	nDRAMRAS0	O	L	DRAM Ras Strobe 0	PHOB8, 8 mA
127	Vddi	Vdd	-	3.3 V	
128	nDRAMRAS1	O	L	DRAM Ras Strobe 1	PHOB8, 8 mA
129	nDRAMRAS2	O	"	DRAM Ras Strobe 2	"
130	nDRAMRAS3	O	"	DRAM Ras Strobe 3	"
131	Vsso	Vss	-	5 V Gnd	
132	DRAMD0	I/O	Input	DRAM Data Bus 0	PHBTT12, 12mA
133	Vddo	Vdd	-	5 V	
134	DRAMD1	I/O	Input	DRAM Data Bus 1	PHBTT12, 12mA
135	DRAMD2	I/O	"	DRAM Data Bus 2	"
136	DRAMD3	I/O	"	DRAM Data Bus 3	"
137	DRAMD4	I/O	"	DRAM Data Bus 4	"
138	Vsso	Vss	-	5 V Gnd	
139	DRAMD5	I/O	Input	DRAM Data Bus 5	PHBTT12, 12mA
140	DRAMD6	I/O	"	DRAM Data Bus 6	"
141	DRAMD7	I/O	"	DRAM Data Bus 7	"
142	Vssi	Vss	-	3.3 V Gnd	
143	DRAMD8	I/O	Input	DRAM Data Bus 8	PHBTT12, 12mA
144	Vddi	Vdd	-	3.3 V	
145	DRAMD9	I/O	Input	DRAM Data Bus 9	PHBTT12, 12mA
146	DRAMD10	I/O	"	DRAM Data Bus 10	"
147	DRAMD11	I/O	"	DRAM Data Bus 11	"
148	Vssp	Vss	-	5 V Gnd	
149	DRAMD12	I/O	Input	DRAM Data Bus 12	PHBTT12, 12mA
150	Vddp	Vdd	-	5 V	

No	Pin Name	I/O	Reset Value	Description	PAD
151	DRAMD13	I/O	Input	DRAM Data Bus 13	PHBTT12, 12mA
152	DRAMD14	I/O	"	DRAM Data Bus 14	"
153	DRAMD15	I/O	"	DRAM Data Bus 15	"
154	DRAMD16	I/O	"	DRAM Data Bus 16	"
155	Vsso	Vss	-	5 V Gnd	
156	DRAMD17	I/O	Input	DRAM Data Bus 17	PHBTT12, 12mA
157	Vddo	Vdd	-	5 V	
158	DRAMD18	I/O	Input	DRAM Data Bus 18	PHBTT12, 12mA
159	DRAMD19	I/O	"	DRAM Data Bus 19	"
160	DRAMD20	I/O	"	DRAM Data Bus 20	"
161	DRAMD21	I/O	"	DRAM Data Bus 21	"
162	Vssi	Vss	-	3.3 V Gnd	
163	DRAMD22	I/O	Input	DRAM Data Bus 22	PHBTT12, 12mA
164	Vddi	Vdd	-	3.3 V	
165	DRAMD23	I/O	Input	DRAM Data Bus 23	PHBTT12, 12mA
166	DRAMD24	I/O	"	DRAM Data Bus 24	"
167	DRAMD25	I/O	"	DRAM Data Bus 25	"
168	DRAMD26	I/O	"	DRAM Data Bus 26	"
169	Vsso	Vss	-	5 V Gnd	
170	DRAMD27	I/O	Input	DRAM Data Bus 27	PHBTT12, 12mA
171	Vddo	Vdd	-	5 V	
172	DRAMD28	I/O	Input	DRAM Data Bus 28	PHBTT12, 12mA
173	DRAMD29	I/O	"	DRAM Data Bus 29	"
174	DRAMD30	I/O	"	DRAM Data Bus 30	"
175	DRAMD31	I/O	"	DRAM Data Bus 31	"
176	Vsso	Vss	-	5 V Gnd	
177	DRAMA0	O	L	DRAM Address Bus 0	PHOB8, 8 mA
178	DRAMA1	O	"	DRAM Address Bus 1	"
179	DRAMA2	O	"	DRAM Address Bus 2	"
180	DRAMA3	O	"	DRAM Address Bus 3	"

No	Pin Name	I/O	Reset Value	Description	PAD
181	DRAMA4	O	L	DRAM Address Bus 4	PHOB8, 8 mA
182	Vsso	Vss	-	5 V Gnd	
183	DRAMA5	O	"	DRAM Address Bus 5	"
184	DRAMA6	O	"	DRAM Address Bus 6	"
185	DRAMA7	O	"	DRAM Address Bus 7	"
186	Vddo	Vdd	-	5 V	
187	DRAMA8	O	L	DRAM Address Bus 8	PHOB8, 8 mA
188	Vsso	Vss	-	5 V Gnd	
189	DRAMA9	O	L	DRAM Address Bus 9	PHOB8, 8 mA
190	DRAMA10	O	"	DRAM Address Bus 10	"
191	DRAMA11	O	"	DRAM Address Bus 11	"
192	Vssi	Vss	-	3.3 V Gnd	
193	nROMCS0	O	H	ROM Chip Select 0	PHOB4, 4 mA
194	Vddi	Vdd	-	3.3 V	
195	nROMCS1	O	H	ROM Chip Select 1	PHOB4, 4 mA
196	nROMCS2	O	"	ROM Chip Select 2	"
197	nROMCS3	O	"	ROM Chip Select 3	"
198	nROMRD	O	"	ROM or IO Read	PHOB8, 8 mA
199	Vssp	Vss	-	5 V Gnd	
200	nROMWR	O	H	ROM or IO Write	PHOB8, 8 mA
201	Vddp	Vdd	-	5 V	
202	ADDR2	O	L	Address Bus 2 for ROM	PHOB8, 8 mA
203	ADDR3	O	"	Address Bus 3 for ROM	"
204	ADDR4	O	"	Address Bus 4 for ROM	"
205	Vsso	Vss	-	5 V Gnd	
206	ADDR5	O	L	Address Bus 5 for ROM	PHOB8, 8 mA
207	ADDR6	O	"	Address Bus 6 for ROM	"
208	ADDR7	O	"	Address Bus 7 for ROM	"
209	Vssi	Vss	-	3.3 V Gnd	
210	ADDR8	O	L	Address Bus 8 for ROM	PHOB8, 8 mA

No	Pin Name	I/O	Reset Value	Description	PAD
211	ADDR9	O	L	Address Bus 9 for ROM	PHOB8, 8 mA
212	Vddo	Vdd	-	5 V	
213	ADDR10	O	L	Address Bus 10 for ROM	PHOB8, 8 mA
214	Vsso	Vss	-	5 V Gnd	
215	ADDR11	O	L	Address Bus 11 for ROM	PHOB8, 8 mA
216	ADDR12	O	"	Address Bus 12 for ROM	"
217	ADDR13	O	"	Address Bus 13 for ROM	"
218	ADDR14	O	"	Address Bus 14 for ROM	"
219	Vsso	Vss	-	5 V Gnd	
220	ADDR15/CTOut[0]	O	L	Address Bus 15 for ROM	PHOB8, 8 mA
221	ADDR16/CTOut[1]	O	"	Address Bus 16 for ROM	"
222	ADDR17/CTOut[2]	O	"	Address Bus 17 for ROM	"
223	ADDR18/CTOut[3]	O	"	Address Bus 18 for ROM	"
224	Vsso	Vss	-	5 V Gnd	
225	ADDR19/CTOut[4]	O	L	Address Bus 19 for ROM	PHOB8, 8 mA
226	ADDR20/CTOut[5]	O	"	Address Bus 20 for ROM	"
227	ADDR21/CTOut[6]	O	"	Address Bus 21 for ROM	"
228	ADDR22/CTOut[7]	O	"	Address Bus 22 for ROM	"
229	Vddo	Vdd	-	5 V	
230	ADDR23/PTOut	O	L	Address Bus 23 for ROM	PHOB8, 8 mA
231	Vsso	Vss	-	5 V Gnd	
232	TESTSE	I	-	Scan Enable :Tied to Gnd	PHILD50, ST
233	TM	I	-	Test Mode :Tied to Gnd	"
234	Vddi	Vcca	-	3.3 V	for PLL
235	MCLK	I	-	Master Clock	PHIC
236	Vssi	Vssa	-	3.3 V Gnd	for PLL
237	FILTER	O	-	Charge Pump Out : Capacitor is connected	POBA
238	CPUTEST	I	-	CPU Test Mode : Tied to Gnd	PHILD50, ST
239	nRESET	I	-	Reset Input	PHIL, ST
240	nRSTOUT	O	L	Reset Output	PHOB8, 8 mA

## 5-3-4 RISC Microprocessor (WorkCentre M15/M15i)

### 1) RISC microprocessor pin & interface (SPGPM)

Ball No	Pin No	Pin Name	I/O	Description	PAD
B1	1	SD15	I/O	SDRAM Bus Data[15]	BD8TRP_TC
C2	2	VSS_PLL1	-	VSS for Core PLL	-
D2	3	VDD_PLL1	-	VDD for Core PLL (1.8V)	-
D3	4	DATA0 / GPI1	I/O	ROM Bus Data[0] / GPI[1]	BD8TRP_FT
E4	5	MCLK	I	Core PLL Clock Input (12MHz)	TLCHT_TC
C1	6	DATA6 / GPI7	I/O	ROM Bus Data[6] / GPI[7]	BD8TRP_FT
D1	7	DATA1 / GPI2	I/O	ROM Bus Data[1] / GPI[2]	BD8TRP_FT
E3	8	DATA5 / GPI6	I/O	ROM Bus Data[5] / GPI[6]	BD8TRP_FT
E2	9	VDD_RING_OSC	-	VDD for Ring Oscillator (1.8V)	-
E1	10	DATA3 / GPI4	I/O	ROM Bus Data[3] / GPI[4]	BD8TRP_FT
F3	11	DATA9 / GPI10	I/O	ROM Bus Data[9] / GPI[10]	BD8TRP_FT
G4	12	GND	-	GROUND_RING	-
F2	13	DATA8 / GPI9	I/O	ROM Bus Data[8] / GPI[9]	BD8TRP_FT
F1	14	DATA7 / GPI8	I/O	ROM Bus Data[7] / GPI[8]	BD8TRP_FT
G3	15	DATA12 / GPI13	I/O	ROM Bus Data[12] / GPI[13]	BD8TRP_FT
G2	16	DATA11 / GPI12	I/O	ROM Bus Data[11] / GPI[12]	BD8TRP_FT
G1	17	DATA10 / GPI11	I/O	ROM Bus Data[10] / GPI[11]	BD8TRP_FT
H3	18	DATA4 / GPI5	I/O	ROM Bus Data[4] / GPI[5]	BD8TRP_FT
H2	19	DATA15 / GPI16	I/O	ROM Bus Data[15] / GPI[16]	BD8TRP_FT
H1	20	DATA14 / GPI15	I/O	ROM Bus Data[14] / GPI[15]	BD8TRP_FT
J4	21	VDD_CORE	-	VDD for CORE (1.8V)	-
J3	22	DATA19	I/O	ROM Bus Data[19]	BD8TRP_FT
J2	23	DATA18	I/O	ROM Bus Data[18]	BD8TRP_FT
J1	24	DATA17	I/O	ROM Bus Data[17]	BD8TRP_FT
K2	25	DATA16	I/O	ROM Bus Data[16]	BD8TRP_FT
K3	26	DATA22	I/O	ROM Bus Data[22]	BD8TRP_FT
K1	27	DATA13 / GPI14	I/O	ROM Bus Data[14] / GPI[14]	BD8TRP_FT
L1	28	DATA20	I/O	ROM Bus Data[20]	BD8TRP_FT
L2	29	DATA21	I/O	ROM Bus Data[21]	BD8TRP_FT
L3	30	DATA25	I/O	ROM Bus Data[25]	BD8TRP_FT
L4	31	DATA26	I/O	ROM Bus Data[26]	BD8TRP_FT
M1	32	DATA23	I/O	ROM Bus Data[23]	BD8TRP_FT
M2	33	DATA24	I/O	ROM Bus Data[24]	BD8TRP_FT
M3	34	DATA29	I/O	ROM Bus Data[29]	BD8TRP_FT
M4	35	DATA30	I/O	ROM Bus Data[30]	BD8TRP_FT
N1	36	DATA27	I/O	ROM Bus Data[27]	BD8TRP_FT
N2	37	DATA28	I/O	ROM Bus Data[28]	BD8TRP_FT

Ball No	Pin No	Pin Name	I/O	Description	PAD
N3	38	VDD_ARM	-	VDD for ARM	-
P1	39	DATA31	I/O	ROM Bus Data[31]	BD8TRP_FT
P2	40	DATA2 / GPI3	I/O	ROM Bus Data[2] / GPI[3]	BD8TRP_FT
R1	41	VDD_CORE	-	VDD for CORE (1.8V)	-
P3	42	nROMCS2	O	ROM Bank2 Select_n	B4TR_TC
R2	43	nRD	O	ROM Bus Read_n	B4TR_TC
T1	44	nROMCS0	O	ROM Bank0 Select_n	B4TR_TC
P4	45	nROMCS3 / nIOCS3 / GPO1	O	ROM Bank3 Select_n / IO Bank3 Select_n / GPO[1]	B4TR_TC
R3	46	nWR	O	ROM Bus Write_n	B4TR_TC
T2	47	nROMCS1	O	ROM Bank1 Select_n	B4TR_TC
U1	48	ADDR12	O	ROM Bus Addr[12]	B8TR_TC
T3	49	ADDR10	O	ROM Bus Addr[10]	B8TR_TC
U2	50	ADDR13	O	ROM Bus Addr[13]	B8TR_TC
V1	51	ADDR15	O	ROM Bus Addr[15]	B8TR_TC
T4	52	ADDR11	O	ROM Bus Addr[11]	B8TR_TC
U3	53	ADDR14	O	ROM Bus Addr[14]	B8TR_TC
V2	54	ADDR16	O	ROM Bus Addr[16]	B8TR_TC
W1	55	ADDR19	I/O	ROM Bus Addr[19]	BD8TRP_TC
V3	56	ADDR17	I/O	ROM Bus Addr[17]	BD8TRP_TC
W2	57	ADDR20	I/O	ROM Bus Addr[20]	BD8TRP_TC
Y1	58	nIOCS0	O	IO Bank0 Select_n	B4TR_TC
W3	59	ADDR21	I/O	ROM Bus Addr[21]	BD8TRP_TC
Y2	60	nIOCS1	O	IO Bank1 Select_n	B4TR_TC
W4	61	ADDR22	I/O	ROM Bus Addr[22]	BD8TRP_TC
V4	62	ADDR18	I/O	ROM Bus Addr[18]	BD8TRP_TC
U5	63	ADDR7	O	ROM Bus Addr[7]	B8TR_TC
Y3	64	VDD_CORE	O	VDD for CORE (1.8V)	-
Y4	65	nIOCS2 / nDACK0 / GPO2	O	IO Bank2 Select_n / DMA IO Bank0 ACK_n / GPO[2]	B4TR_TC
V5	66	ADDR1	O	ROM Bus Addr[1]	B8TR_TC
W5	67	ADDR8	O	ROM Bus Addr[8]	B8TR_TC
Y5	68	ADDR9	O	ROM Bus Addr[9]	B8TR_TC
V6	69	ADDR4	O	ROM Bus Addr[4]	B8TR_TC
U7	70	ADDR6	O	ROM Bus Addr[6]	B8TR_TC
W6	71	ADDR2	O	ROM Bus Addr[2]	B8TR_TC
Y6	72	ADDR3	O	ROM Bus Addr[3]	B8TR_TC
V7	73	ADDR5	O	ROM Bus Addr[5]	B8TR_TC
W7	74	VDD_ARM	-	VDD for ARM Hard Macro(1.8V)	-
Y7	75	VDD_CORE	-	VDD for CORE (1.8V)	-
V8	76	EINT0 / TnRST	I	Ext. Interrupt0 / TAP Controller Reset_n	SCHMITT_FT



Ball No	Pin No	Pin Name	I/O	Description	PAD
W8	77	EINT1 / TCK	I	Ext. Interrupt1 / TAP Controller Clock	SCHMITT_FT
Y8	78	EINT2 / nRXD2 / TMS	I	Ext. Interrupt2 / UART RX DATA[2] / TAP Controller Mode Select	SCHMITT_FT
U9	79	EINT3 / nTXD2 / GPO9	I/O	Ext. Interrupt3 / UART TX Data[2] / GPO[9]	BD4STRP_FT
V9	80	nRxD0	I	UART RX Data[0]	SCHMITT_FT
W9	81	nRxD1 / GPI17 / TDI	I	UART RX Data[1] / GPI[17] / TAP Controller Data In	SCHMITT_FT
Y9	82	nTxD0	O	UART TX Data[0]	B4TR_TC
W10	83	TESTMODE	I	TESTMODE (Normal : 0)	SCHMITT_TC
V10	84	nTxD1 / GPO10 / TDO	O	UART Tx Data[1] / GPO[10] / Tap Controller Data Out	B4TR_TC
Y10	85	TESTSE	I	TESTSE (Normal : 0)	SCHMITT_TC
Y11	86	VDD_CORE	-	VDD for CORE (1.8V)	-
W11	87	RXERR / GPI25	I	MAC RX Error / GPI[25]	SCHMITT_TC
V11	88	GND	-	GROUND_RING	-
U11	89	RX_DV / GPI20	O	MAC RX Data Valid / GPI[20]	SCHMITT_TC
Y12	90	RXD0 / GPI21	O	MAC RX Data[0] / GPI[21]	SCHMITT_TC
W12	91	nLFPHB1 / nPRINT	O	Motor Out B_n / Print Start_n	B4TR_TC
V12	92	nLFPHB0 / nCMMSG	O	Motor Out B / Command Message_n	B4TR_TC
U12	93	nLFPHA0 / CCLK	O	Motor Out A / Communication Clock	B4TR_TC
Y13	94	RXD1 / GPI22	I	MAC RX Data[1] / GPI[22]	SCHMITT_TC
W13	95	VDO	O	Video Data Out	B8TR_TC
V13	96	SPD / nDREQ3	I/O	DIMM Detect / DMA REQ[3]_n	BD4SRTP_TC
Y14	97	nWAIT1 / CRS	I	Wait_n / MAC Carrier Sensor	SCHMITT_TC
W14	98	COL / EINT4	I	MAC Collision Detect / Ext. Interrupt4	SCHMITT_TC
Y15	99	TX_EN	O	MAC TX Enable	B4TR_TC
V14	100	MDIO	I/O	MAC Management Data Inout	BD4STRUQP_TC
W15	101	TXD3 / GPO14	O	MAC TX Data[3] / GPO[14]	B4TR_TC
Y16	102	TXD2 / GPO13	O	MAC TX Data[2] / GPO[13]	B4TR_TC
U14	103	MDC / GPO15	O	MAC Management Data Clock / GPO[15]	B4TR_TC
V15	104	TXCLK / GPI18	I	MAC TX Clock(25MHz) / GPI[18]	SCHMITT_TC
W16	105	TXD1 / GPO12	O	MAC TX Data[1] / GPO[12]	B4TR_TC
Y17	106	PD4	I/O	Parallel Port Data[4]	BD4STRP_FT
V16	107	TXD0 / nIOCS3	O	MAC TX Data[0] / IO Bank3 Select_n	B4TR_TC
W17	108	RXD3 / GPI24	I	MAC RX Data[3] / GPI[24]	SCHMITT_TC
Y18	109	PD2	I/O	Parallel Port Data[2]	BD4STRP_FT
U16	110	PD6	I/O	Parallel Port Data[6]	BD4STRP_FT
V17	111	RXD2	I	MAC RX Data[2] / GPI[23]	SCHMITT_TC
W18	112	PWMOUT2	O	PWM Output[2]	B4TR_TC
Y19	113	VCLK	I	Video Reference Clock	TLCHT_TC

Ball No	Pin No	Pin Name	I/O	Description	PAD
V18	114	RXCLK / GPI19	I	MAC RX Clock(25MHz) / GPI[19]	SCHMITT_TC
W19	115	PD1	I/O	Parallel Port Data[1]	BD4STRP_FT
Y20	116	nINIT	I	Parallel Port Initialization_n	SCHMITT_FT
W20	117	VSS_ADC	-	VSS for ADC	-
V19	118	ATEST_OUT	O	ADC Test Output	ANA_TC
U19	119	AIN2	I	ADC Channel2 Input	ANA_TC
U18	120	AIN1	I	ADC Channel1 Input	ANA_TC
T17	121	AIN0	I	ADC Channel0 Input	ANA_TC
V20	122	VDD_ADC	-	Analog power for ADC (3.3V)	-
U20	123	VDD_CORE	-	VDD for CORE (1.8V)	-
T18	124	GND	-	GROUND_RING	-
T19	125	VDD_CORE	-	VDD for CORE (1.8V)	-
T20	126	VDD_CORE	-	VDD for CORE (1.8V)	-
R18	127	VBUS	I	USB Detect	SCHMITT_FT
P17	128	nLREADY / nEBSY	I	LSU Ready_n / Engine Busy_n	SCHMITT_FT
R19	129	nSELECTIN	I	Parallel Port Select Input_n	SCHMITT_FT
R20	130	LSUCLK / nCBSY / GPO11	O	LSU Clock / Command Busy_n / GPO[11]	B4TR_TC
P18	131	PD7	I/O	Parallel Port Data[7]	BD4STRP_FT
P19	132	PWMOUT1	O	PWM Output[1]	B4TR_TC
P20	133	PWMOUT0	O	PWM Output[0]	B4TR_TC
N18	134	nEMSG / nDACK3 / PWMOUT3	I/O	Engine Message_n / DMA ACK[3]_n / PWM Output[3]	BD4STRP_FT
N19	135	nFSYNC / nLFPHA1	I/O	Frame Sync_n / Motor Out A_n	BD4STRP_FT
N20	136	nHSYNC	I	Line Sync_n	SCHMITT_FT
M17	137	nSTROBE	I	Parallel Port Data Strobe_n	SCHMITT_FT
M18	138	PD5	I/O	Parallel Port Data[5]	BD4STRP_FT
M19	139	nWAIT0 / PDE	I/O	Wait_n / Parallel Port Data Enable	BD4STRP_TC
M20	140	nIOCS5 / nSCS4 / GPO3 / TONEOUT	O	DRAM Bank4 / IO Bank5 Select_n / GPO[3] / Tone Pulse Out	BD8TARP_TC
L19	141	PD3	I/O	Parallel Port Data[3]	BD4STRP_FT
L18	142	nFAULT	O	Parallel Port Fault_n	B4TR_TC
L20	143	nDREQ0 / GPI0 / ADDR23	I/O	DMA REQ[0]_n / GPI[0] / ADDR[23]	BD4STRP_TC
K20	144	nRESET	I	External Reset_n Input	SCHMITT_TC
K19	145	PERROR	O	Parallel Port Paper Error	B4TR_TC
K18	146	nAUTOFD	I	Parallel Port Auto Feed_n	SCHMITT_FT
K17	147	nDACK2 / DQM7 / GPO5	O	DMA ACK[2]_n / DQM[7] / GPO[5]	BD8TARP_TC
J20	148	nDREQ2 / DQM6 / GPO6	I/O	DMA REQ[2]_n / DQM[6] / GPO[6]	BD8TARP_TC

Ball No	Pin No	Pin Name	I/O	Description	PAD
J19	149	nDREQ1 / DQM4 / GPO8	I/O	DMA REQ[1]_n / DQM[4] / GPO[8]	BD8TARP_TC
J18	150	VDD_CORE	-	VDD for CORE (1.8V)	-
J17	151	nSCS0	O	SDRAM Bank0 Select_n	BD8TARP_TC
H20	152	nSCS2	O	SDRAM Bank2 Select_n	BD8TARP_TC
H19	153	nCAS	O	SDRAM Column Address Select_n	BD8TARP_TC
H18	154	nSCS1	O	SDRAM Bank1 Select_n	BD8TARP_TC
G20	155	nIOCS4 / nSCS3 / GPO4	O	IO Bank4 / SDRAM Bank3 Select_n / GPO[4]	BD8TARP_TC
G19	156	BUSY	O	Parallel Port Busy	B4TR_TC
F20	157	PD0	I/O	Parallel Port Data[0]	BD4STRP_FT
G18	158	SLCT_OUT	O	Parallel Port Selection Out	B4TR_TC
F19	159	nACK	O	Parallel Port Acknowledge_n	B4TR_TC
E20	160	nDACK1 / DQM5 / GPO7	O	DMA ACK[1]_n / DQM[5] / GPO[7]	BD8TARP_TC
G17	161	nRSTOUT / CLKOUT / GPO0	O	Internal Reset_n Out / Internal System Clock Out / GPO[0]	B8TR_TC
F18	162	SA7	O	SDRAM Bus Addr[7]	BD8TARP_TC
E19	163	SA9	O	SDRAM Bus Addr[9]	BD8TARP_TC
D20	164	VDD_USB	-	VDD for USB Hard Macro (1.8V)	-
E18	165	SA10	O	SDRAM Bus Addr[10]	BD8TARP_TC
D19	166	SA12	O	SDRAM Bus Addr[12]	BD8TARP_TC
C20	167	BA0	O	SDRAM Bus Bank Select Addr[0]	BD8TARP_TC
E17	168	nRAS	O	SDRAM Row Address Select_n	BD8TARP_TC
D18	169	DQM2	O	SDRAM Bus DQM[2]	BD8TARP_TC
C19	170	DQM1	O	SDRAM Bus DQM[1]	BD8TARP_TC
B20	171	BA1	O	SDRAM Bus Bank Select Addr[1]	BD8TARP_TC
C18	172	DQM0	O	SDRAM Bus DQM[0]	BD8TARP_TC
B19	173	DQM3	O	SDRAM Bus DQM[3]	BD8TARP_TC
A20	174	RREF	I/O	USB PHY Register Reference	ANA_FT
A19	175	VSSL	-	VSS for Deserialisation Flip flops	-
B18	176	VDDL	-	VDD for Deserialisation Flip flops (1.8V)	-
B17	177	VSSB	-	VSS for buffers	-
C17	178	DMNS	I/O	USB2 DATA-	ANA_FT
D16	179	DPLS	I/O	USB2 DATA+	ANA_FT
A18	180	VDD3_USB	-	VDD for USB1.1 FS compliance (3.3V)	-
A17	181	VSSC	-	VSS for DLL and Xor tree	-
C16	182	VDDC	-	VDD for DLL and Xor tree (1.8V)	-
B16	183	Vddb	-	VDD for buffers (1.8V)	-
A16	184	VDD_USB	-	VDD for USB Hard Macro (1.8V)	-
C15	185	UCLK	I	USB PLL Input Clock (12MHz)	TLCHT_TC
D14	186	VSS_PLL2	-	VSS for USB PLL	-

Ball No	Pin No	Pin Name	I/O	Description	PAD
B15	187	VDD_PLL2	-	VSS for USB PLL (1.8V)	-
A15	188	SA11	O	SDRAM Bus Addr[11]	BD8TARP_TC
C14	189	SA6	O	SDRAM Bus Addr[6]	BD8TARP_TC
B14	190	SA5	O	SDRAM Bus Addr[5]	BD8TARP_TC
A14	191	SA8	O	SDRAM Bus Addr[8]	BD8TARP_TC
C13	192	SA3	O	SDRAM Bus Addr[3]	BD8TARP_TC
B13	193	SA2	O	SDRAM Bus Addr[2]	BD8TARP_TC
A13	194	SA4	O	SDRAM Bus Addr[4]	BD8TARP_TC
D12	195	SA0	O	SDRAM Bus Addr[0]	BD8TARP_TC
C12	196	SA1	O	SDRAM Bus Addr[1]	BD8TARP_TC
B12	197	CKE	O	SDRAM Clock Enable	BD8TARP_TC
A12	198	nWE	O	SDRAM Write Enable_n	BD8TARP_TC
B11	199	SD30	I/O	SDRAM Bus Data[30]	BD8TARP_TC
C11	200	SD31	I/O	SDRAM Bus Data[31]	BD8TARP_TC
A11	201	SD29	I/O	SDRAM Bus Data[29]	BD8TARP_TC
A10	202	SD25	I/O	SDRAM Bus Data[25]	BD8TARP_TC
B10	203	SD26	I/O	SDRAM Bus Data[26]	BD8TARP_TC
C10	204	SD27	I/O	SDRAM Bus Data[27]	BD8TARP_TC
D10	205	SD28	I/O	SDRAM Bus Data[28]	BD8TARP_TC
A9	206	SD21	I/O	SDRAM Bus Data[21]	BD8TARP_TC
B9	207	SD22	I/O	SDRAM Bus Data[22]	BD8TARP_TC
C9	208	SD23	I/O	SDRAM Bus Data[23]	BD8TARP_TC
D9	209	SD24	I/O	SDRAM Bus Data[24]	BD8TARP_TC
A8	210	SD18	I/O	SDRAM Bus Data[18]	BD8TARP_TC
B8	211	SDCLK0	O	SDRAM Clock Output0	BD8TARP_TC
C8	212	SD20	I/O	SDRAM Bus Data[20]	BD8TARP_TC
A7	213	SD14	I/O	SDRAM Bus Data[14]	BD8TARP_TC
B7	214	SD19	I/O	SDRAM Bus Data[19]	BD8TARP_TC
A6	215	SD11	I/O	SDRAM Bus Data[11]	BD8TARP_TC
C7	216	SD16	I/O	SDRAM Bus Data[16]	BD8TARP_TC
B6	217	SDCLK1	O	SDRAM Clock Output1	BD8TARP_TC
A5	218	SD12	I/O	SDRAM Bus Data[12]	BD8TARP_TC
D7	219	SD17	I/O	SDRAM Bus Data[17]	BD8TARP_TC
C6	220	SD13	I/O	SDRAM Bus Data[13]	BD8TARP_TC
B5	221	SD8	I/O	SDRAM Bus Data[8]	BD8TARP_TC
A4	222	SD5	I/O	SDRAM Bus Data[5]	BD8TARP_TC
C5	223	SD9	I/O	SDRAM Bus Data[9]	BD8TARP_TC
B4	224	SD6	I/O	SDRAM Bus Data[6]	BD8TARP_TC
A3	225	SD3	I/O	SDRAM Bus Data[3]	BD8TARP_TC
D5	226	SD10	I/O	SDRAM Bus Data[10]	BD8TARP_TC

Ball No	Pin No	Pin Name	I/O	Description	PAD
C4	227	SD7	I/O	SDRAM Bus Data[7]	BD8TARP_TC
B3	228	SD4	I/O	SDRAM Bus Data[4]	BD8TARP_TC
B2	229	SD1	I/O	SDRAM Bus Data[1]	BD8TARP_TC
A2	230	SD0	I/O	SDRAM Bus Data[0]	BD8TARP_TC
C3	231	SD2	I/O	SDRAM Bus Data[2]	BD8TARP_TC

## 2) RISC microprocessor pin & interface (CIP4)

No	Pin Name	I/O	Description	Pad Type	Current drive
1	GND2	P	Vss Supply	vss2i	-
2	NTEST	I	Nand Tree Test Mode Selection	pticd	-
3	TM	I	Global Test Mode Selection	pticd	-
4	TEST1	I	Test Mode Selection 1	pticd	-
5	GND17	P	Vss Supply	vss3op	-
6	TEST2	I	Test Mode Selection 2	pticd	-
7	XDACK1	I	DMA Acknowledge Signal 1	ptis	-
8	XDREQ1	O	DMA Request Signal 1	phob4	4mA
9	VDD1	P	Vdd Supply	vdd2i	-
10	XDACK2	I	DMA Acknowledge Signal 2	ptis	-
11	XDREQ2	O	DMA Request Signal 2	phob4	4mA
12	XDACK3	I	DMA Acknowledge Signal 3	ptis	-
13	XDREQ3	O	DMA Request Signal 3	phob4	4mA
14	nRESET	I	Global Reset	ptis	-
15	CLK_OUT	O	PLL Clock Out	phob12	12mA
16	GND3	P	Vss Supply	vss2i	-
17	XP	I	Clock Oscillation Input	phsosc26	10~40MHz
18	XPOUT	O	Clock Oscillation Output	phsosc26	10~40MHz
19	GNDD16	P	Vss Supply	vss2t_abb	-
20	FILTER*	O	PLL Filter Pump Out	poar50_abb	-
21	GND1	P	Vss Supply	vbb_abb	-
22	VDDA9,VDDD9	P	Vdd Supply	vdd2t_abb	-
23	GND24,GND33	P	Vss Supply	vss3t_abb	-
24	RTC_XO	O	RTC Clock Oscillation Output	poar50_abb	-
25	RTC_XI	I	RTC Clock Oscillation Input	piar50_abb	-
26	VDD8,VDD18	P	Vdd Supply	vdd3t_abb	-
27	IRQ	O	Interrupt Request Signal	phob4	4mA
28	nCS	I	CIP4 Chip Select	ptis	-
29	GND4	P	Vss Supply	vss2i	-
30	nRD	I	CIP4 CPU Read Control	ptis	-
31	nWR	I	CIP4 CPU Write Control	ptis	-
32	BA1	I	Bank Address Bus [1]	ptis	-

Circuit Description

No	Pin Name	I/O	Description	Pad Type	Current drive
33	BA0	I	Bank Address Bus [0]	ptis	-
34	GND19	P	Vss Supply	vss3op	-
35	A5	I	CPU Address Bus [5]	ptis	-
36	A4	I	CPU Address Bus [4]	ptis	-
37	A3	I	CPU Address Bus [3]	ptis	-
38	VDD2	P	Vdd Supply	vdd2i	-
39	A2	I	CPU Address Bus [2]	ptis	-
40	A1	I	CPU Address Bus [1]	ptis	-
41	A0	I	CPU Address Bus [0]	ptis	-
42	GND5	P	Vss Supply	vss2i	-
43	D31	B	CPU Data Bus [31]	phbst8	8mA
44	D30	B	CPU Data Bus [30]	phbst8	8mA
45	D29	B	CPU Data Bus [29]	phbst8	8mA
46	D28	B	CPU Data Bus [28]	phbst8	8mA
47	GND20	P	Vss Supply	vss3op	-
48	D27	B	CPU Data Bus [27]	phbst8	8mA
49	D26	B	CPU Data Bus [26]	phbst8	8mA
50	D25	B	CPU Data Bus [25]	phbst8	8mA
51	VDD11	P	Vdd Supply	vdd3op	-
52	D24	B	CPU Data Bus [24]	phbst8	8mA
53	D23	B	CPU Data Bus [23]	phbst8	8mA
54	D22	B	CPU Data Bus [22]	phbst8	8mA
55	D21	B	CPU Data Bus [21]	phbst8	8mA
56	GND6	P	Vss Supply	vss2i	-
57	D20	B	CPU Data Bus [20]	phbst8	8mA
58	D19	B	CPU Data Bus [19]	phbst8	8mA
59	D18	B	CPU Data Bus [18]	phbst8	8mA
60	GND21	P	Vss Supply	vss3op	-
61	D17	B	CPU Data Bus [17]	phbst8	8mA
62	D16	B	CPU Data Bus [16]	phbst8	8mA
63	D15	B	CPU Data Bus [15]	phbst8	8mA
64	D14	B	CPU Data Bus [14]	phbst8	8mA
65	VDD3	P	Vdd Supply	vdd2i	-
66	D13	B	CPU Data Bus [13]	phbst8	8mA
67	D12	B	CPU Data Bus [12]	phbst8	8mA
68	D11	B	CPU Data Bus [11]	phbst8	8mA
69	GND7	P	Vss Supply	vss2i	-
70	D10	B	CPU Data Bus [10]	phbst8	8mA
71	D9	B	CPU Data Bus [9]	phbst8	8mA
72	D8	B	CPU Data Bus [8]	phbst8	8mA

No	Pin Name	I/O	Description	Pad Type	Current drive
73	D7	B	CPU Data Bus [7]	phbst8	8mA
74	GND22	P	Vss Supply	vss3op	-
75	D6	B	CPU Data Bus [6]	phbst8	8mA
76	D5	B	CPU Data Bus [5]	phbst8	8mA
77	D4	B	CPU Data Bus [4]	phbst8	8mA
78	VDD12	P	Vdd Supply	vdd3op	-
79	D3	B	CPU Data Bus [3]	phbst8	8mA
80	D2	B	CPU Data Bus [2]	phbst8	8mA
81	D1	B	CPU Data Bus [1]	phbst8	8mA
82	D0	B	CPU Data Bus [0]	phbst8	8mA
83	GND8	P	Vss Supply	vss2i	-
84	TX_EN1	O	Motor Control Tx Enable 1	phob4	4mA
85	TX_EN2	O	Motor Control Tx Enable 2	phob4	4mA
86	TX_A	O	Motor Control Tx Channel A	phob4	4mA
87	TX_B	O	Motor Control Tx Channel B	phob4	4mA
88	GND23	P	Vss Supply	vss3op	-
89	nTX_A	O	Motor Control Tx Channel A	phob4	4mA
90	nTX_B	O	Motor Control Tx Channel A	phob4	4mA
91	MOTOR_POL	I	Motor Polarity	ptis	4mA
92	VDD4	P	Vdd Supply	vdd2i	-
93	Pltg1	O	CIS/CCD Pltg1 Signal	phob8	8mA
94	PI1	O	CIS/CCD PI1 Signal	phob8	8mA
95	PI2	O	CIS/CCD PI2 Signal	phob8	8mA
96	GND9	P	Vss Supply	vss2i	-
97	PIrs	O	CIS/CCD PIrs Signal	phob8	8mA
98	PIcp	O	CIS/CCD PIsh Signal	phob8	8mA
99	ADC_CLK	O	AFE ADC Clock	phob8	8mA
100	VDD13	P	Vdd Supply	vdd3op	-
101	CDS2_CLK	O	AFE CDS2 Clock	phob8	8mA
102	SCLK1	O	AFE SIO Sync. Clock	phob8	8mA
103	SLOAD1	O	AFE SIO Read/Write Control Signal	phob8	8mA
104	VDD10	P	Vdd Supply	vdd3op	-
105	SDO1	O	AFE SIO Serial Output 1	phob8	8mA
106	SDIO1	B	AFE SIO Serial Inout/Output 1	phbst8	8mA
107	SDIO2	B	AFE SIO Serial Inout/Output 2	phbst8	8mA
108	GND10	P	Vss Supply	vss2i	-
109	AFE_D9	I	A/D Converted Data Bus [9]	ptis	-
110	AFE_D8	I	A/D Converted Data Bus [8]	ptis	-
111	AFE_D7	I	A/D Converted Data Bus [7]	ptis	-
112	AFE_D6	I	A/D Converted Data Bus [6]	ptis	-

Circuit Description

No	Pin Name	I/O	Description	Pad Type	Current drive
113	VDD5	P	Vdd Supply	vdd2i	-
114	AFE_D5	I	A/D Converted Data Bus [5]	ptis	-
115	AFE_D4	I	A/D Converted Data Bus [4]	ptis	-
116	AFE_D3	I	A/D Converted Data Bus [3]	ptis	-
117	GND25	P	Vss Supply	vss3op	-
118	AFE_D2	I	A/D Converted Data Bus [2]	ptis	-
119	AFE_D1	I	A/D Converted Data Bus [1]	ptis	-
120	AFE_D0	I	A/D Converted Data Bus [0]	ptis	-
121	GND11	P	Vss Supply	vss2i	-
122	SRAM_A15	O	SRAM Address Bus [15]	phob8	8mA
123	SRAM_A14	O	SRAM Address Bus [14]	phob8	8mA
124	SRAM_A13	O	SRAM Address Bus [13]	phob8	8mA
125	SRAM_A12	O	SRAM Address Bus [12]	phob8	8mA
126	VDD14	P	Vdd Supply	vdd3op	-
127	SRAM_A11	O	SRAM Address Bus [11]	phob8	8mA
128	SRAM_A10	O	SRAM Address Bus [10]	phob8	8mA
129	SRAM_A9	O	SRAM Address Bus [9]	phob8	8mA
130	GND26	P	Vss Supply	vss3op	-
131	SRAM_A8	O	SRAM Address Bus [9]	phob8	8mA
132	SRAM_A7	O	SRAM Address Bus [9]	phob8	8mA
133	SRAM_A6	O	SRAM Address Bus [9]	phob8	8mA
134	SRAM_A5	O	SRAM Address Bus [9]	phob8	8mA
135	GND12	P	Vss Supply	vss2i	-
136	SRAM_A4	O	SRAM Address Bus [9]	phob8	8mA
137	SRAM_A3	O	SRAM Address Bus [9]	phob8	8mA
138	SRAM_A2	O	SRAM Address Bus [9]	phob8	8mA
139	SRAM_A1	O	SRAM Address Bus [9]	phob8	8mA
140	VDD6	P	Vdd Supply	vdd2i	-
141	SRAM_A0	O	SRAM Address Bus [9]	phob8	8mA
142	SRAM_nWR	O	SRAM Write Enable Signal	phob8	8mA
143	SRAM_D15	B	SRAM Data Bus [15]	phbst8	8mA
144	SRAM_D14	B	SRAM Data Bus [14]	phbst8	8mA
145	GND27	P	Vss Supply	vss3op	-
146	SRAM_D13	B	SRAM Data Bus [13]	phbst8	8mA
147	SRAM_D12	B	SRAM Data Bus [12]	phbst8	8mA
148	SRAM_D11	B	SRAM Data Bus [11]	phbst8	8mA
149	GND13	P	Vss Supply	vss2i	-
150	SRAM_D10	B	SRAM Data Bus [10]	phbst8	8mA
151	SRAM_D9	B	SRAM Data Bus [9]	phbst8	8mA
152	SRAM_D8	B	SRAM Data Bus [8]	phbst8	8mA



No	Pin Name	I/O	Description	Pad Type	Current drive
153	SRAM_D7	B	SRAM Data Bus [7]	phbst8	8mA
154	VDD15	P	Vdd Supply	vdd3op	-
155	SRAM_D6	B	SRAM Data Bus [6]	phbst8	8mA
156	SRAM_D5	B	SRAM Data Bus [5]	phbst8	8mA
157	SRAM_D4	B	SRAM Data Bus [4]	phbst8	8mA
158	GND28	P	Vss Supply	vss3op	-
159	SRAM_D3	B	SRAM Data Bus [3]	phbst8	8mA
160	SRAM_D2	B	SRAM Data Bus [2]	phbst8	8mA
161	SRAM_D1	B	SRAM Data Bus [1]	phbst8	8mA
162	SRAM_D0	B	SRAM Data Bus [0]	phbst8	8mA
163	GND14	P	Vss Supply	vss2i	-
164	GPO7/Pltg2	O	General Purpose Output [7]	phob8	8mA
165	GPO6/RLED	O	General Purpose Output [6]	phob8	8mA
166	GPO5/GLED	O	General Purpose Output [5]	phob8	8mA
167	GPO4/BLED	O	General Purpose Output [4]	phob8	8mA
168	VDD7	P	Vdd Supply	vdd2i	-
169	GPO3/Pltg3	O	General Purpose Output [3]	phob8	8mA
170	GPO2/Plsh	O	General Purpose Output [2]	phob8	8mA
171	GPO1/ LEVEL_SHIFT	O	General Purpose Output [1]	phob8	8mA
172	GPO0	O	General Purpose Output [0]	phob8	8mA
173	GND29	P	Vss Supply	vss3op	8mA
174	GPIO2B/AFE_D11	B	General Purpose Input/Output 2 [11]	phbst8	8mA
175	GPIO2A/AFE_D10	B	General Purpose Input/Output 2 [10]	phbst8	-
176	GPIO29/AFE_D9	B	General Purpose Input/Output 2 [9]	phbst8	8mA
177	GND30	P	Vss Supply	vss3op	8mA
178	GPIO28/AFE_D8	B	General Purpose Input/Output 2 [8]	phbst8	8mA
179	GPIO27/AFE_D7	B	General Purpose Input/Output 2 [7]	phbst8	8mA
180	GPIO26/AFE_D6	B	General Purpose Input/Output 2 [6]	phbst8	-
181	GPIO25/AFE_D5	B	General Purpose Input/Output 2 [5]	phbst8	8mA
182	VDD16	P	Vdd Supply	vdd3op	8mA
183	GPIO24/AFE_D4	B	General Purpose Input/Output 2 [4]	phbst8	8mA
184	GPIO23/AFE_D3	B	General Purpose Input/Output 2 [3]	phbst8	8mA
185	GPIO22/AFE_D2	B	General Purpose Input/Output 2 [2]	phbst8	8mA
186	GND15	P	Vss Supply	vss2i	8mA
187	GPIO21/AFE_D1	B	General Purpose Input/Output 2 [1]	phbst8	8mA
188	GPIO20/AFE_D0	B	General Purpose Input/Output 2 [0]	phbst8	8mA
189	GPIO1F/ SRAM_D15	B	General Purpose Input/Output 1 [15]	phbst8	8mA
190	GPIO1E/ SRAM_D14	B	General Purpose Input/Output 1 [14]	phbst8	-

Circuit Description

No	Pin Name	I/O	Description	Pad Type	Current drive
191	GND31	P	Vss Supply	vss3op	8mA
192	GPIO1D/ SRAM_D13	B	General Purpose Input/Output 1 [13]	phbst8	8mA
193	GPIO1C/ SRAM_D12	B	General Purpose Input/Output 1 [12]	phbst8	-
194	GPIO1B/ SRAM_D11	B	General Purpose Input/Output 1 [11]	phbst8	4mA
195	GPIO1A/ SRAM_D10	B	General Purpose Input/Output 1 [10]	phbst8	-
196	VDD17	P	Vdd Supply	vdd3op	
197	GPIO19/ SRAM_D9	B	General Purpose Input/Output 1 [9]	phbst8	
198	GPIO18/ SRAM_D8	B	General Purpose Input/Output 1 [8]	phbst8	
199	GPIO17/ SRAM_D7	B	General Purpose Input/Output 1 [7]	phbst8	
200	GND32	P	Vss Supply	vss3op	
201	GPIO16/ SRAM_D6	B	General Purpose Input/Output 1 [6]	phbst8	-
202	GPIO15/ SRAM_D5	B	General Purpose Input/Output 1 [5]	phbst8	-
203	GPIO14/ SRAM_D4	B	General Purpose Input/Output 1 [4]	phbst8	-
204	GPIO13/ SRAM_D3	B	General Purpose Input/Output 1 [3]	phbst8	-
205	GND18	P	Vss Supply	vss3op	-
206	GPIO12/ SRAM_D2	B	General Purpose Input/Output 1 [2]	phbst8	-
207	GPIO11/ SRAM_D1	B	General Purpose Input/Output 1 [1]	phbst8	-
208	GPIO10/ SRAM_D0	B	General Purpose Input/Output 1 [0]	phbst8	-

### 5-3-4-1 Specifications (FaxCentre F12 only)

This section presents the electrical and environmental specifications of the F12.

#### 1) Power Ratings

Table presents the minimum and maximum power ratings and storage temperatures.

Parameter	Symbol	Min.	Max	Units
<b>3.3 Volts Supply Voltage</b>	VDD	-0.3	7.0	Volts
<b>5.0_Volt Reference Level*</b>	<b>3.3_Volt Oper.</b>	VDD	3.6	Volts
	<b>5.0_Volt Oper.</b>	VDD	5.55	Volts
<b>Input pin voltages for other than VDD, VSS</b>	Vin	-0.3	VDDBIAS + 0.3	Volts
<b>DC Input Current</b>	Iin	-10	+10	mAmps
<b>Storage Temperature</b>	Tas	-40	125	Degrees C

\* VDDBIAS is connected to the system's 5.0V supply to provide 5V tolerance on I/O signal pins (including all inputs, outputs, and bidirectional). in systems where 3.3V signaling only is used, connect VDDBIAS to a 3.3V supply.

#### 2) Required Operation Conditions

Table presents the environmental specifications.

Parameter	Symbol	Min.	Max	Units
<b>3.3 Volts Supply Voltage</b>	VDD	3.0	3.6	Volts
<b>5.0_Volt Reference Level*</b>	VDDBIAS	4.75	5.25	Volts
<b>Power Consumption at 66 MHz Operation Pd</b>	-	1.0	Watt	
<b>Operating Temperature</b>	Tao	0	70	Degrees C

\* VDDBIAS is connected to the system's 5.0V supply to provide 5V tolerance on I/O signal pins (including all inputs, outputs, and bidirectional). in systems where 3.3V signaling only is used, connect VDDBIAS to a 3.3V supply.

### 5-3-4-2 Electrical Specifications (FaxCentre F12 only)

This section provides the electrical specifications.

Parameter	Symbol	Min.	Max	Units
Input capacitance for all input only pins	Cin	0	10	pF
Input capacitance for all bidirectional pins	Cio	0	15	pF
Input high voltage for all inputs	Vin	2.0	VDDBIAS +0.3	Volts
Input low voltage for all inputs	Vil	GND -0.3	0.8	Volts
Output high voltage for all outputs	Voh	2.4	VDD	Volts
Output low voltage for all outputs	Vol	GND	0.4	Volts
Input current with input at VDD	Iih	-30	30	
Input current with input at GND	Iil	-30	30	
Tri-state output current with output at VDD	Iozh	-100	100	μA
Tri-state output current with output at GND	Iozl	-100	100	
Power supply current	Icc	0	95	mA

#### DC Characteristics

Table presents the DC characteristics.

IMPORTANT: CLOCK pin timing is measured at TTL levels, not CMOS. The system CLOCK driver must be configured correctly in order to ensure that duty cycle and Vil specifications are met.

### 5-3-4-3 Pin Classification and Loading (FaxCentre F12 only)

Table describes the pin classification and loading of the signal pins. The capacitance column presents the values used to derive the specification timing. The current columns present maximum values.

Name	Pins	Level	Resistor	Type	Abbreviation/Description	Maximum Loading		
						Cap. (pF)	Current (mA)	
							Vol	Voh
AGND		L	~	P	Analog Supply Return (Gnd.)	~	~	~
AVDD		H	~	P	Analog Power Supply Source	~	~	~
ALD[7:0]	8	H	H	1/3S	Alternate Data Output	50	4	4
CD[15:0]	16	H	H	1/3S	Command Data	50	8	8
CLOCK	1	H	~	I	System Clock	~	~	~
CLK_OUT	1	H	~	3S	PLL Clock Test Output			
CS	1	L	~	I	System Clock	~	~	~
DONE	1	H	~	O	Operation Done Flag	50	8	8
GND	23	N/A	~	P	Supply Return (Gnd.)	~	~	~
IBACK	1	L	~	I	Input Burst Active	~	~	~
I/D	1	H	~	I	Index/Data Control	~	~	~
ID[15:0]	16	H	~	1/3S	Input Data	~	~	~
IDACK	1	L	~	I	Input Data Strobe	~	~	~
IDREQ	1	H	~	3S	Input Data Request	50	8	8
IFRDY	1	H	~	I	Input Buffer Ready	~	~	~
IN_OVR	1	L	H	I	Buffer Overflow Alert	~	~	~
INT	1	L	~	OD	Interrupt Request	50	8	8
ISTRB	1	L	~	O	Input Buffer Strobe	50	4	4
LSYNC	1	H	~	O	Input Data Sync	50	4	4
NC	4	~	~	~	No Connect	~	~	~
OBACK	1	L	H	I	Output Burst Active	~	~	~
OD[15:0]	16	H	~	1/3S	Output Data	50	8	8
ODACK	1	L	H	I	Output Data Strobe	~	~	~
ODREQ	1	H	~	3S	Output Data Request	50	8	8
OFRDY	1	H	~	I	Output Buffer Ready	~	~	~
OSTRB	1	L	~	O	Output Buffer Strobe	50	4	4
PLL_BYP	1	H	~	I	Phase Locked Loop Bypass	~	~	~
RA[15:0]	16	H	~	O	RAM Address	50	4	4
RAMOE	1	L	~	O	RAM Output Enable	50	4	4
RAMWR	1	L	~	I	RAM Write Enable	50	4	4

Name	Pins	Level	Resistor	Type	Abbreviation/Description	Maximum Loading		
						Cap. (pF)	Current (mA)	
							Vol	Voh
RD	1	L	~	I	Command Port Read	~	~	~
RD [7:0]	8	H	H	1/3S	RAM Data	50	4	4
RE [1:0]	2	L	~	O	RAM Enable	50	4	4
RESET	1	L	H	I	Chip Reset	~	~	~
TESTIN	1	H	~	I	Test Input	~	~	~
TEST-OUT	1	H		O	Manufacturing Test Output	~	~	~
VDD	22	N/A	~	P	Power Supply Source	~	~	~
VDDBIAS	1	N/A			Input Reference Voltage			
WR	1	L	~	I	Command Port Write	~	~	~
RAMWR	1	L	~	I	RAM Write Enable	50	4	4
RD	1	L	~	I	Command Port Read	~	~	~
RD [7:0]	8	H	H	1/3S	RAM Data	50	4	4
RE [1:0]	2	L	~	O	RAM Enable	50	4	4

#### Pin Classification and Loading

- I: Input
- O: Output
- 3S: Tri-state output
- OD: Open drain output
- P: Power supply

Combinations indicate bidirectional pins.

An "H" in the Resistor column indicates the pad has an internal pull-up resistor. A tilde (~) indicates no internal resistor.

### 5-3-5 Program ROM (Flash Memory) Control (WorkCentre Pro 412 & FaxCentre F12)

#### 1) Device

TYPE No.	AM29F800B
CAPACITY	4 Mbyte (512K * 16BITS * 4)

#### 1) Device (WorkCentre M15/M15i)

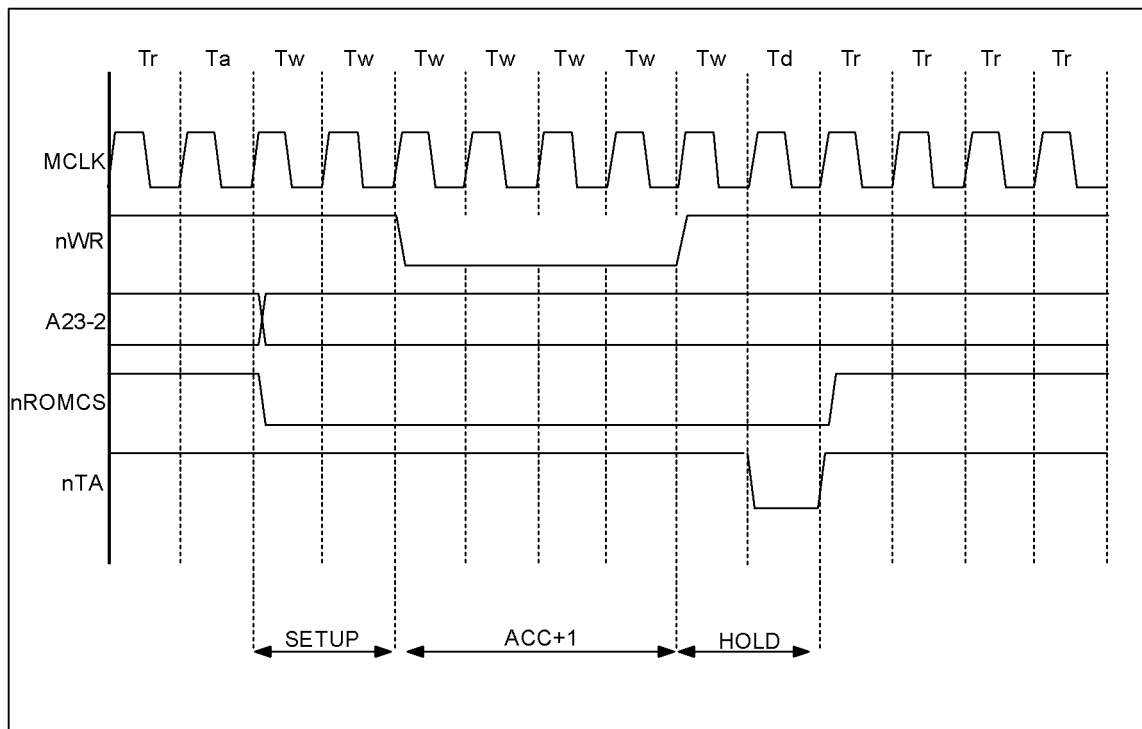
TYPE No.	AM29LU160DB
CAPACITY	4 MBYTE (1MB * 16BITS * 2)

#### 2) Programming

BEFORE ASS'Y	EPROM programmer or programming at the factory
AFTER ASS'Y	Download from PC

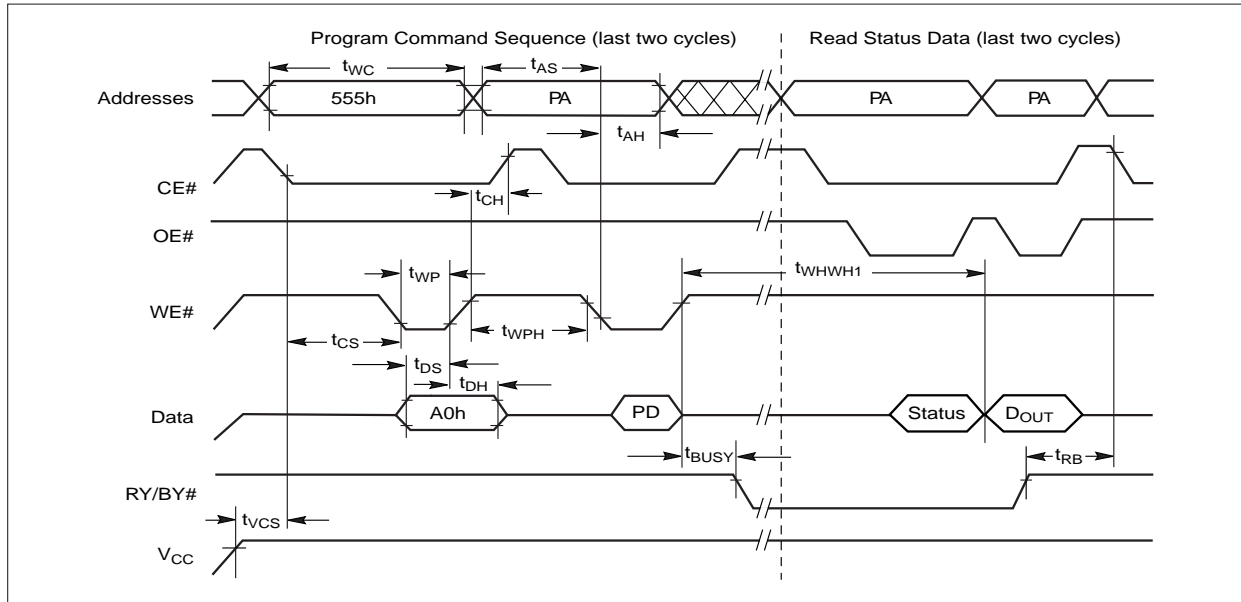
#### 3) Operating Principle

When the RCSO(ROM CHIP SELECT) signal is activated from the CPU after the POWER is ON, it activates RD SIGNAL and reads the DATA(HIGH/LOW) stored in the FLASH MEMORY to control the overall system. The FLASH MEMORY may also write. When turning the power on, press and hold the key (power switch) for 2 - 3 seconds, then the LED will scroll and the PROGRAM DOWNLOAD MODE will be activated. In this mode, you can download the program through the parallel port.



Write Timing Diagram for Two Beat Burst Cycle

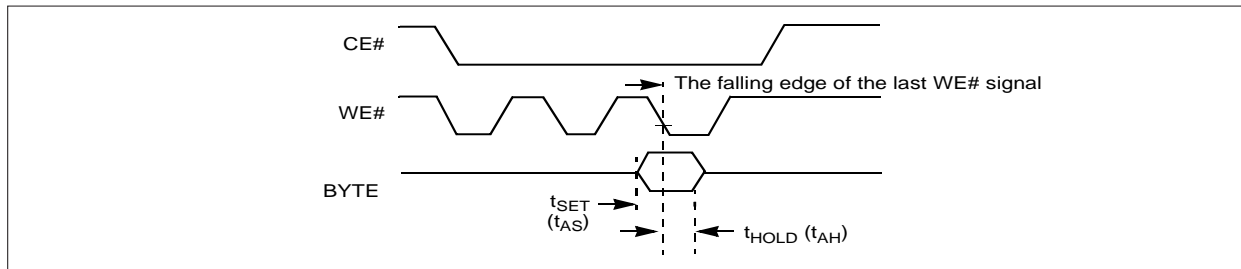
### AC Characteristics (WorkCentre M15/M15i)



**Notes:**

1. PA = program address, PD = program data, D<sub>OUT</sub> is the true data at the program address.
2. Illustration shows device in word mode.

**Figure 17. Program Operation Timings**



**Note:** Refer to the Erase/Program Operations table for  $t_{AS}$  and  $t_{AH}$  specifications.

**Figure 16. BYTE# Timings for Write Operations**



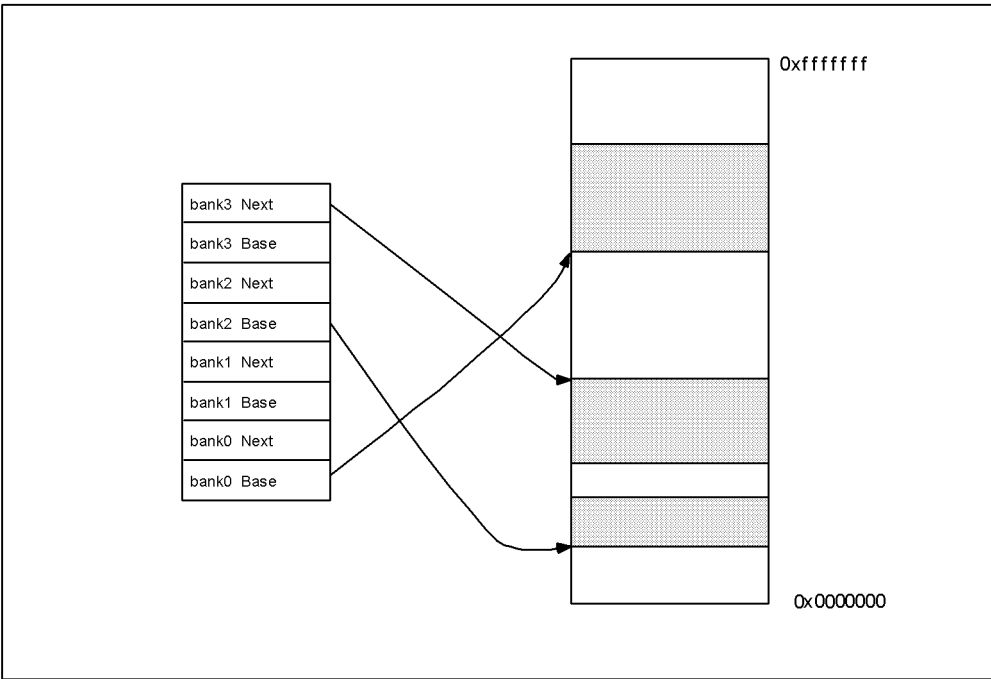
### 5-3-6 Dram Control (WorkCentre Pro 412 & FaxCentre F12)

#### 1) Device

Type No.	K4E6411D EDO type
Capacity	4Mbytes (1M*16BITS*2)

#### 2) Operating Principle

DRAM can either read or write. The data can be stored in the DRAM only when the power is on. It stores data while the CPU processes data. The address to read and write the data is specified by RAS SIGNAL and CAS SIGNAL. DRAMWE\*SIGNAL is activated when writing data and DRAMOE\*SIGNAL, when reading. You can expand up to 64MBYTE of DRAM in this system.



DRAM Bank Configuration

#### 1) Device (WorkCentre M15/M15i)

<b>TYPE NO.</b>	K4S
<b>CAPACITY</b>	16MBYTES (1M * 16BITS * 4Bank * 2)

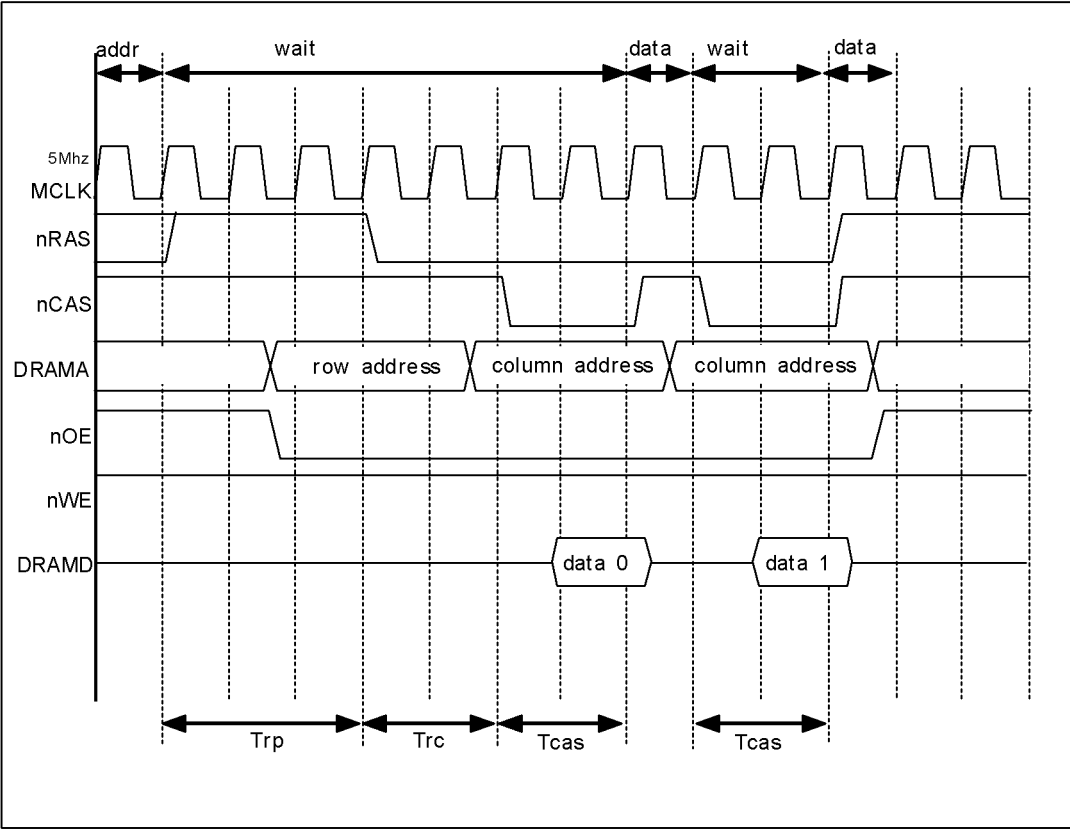
**2) Operating Principle (WorkCentre M15/M15i)**

DRAM can either read or write. The data can be stored in the DRAM only when the power is on. It stores data while the CPU processes data. The address to read and write the data is specified by RAS SIGNAL and CAS SIGNAL. DRAMWE\*SIGNAL is activated when writing data and DRAMOE\*SIGNAL, when reading. You can expand up to 64MBYTE of DRAM in this system.

Start Address ~ End Address	Contents
0x00000000 ~ 0x00FFFFFF	ROM Bank0
0x01000000 ~ 0x01FFFFFF	ROM Bank1
0x02000000 ~ 0x02FFFFFF	ROM Bank2
0x03000000 ~ 0x03FFFFFF	ROM Bank3
0x04000000 ~ 0x0FFFFFFF	Unused
0x10000000 ~ 0x1FFFFFFF	Special Function Registers
0x20000000 ~ 0x20FFFFFF	I/O Bank0
0x21000000 ~ 0x21FFFFFF	I/O Bank1
0x22000000 ~ 0x22FFFFFF	I/O Bank2
0x23000000 ~ 0x23FFFFFF	I/O Bank3
0x24000000 ~ 0x24FFFFFF	I/O Bank4
0x25000000 ~ 0x25FFFFFF	I/O Bank5
0x26000000 ~ 0x26FFFFFF	DMA I/O Bank0
0x27000000 ~ 0x27FFFFFF	DMA I/O Bank1
0x28000000 ~ 0x28FFFFFF	DMA I/O Bank2
0x29800000 ~ 0x29FFFFFF	DMA I/O Bank3
0x2A000000 ~ 0x2FFFFFFF	Unused
0x30000000 ~ 0x30FFFFFF	RSH SRAM
0x31000000 ~ 0x31FFFFFF	HPVC SRAM
0x32000000 ~ 0x32FFFFFF	MOTOR SRAM
0x33000000 ~ 0x37FFFFFF	Unused
0x38000000 ~ 0x38FFFFFF	USB CSR & FIFO
0x39000000 ~ 0x390003FF	USB PLUG DETECT
0x38000500 ~ 0x3FFFFFFF	Unused
0x40000000 ~ 0x4FFFFFFF	SDRAM array0 (bank 0)
0x50000000 ~ 0x5FFFFFFF	SDRAM array1 (bank 1)
0x60000000 ~ 0x6FFFFFFF	SDRAM array2 (bank 2)
0x70000000 ~ 0x7FFFFFFF	SDRAM array3 (bank 3)
0x80000000 ~ 0xBFFFFFFF	SDRAM array0~4 (Mirror)
0xC0000000 ~ 0xC00007FF	MAC
0xC0000800 ~ 0xC0FFFFFF	Unused

### 5-3-6-1 FPM DRAM Reading Timing (WorkCentre Pro 412 & FaxCentre F12)

Fast Page Mode DRAM can access the page mode. It can read consecutive cells by accessing the page mode while accessing the burst. For FPM DRAM, the data are valid only when the nCAS is active. While configuring the software, you must set the timing register of SFR considering the clock speed and the DRAM spec.

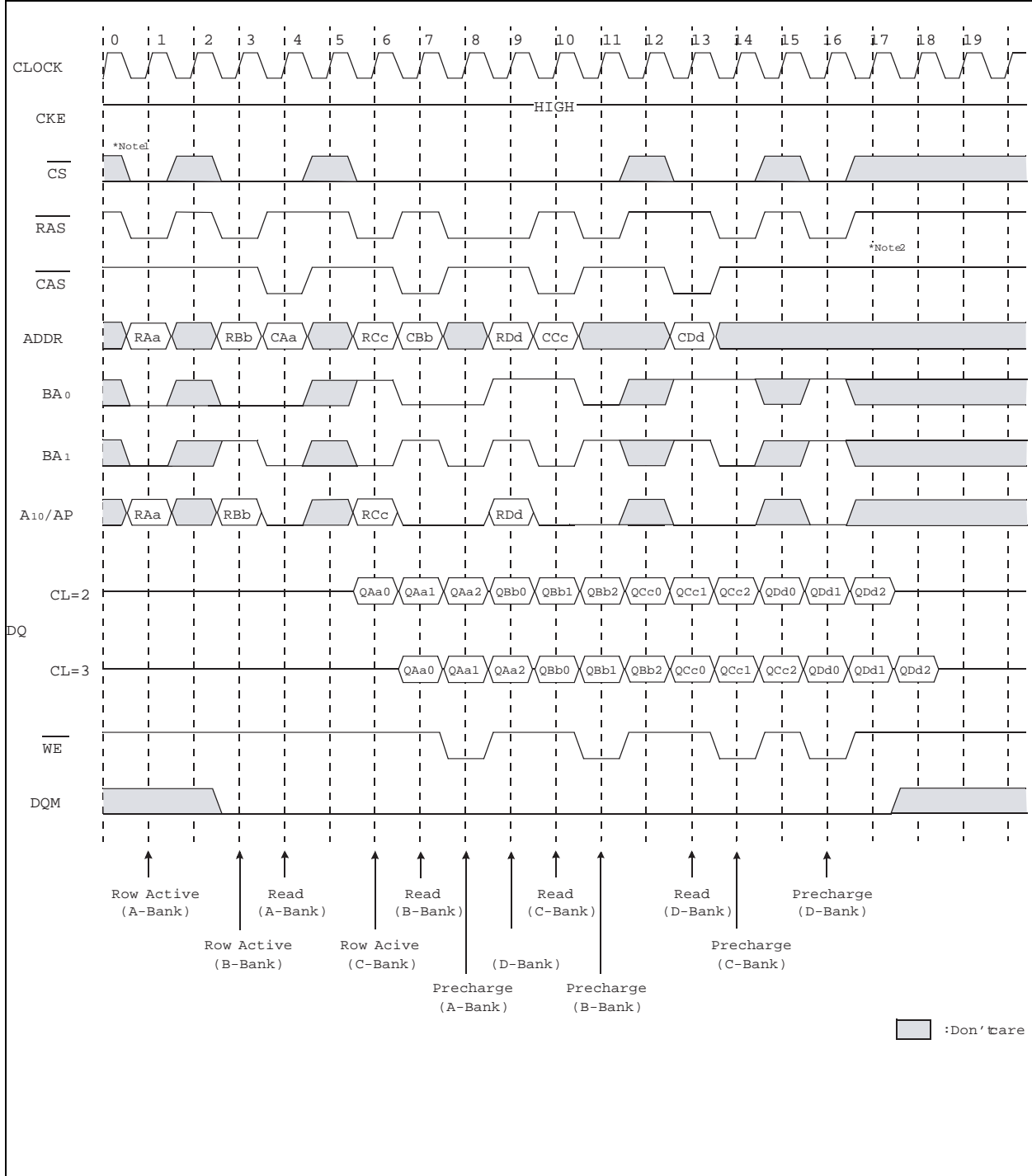


FPM Read Timing Diagram

### 5-3-6-2 SDRAM DRAM read timing (WorkCentre M15/M15i)

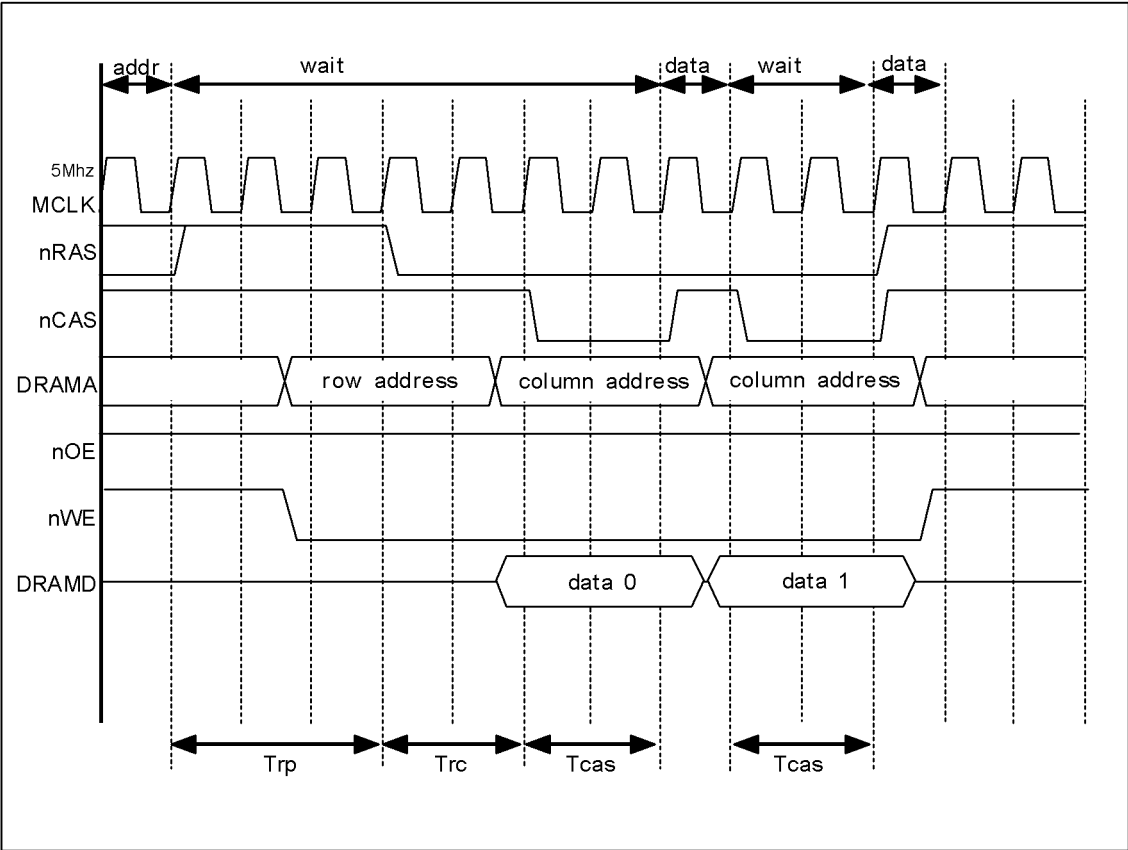
Basically the Extended Data Out DRAM is similar to Fast Page Mode DRAM. For FPM, the data are valid only when the nCAS is active while reading the internal data, however, it has a latch that the data will be continuously outputted even after the nCAS is inactivated.

While configuring the software, you must set the timing register of SFR considering the clock speed and the DRAM spec.



\* Note : 1. CS can be don't cared when RAS, CAS and WE are hih at the clock high going dege.  
 2. To interrupt a burst read by row precharge, both the read and the precharge banks must be the same.

5-3-6-3 FPM DRAM Write Timing (WorkCentre Pro 412 & FaxCentre F12)

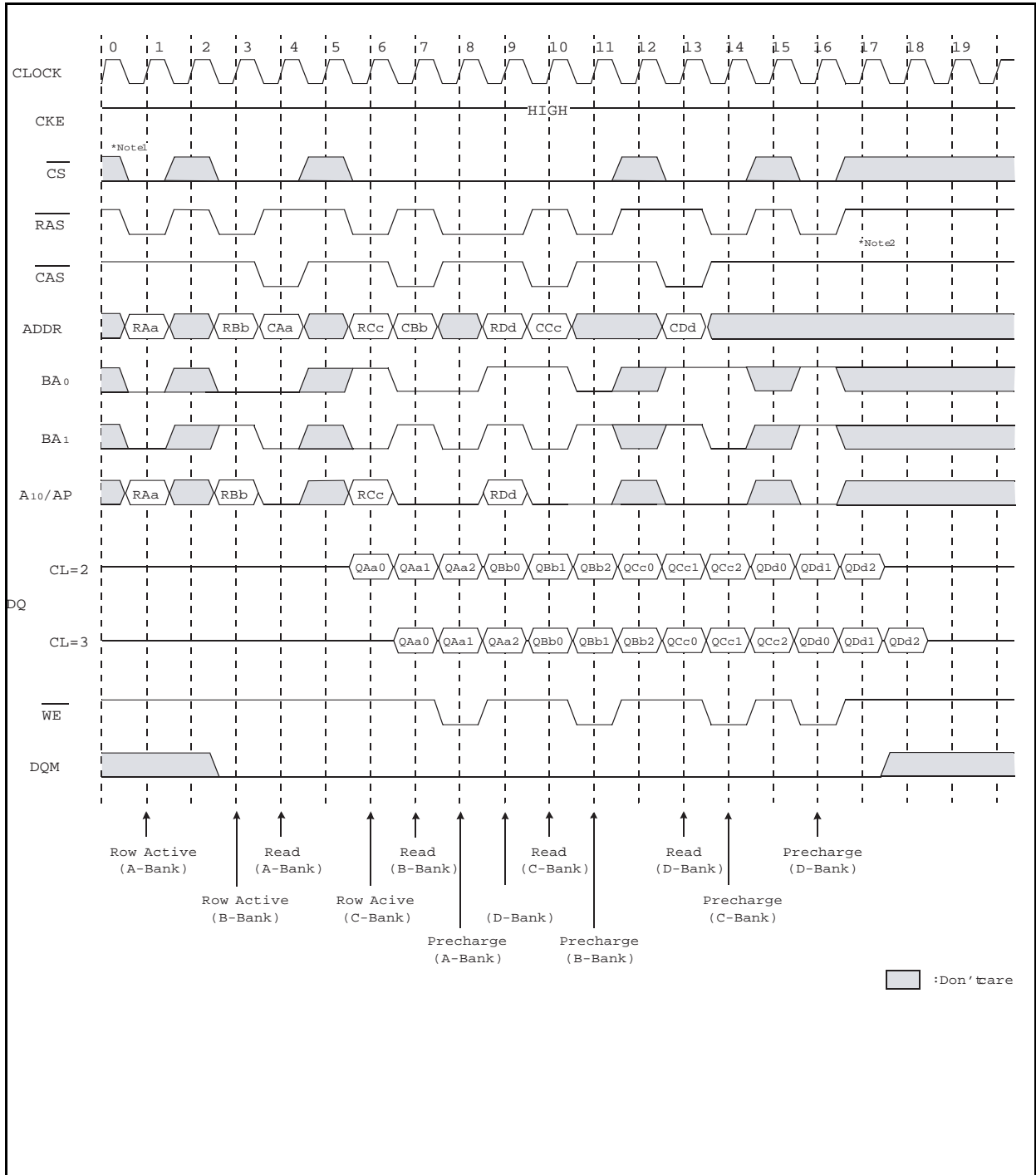


FPM Write Timing Diagram

clock	type	Trp		Trc		Tcas	
		cycle #	register	cycle #	register	cycle #	register
58Mhz	40 ns FPM	2	0x1	2	0x1	1	0x0
	50 ns FPM	2	0x1	2	0x1	1	0x0
	60 ns FPM	3	0x2	2	0x1	2	0x1
	70 ns FPM	3	0x2	2	0x1	2	0x1

SFR Values Example for FPM

### 5-3-6-4 SDRAM write timing (WorkCentre M15/M15i)

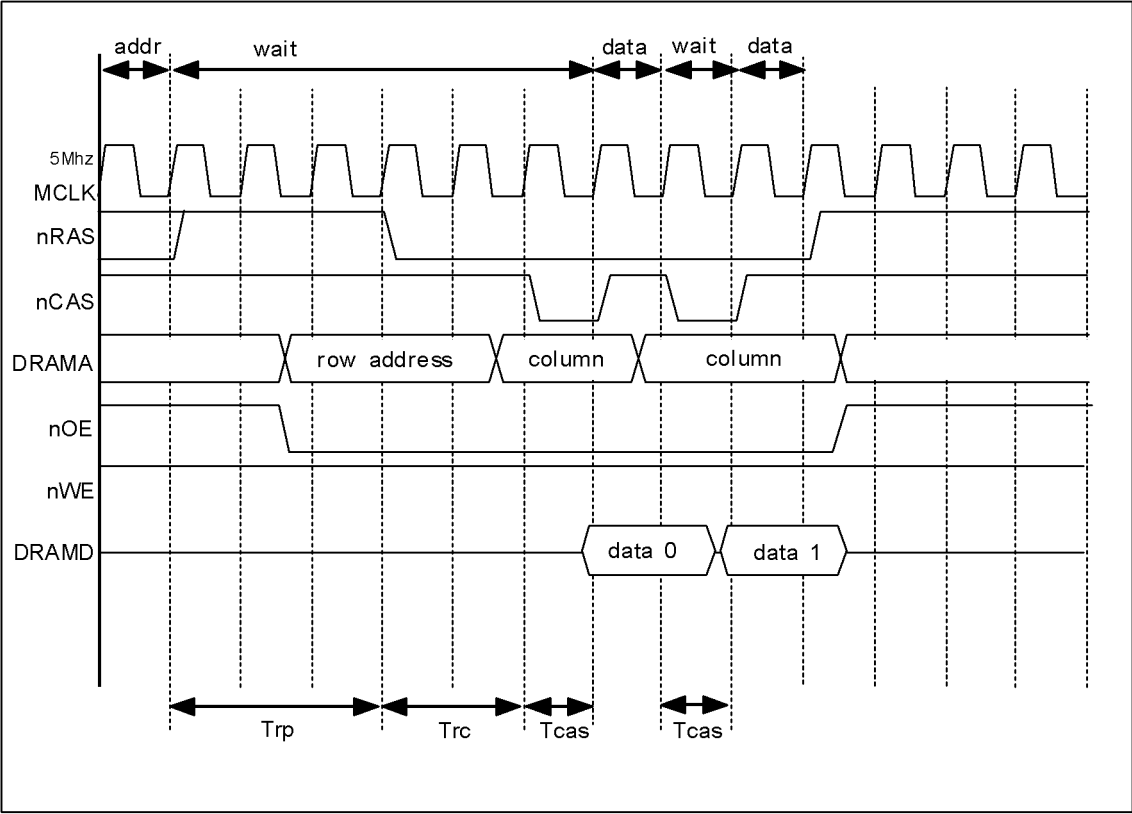


\*Note : 1. To interrupt burst write by Row precharge, DQM should be asserted to mask invalid input data.  
 2. To interrupt burst write by Row precharge, both the write and the precharge banks must be the same.

### 5-3-6-5 EDO DRAM Read Timing

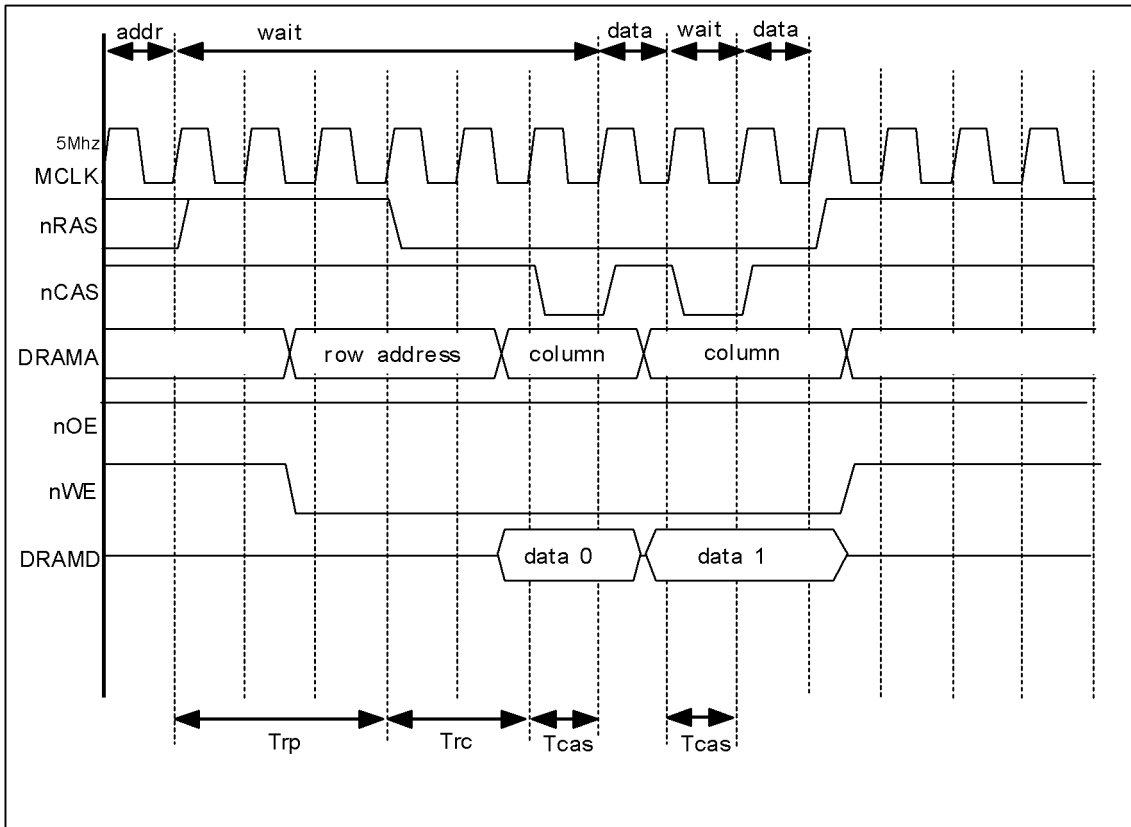
Basically the Extended Data Out DRAM is similar to Fast Page Mode DRAM. For FPM, the data are valid only when the nCAS is active while reading the internal data, however, it has a latch that the data will be continuously outputted even after the nCAS is inactivated.

While configuring the software, you must set the timing register of SFR considering the clock speed and the DRAM spec.



EDO Read Timing Diagram

### 5-3-6-6 edo DRAM Write Timing



FPM Write Timing Diagram

clock	type	Trp		Trc		Tcas	
		cycle #	register	cycle #	register	cycle #	register
58Mhz	40 ns EDO	2	0x1	2	0x1	1	0x0
	50 ns EDO	2	0x1	2	0x1	1	0x0
	60 ns EDO	3	0x2	2	0x1	1	0x0
	70 ns EDO	3	0x2	2	0x1	2	0x1

SFR Values Example for FPM



### **5-3-7 FS781 (Frequency Attenuator)**

This system uses FS781 for the main clock for EMI suppression.

It spreads the source clock in a consistent bandwidth to disperse the energy gathered in order to attenuate the energy.

The capacitor value of the loop filter (PIN 4) is set depending on the source clock used or the spread bandwidth. Refer to FS781 Spec. for detail.

### **5-3-8 USB (Universal Serial Bus)**

NS's USBN9602 is used as the interface IC and 48MHz clock is used.

When the data is received through the USB port, EIRQ1 SIGNAL is activated to send interrupt to CPU, then it directly sends the data to DRAM by IOCS4\* & DRAMA(11) SIGNAL through DRAMD (24;31).

### **5-3-9 SRAM; 32KB SRAM (WorkCentre Pro 412 & FaxCentre F12)**

It stores a variety of option data.

### **5-3-10 SRAM : 1MByte SRAM K6F1008U2C (WorkCentre M15/M15i)**

It stores a variety of option data.

### 5-3-11 FAX Transceiver

#### 5-3-11-1 General

This circuit processes transmission signals of modem and between LIU and modem.

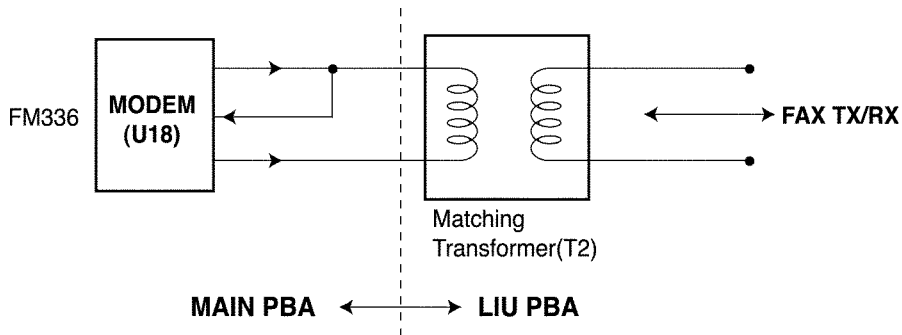
#### 5-3-11-2 Modem (u44)

FM336 is a single chip fax modem. It has functions of DTMF detection and DTMF signal production as well as functions of modem. TX A1, 2 is transmission output port and RX IN is received data input port. /POR signal controlled by MFP controller (U3:KS32C61200) can initialize modem (/M\_RST) without turning off the system.

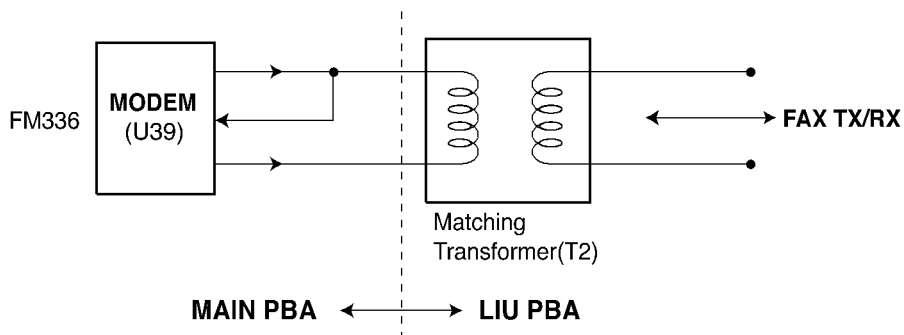
D0-D7 are 8-bit data buses. RS0-RS4 signals to select the register in modem chips. /RS and /WR signals control READ and WRITE respectively. /IRQ is a signal for modem interrupt.

Transmission speed of FM336 is supported up to 33.6k.

The modem is connected to LINE through transformer directly.



WorkCentre Pro 412 & WorkCentre M15/M15i FAX Transceiver



FaxCentre F12 FAX Transceiver

## 5-4 Scanner

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### 5-4-1 WorkCentre Pro 412 Scanner & WorkCentre M15/M15i Scanner

#### 5-4-1-1 Summary

This flat-bed type device to read manuscripts has 600dpi CCD as an image sensor. There is one optical sensor for detecting CCD home position and Scan-end position. The home position is detected by an optical sensor which is attached to the CCD Module. The Scan-end position is calculated by the number of motor steps.

#### **CCD (WorkCentre Pro 412)**

Contact Image Sensor improves productivity and allows a compact design.

**This machine uses a color CCD.**

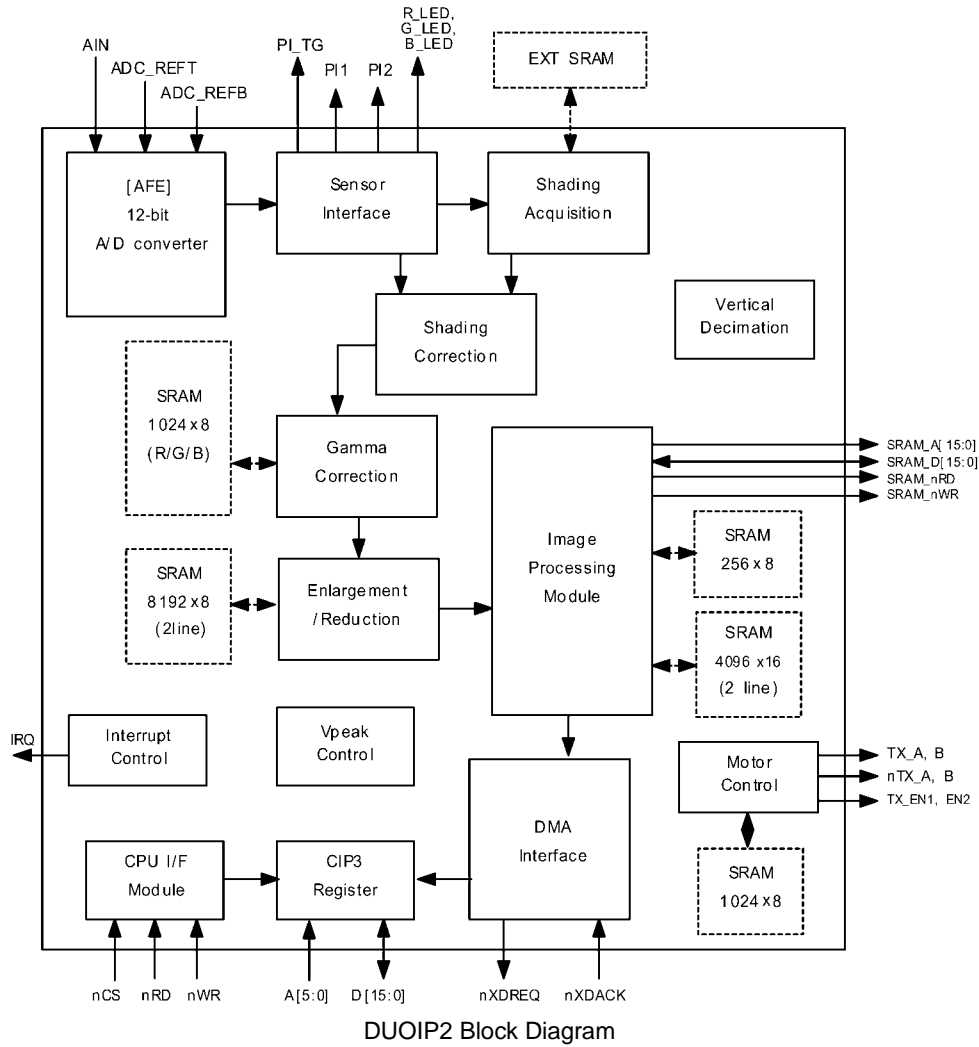
- Minimum scan line time for one color: 5mS.
- Light source power: +12V.
- Maximum pixel frequency: 6 MHz.
- Effective sensor element: 5340 X 3.
- Clamp level: 0.7 to 0.8V.
- Bright output: min. 0.8V.

#### **CCD (WorkCentre M15/M15i)**

Charge Coupled Device improves productivity and allows a compact design.

**This machine uses a color CCD.**

- Minimum Scan Line Time for One Color : 2.5mS.
- Light Source Power : +18V
- Maximum Pixel frequency : 10MHz
- Effective Sensor Element : 5340 X 3
- Clamp Level : 0.7 to 0.8V
- Bright Output : min 0.8V



## 5-4-1-2 Key Features

### Overview

- (1) 0.5µm C-MOS process (TLM), 208-PIN QFP, STD85 library.
- (2) Frequency: 50 MHz.
- (3) On-Chip oscillator.
- (4) Method: Raster scanning method.
- (5) Image Sauce: 300/400/600dpi CIS & CCD.
- (6) Scanning Mode.
  - color gray image: each 8 bits / RGB.
  - mono gray image: 8 bits / pixel.
  - binary image: 1 bit / pixel (for text/photo/mixed mode).
- (7) Maximum scanning width: A3, 600dpi (8K effective pixels).
- (8) Ideal MSLT (A4, 600/300dpi).
  - color gray image: 3x5Kx80nsec = 1.2msec (7/28 CPM).
  - mono gray image: 1x5Kx80nsec = 0.4msec (21/84 CPM).
  - binary image: 1x5Kx80nsec = 0.4msec (21/84 CPM).
- (9) A/D conversion depth: 12bits.

## 5-4-2 FaxCentre F12 Scanner

### 5-4-2-1 Summary

This device to read manuscripts has 300 dpi CIS as an image sensor.

### CCD

Contact Image Sensor

**This machine uses a color CCD.**

- Minimum Scan Line Time for One Color : 1.2 mS
- Light Source Power : +12 V
- Maximum Pixel frequency : 1.17 MHz
- Effective Sensor Element : 2574
- Clamp Level : 1.4 V
- Bright Output : 2.6 V

### 5-4-2-2 Key Features

#### Overview

- (1) 0.5µm C-MOS process (TLM), 208-PIN QFP, STD85 library
- (2) Frequency: 50 MHz
- (3) On-Chip oscillator
- (4) Method: Raster scanning method
- (5) Image Sauce: 300 dpi CIS
- (6) Scanning Mode
  - color gray image: each 8 bits / RGB
  - mono gray image: 8 bits / pixel
  - binary image: 1 bit / pixel (for text/photo/mixed mode)
- (7) Maximum scanning width: A4, 300 dpi
- (8) A/D conversion depth: 12bits

### **Pixel Processing Structure**

- Minimum pixel processing time: 4 system clocks.
- High speed pipe-lined processing method.

(Shading correction, gamma correction, enlargement/reduction, and binarisation).

### **Shading Correction**

- (1) White shading correction support for each R/G/B.
- (2) White shading data memory:  $3 \times 8K \times 12\text{bits} = 288\text{Kbits} \rightarrow 384\text{Kbits}$  (external).
- (3) Black shading data memory:  $3 \times 8K \times 12\text{bits} = 288\text{Kbits} \rightarrow 384\text{Kbits}$  (external).

### **Gamma Correction**

- (1) Independent gamma table for each RGB component.
- (2) Gamma table data memory:  $3 \times 1K \times 8\text{bits} = 24\text{Kbits}$  (internal).

### **Binarisation (mono)**

- (1) 256 Gray's halftone representation for photo document:  $3 \times 5$  EDF (Error DifFusion) method proposed by Stucki.
- (2) LAT (Local Adaptive Thresholding) for text document:
  - use of  $5 \times 5$  LOCAL WINDOW (TIP ALGORITHM).
  - ABC (Automatic Background Control): T<sub>min</sub> automatic change.
- (3) Mixed mode processing for text/photo mixed document.
- (4) EDF data memory:  $2 \times 4K \times 16\text{bits} = 128\text{Kbits}$  (internal).
- (5) LAT data memory:  $4 \times 4K \times 16\text{bits} = 256\text{Kbits}$  (external).

### **Scaling of Input Image**

- (1) Scaling factor:
  - Horizontal direction: 25 to 800% by 1% unit.
  - Vertical direction: 25 to 100% by 1% unit.
- (2) Scaling data memory:  $2 \times 8K \times 8\text{bits} = 128\text{Kbits}$  (internal).

### **Intelligent scan motor controller**

- (1) Automatic acceleration/deceleration/uniform velocity.
- (2) Data memory:  $256 \times 16\text{bits} = 4\text{Kbits}$  (internal).

### **Auto-Run**

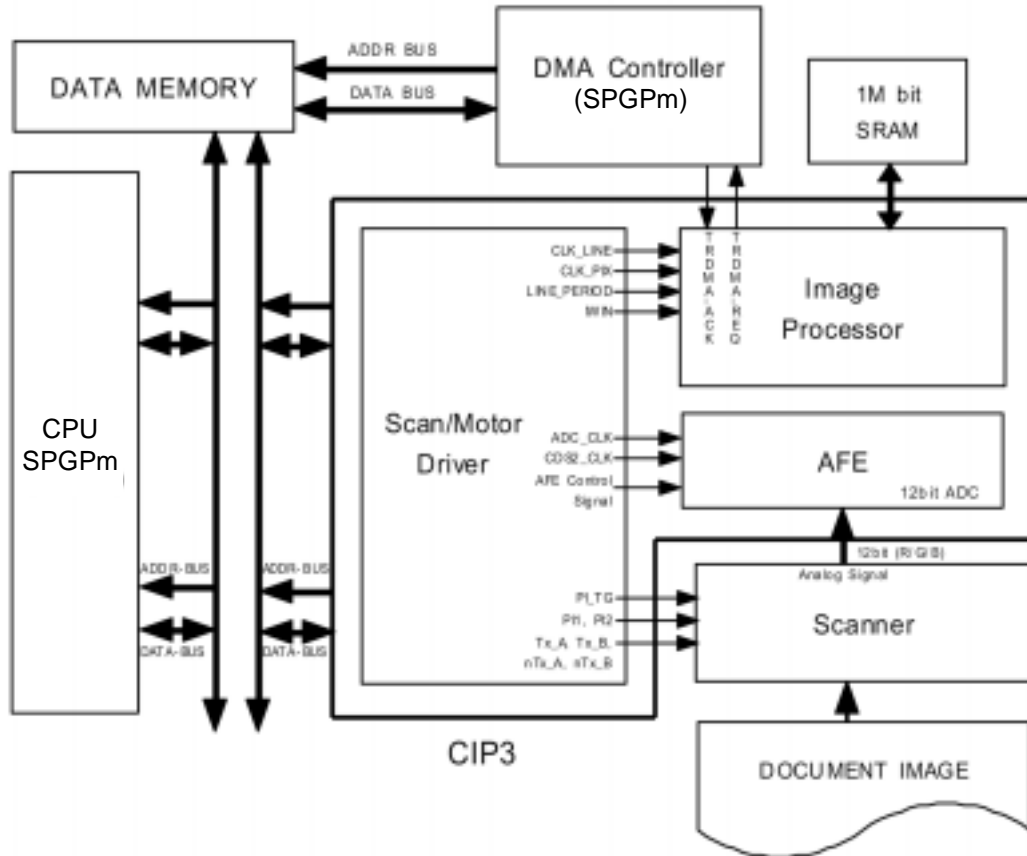
Automatic CLK\_LINE (line processing start control) and •TG (line scan start control) signal generation.

- (1) Available re-synchronisation of øTG signal.
- (2) programmable øTG's period & CLK\_LINE's occurrence number.

### **Processed data output format in DTM (Data Transfer Module)**

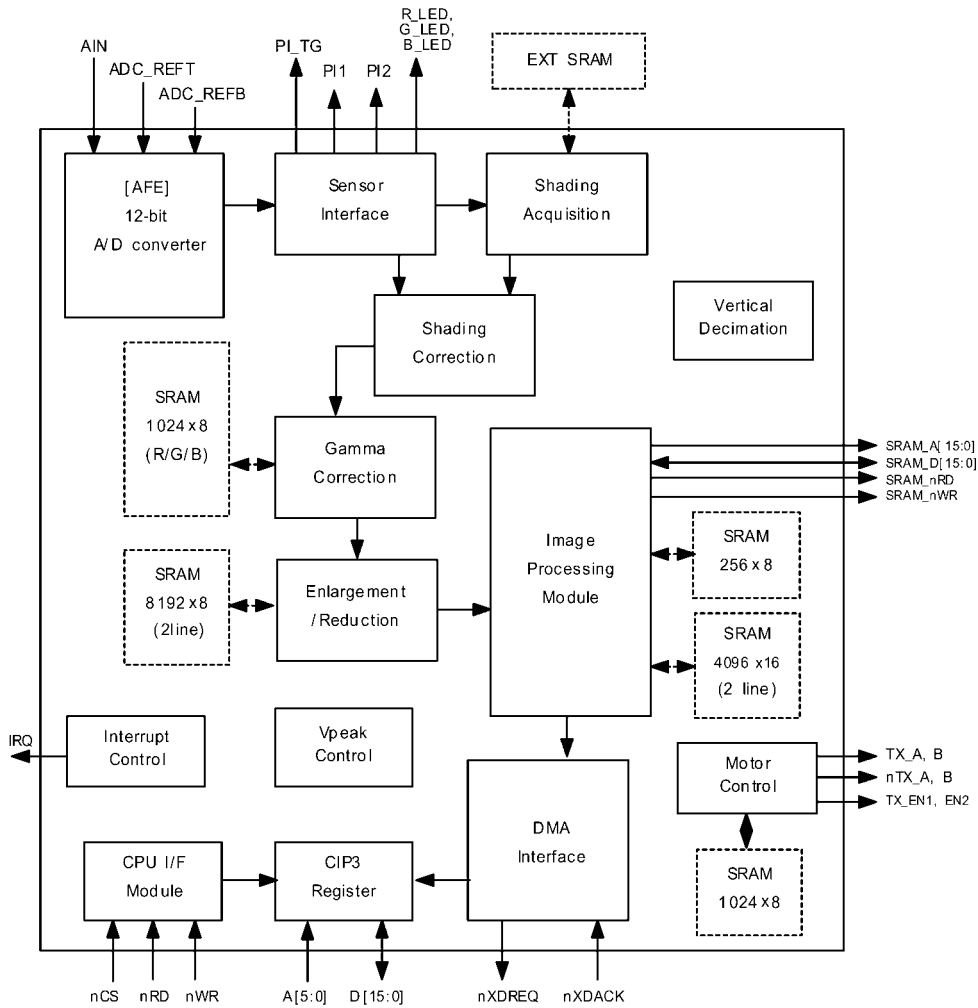
- (1) DMA mode: Burst/On-demand mode.
- (2) CDIP I/F: LINE\_SYNC, PIXEL\_SYSNC, PIXEL\_DATA[7:0].



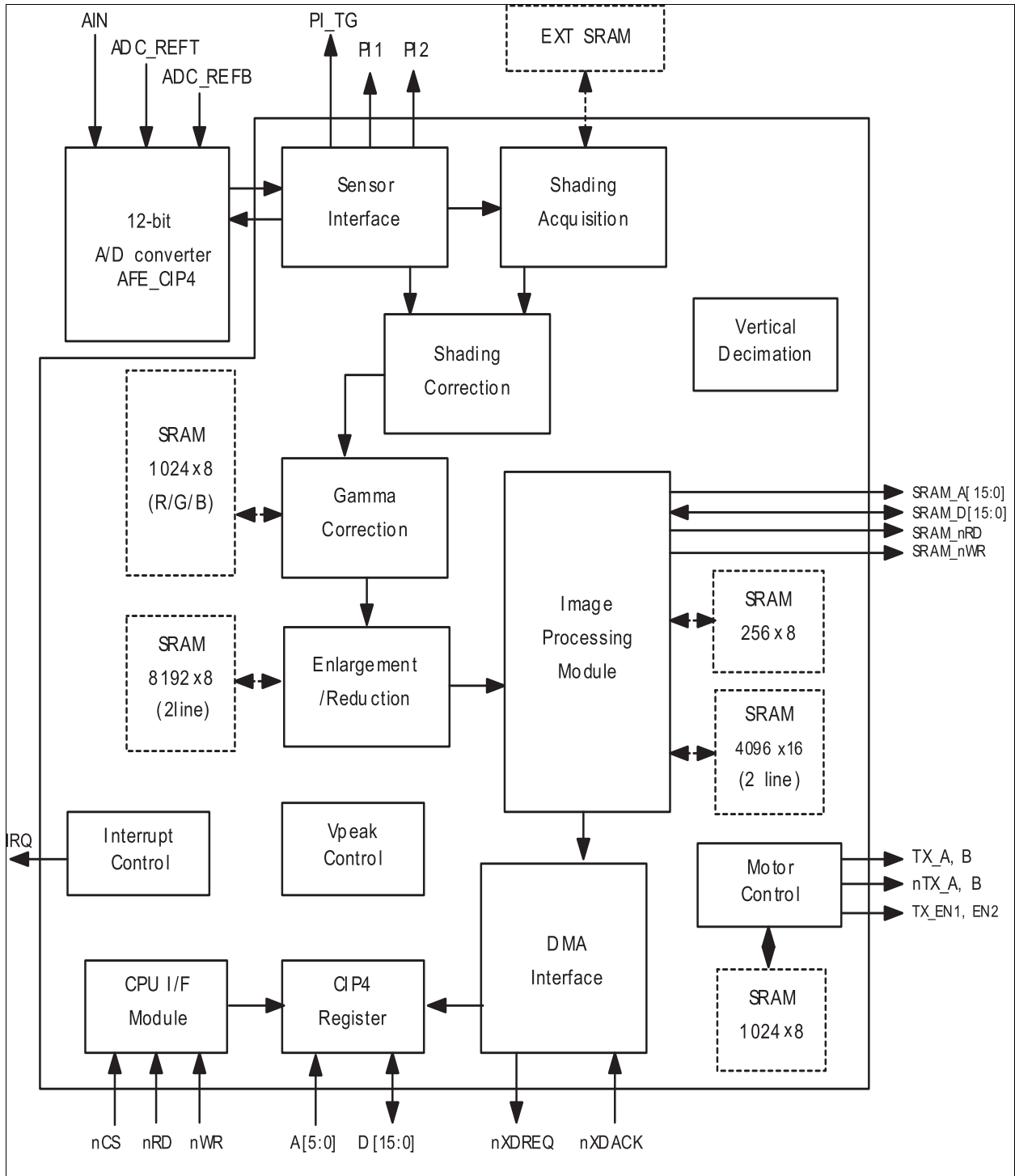


External interface with CIP4 (WorkCentre M15/M15i)





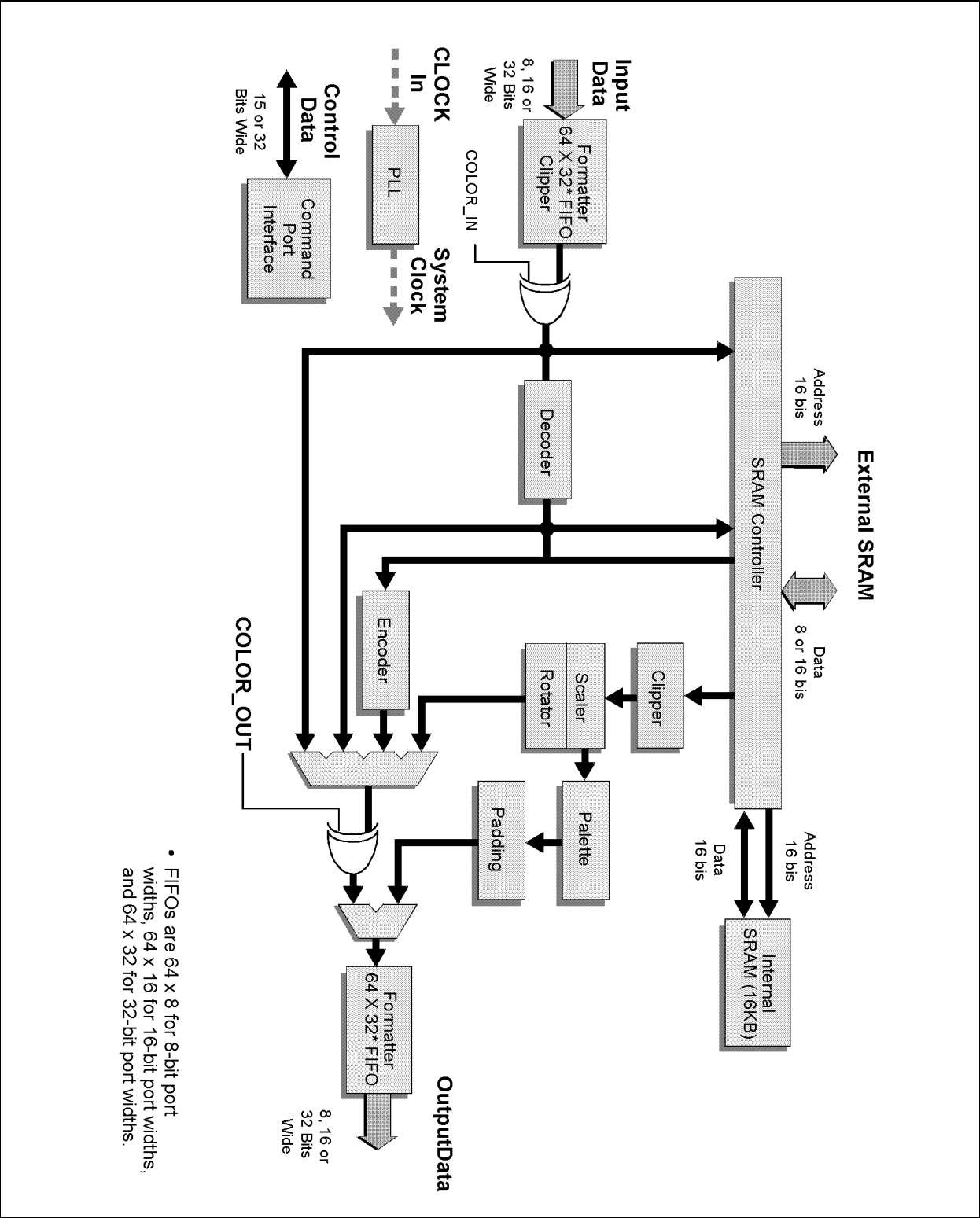
Block diagram of CIP3 (WorkCentre Pro 412)



Block diagram of CIP4 (WorkCentre M15/M15i)

### 5-4-3 Jbig compress & decompress

#### 5-4-3-1 Block Diagram



## 5-5-1 Specifications

This section presents the electrical and environmental specifications of the FaxCentre F12.

### 1. Power Ratings

Table presents the FaxCentre F12's minimum and maximum power ratings and storage temperatures.

Parameter	Symbol	Min.	Max	Units	
3.3 Volts Supply Voltage	VDD	-0.3	7.0	Volts	
5.0_Volt Reference Level*	3.3_Volt Oper.	VDDBIAS	VDD	3.6	Volts
	5.0_Volt Oper.	VDDBIAS	VDD	5.55	Volts
Input pin voltages for other than VDD, VSS	Vin	-0.3	VDDBIAS + 0.3	Volts	
DC Input Current	Iin	-10	+10	mAmps	
Storage Temperature	Tas	-40	125	Degrees C	

\* VDDBIAS is connected to the system's 5.0V supply to provide 5V tolerance on I/O signal pins (including all inputs, outputs, and bidirectional). in systems where 3.3V signaling only is used, connect VDDBIAS to a 3.3V supply.

### 2. Required Operation Conditions

Table presents the FaxCentre F12's environmental specifications.

Parameter	Symbol	Min.	Max	Units
3.3 Volts Supply Voltage	VDD	3.0	3.6	Volts
5.0_Volt Reference Level*	VDDBIAS	4.75	5.25	Volts
Power Consumption at 66 MHz Operation Pd	-	1.0	Watt	
Operating Temperature	Tao	0	70	Degrees C

\* VDDBIAS is connected to the system's 5.0V supply to provide 5V tolerance on I/O signal pins (including all inputs, outputs, and bidirectional). in systems where 3.3V signaling only is used, connect VDDBIAS to a 3.3V supply.

**5-5-1-1 Electrical Specifications**

This section provides the PM-22's electrical specifications.

Parameter	Symbol	Min.	Max	Units
Input capacitance for all input only pins	Cin	0	10	pF
Input capacitance for all bidirectional pins	Cio	0	15	pF
Input high voltage for all inputs	Vin	2.0	VDDBIAS +0.3	Volts
Input low voltage for all inputs	Vil	GND -0.3	0.8	Volts
Output high voltage for all outputs	Voh	2.4	VDD	Volts
Output low voltage for all outputs	Vol	GND	0.4	Volts
Input current with input at VDD	Iih	-30	30	
Input current with input at GND	Iil	-30	30	
Tri-state output current with output at VDD	Iozh	-100	100	$\mu$ A $\mu$ A
Tri-state output current with output at GND	Iozl	-100	100	
Power supply current	Icc	0	95	mA

**DC Characteristics**

Table presents the PM-22's DC characteristics.

**IMPORTANT:** CLOCK pin timing is measured at TTL levels, not CMOS. The system CLOCK driver must be configured correctly in order to ensure that duty cycle and Vil specifications are met.

**5-5-1-2 Pin Classification and Loading**

Table describes the pin classification and loading of the FaxCentre F12's signal pins. The capacitance column presents the values used to derive the specification timing. The current columns present maximum values. Table uses the following notation for pin types:

Name	Pins	Level	Resistor	Type	Abbreviation/Description	Maximum Loading		
						Cap (pF)	Current (mA)	
							Vol	Voh
AGND		L	~	P	Analog Supply Return (Gnd.)	~	~	~
AVDD		H	~	P	Analog Power Supply Source	~	~	~
ALD[7:0]	8	H	H	1/3S	Alternate Data Output	50	4	4
CD[15:0]	16	H	H	1/3S	Command Data	50	8	8
CLOCK	1	H	~	I	System Clock	~	~	~
CLK_OUTPUT	1	H	~	3S	PLL Clock Test Output			
CS	1	L	~	I	System Clock	~	~	~
DONE	1	H	~	O	Operation Done Flag	50	8	8
GND	23	N/A	~	P	Supply Return (Gnd.)	~	~	~
IBACK	1	L	~	I	Input Burst Active	~	~	~
I/D	1	H	~	I	Index/Data Control	~	~	~
ID[15:0]	16	H	~	1/3S	Input Data	~	~	~
IDACK	1	L	~	I	Input Data Strobe	~	~	~
IDREQ	1	H	~	3S	Input Data Request	50	8	8
IFRDY	1	H	~	I	Input Buffer Ready	~	~	~
IN_OVERFLOW	1	L	H	I	Buffer Overflow Alert	~	~	~
INT	1	L	~	OD	Interrupt Request	50	8	8
ISTRB	1	L	~	O	Input Buffer Strobe	50	4	4
LSYNC	1	H	~	O	Input Data Sync	50	4	4
NC	4	~	~	~	No Connect	~	~	~
OBACK	1	L	H	I	Output Burst Active	~	~	~
OD[15:0]	16	H	~	1/3S	Output Data	50	8	8
ODACK	1	L	H	I	Output Data Strobe	~	~	~
ODREQ	1	H	~	3S	Output Data Request	50	8	8
OFRDY	1	H	~	I	Output Buffer Ready	~	~	~

OSTRB	1	L	~	O	Output Buffer Strobe	50	4	4
PLL_BYP	1	H	~	I	Phase Locked Loop Bypass	~	~	~
RA[15:0]	16	H	~	O	RAM Address	50	4	4
RAMOE	1	L	~	O	RAM Output Enable	50	4	4
RAMWR	1	L	~	I	RAM Write Enable	50	4	4

Name	Pins	Level	Resistor	Type	Abbreviation/Description	Maximum Loading		
						Cap (pF)	Current (mA)	
							Vol	Voh
RD	1	L	~	I	Command Port Read	~	~	~
RD [7:0]	8	H	H	1/3S	RAM Data	50	4	4
RE [1:0]	2	L	~	O	RAM Enable	50	4	4
RESET	1	L	H	I	Chip Reset	~	~	~
TESTIN	1	H	~	I	Test Input	~	~	~
TEST-OUT	1	H		O	Manufacturing Test Output	~	~	~
VDD	22	N/A	~	P	Power Supply Source	~	~	~
VDDBIAS	1	N/A			Input Reference Voltage			
WR	1	L	~	I	Command Port Write	~	~	~
RAMWR	1	L	~	I	RAM Write Enable	50	4	4
RD	1	L	~	I	Command Port Read	~	~	~
RD [7:0]	8	H	H	1/3S	RAM Data	50	4	4
RE [1:0]	2	L	~	O	RAM Enable	50	4	4

## &lt; Pin Classification and Loading &gt;

- I: Input
- O: Output
- 3S: Tri-state output
- OD: Open drain output
- P: Power supply

Combinations indicate bidirectional pins.

An "H" in the Resistor column indicates the pad has an internal pull-up resistor.

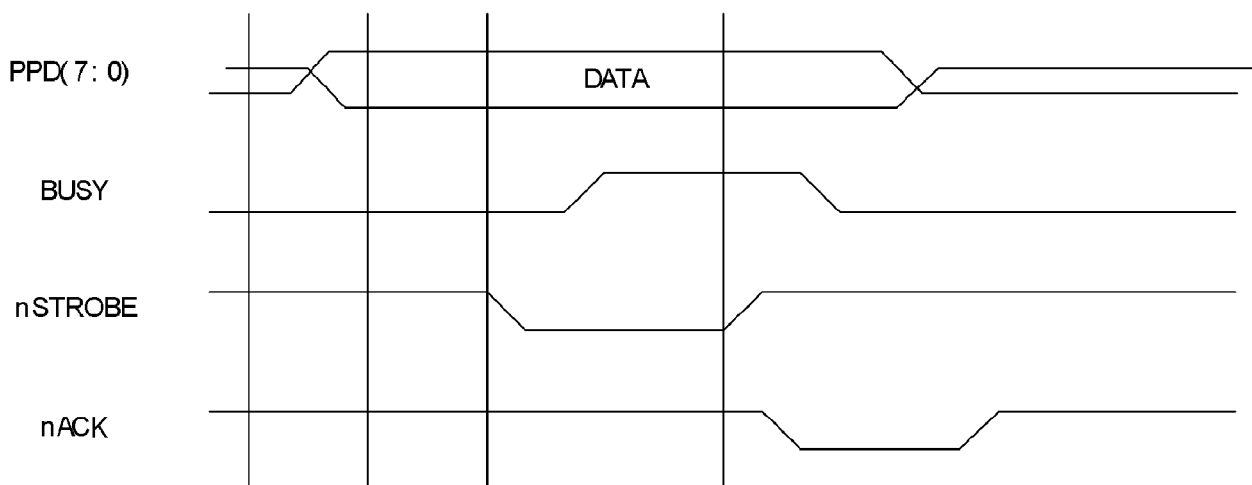
A tilde (~) indicates no internal resistor.

## 5-6 Host Interface

Referred to IEEE 1284 standard.

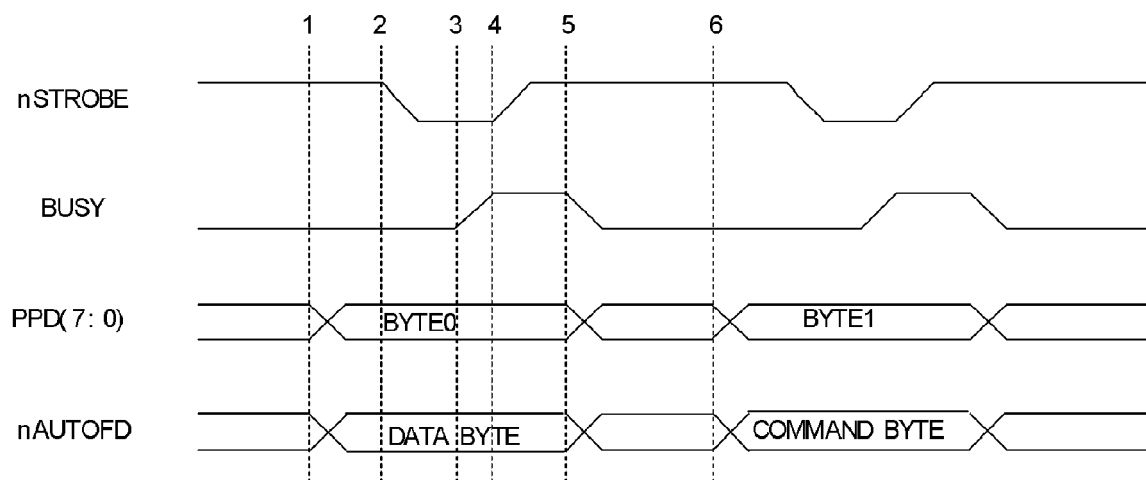
### 5-6-1. Host Interface

PARALLEL PORT INTERFACE PART KS32C61200 enables the parallel interface with the PC. This part is connected to the PC through a Centronics connector. It generates major control signals that are used to actuate parallel communication. It is comprised of /ERROR, PE, BUSY, /ACK, SLCT, /INIT, /SLCTIN, /AUTOFD and /STB. This part and the PC data transmission method support the method specified in IEEE P1283 Parallel Port Standard (<http://www.fapo.com/ieee1284.html>). In other words, it supports both compatibility mode (basic print data transmitting method), the nibble mode (4bit data; supports data uploading to PC) and ECP (enhanced capabilities port: 8bits data - high speed two-way data transmission with PC). Compatibility mode is generally referred to as the Centronics mode and this is the protocol used by most PCs to transmit data to the printer. ECP mode is an improved protocol for the communication between PC and peripherals such as printer and scanner, and it provides high speed two-way data communication. ECP mode provides two cycles in the two-way data transmission; data cycle and command cycle. The command cycle has two formats; Run-Length Count and Channel Addressing. RLE (Run-Length Count) has high compression rate (64x) and it allows real-time data compression that it is useful for the printer and scanner that need to transmit large raster images. Channel Addressing was designed to address multiple devices with single structure. For example, like this system, when the fax/printer/scanner have one structure, the parallel port can be used for other purposes while the printer image is being processed. This system uses RLE for high speed data transmission. PC control signals and data send/receive tasks such as PC data printing, high speed uploading of scanned data to PC, upload/download of the fax data to send or receive and monitoring the system control signal and overall system from PC are all processed through this part.



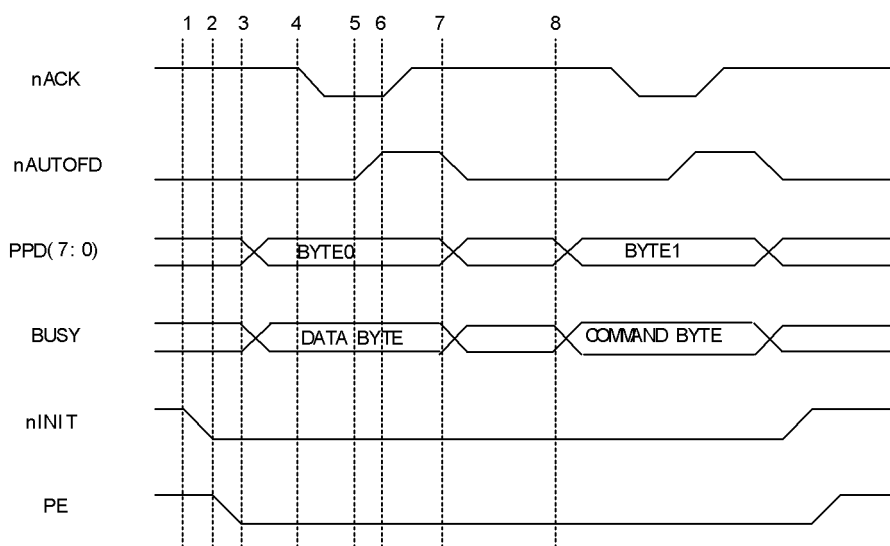
Compatibility Hardware Handshaking Timing





ECP Hardware Handshaking Timing (forward)

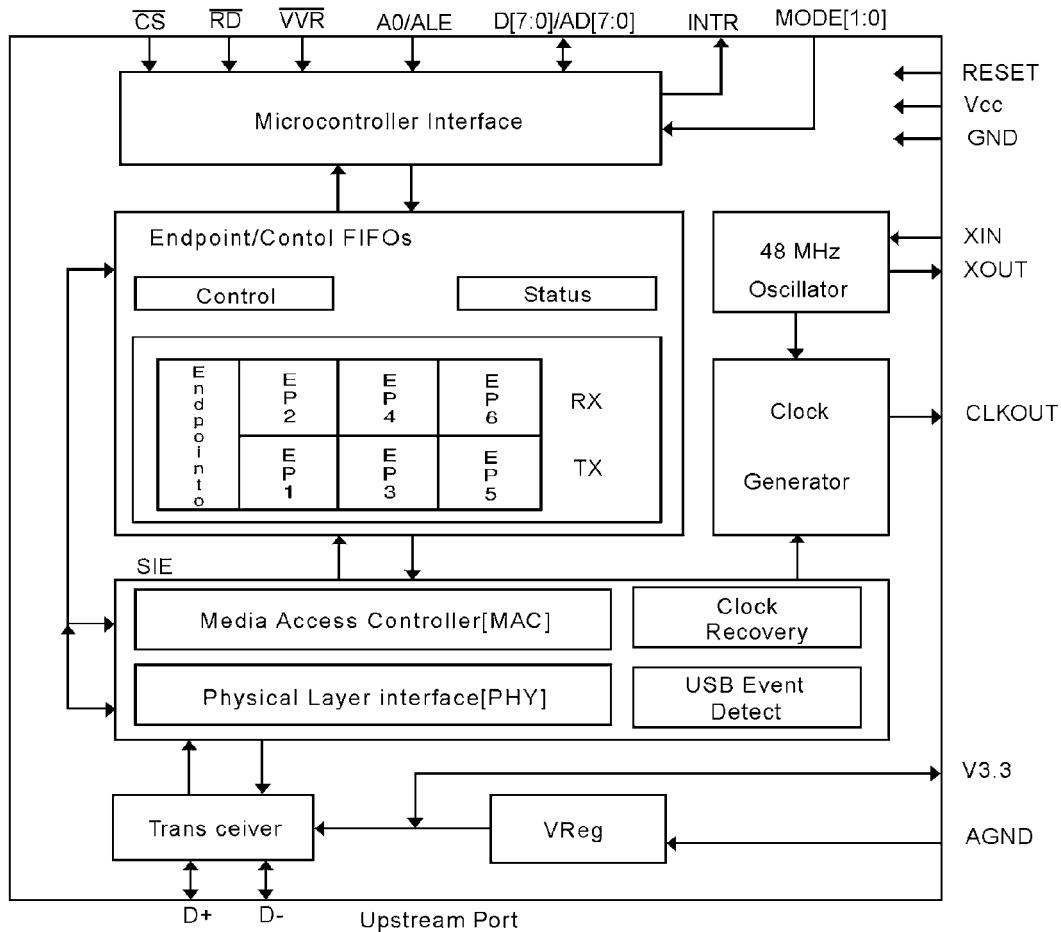
1. The host places data on the data lines and indicates a data cycle by setting nAUTOFD.
2. Host asserts nSTROBE low to indicate valid data.
3. Peripheral acknowledges host by setting BUSY high.
4. Host sets nSTROBE high. This is the edge that should be used to clock the data into the Peripheral.
5. Peripheral sets BUSY low to indicate that it is ready for the next byte.
6. The cycle repeats, but this time it is a command cycle because nAUTOFD is low.



ECP Hardware Handshaking Timing (reverse)

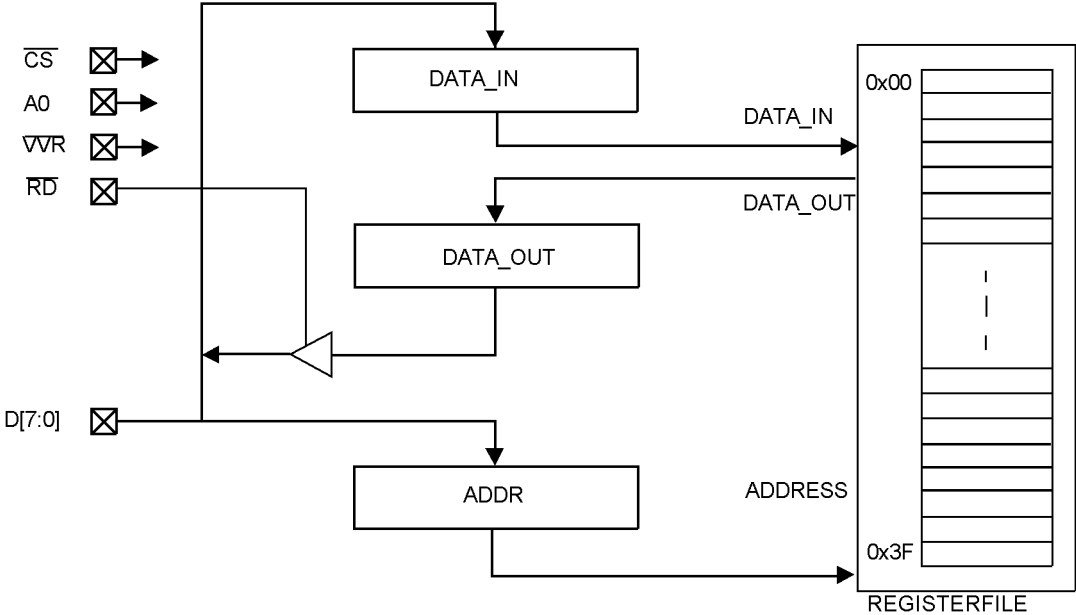
1. The host request a reverse channel transfer by setting nINIT low.
2. The peripheral signals that it is OK to proceed by setting PE low.
3. The peripheral places data on the data lines and indicates a data cycle by setting BUSY high.
4. Peripheral asserts nACK low to indicate valid data.
5. Host acknowledges by setting nAUTOFD high.
6. Peripheral sets nACK high. This is the edge that should be used to clock the data into the host.
7. Host sets nAUTOFD low to indicate that it is ready for the next byte.
8. The cycle repeats, but this time it is a command cycle because BUSY is low.

## 5-6-2 USB INTERFACE

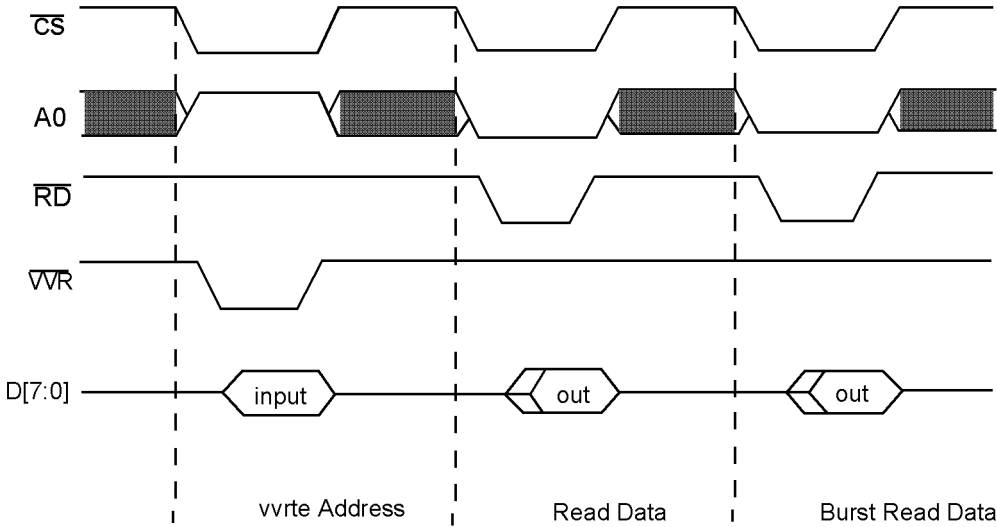


### 5-6-2-1 Features

- Full-Speed USB Node Device.
- USB transceiver.
- 3.3V signal voltage regulator.
- 48 MHz oscillator circuit.
- Programmable clock generator.
- Serial Interface Engine consisting of Physical Layer Interface (PHY) and Media Access Controller (MAC), USB Specification 1.0 compliant.
- Control/Status Register File.
- USB Function Controller with seven FIFO-based End-points.
- One bidirectional Control Endpoint 0 (8bytes).
- Three Transmit Endpoints (2\*32 and 1\*64 bytes).
- Three Receive Endpoints (2\*32 and 1\*64 bytes).
- 8-bit parallel interface with two selectable modes - non-multiplexed.
- multiplexed (Intel compatible).
- DMA support for parallel interface.
- MICROWIRE/PLUS Interface.
- 28-pin SO package.



Non-Multiplexed Mode Interface Block Diagram



Non-Multiplexed Mode Basic Timing Diagram

## 5-7 Engine Controller

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### 5-7-1 Fuser Control / Thermistor Circuit

This circuit controls the heat lamp temperature to fix the transferred toner on the paper. It is comprised of the thermistor that has the negative resistance against the temperature and LM393 (voltage comparator) and transistor for switching.

The thermistor has the resistance value reverse proportional to the heat lamp surface temperature. The voltage value is read by #60 pin(AVIN2) of CPU referring to the parallel combined resistance with the resistor(R43) connected parallel to it and the voltage distribution of R29. The voltage read activates (or de-activates) 'fuser' signal to high (or low) referring to the set temperature and when the 'FUSERON' signal turns down (high) to low (high) by Q3 switching, the S21ME4 inside SMPS (PC3) turns on (off) and this eventually turns two-way thyristor(THY501) on (off) to allow (shut) AC voltage to the heat lamp.

LM393 is hardware designed to protect the system when the firmware that controls the heat lamp no longer functions correctly. When the thermistor temperature goes beyond 210 degrees C, the level of pin #1 (LM393) will turn low, which turns the 'FUSERON' signal to high. The LM393 will force the heat lamp off by forcefully shutting off the power to Q3.

### 5-7-2 Paper Sensing Circuit

#### 1) Cover Open Sensing

Cover open sensor is located on the right side of the printer. In case the right cover is open, it shuts +5V (LSU laser unit) and +24V(main motor, polygon motor of fixer LSU and HVPS) that are supplied to each unit. It detects the cover opening through CPU. In this case, the red LED of the OP panel LED will turn on.

#### 2) Paper Empty Sensing

The paper empty sensor (photo interruption), located inside bottom of the bin cassette detects paper with the actuator connected to it and informs the CPU of whether there is paper. When there is no paper in the cassette, the red LED of the OP panel LED will turn on to tell the user to fill the cassette with paper.

#### 3) Paper Feeding

When the paper is fed into the set and passes through the actuator of the feed sensor unit, transistor inside the photo interrupter will turn on, 'nFEED' signal will turn low and inform CPU that the paper is currently fed into the system. CPU detects this signal and sprays video data after certain time (related to paper adjustment). If the paper does not hit the feed sensor within certain time, CPU detects this and informs as "Paper Jam0" (red LEDs on the OP panel will turn on).

#### 4) Paper Exit Sensing

The system detects the paper going out of the set with the exit sensor assembled to the actuator attached to the frame. If CPU does not turn back high a while after the paper hits the exit sensor, CPU detects this and inform as "Paper Jam2" (red LEDs on the OP panel will turn on).

### 5-7-3 LSU Circuit

#### 1) Polygon Motor Unit (actuated by +24V)

The polygon motor inside LSU rotates by the 'PMOTOR' signal. When it reaches the motor constant velocity section through the initial transient (transient response) section, it sends the 'nLREADY' signal to the CPU.

The 'clock' pin is the pin that receives clock of the required frequency when LSU uses external CLK as the motor rotational frequency. Currently the external clock circuit is located in the HVPS and  $1686\text{Hz} = 6.9083\text{MHz (crystal frequency)} \div 212(74\text{HC}4060\text{N IC})$ , is used as the rotational frequency of the polygon motor.

#### 2) Laser Unit (actuated by +5V)

After laser is turned on by 'nLD\_ON' signal, it is reflected by 6 mirrors (polygon mirror) attached to the polygon motor and performs scan in horizontal way. When the laser beam hits the corner of the polygon mirror, it generates 'nHSYNC' signal (pulse) and the CPU forms the left margin of the image using this signal (horizontal synchronous signal).

There are no user-serviceable parts inside the Laser unit.

### 5-7-4 Fan/Solenoid Actuation Circuit

The fan actuation circuit gets its power using NPN TR. When it receives 'FAN' signal from the CPU. The TR will turn on to make the voltage supplied to the fan to 24V in order to actuate the fan.

The solenoid is actuated in the same way. When it receives control signal from the CPU, the solenoid for paper feeding is actuated by switching circuit.

D29(1N4003) diode is applied to the both ends of the output terminal to protect Q22(KSC1008-Y) from noise pulse induced while the solenoid is de-energized.

### 5-7-5 PTL Actuation Circuit

PTL actuation circuit switches its power using NPN TR.

### 5-7-6 Motor Actuation Circuit

Motor actuation circuit is determined while selecting the initial driver IC (provided by the vendor). This system uses TEA3718(U57, U58), A2918(U59)'s motor driver IC. However, the sensing resistance (R273, R274, R292, R293) and reference resistance (R284, R289, R294, R295) can vary depending on the motor actuation current value.

It receives motor enable signal (2 phase) from CPU and generates bipolar pulse (constant-current) and sends its output to stepping motor input.

## 5-7-7 High Voltage Power Supply

### 5-7-7-1 Summary

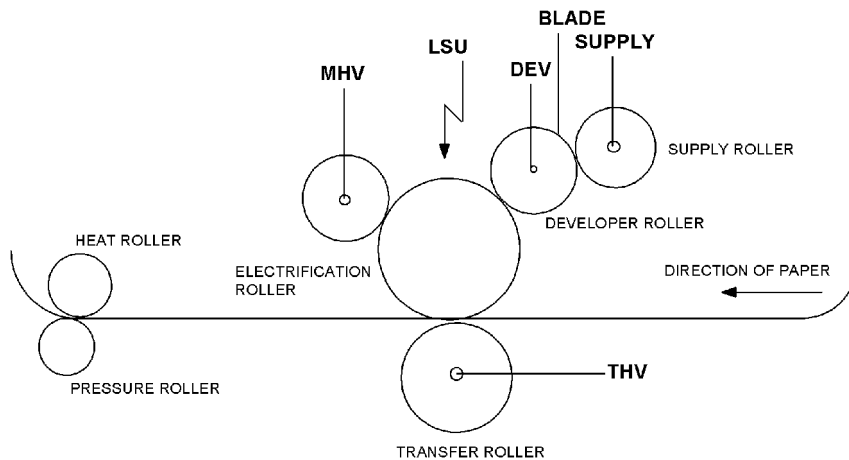
It is the high voltage power supply that has DC+24V/DC+5V (used for the image forming device in OA digital picture developing method) as the rated inputs. It supplies electrifying voltage (MHV), supply voltage (SUPPLY), developing voltage (DEV), blade voltage (BLADE) and transferring voltage (THV).

Each high voltage supply shows the voltage required in each digital picture process.

### 5-7-7-2 Digital Picture Process

Digital picture developing method is widely used by copy machine, laser beam printer and fax paper.

The process is comprised of electrification, exposure, develop, transfer and fixing.



First, in the electrification process, retain constant charge at approximately -900V for the electric potential on the OPC surface by electrifying OPC drum at approximately -1.4KV through the electrification roller. The electrified surface of OPC is exposed responding to the video data by the LSU that received print command due to rotation. The unexposed non-video section will retain the original electric potential of -900V, but the electric potential of the image area exposed by LSU will be approximately -180V that it will form the electrostatic latent image. The surface of the photo-conductive drum where the electrostatic latent image is formed reaches the developer as the drum rotates. Then the electrostatic latent image formed on the OPC drum is developed by the toner supplied to the developing roller by supplying roller and it is transformed into visible image. It is the process to change the afterimage on the OPC drum surface formed by LSU into visible image by the toner particles.

While the supply roller energized with -450V by HVPS and the developer roller energized with -300V rotate in the same direction, it keeps the toner particles between two rollers supplied to OPC drum in negative state by the friction between two rollers.

The toner supplied to the developer roller is biased to bias electric potential by the developer roller and transferred to the developing area. After (-) toner is attached to the developer roller, it will move to the exposed high electric potential surface (-180V) rather than to the unexposed low electric potential surface (-900V) of the developer roller and OPC drum. Eventually the toner will not settle in the low electric potential surface to form the visible image.

Later, the OPC drum continues to rotate and reaches to transfer location in order to accomplish the transfer process.

This process transfers the (-)toner on the transfer roller to the printing paper by the transfer roller. The (-)toner attached to the OPC drum will be energized to hundreds to thousands of the (+)transfer voltage by HVPS. The (+)electrostatic force of the transfer roller generated has higher adhesiveness than the (-)toner OPC drum and thus it moves to the surface of the paper passing through the transfer roller.

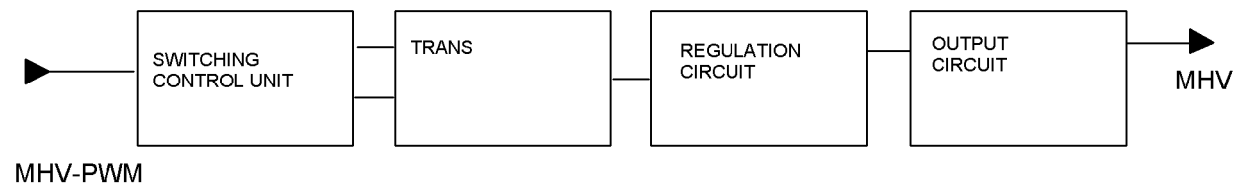
The toner transferred to the paper with weak electrostatic force is fixed to the paper by the pressure and heat of the fixer composed of pressure roller and heat roller.

The toner attached to the paper is melted by applying the heat (approximately 180°C) from the heat roller and the pressure (approximately 4kg) from the pressure roller. After the fixing process, the paper is sent out of the set to finish the printing process.

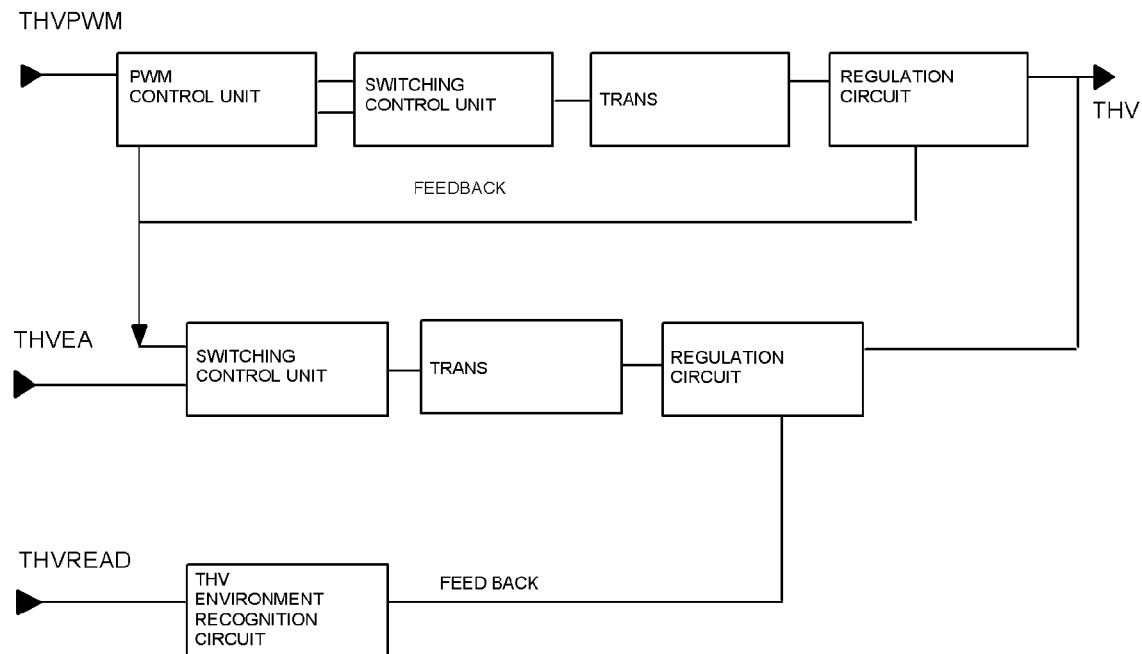
### 5-7-7-3. Organization of the Device

HVPS is comprised of electrification output unit, bias output unit and transfer output unit.

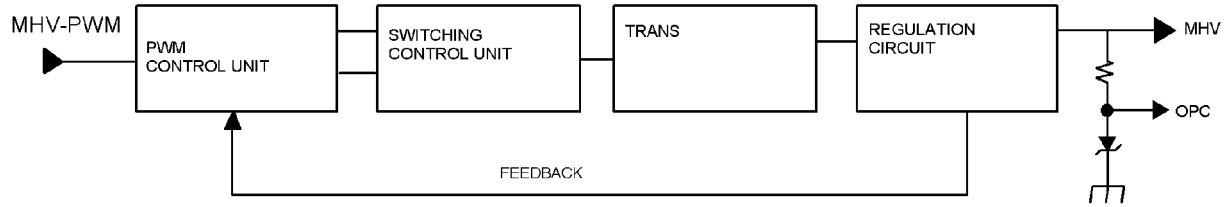
- 1) Input Unit.
- 2) Electrification Output (Enable) Unit: MHV (Main High Voltage).
- 3) Bias Output (Enable) Unit: DEV (Development Voltage)/Supply (Supply Voltage)/BLADE (Blade Voltage).
- 4) Transfer '+' Output (Enable) Unit: THV (+) (Transfer High Voltage(+)).
- 5) Transfer '-' Output (Enable) Unit: THV (-) (Transfer High Voltage(-)).
- 6) Switching Unit.
- 7) Feedback Unit.
- 8) Regulation Unit.
- 9) Output Unit.



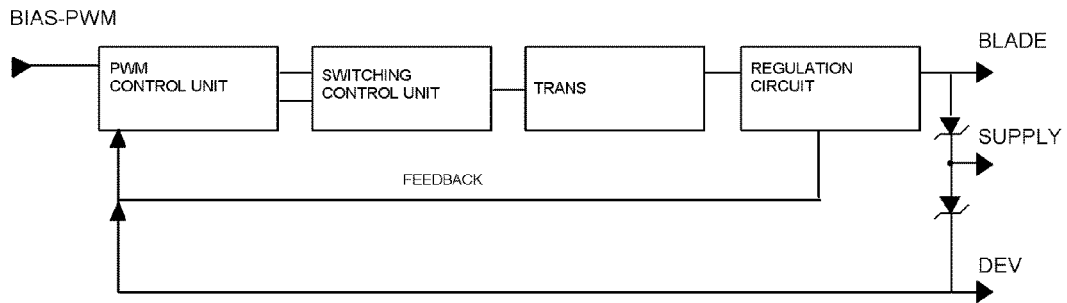
Electrification Unit Block-Diagram



Transfer Output Unit Block Diagram



MHV Output unit Block Diagram

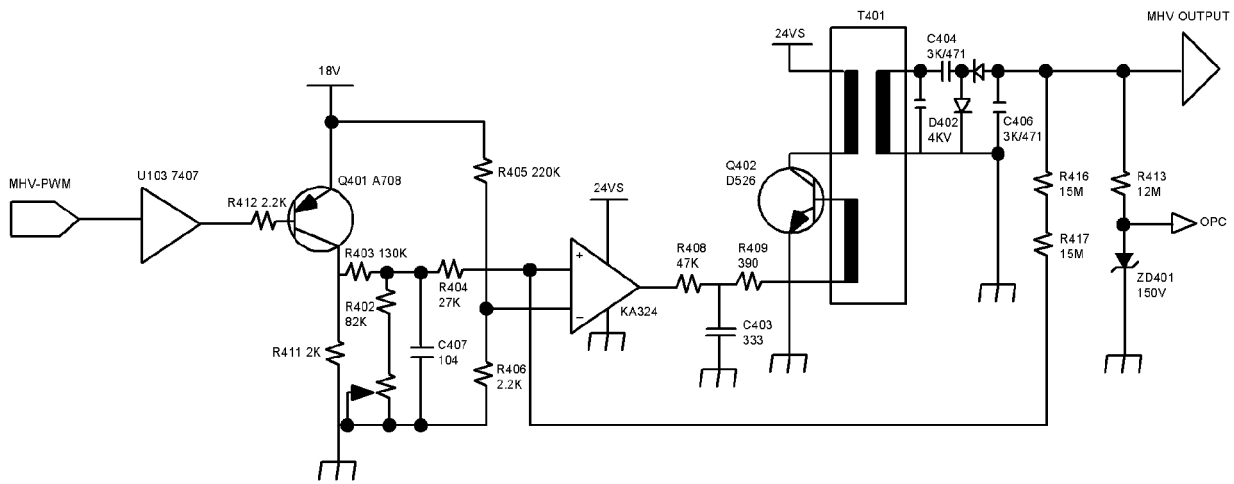


( BIAS Output Unit Block Diagram )



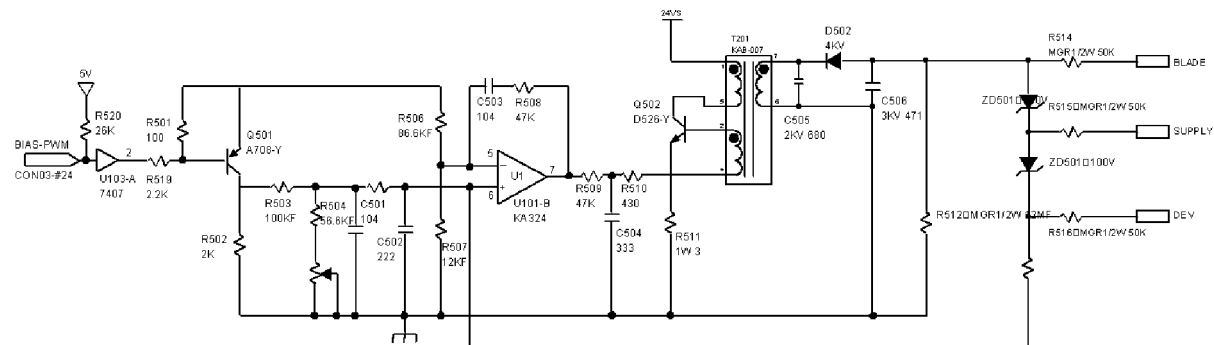
### 5-7-7-4 MHV (Electrification Output Enable)

Electrification Output Enable is the electrification output control signal 'PWM-LOW ACTIVE'. When MHV-PWM LOW signal is received, Q401 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage higher than the inverting reference voltage of OP-AMP, which is set to R405 and R406, OP-AMP output turns high. This output sends IB to the TRANS auxiliary wire through current-restricting resistance Q402 via R408 and C403 and Q402 turns on. When the current is accepted to Q402, Ic increases to the current proportional to time through the T401 primary coil, and when it reaches the Hfe limit of Q402, it will not retain the "on" state, but will turn to "off". As Q402 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary unit, sends current to the load and outputs MHV voltage through the high voltage output enable, which is comprised of Regulation circuit.



### 5-7-7-5 BIAS (supply/dev/blade output unit)

BIAS (Electrification Output Enable) Electrification Output Enable is the electrification output control signal 'PWM-LOW ACTIVE'. When BIAS-PWM LOW signal is received, Q501 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage higher than the inverting reference voltage of OP-AMP, which is set to R506 and R507, OP-AMP output turns high. This output sends IB to the TRANS auxiliary wire through current-restricting resistance Q502 via R509 and C504 and Q502 turns on. When the current is accepted to Q502, Ic increases to the current proportional to time through the T201 primary coil, and when it reaches the Hfe limit of Q502, it will not retain the "on" state, but will turn to "off". As Q502 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary unit, sends current to the load and outputs DEV voltage through the high voltage output enable, which is comprised of Regulation-circuit.



### 5-7-7-6 THV(THV+)/THV(-) Output Unit

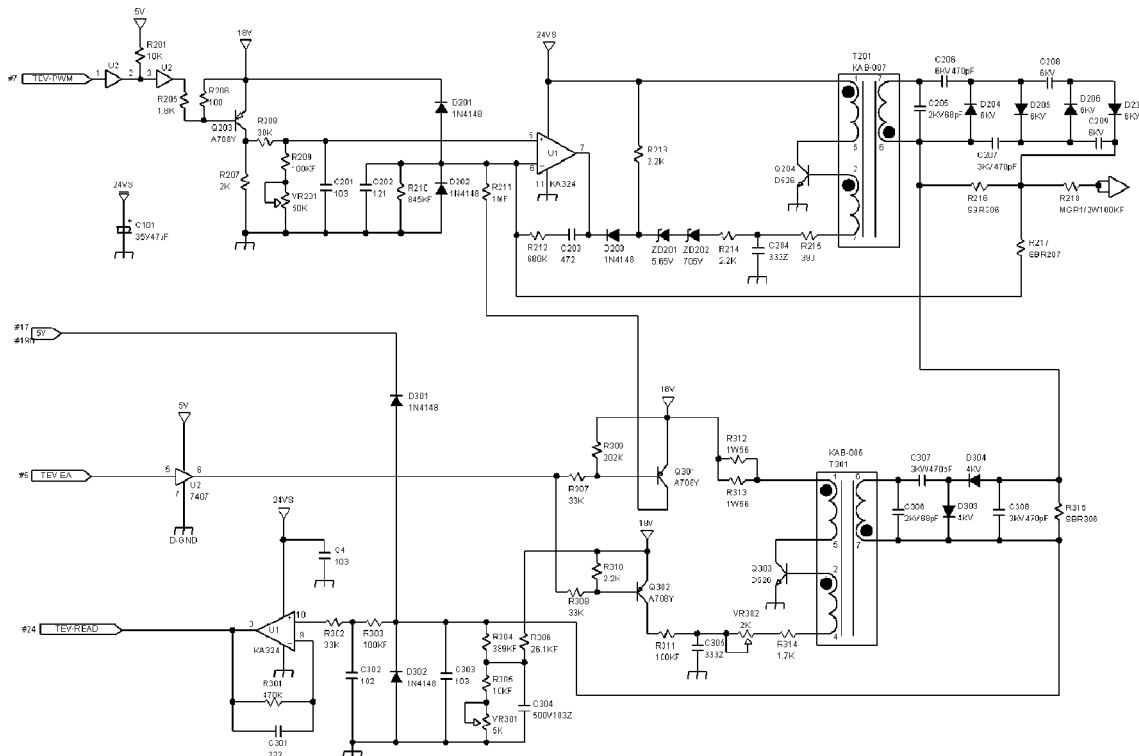
Transfer(+) output unit is the transfer output control signal 'PWM-LOW ACTIVE'.

When THV-PWM LOW signal is received, Q203 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage is higher than the inverting reference voltage of OP-AMP, OP-AMP output turns high.

The 24V power adjusts the electric potential to ZD201 and ZD202, sends IB to TRANS auxiliary wire through current-restricting resistance R215 via R212 and C204, and eventually Q204 will turn on. When the current is accepted to Q402, Ic increases to the current proportional to time through the T201 primary coil, and when it reaches the Hfe limit of Q204, it will not retain the "on" state, but will turn to "off". As Q402 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary coil, sends current to the load and outputs THV voltage through the high voltage output enable, which is comprised of Regulation- circuit. The output voltage is determined by the DUTY width. Q203 switches with PWM DUTY cycle to fluctuate the output by fluctuating the OP-AMP non-inverting end VREF electric potential, and the

maximum is output at 0% and the minimum, at 100%. Transfer(-) output unit is THV-EA 'L' enable.

When THV-EA is 'L', Q302 turns on and the VCE electric potential of Q302 will be formed and sends IB to TRANS auxiliary wire through R311, C305 and VR302 via current-restricting resistance R314, and eventually Q303 will turn on. When the current is accepted to Q303, Q303's Ic increases to the current proportional to time through the T301 primary coil, and when it reaches the Hfe limit of Q303, it will not retain the "on" state, but will turn to "off". As Q303 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary coil, send current to load and output THV(-) voltage through the high voltage output enable, which is comprised of Regulation circuit.



### 5-7-7-7 Environment Recognition

THV voltage recognizes changes in transfer roller environment and allows the voltage suitable for the environment in order to realize optimum image output. The analog input is converted to digital output by the comparator that recognizes the environmental changes of the transfer roller. It is to allow the right transfer voltage to perform appropriate environmental response considering the environment and the type of paper depending on this digital output by the programs that can be input to the engine controller ROM.

This environment recognition setting is organized as follows: First, set the THV(+) standard voltage. Allow 200M% load to transfer output, enable output and set the standard voltage 800V using VR201. Then set 56 (CPU's recognition index value) as the standard using VR302. This standard value with CPU makes sure that the current feedback is 4 $\mu$ A when output voltage is 800V and load is 200M%. If the load shows different resistance value when 800V is output, the current feedback will also be different and thus the index value will also be different. according to the index value read by CPU, the transfer voltage output will differ according to the preset transfer table. The changes in transfer output required by each load is controlled by PWM-DUTY.

## 5-8 OPE PBA

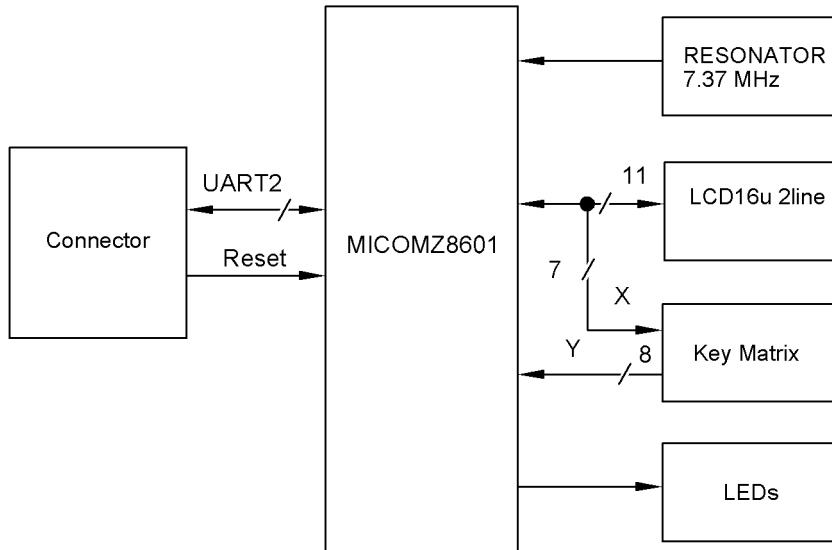
### 5-8-1 SUMMARY (WorkCentre Pro 412 & FaxCentre F12)

OPE Board is separated functionally from the main board and operated by the micom(Z8601) in the board. OPE and the main use UART (universal asynchronous receiver/transmitter) channel to exchange information. OPE reset can be controlled by the main. OPE micom controls key-scanning and LCD and LED display. If there occurs an event in OPE (such as key touch), it sends specific codes to the main to respond to the situation and the main analyzes these codes and operates the system. For example, if the main is to display messages in OPE, the main transmits data through UART line to OPE according to the

designated format and OPE displays this on LCD, LED. OPE's sensing is also transmitted to the main through UART line and then the main drives necessary operation.

OPE PBA consists of U1(MICOM, Z8601),LCD, key matrix, LED indicators. Refer to OPE Schematic Diagram and Wiring Diagram sections of this manual.

- Signals from the key matrix are delivered to U1 input pin group (D1 to D6)
- U1 pin 48 (TX DATA) is the UART code sent to MAIN PBA.
- Display from the controller is received at U1 pin 5(RX DATA).
- LCD drive signals are sent from U1 P2-x pin group, P3-4 to P3-6 pins.
- Machine status LED drive signals are sent from U1 LED1 to LED8.



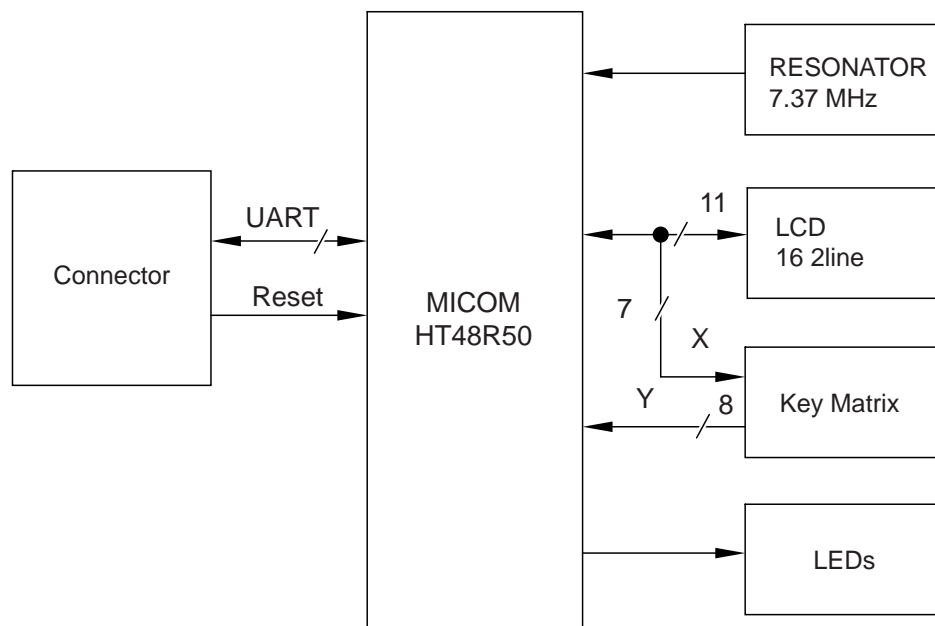
OPE BLOCK DIAGRAM

### 5-8-2 SUMMARY (WorkCentre M15/M15i)

OPE Board is separated functionally from the main board and operated by the micom(HT48R50) in the board. OPE and the main use UART (universal asynchronous receiver/transmitter) channel to exchange information. OPE reset can be controlled by the main. OPE micom controls key-scanning and LCD and LED display. If there occurs an event in OPE (such as key touch), it sends specific codes to the main to respond to the situation and the main analyzes these codes and operates the system. For example, if the main is to display messages in OPE, the main transmits data through UART line to OPE according to the designated format and OPE displays this on LCD, LED. OPE's sensing is also transmitted to the main through UART line and then the main drives necessary operation.

OPE PBA consists of U1(MICOM, HT48R50),LCD, key matrix, LED indicators. Refer to OPE Schematic Diagram and Wiring Diagram sections of this manual.

- Signals from the key matrix are delivered to U1 input pin group (D1~D6)
- U1 pin 48 (TX DATA) is the UART code sent to MAIN PBA.
- Display from the controller is received at U1 pin 5(RX DATA).
- LCD drive signals are sent from U1 P2-x pin group, P3-4 to P3-6 pins.
- Machine status LED drive signals are sent from U1 LED0 to LED7.



OPE BLOCK DIAGRAM

## 5-9 LIU PBA

### 5-9-1 SUMMARY

LIU WIRE CONNECTS Main B'D's MODEM AND LINE PARTS, AND IMPEDANCE MATCHING (AC, DC), RING DETECTION PART and LINE SEIZURE (DIALER).

### 5-9-2 DC MATCHING PART

Normal movement range of LIU is 12mA to 9mA.

Adapting CTR21 standard, the regulation limits to 60mA CURRENT flow through the terminal.

Therefore, select (\*:for EU PIT) Option to connect necessary items then the current through LIU will not exceed 60mA.

- CTR21 Standard (Europe): 12mA~60mA
  - OTHER Standard (U.S.): 12mA to 90mA
- DC has a character to pass through the LINE. And with Q1 (VN2410) GATE section's LINE INPUT current and Q1 Source connection to R20, can be decided as follows:

- $-VDCR = VL1 + ILINE \times R20$ .

(VDCR: Tip-Ring CD Voltage, ILINE:

Current flow)VL1:Line Input Voltage, VL1 = VBD1+VCE(Q2)+VDS(Q1).

### 5-9-3 AC MATCHING PART

Basic LIU's AC IMPEDANCE is 600 and uses R47. 48. C36 to possibly control combined IMPEDANCE.

- U.S. Usage: A terminal IMPEDANCE  $\approx 600W(\pm 30\%)$ .
- CTR21: A Terminal IMPEDANCE  $\approx 270+750W//150nF$ .

### 5-9-4 DIALER PART

#### \*MF DIAL

DTMF Dialing is controlled by MODEM and should be selected by appropriate LEVEL and On-off Time output based on each countries' own National specification.

- Frequency Tolerance:  $\pm 1.5\%$ .
- High Group: 1209, 1336, 1477, 1633Hz.  
Low Group: 697, 770, 852, 941 Hz.

	U.S. Usage	CTR21
High Frequency Level	-9.0+2.0/-2.5	-7.0 +1.0/-2.0
Low Frequency Level	-9.0+1.0/-2.0	-11.0+2.5/-2.0

#### \*DP DIAL

Controls from MAIN through / DP-Terminal.

for U.S.Usage, set time to DF signal of 40:60 M/B. DP signal is made of U6 (pcb817). The DC current which flows through Q2 Base is regulated by On/Off switch and turns to DP dial signal with a COUPLER.

- CTR 21 does not have telephone capability but has the number 3 and 4 Line Connection. No DP condition but possibility to get approval only on DTMF Dial based terminal.

**5-9-5 RING DETECTION PART**

RING SIGNALS from the LINE section (TIP, RING) are further passed through C5, R3, ZD1, and ZD2 and ends up at U9, (PC 814). U9 then detects above RING SIGNAL and passes the output to MAIN B'D. The wire diagram's C5 is RINGER CAPACITOR and it normally uses 1UF/250V. A R3 limits AC current and controls upper and lower REN meter.

## 5-10 SMPS (Switching Mode Power Supply) Unit.

### 5-10-1 SMPS Specifications

There are no user-serviceable parts inside the SMPS unit.

The SMPS (Switching Mode Power Supply) unit used here is a PWM (Pulse Width Modulation) type power supply unit that supplies DC+5V to controller and control panel, and DC+5V, DC+24V and DC+12V to the engine. It also supplies AC power to fixer heat lamp.

No.	Output Channel	Ch.1	Ch.2	Ch.3
1	Channel name	+5.1V	+24.0V	+12.0V
2	Rated output voltage	+5.1V	+24.0V	+12.0V
3	Rate output current	2A	2.5A	1.0A
4	Maximum load current and load pattern	3A continuous	3.5A continuous	1.0A continuous
5	Load change range	0.5~2.0A	0.3~2.5A	0.2~1.0A
6	Rate output voltage (For rated I/O)	+5.1V±5% (+4.84 to +5.35V)	+24.0V±10% (+21.60 to +26.40V)	+12V±5% (+11.40 to +12.60V)
7	1) Total output voltage deviation (Input, load, temp., aging) 2) Dynamic input change 3) Dynamic load change	Including all +5.1V±5% (+4.84 to +5.35V) including set error	Including all +24.0V±10% (+21.60 to +26.40V) including set error	Including all +12V±5% (+11.40 to +12.60V) including set error
8	Refer to ripple & noise 27)	150mVp-p or less	500mVp-p or less	150mVp-p or less



### **5-10-2 AC Input Stage (WorkCentre Pro 412 & FaxCentre F12)**

AC input power path is consist of the fuse (F501) for AC current limit, the Varistor (TNR501) for by-passing high voltage surge, the discharge resistor(R508), the AC impulse noise filtering circuit (C501, LF501, C503), the common mode grounding circuit (C504, C505), the second noise filter (LF502), and the thermistor (TH501).

When power is turned on, TH 501 limits inrush current by it's high resistance, and when it's temperature rises, it's resistance reduces to approximately zero ohms.

### **5-10-3 AC Input Stage (WorkCentre M15/M15i)**

AC Input power path is consist of the Fuse (F1) for AC current limit, the Varistor (TNR1) for by-passing high Voltage Surge, the discharge resistor(R1), the AC Impulse Noise Filtering Circuit (C2, C4, LF1), the Common Mode Grounding Circuit (C5, C6), the 2'nd noise filter (C7, LF2), and the thermistor (TH1).

Wher power is turned on, TH 1 limits Inlush-Current by it's high resistanle, and When it's temperature rise, it's resistance become about Zero ohm.

### **5-10-4 SMC (Switched Mode Control) (WorkCentre Pro 412 & FaxCentre F12)**

The AC input voltage is rectified and filtered by BD552 and C507 to create the DC high voltage applied to the primary winding of T501. TR01 pin #1 is driven by the SMPS device U502. U502. auto-starts and chops the DC voltage. The U502 is PWM SMPS IC and has internally a SMC (switched mode control) IC and a MOSFET output stage. The SMC IC has a Auto-restart without a Power Supply for the IC and a Thermal Shutdown function and so on. C509, R512, C510, D505 clamp leading-edge voltage spikes caused by transformer leakage inductance.

The power secondary winding (pin # 11-12) is rectified and filtered by D507, C552, L551, and C554 to create the 5V output voltage. The bias winding (pin # 4-5) is rectified and filtered by D506 and C511 to create U502 bias voltage. The secondary output 5V is regulated through the path of the voltage divide by R553, R556-U503 switching PC252-the bias voltage of U502-U503 PWM duty cycle-T501 secondary voltage. C508 filters internal pin, determines the auto-restart frequency, and together with R506, compensates the control loop. U552 of the secondary stage -12V is the Low Power-loss Regulator with built-in over-current protection function.

### **5-10-5 SMC (Switched Mode Control) (WorkCentre M15/M15i)**

The AC input voltage is rectified and filtered by BD1 and C10 to create the DC high voltage applied to the primary winding of T1, Q5 pin #1 is driven by the SMPS device IC2, IC2. auto-starts and chops the DC voltage. The U502 is PWM SMPS IC and has internally a SMC(switched mode control) IC and a MOSFET output stage. The SMC IC has a Auto-restart without a Power Supply for the IC and a Thermal Shutdown function and so on. R4, R5, C11, D1 clamp leading-edge voltage spikes caused by transformer leakage inductance.

The power secondary winding(Pin #5~6)is rectified and filtered by D8, D9, L2, C33, C34 to create the 5V output voltage. The bias winding(Pin #9~8)is rectified and filtered by D2 and C12 to create U502 bias voltage. The secondary output 5V is regulated through the path of the voltage divide by R34, R35.



### 5-10-6-3 The Concept of Fixed Lamp Control (WorkCentre Pro 412 & FaxCentre F12)

For fixed lamp control, the logic unit “fuser on” control signal and SMPS unit DC power must be supplied. This circuit turns on only when “fuser on” sends the signal and the DC power is supplied.

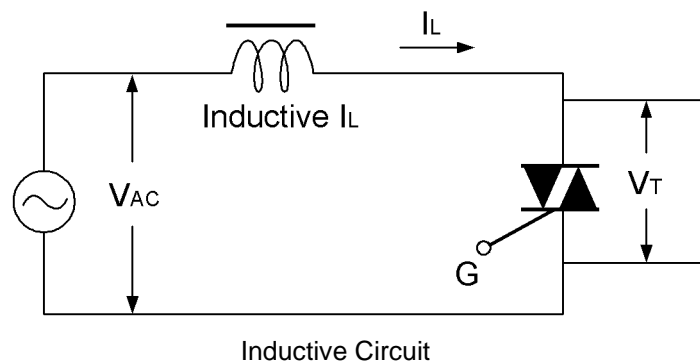
The following explains how the fixed lamp control circuit works.

Logic unit “fuser on” sends trigger current to triac driver U501 LED, then the infrared ray is detected by U501 photo detector. Next, U501 triac is conducted.

The conducted current sends trigger input to triac THY501 gate. At this point, THY501 is conducted and AC power is supplied to fixed lamp. Lamp is turned on and temperature rises.

As this fixed lamp control circuit uses the AC voltage (“+” and “-” are repeated) as the power supply, it used two-way triac (THY501), which has advantage over one-way SCR considering the price, size and reliability.

Triac's gate can be triggered by either forward or reverse signal. Once triac is turned on, it will not be controlled by gate signal, but will be continuously on until the current between major terminals decreases below the holding current. In other words, you cannot turn it off with reverse signal unlike SCR. This property is called current-voltage threshold rise rate (commutation:  $dv/dt$ ). In AC power control application, triac has to turn off conduction in each zero crossing or switch it twice in each cycle. This switching operation is called commutation. It is possible to turn off the triac at the end of half cycle by eliminating the gate signal when the load current ( $I_L$ ) is gained at the level equal to or lower than holding current. When triac commutes off-line, the direction of the voltage of the both ends of triac will be reversed and increase up to the maximum value of line voltage ( $V_{AC}$ ). At this point, the width of rise rate will be determined by  $dv/dt$  and overshoot voltage, by the circuit. When triac commutes off-line, the voltage of both ends of triac will have the same voltage as the line voltage.



### 5-10-6-4 The Concept of Fixed Lamp Control

For fixed lamp control, the logic unit "fuser on" control signal and SMPS unit DC power must be supplied. This circuit turns on only when "fuser on" sends the signal and the DC power is supplied.

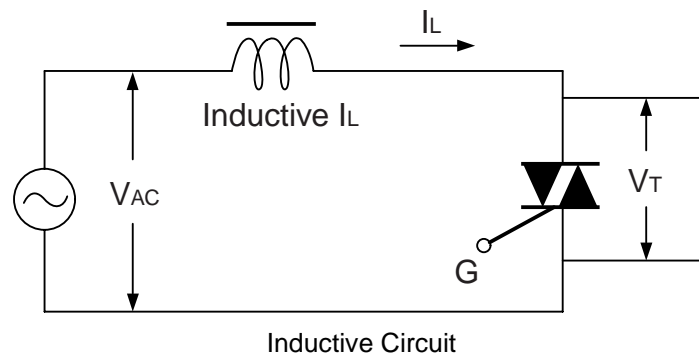
The following explains how the fixed lamp control circuit works.

logic unit "fuser on" sends trigger current to triac driver PC3 LED, then the infrared ray is detected by PC3 photo detector. Next, YC3 triac is conducted.

The conducted current sends trigger input to triac SY1 gate. At this point, SY1 is conducted and AC power is supplied to fixed lamp. Lamp is turned on and temperature rises.

As this fixed lamp control circuit uses the AC voltage ("+" and "-" are repeated) as the power supply, it used two-way triac (SY1), which has advantage over one-way SCR considering the price, size and reliability.

Triac's gate can be triggered by either forward or reverse signal. Once triac is turned on, it will not be controlled by gate signal, but will be continuously on until the current between major terminals decreases below the holding current. In other words, you cannot turn it off with reverse signal unlike SCR. This property is called current-voltage threshold rise rate (commutation:  $dv/dt$ ). In AC power control application, triac has to turn off conduction in each zero crossing or switch it twice in each cycle. This switching operation is called commutation. It is possible to turn off the triac at the end of half cycle by eliminating the gate signal when the load current ( $I_L$ ) is gained at the level equal to or lower than holding current. When triac commutes off-line, the direction of the voltage of the both ends of triac will be reversed and increase up to the maximum value of line voltage ( $V_{AC}$ ). At this point, the width of rise rate will be determined by  $dv/dt$  and overshoot voltage, by the circuit. When triac commutes off-line, the voltage of both ends of triac will have the same voltage as the line voltage.



## 6. Disassembly and Reassembly

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### 6-1 WorkCentre Pro 412 & WorkCentre M15/M15i

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#### General Precautions on Disassembly

#### **WARNING**

When you disassemble and reassemble components, you must use extreme care. The close proximity of cables to moving parts makes proper routing essential. If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

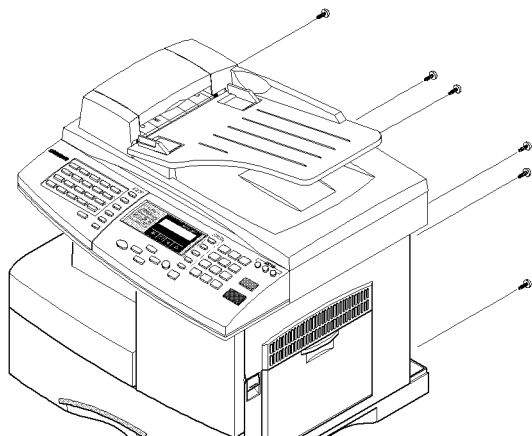
Whenever servicing the machine, you must perform as follows:

1. Check to verify that documents are not stored in memory.
2. Unplug the power cord.
3. Use a flat and clean surface.
4. Replace only with authorized components.
5. Do not use force to remove or install plastic components.
6. Make sure all components are correctly installed.

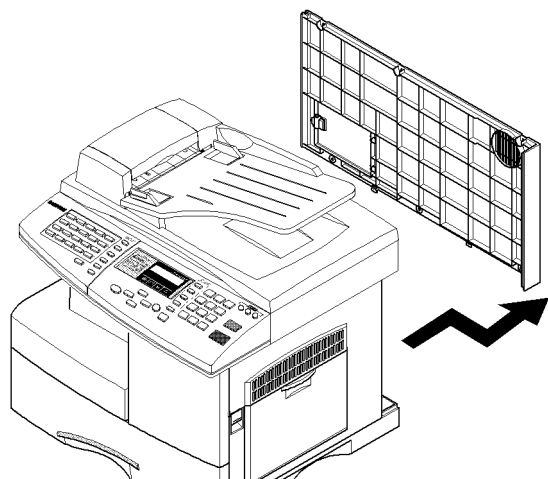
## 6-1-1 Rear Cover

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1. Remove the six screws securing the rear cover.

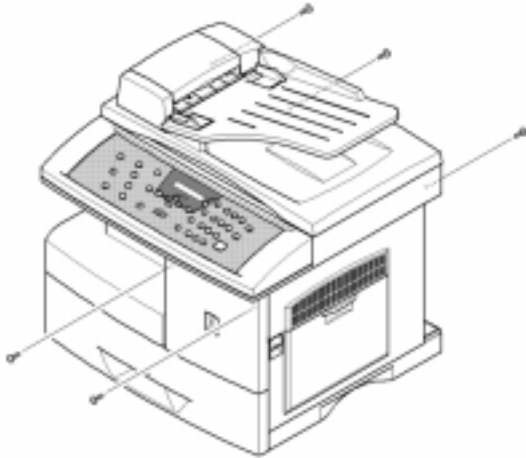


2. Separate the rear cover from the base frame and scanner assembly.

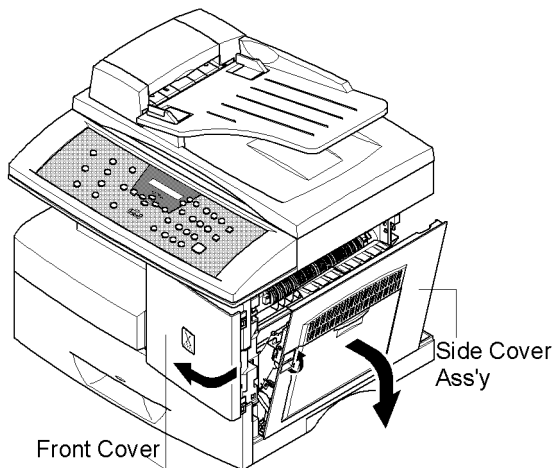


## 6-1-2 Scanner Assembly

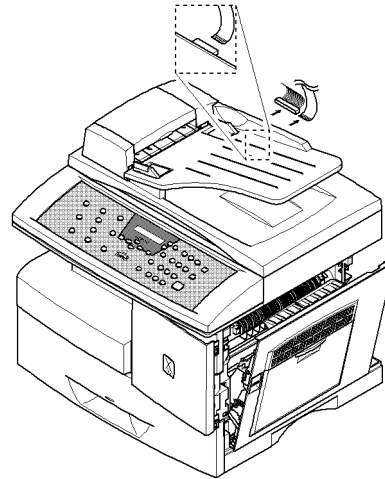
1. Before you remove the scanner assembly, you should remove the Rear cover (see page 6-2).
2. Remove the three screws at the rear, as shown below.
3. Remove the two screws behind the front cover



4. Open the side cover assembly and front cover, as shown below.



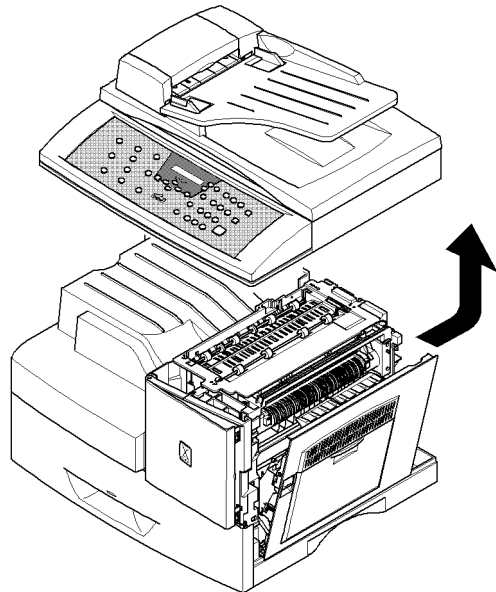
5. Unplug the two connectors and CCD cable.



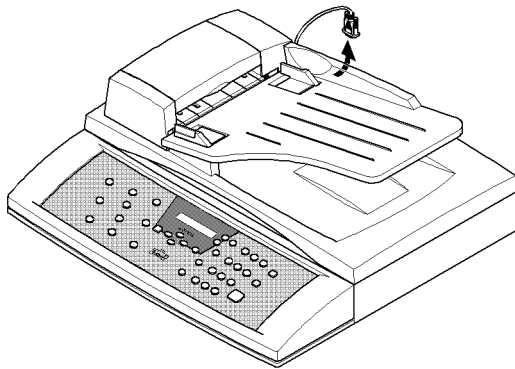
### CAUTION

*You should disconnect the CCD cable horizontally to avoid CCD cable pin damage.*

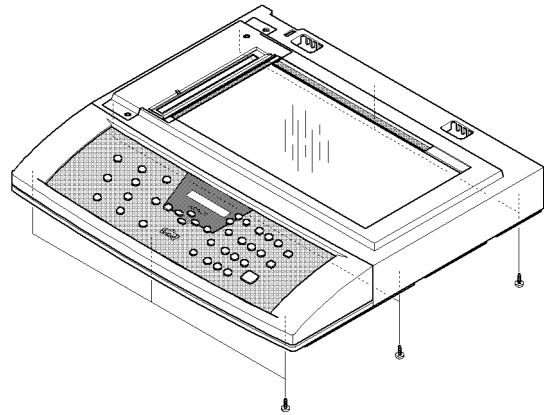
6. Pull up the scanner assembly in the direction of arrow.



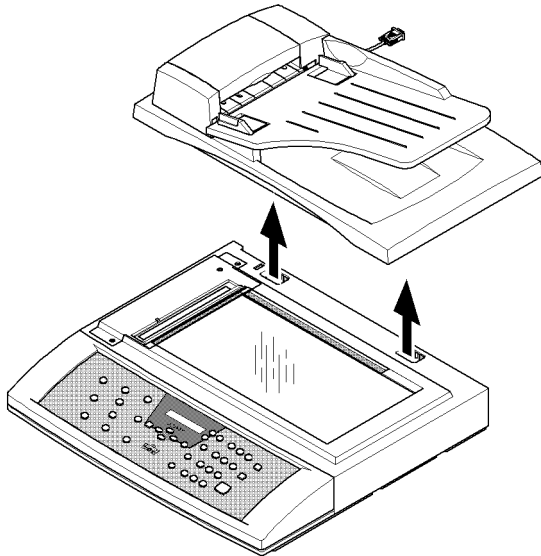
7. Remove the connector from the platen assembly.



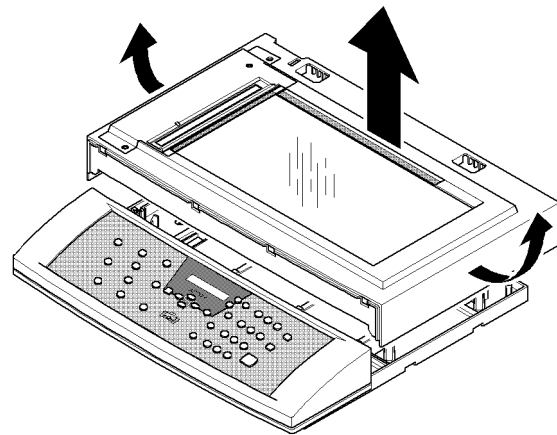
9. Remove the eight screws securing the platen assembly.



8. Pull the ADF assembly upward and remove it.

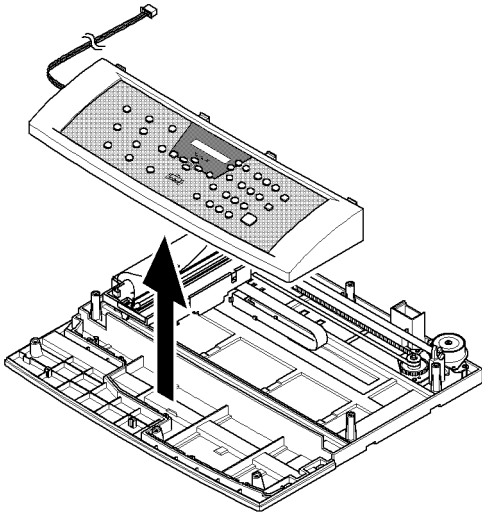


10. Unlatch the scan upper assembly securing the glass and remove it.

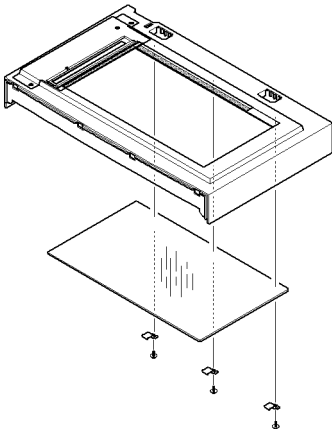




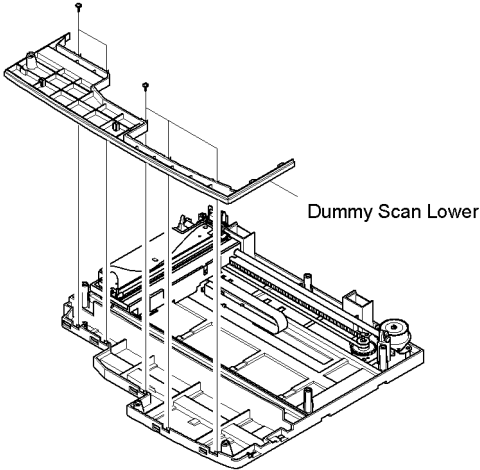
11. Unplug the one connector and remove the OPE assembly.



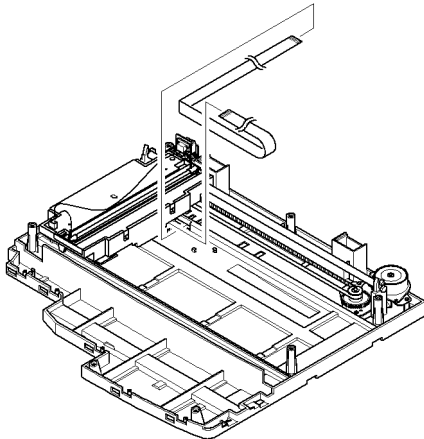
12. Remove the three screws and take out the glass from the cover scan upper assembly.



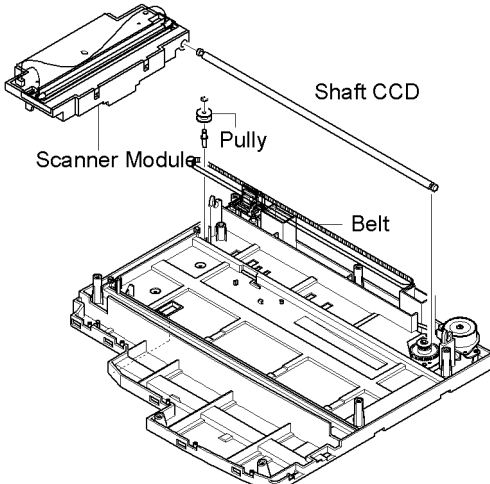
13. Remove the five screws and dummy scanner lower.



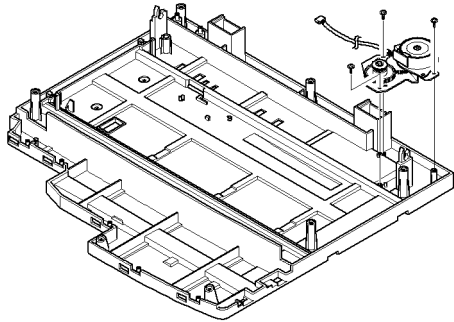
14. Remove the CCD cable.



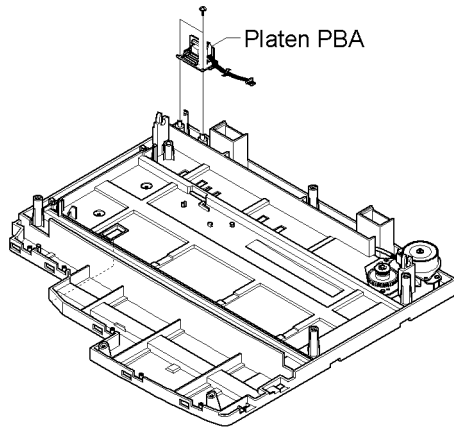
15. Pull up the shaft CCD and take out the scanner module.



16. Remove three screws and take out the motor bracket.



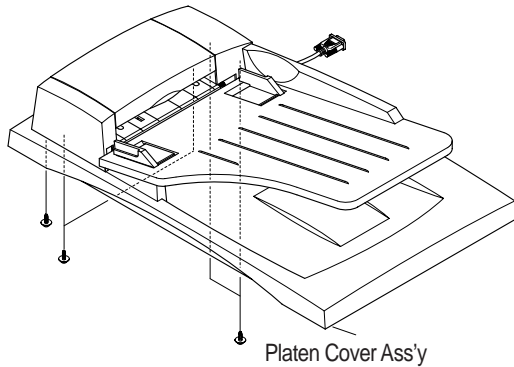
17. Remove two screws and take out the platen PBA.



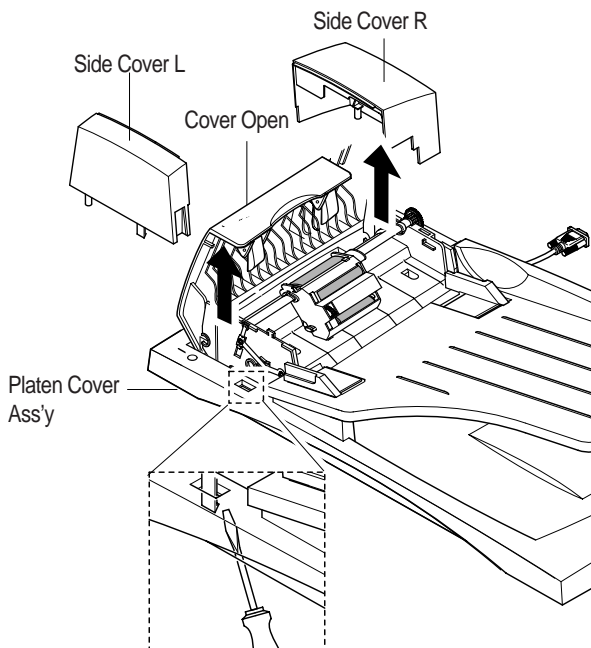
## 6-1-3 ADF Assembly

1. Before you remove the ADF Assembly, you should remove:
  - Rear Cover (see page 6-2)
  - Scanner Assembly (see page 6-3)

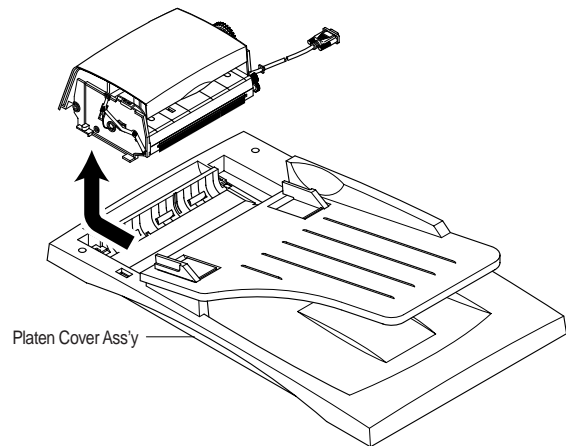
2. Remove the five screws from the Platen Cover.



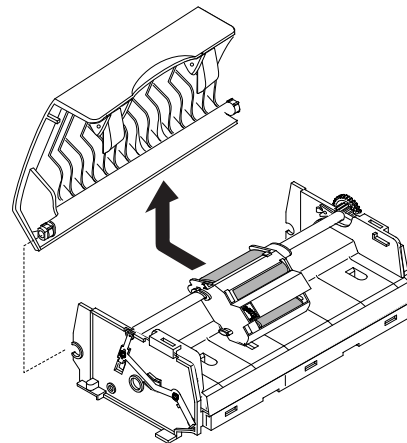
3. Open the Cover open and pull the Cover Side L and Cover Side R and unlatch the Side Cover L by pushing the part hooked the Platen Cover using a sharp tool.



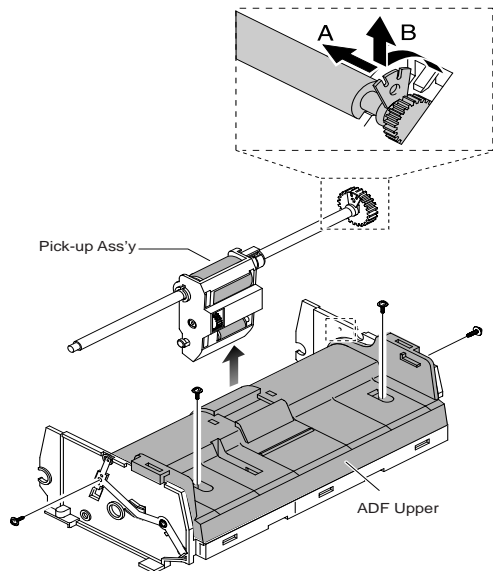
4. Pull the ADF Assembly upward and remove it.



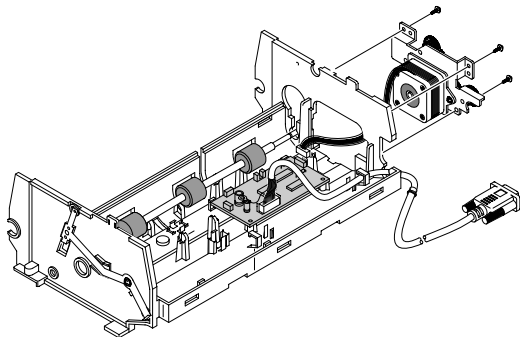
5. Take out the Open Cover.



6. Take out the Pick-up Assembly.  
Remove the four screws and the ADF Upper.

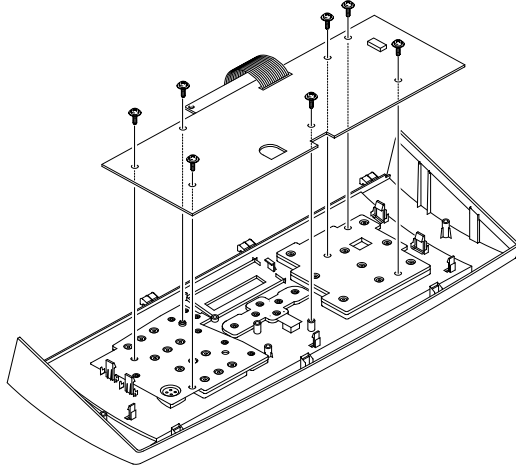


7. Remove three screws and take out the ADF Motor assembly.

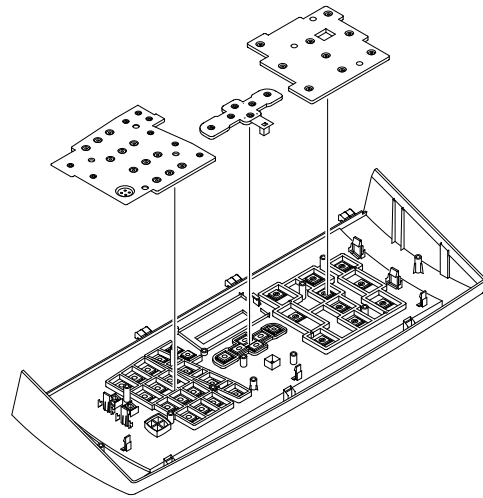


## 6-1-4 OPE Assembly

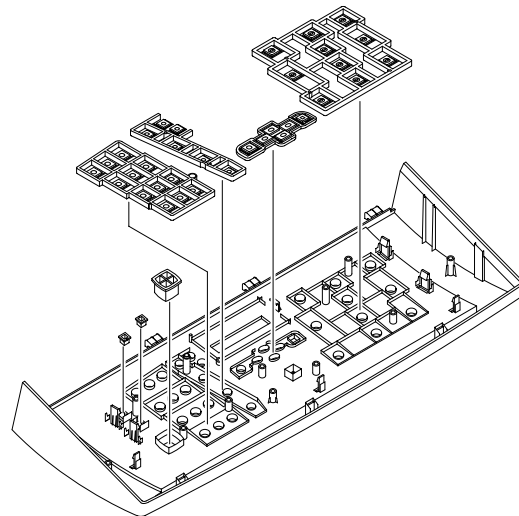
1. Before you remove the OPE Assembly, you should remove:
  - Rear Cover (see page 6-2)
  - Scanner Assembly (see page 6-3)
2. Remove ten screws securing the OPE PBA and the LCD Module from the OPE Cover.



3. Remove the contact rubbers from the unit.

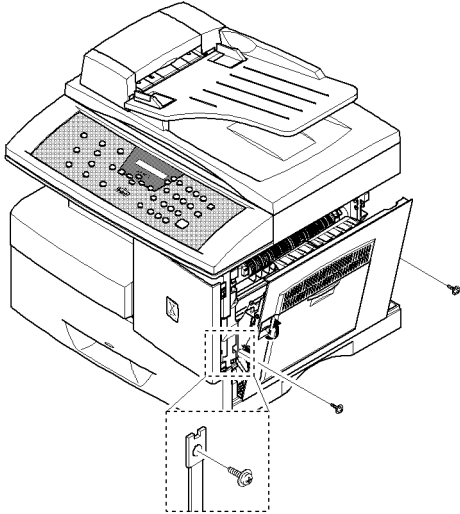


4. Remove the key pad from the unit.

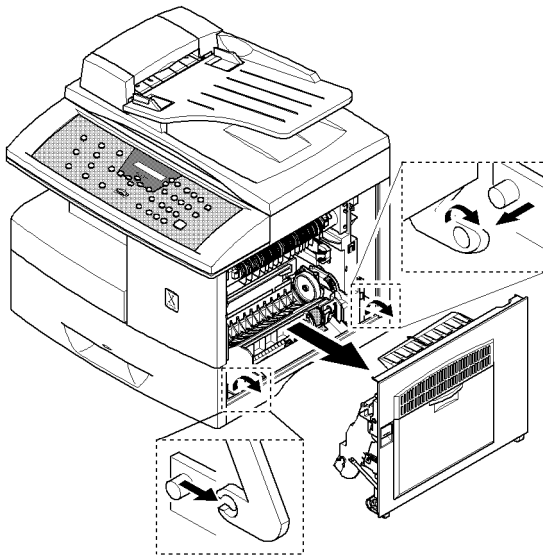


## 6-1-5 Side Cover Assembly

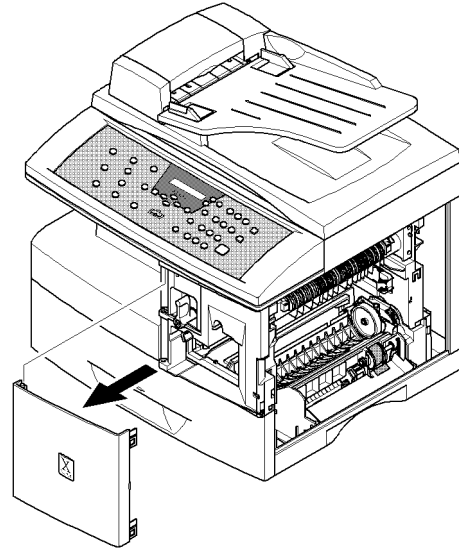
1. Remove the two screws to release the stopper securing the side cover to the main frame.



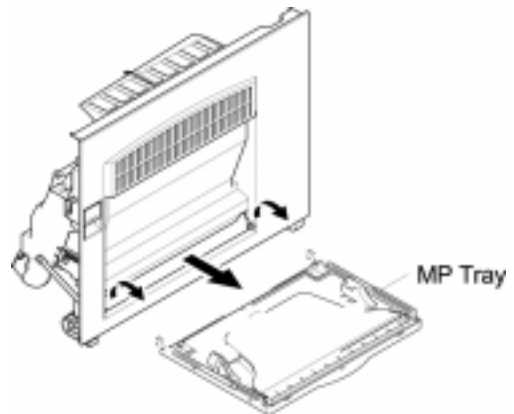
2. Release the right-bottom of the cover, then pull it the direction of arrow to release the other end.



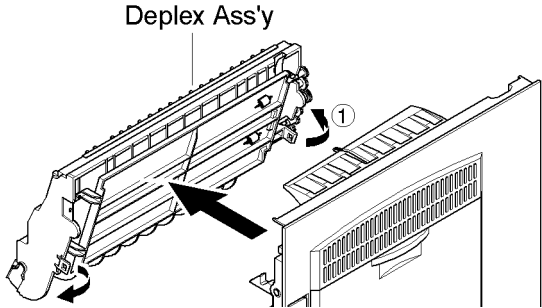
3. Unlatch the cover front securing the base frame and remove it.



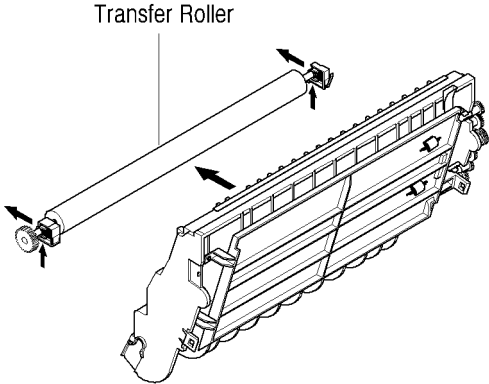
4. Unlatch the MP tray securing the side cover assembly and remove it.



- 5. Unlatch the duplex assembly securing the side cover assembly and remove it.

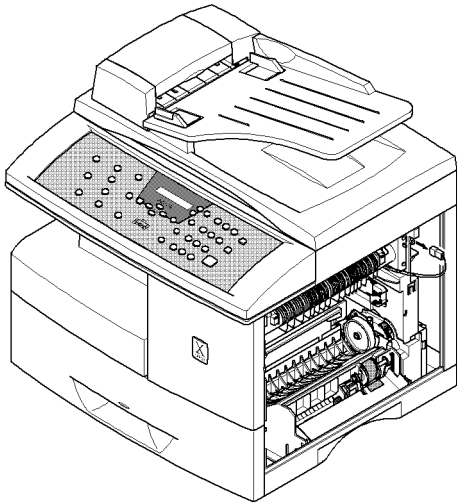


- 6. Take out the exit roller, as shown below.

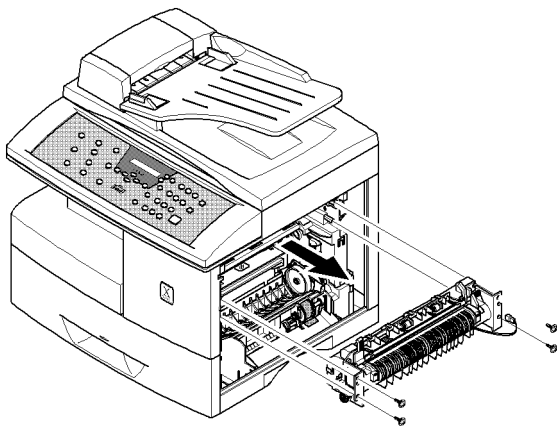


## 6-1-6 Fuser Assembly

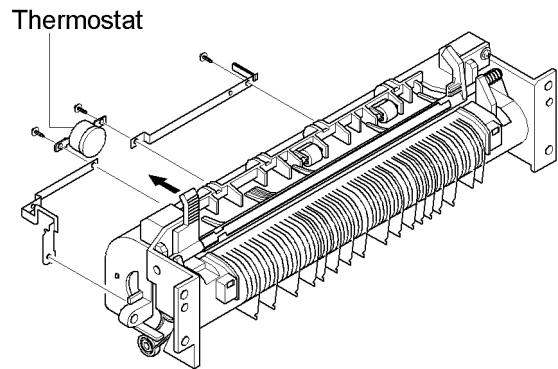
1. Before you remove the Fuser assembly, you should remove the Side cover assembly (see page 6-10).
2. Unplug the connector.



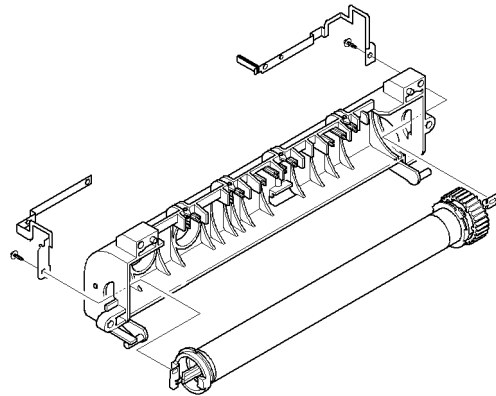
3. Remove four screws and take out the fuser assembly.



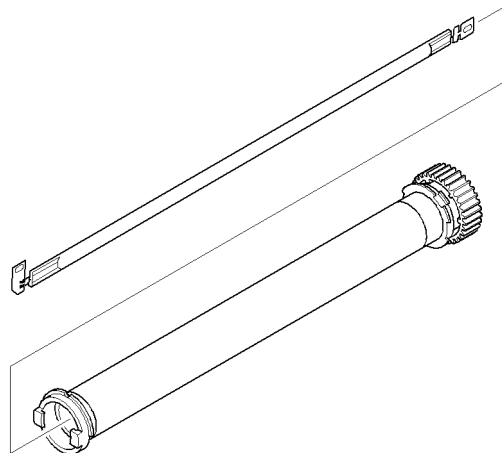
4. Remove four screws and take out the thermostat.



5. Remove two screws and take out the heat roller.



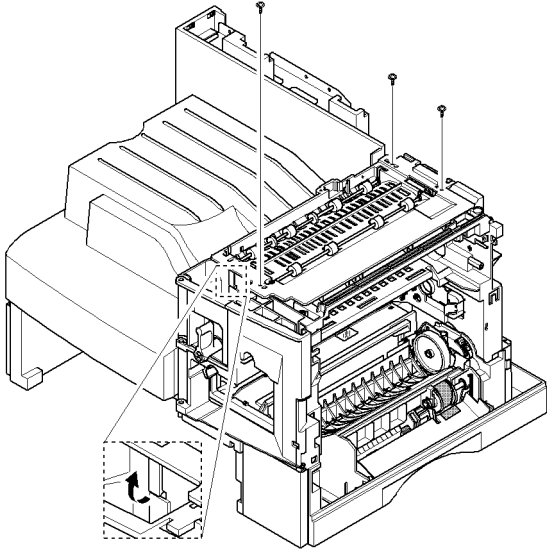
6. Remove the halogen lamp from the heat roller.



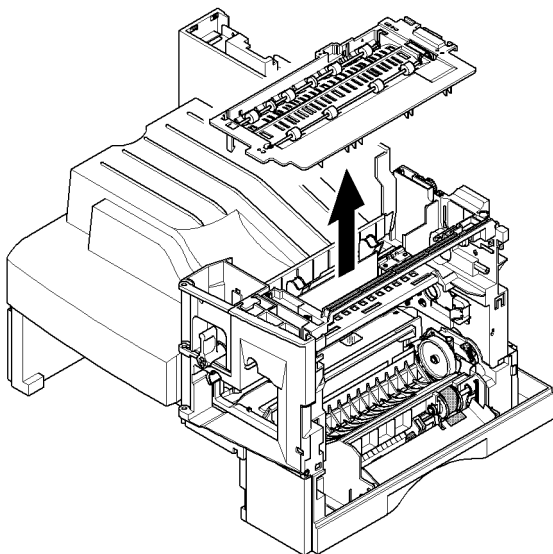


## 6-1-7 Exit Assembly

1. Before you remove exit assembly, you should remove:
  - Rear cover (see page 6-2).
  - Scanner assembly (see page 6-3).
  - Side cover assembly (see page 6-10).
2. Remove three screws and unlatch the exit assembly, as shown below.

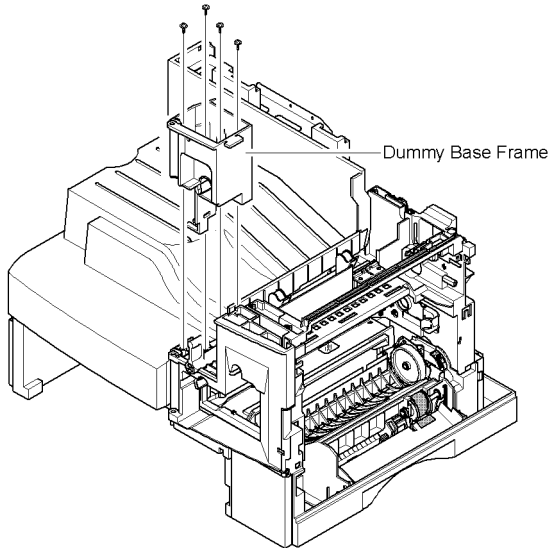


3. Pull the exit assembly and remove it.

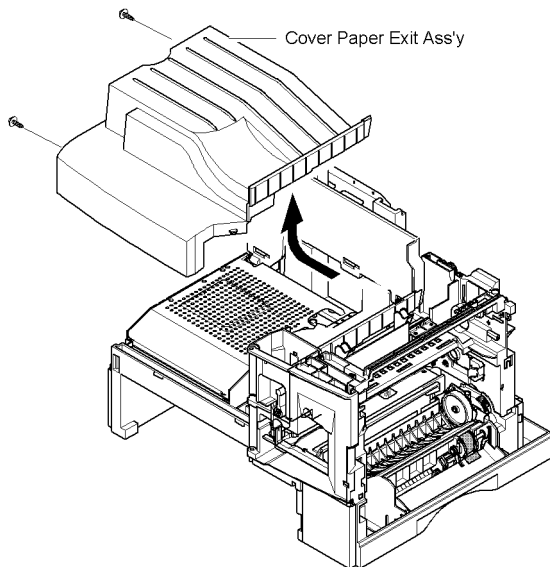


## 6-1-8 Cover Paper Exit Assembly

1. Before you remove the cover paper exit assembly, you should remove:
  - Rear cover (see page 6-2).
  - Scanner assembly (see page 6-3).
  - Side cover assembly (see page 6-10).
  - Exit assembly (see page 6-13).
2. Remove four screws and take out the dummy base frame.

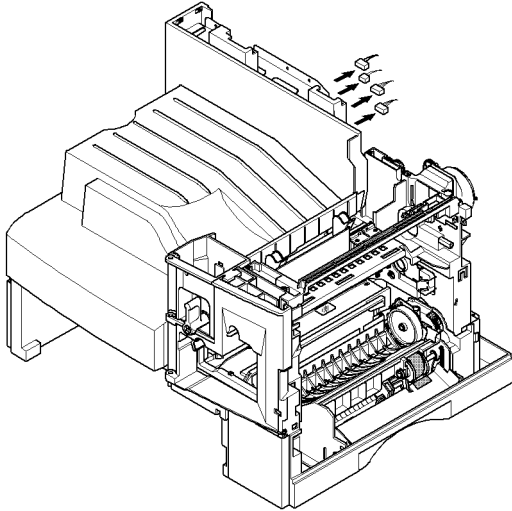


3. Remove two screws and cover paper exit assembly, as shown below.

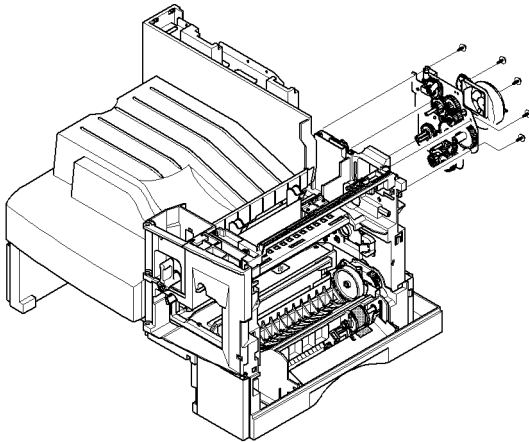


## 6-1-9 Drive Assembly

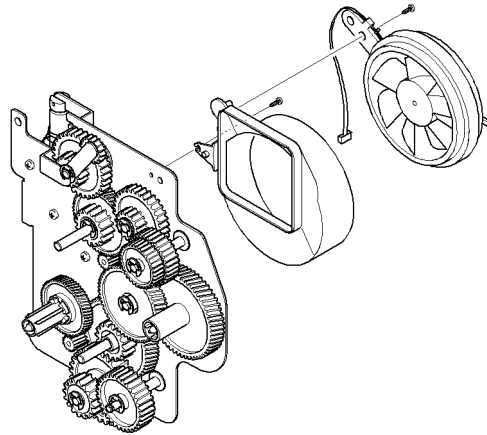
1. Before you remove the drive assembly, you should remove:
  - Rear cover (see page 6-2).
  - Scanner assembly (see page 6-3).
  - Side cover assembly (see page 6-10).
  - Exit assembly (see page 6-13).
2. Unplug the all connectors.



3. Remove five screws and take out the drive assembly.



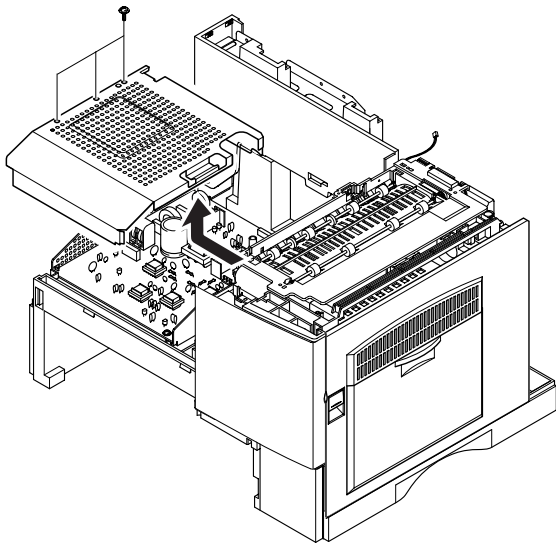
4. Remove one screw and take out the fan and dust fan.



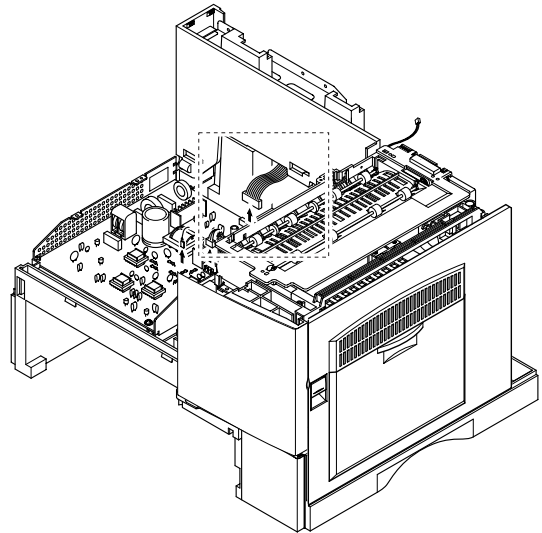
## 6-1-10 SMPS

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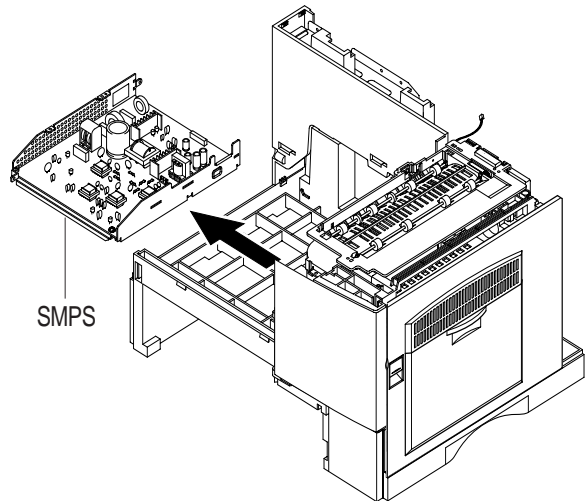
1. Before you remove the LSU, you should remove:
  - Rear Cover (see page 6-2)
  - Scanner Assembly (see page 6-3)
  - Cover Paper Exit Assembly (see page 6-14)
2. Remove three screws and take out the Shield SMPS Upper.



3. Unplug the all connectors.

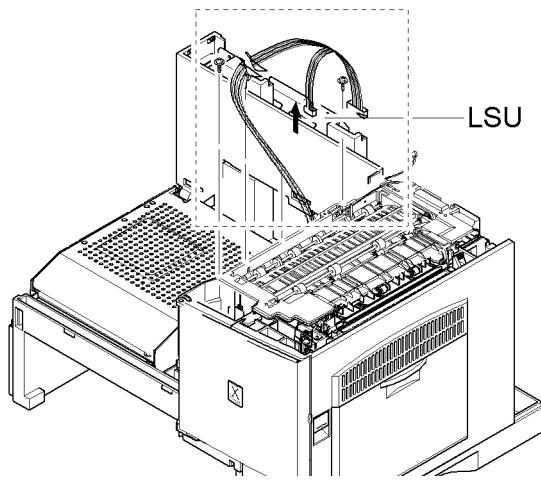


4. Remove the SMPS, as shown below.

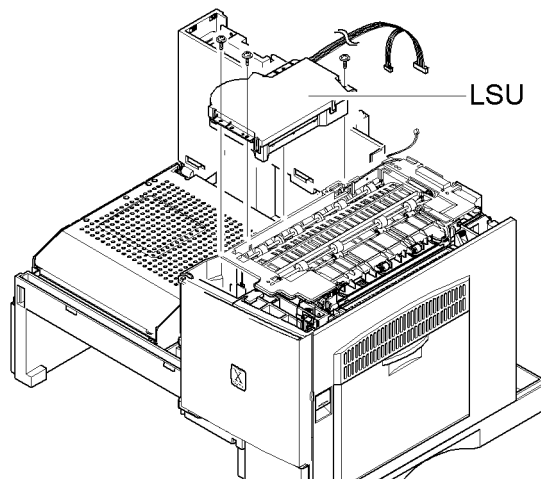


## 6-1-11 LSU

1. Before you remove the LSU, you should remove:
  - Rear cover (see page 6-2).
  - Scanner assembly (see page 6-2).
  - Side cover assembly (see page 6-10).
  - Exit assembly (see page 6-13).
2. Unplug two connectors.

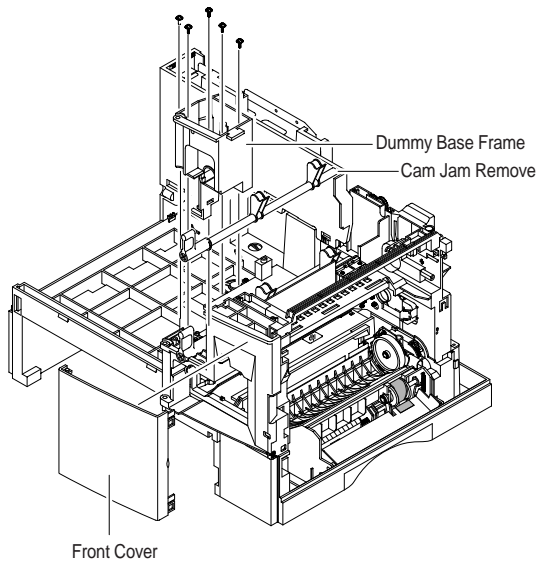


3. Remove four screws and take out the LSU.

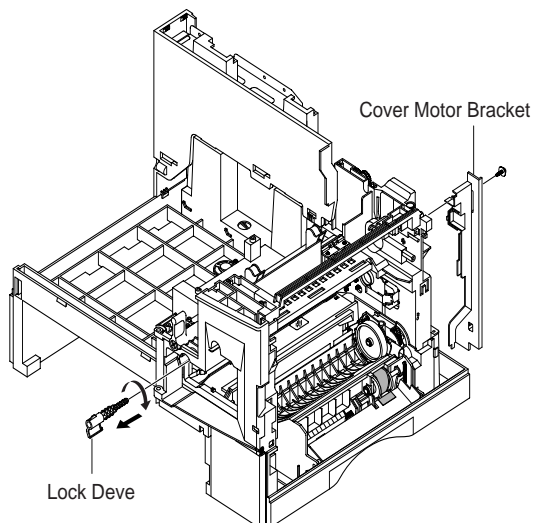


## 6-1-12 Main Frame Assembly

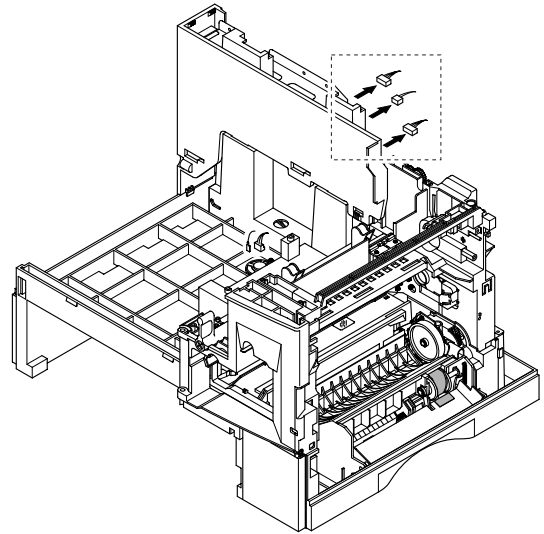
1. Before you remove the LSU, you should remove:
  - Rear Cover (see page 6-2)
  - Scanner Assembly (see page 6-3)
  - Side Cover Assembly (see page 6-10)
  - Fuser (see page 6-12)
  - Exit Assembly (see page 6-13)
  - Cover Paper Exit Assembly (see page 6-14)
  - SMPS (see page 6-16)
  - LSU (see page 6-17)
2. Remove one screw in the Channel Base Frame from the bellow section of the Base Frame, and then remove the rest of the five screws to disassemble the Dummy Base Frame, the Cover Front and the Cam Jam Remove.



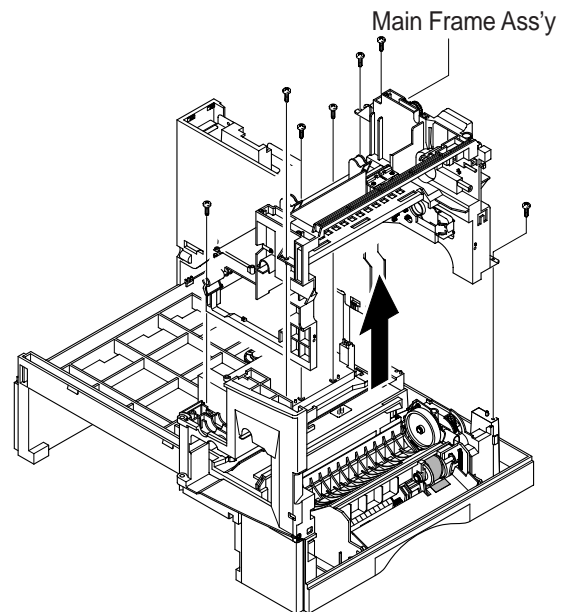
3. Remove the Locker Deve, and then remove the one screw and the Cover Motor Bracket.



4. Unplug the all connectors.

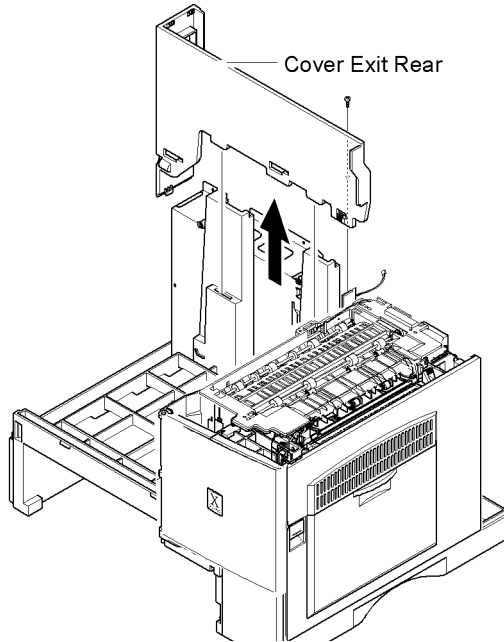


5. Remove the seven screws and take out the Main Frame Assembly.



## 6-1-13 Cover Exit Rear

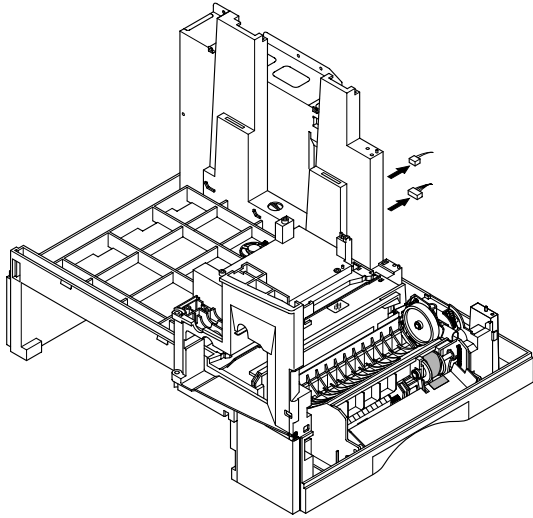
1. Remove one screw and cover exit rear, as shown below.



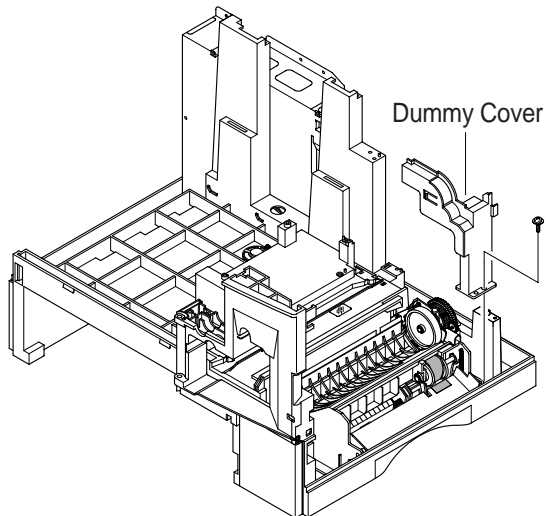
## 6-1-14 MP Assembly

1. Before you remove the MP Assembly, you should remove:
  - Rear Cover (see page 6-2)
  - Shield Main Upper
  - Side Cover Assembly (see page 6-10)

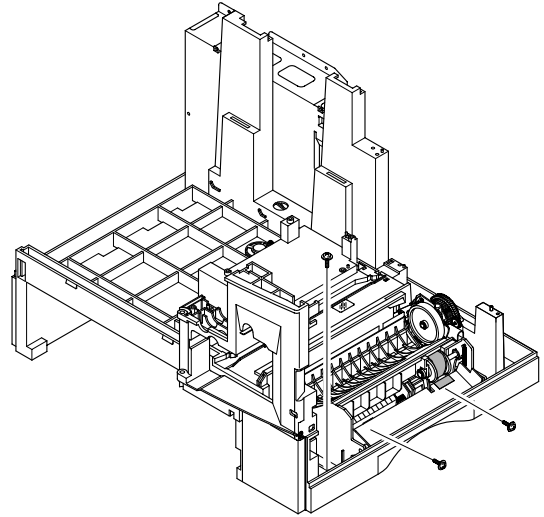
2. Unplug the two connectors.



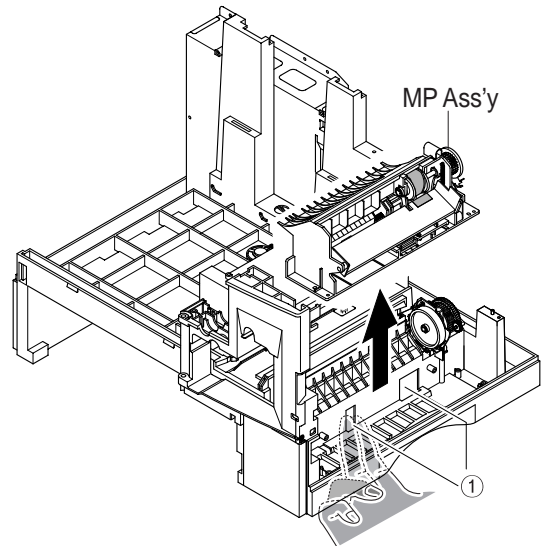
3. Remove the one screw and take out the Dummy Cover.



4. Remove the three screws.



5. Release the SMPS fit. Pull the MP Assembly upward and remove it.

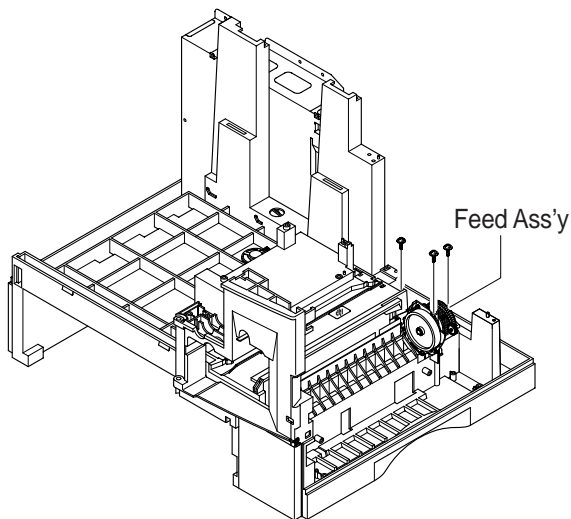




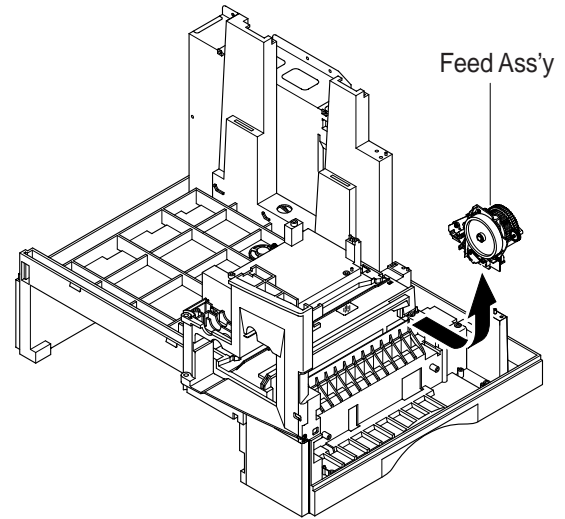
## 6-1-15 Feed Assembly

1. Before you remove the Feed Assembly, you should remove:
  - Rear Cover (see page 6-2)
  - Scanner Assembly (see page 6-3)
  - Side Cover Assembly (see page 6-10)
  - Exit Assembly (see page 6-13)
  - Cover Paper Exit Assembly (see page 6-14)
  - LSU (see page 6-17)
  - Main Frame Assembly (see page 6-18)

2. Remove the three screws.

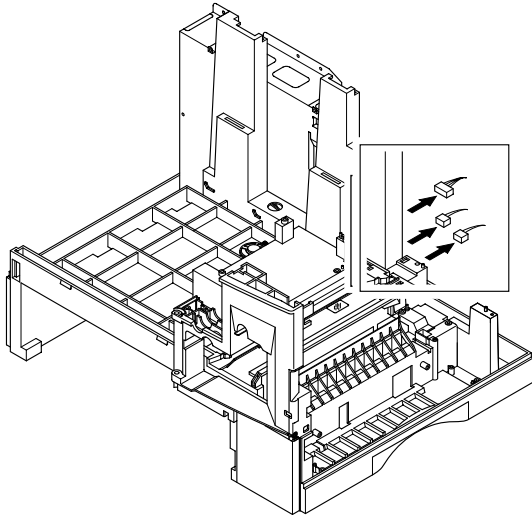


3. Pull the Feed Ass'y upward and remove it.

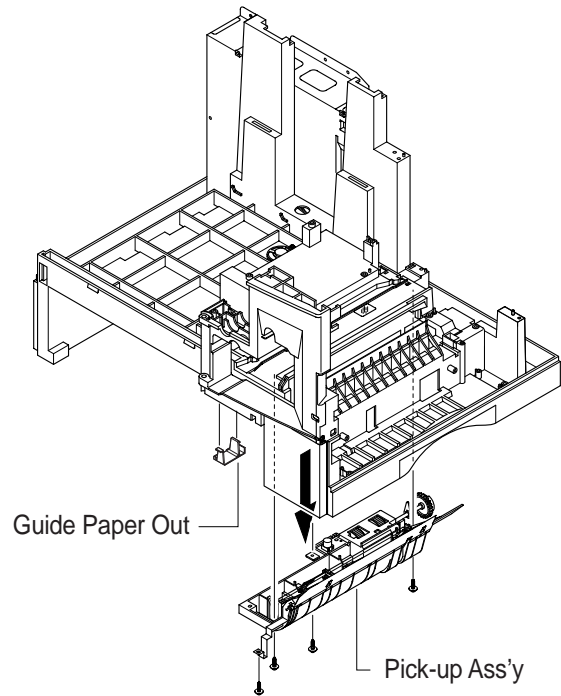


## 6-1-16 Pick Up Assembly

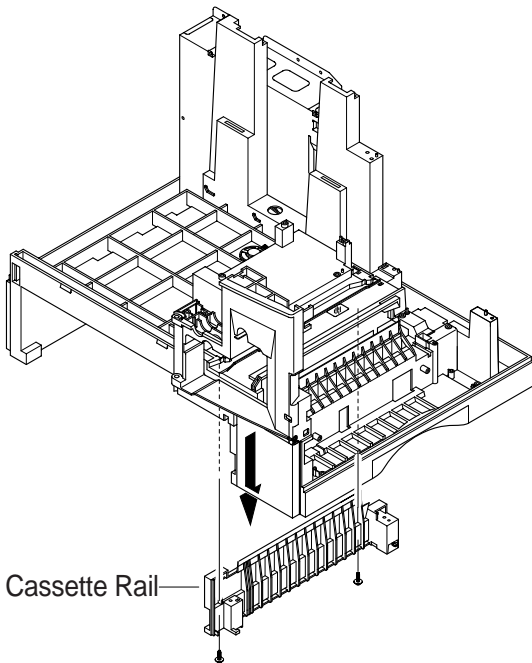
1. Before you remove the Pick Up Assembly, you should remove:
  - Rear Cover (see page 6-2)
  - Shield Main Upper
  - Drive Assembly (see page 6-15)



4. Remove the four screws and take out the Pick Up Assembly, as shown below.

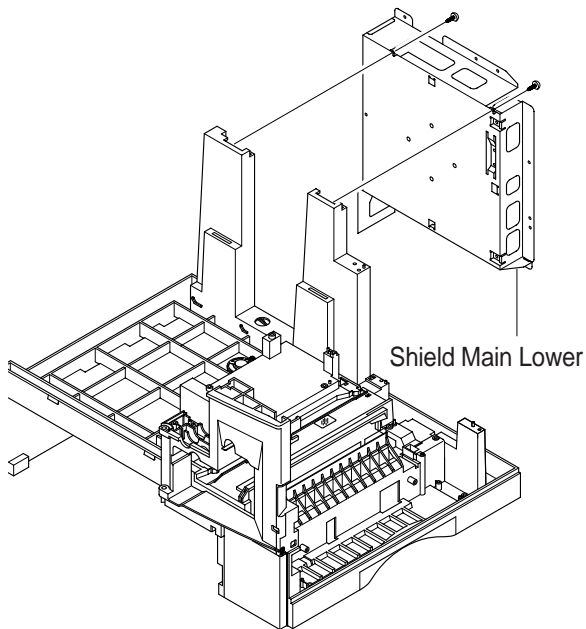


2. Unplug the three connectors.
3. Remove the two screws and take out the Cassette Rail.

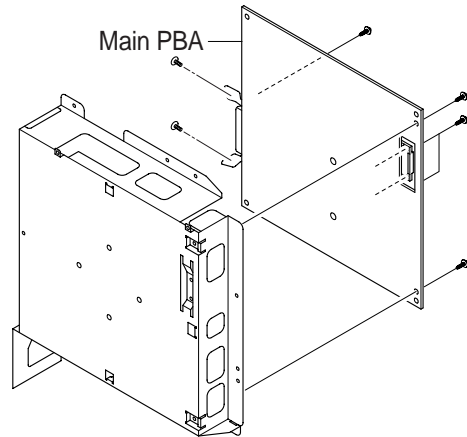


## 6-1-17 Main PBA

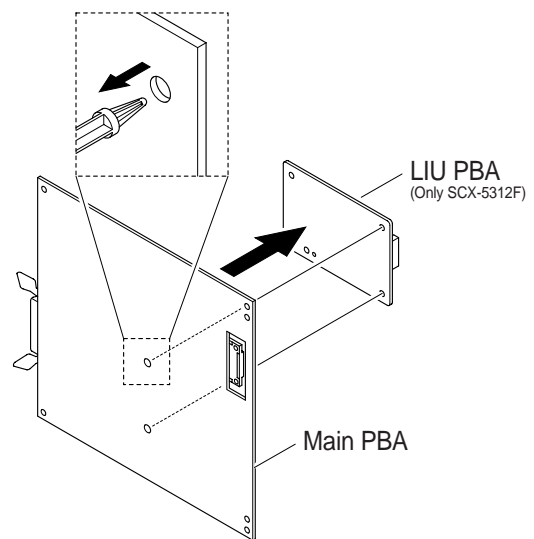
1. Before you remove the Main PBA, you should remove:
  - Rear Cover (see page 6-2)
  - Side Cover Assembly (see page 6-10)
  - Cover Paper Exit Assembly (see page 6-14)
  - SMPS (see page 6-16)
2. Remove the two screws and take out the Shield Main Lower.



3. Remove the five screws and take out the main PBA from the Shield Main Lower.



4. Remove the one screw and unlatch the LIU PBA securing the main PBA and remove it.



## 6-2 FaxCentre F12

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### General Precautions on Disassembly

When you disassemble and reassemble components, you must use extreme caution. The close proximity of cables to moving parts makes proper routing a must. If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

#### Whenever servicing the machine, you must perform the following:

1. Check to verify that documents are not stored in memory.
2. Unplug the power cord.
3. Use a flat and clean surface.
4. Replace only with authorized components.
5. Do not use force to remove the platen or plastic-material components.
6. Make sure all components are in their proper position when re-assembling.

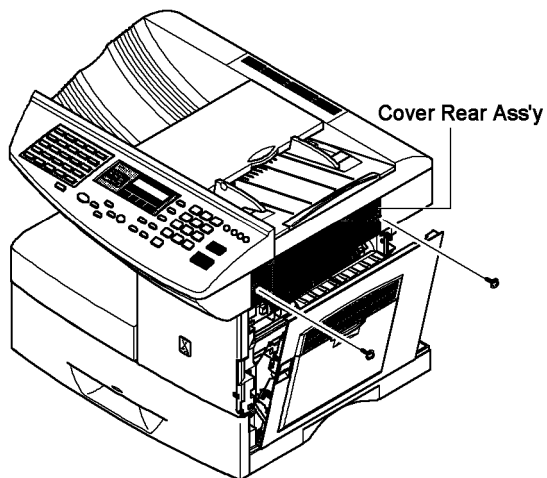
## 6-2-1 Cover Rear Assembly

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1. Open the Side cover.



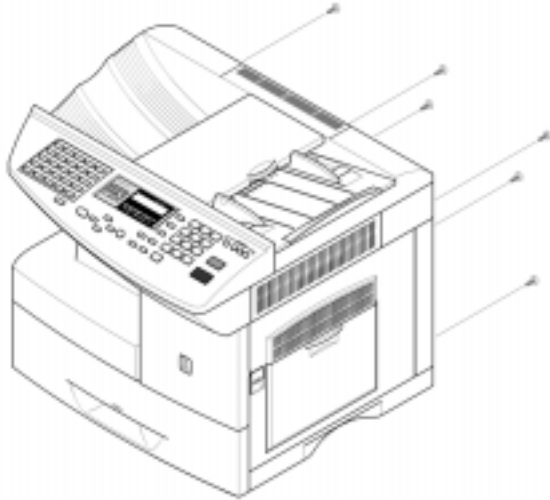
2. Remove two screws securing the Cover Rear Assembly.



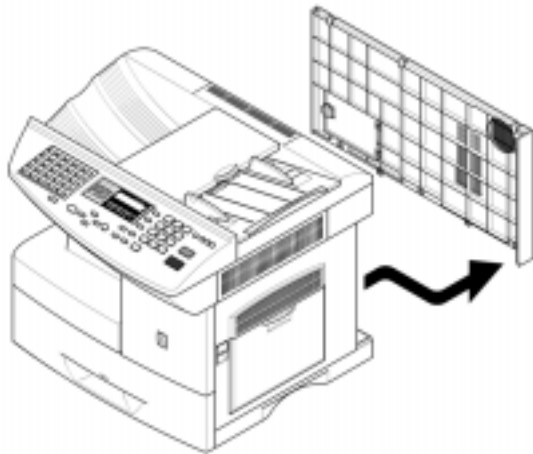
## 6-2-2 Rear Cover

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1. Remove six screws securing the Rear Cover.

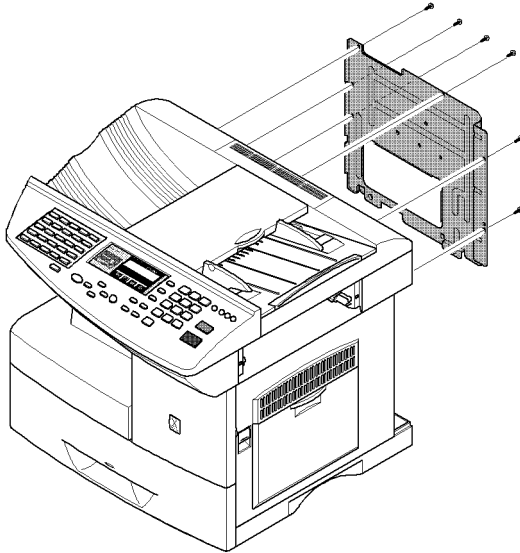


2. Separate the Rear Cover from the Base Frame and Scanner Assembly.

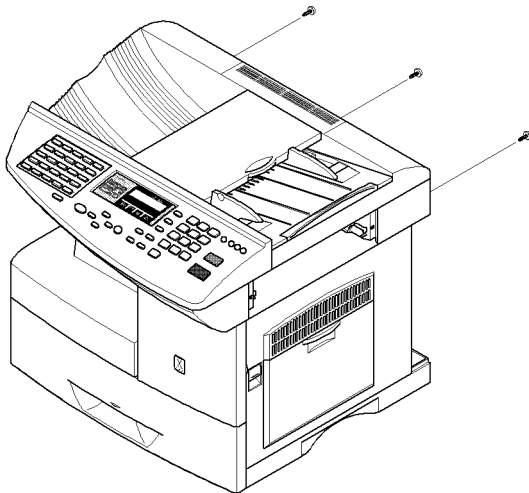


## 6-2-3 Scanner Assembly

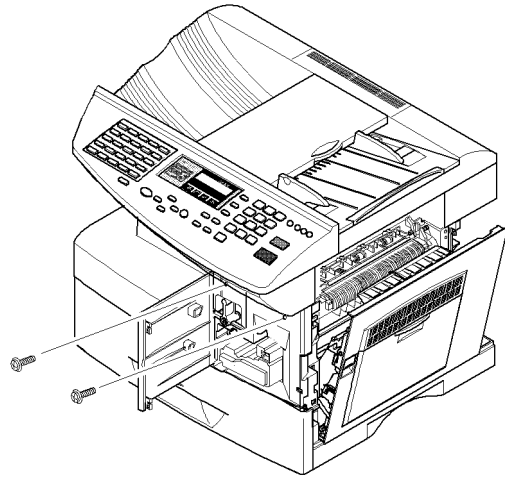
1. Before you remove the Scanner Assembly, you should remove:
  - Cover Rear Assembly (see page 6-25)
  - Rear Cover (see page 6-26)
2. Remove six screws and take out the Shield Main Upper.



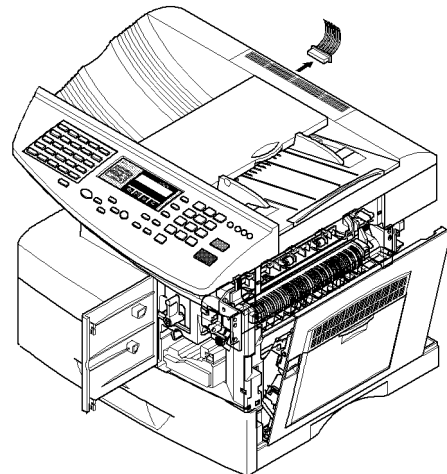
3. Remove three screws, as shown below.



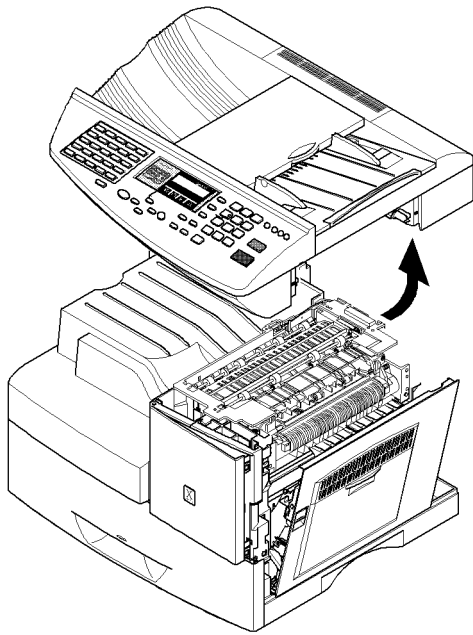
4. Open the Side Cover Assembly, then open the Front Cover and remove 2 screws.



5. Unplug the connector from the Main Board.



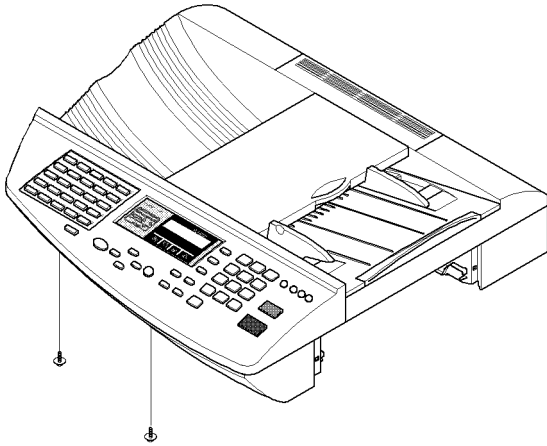
6. Pull up the Scanner Assembly in the direction of arrow.



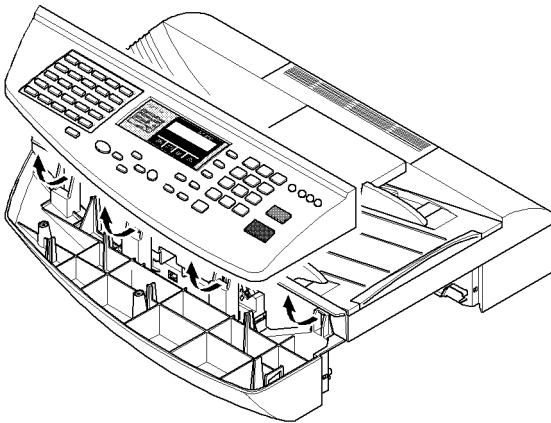


## 6-2-4 OPE Assembly

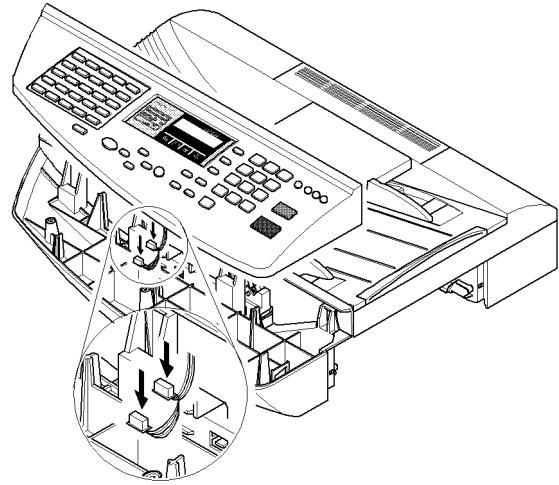
1. Before you remove the OPE Assembly, you should remove:
  - Rear Cover (see page 6-26)
  - Scanner Assembly (see page 6-27)
2. Remove two screws securing the Scanner Assembly



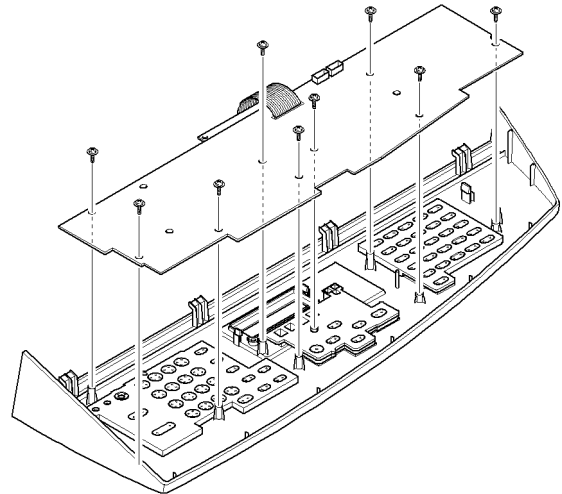
3. Pull the OPE Assembly as shown below.



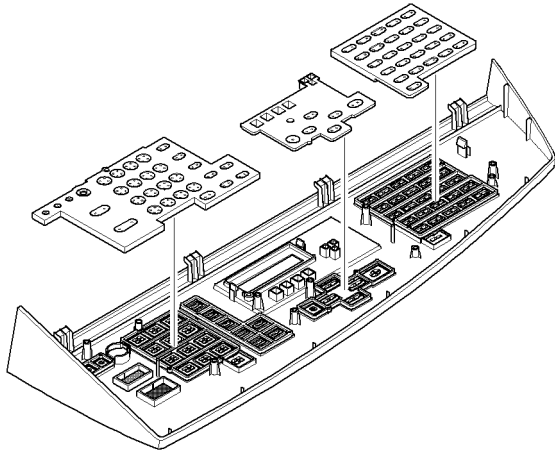
4. Unplug the two connector from the OPE Assembly.



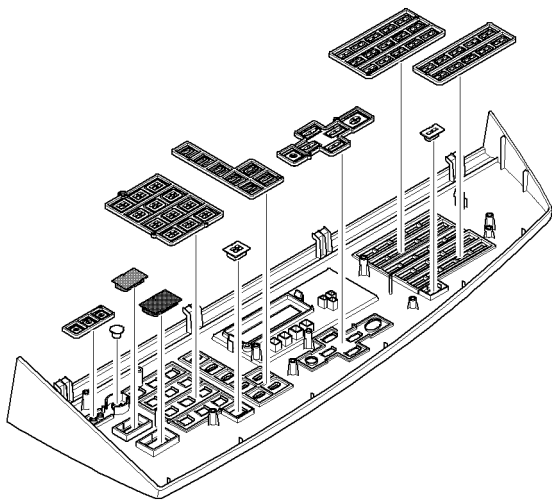
5. Remove nine screws securing the OPE PBA to the OPE Cover.



6. Remove the Contact Rubber from the unit.



7. Remove the Key Pad from the unit.

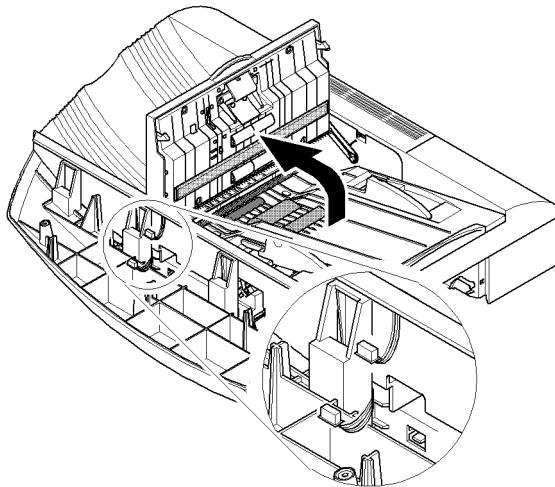


## 6-2-5 ADF Upper Assembly

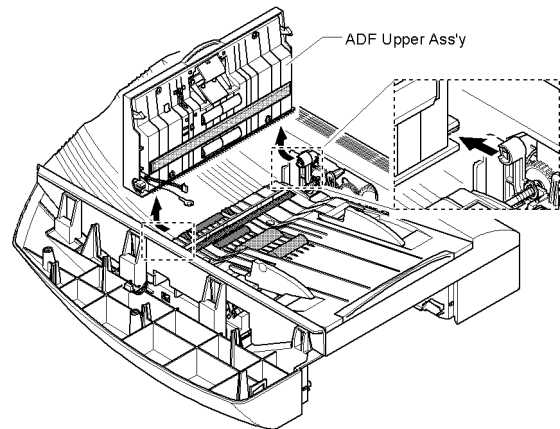
1. Before you remove the ADF Assembly, you should remove:
  - Rear cover (see page 6-26)
  - Scanner Assembly (see page 6-27)
  - OPE Assembly (see page 6-29)
2. Open the ADF Upper Assembly.

### Caution

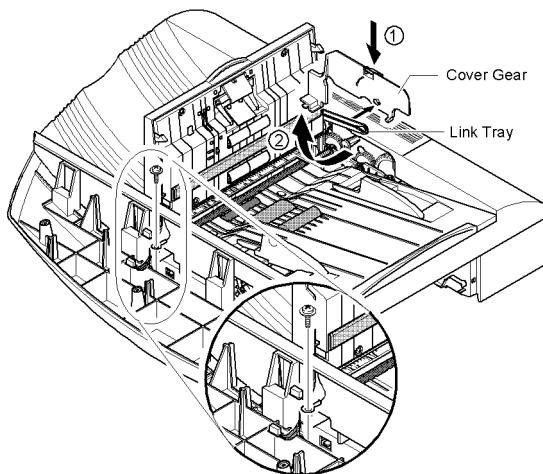
Do not damage the two harnesses shown in the figure below



4. Remove the ADF Upper Assembly, as shown below.

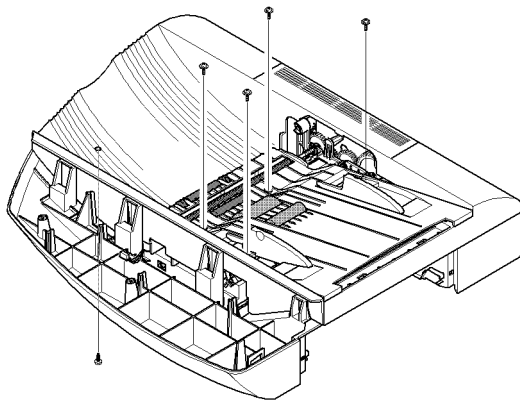


3. Remove the Ground Cable and unlatch the Link Tray from the Cover Gear, as shown below.

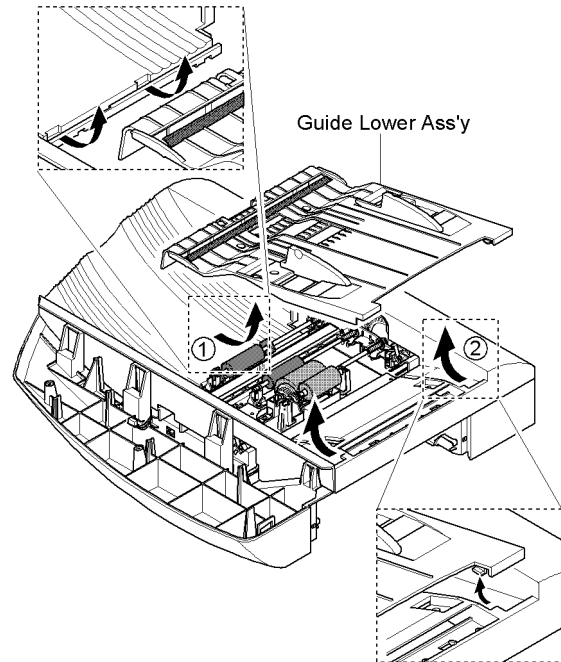


## 6-2-6 Guide Lower Assembly

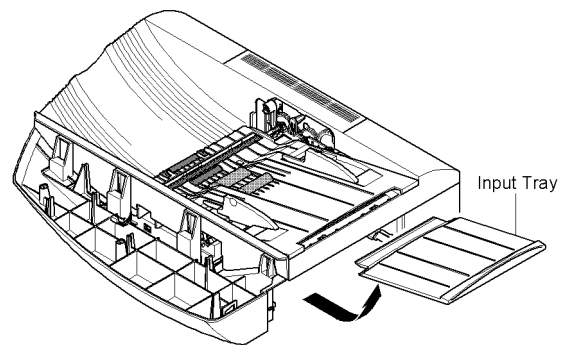
1. Before you remove the Guide Lower Assembly, you should remove:
  - Rear Cover (see page 6-26)
  - Scanner Assembly (see page 6-27)
  - OPE Assembly (see page 6-29)
  - ADF Upper Assembly (see page 6-31)
2. Remove the four screws securing the Guide Lower Assembly. Then remove the fifth screw from underneath, as shown below.



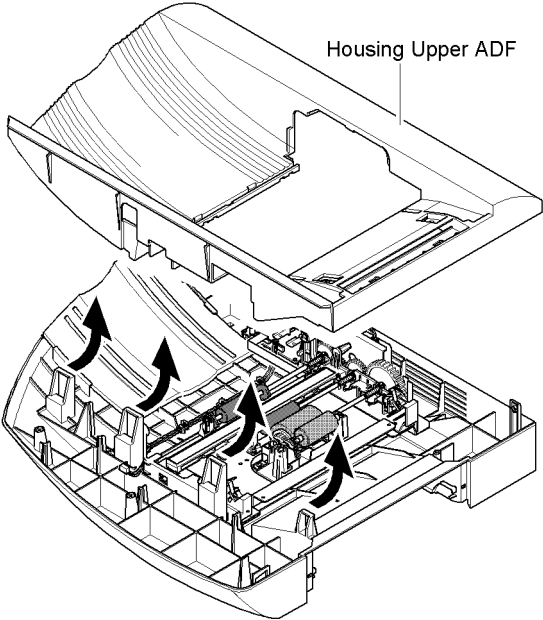
3. First push in the Guide Lower in the direction of arrow 1. Unlatch the Guide Lower Assembly as shown by arrow 2 and remove in the direction of the arrows.



4. Pull the Input Tray in the direction of the arrow and remove it.

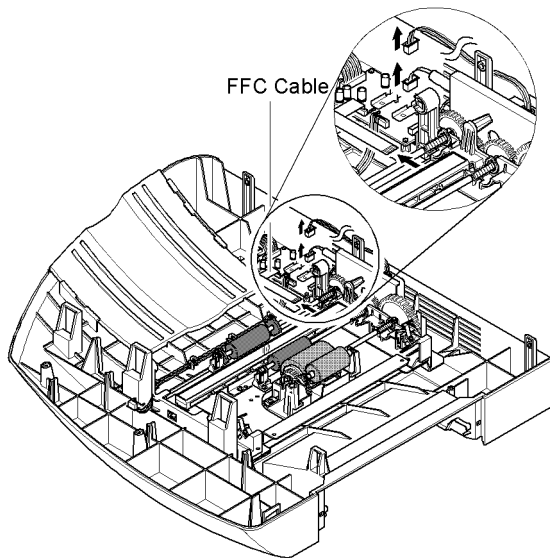


- 5. Take out the Housing Upper ADF in the direction of the arrows, as shown below.

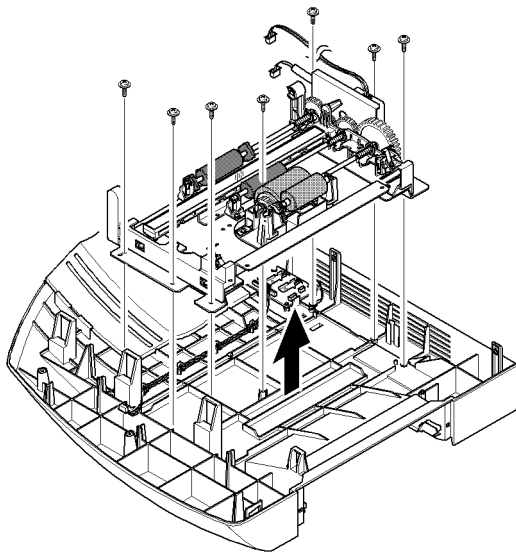


## 6-2-7 Housing Lower Assembly

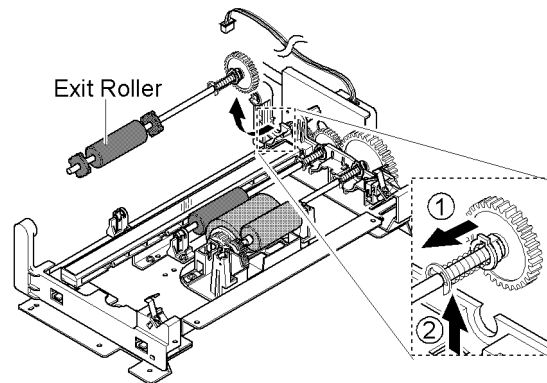
1. Before you remove the Housing Lower Assembly, you should remove:
  - Rear Cover (see page 6-26)
  - Scanner Assembly (see page 6-27)
  - OPE Assembly (see page 6-29)
  - ADF Upper Assembly (see page 6-31)
  - Guide Lower Assembly (see page 6-32)
2. Unplug two connectors and the FFC Cable from the Scan Board.



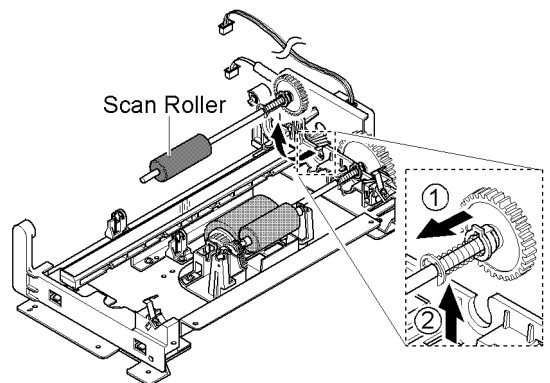
3. Remove seven screws securing the ADF Lower Assembly.



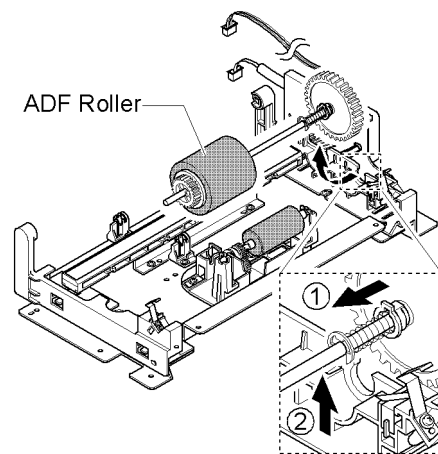
4. Unlatch the Exit Roller gear part and remove it, as shown below.



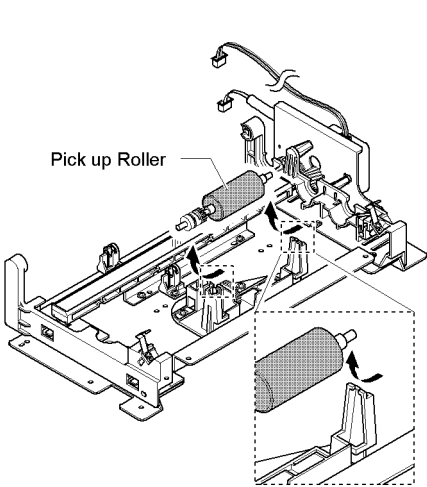
5. Unlatch the Scan Roller gear part and remove it, as shown below.



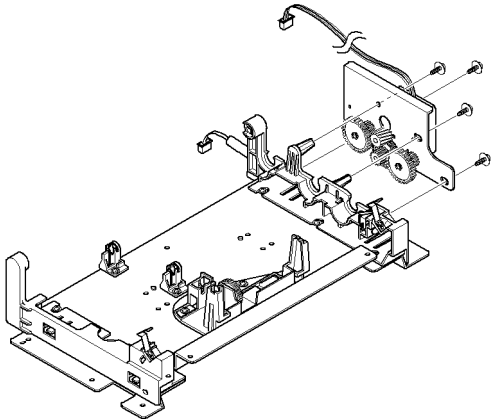
6. Unlatch the ADF Roller gear part and remove it, as shown below.



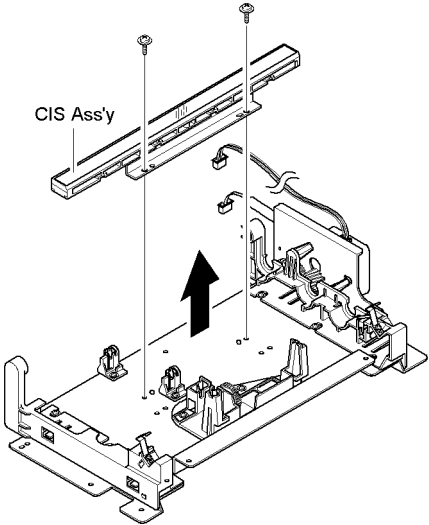
7. Pull both sides and remove the Pick up Roller, as shown below.



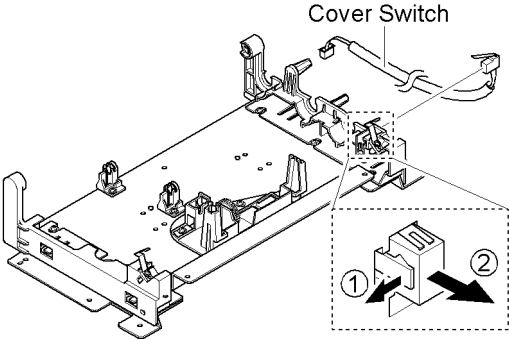
10. Remove four screws securing the ETC Motor Assembly and remove it.



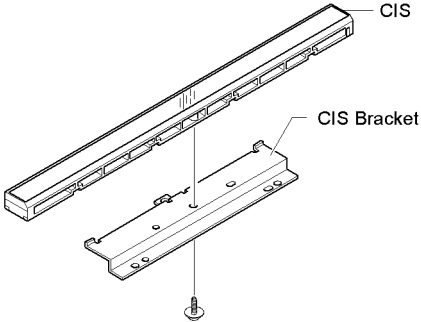
8. Remove two screws and pull the CIS Cable. Take out the CIS Assembly.



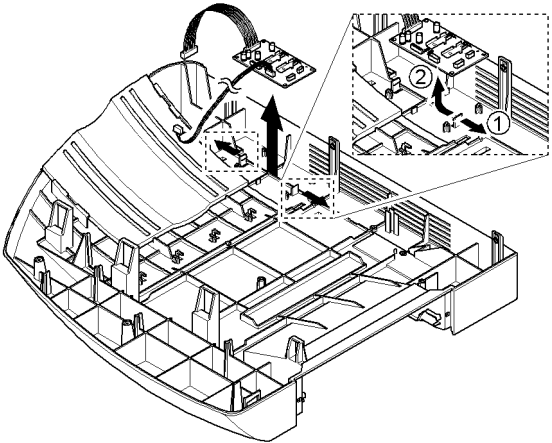
11. Unlatch the Cover Switch and remove it, as shown below.



9. Remove one screw securing the CIS Bracket and remove the CIS.



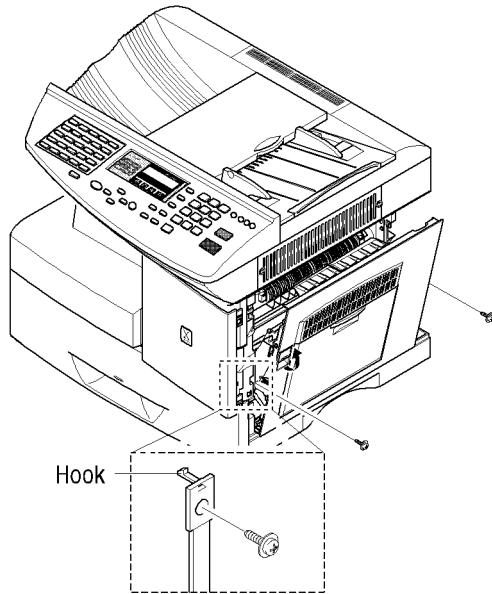
12. Unlatch both sides and remove the Scan Board.



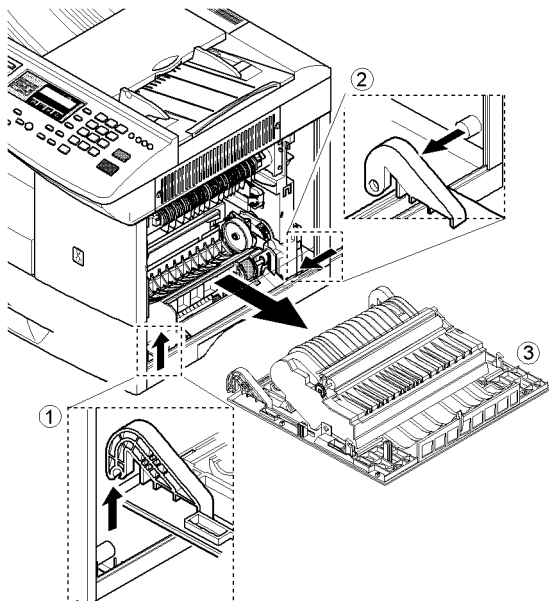
## 6-2-8 Side Cover Assembly

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1. Remove the two screws to release the Stopper (Main Frame side) that secures the Side Cover to the Main Frame.



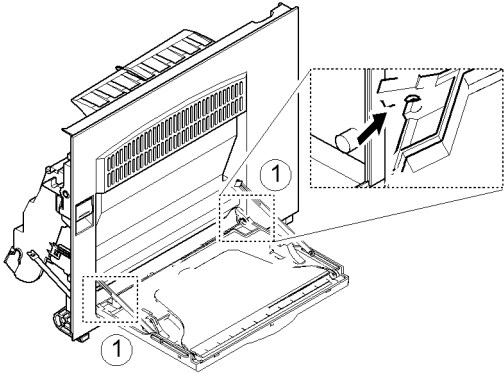
2. Completely open the Side Cover Assembly, then lift side 1 in the direction of the arrow, pull side 2 forwards in the direction of the arrow and remove the side cover (3).



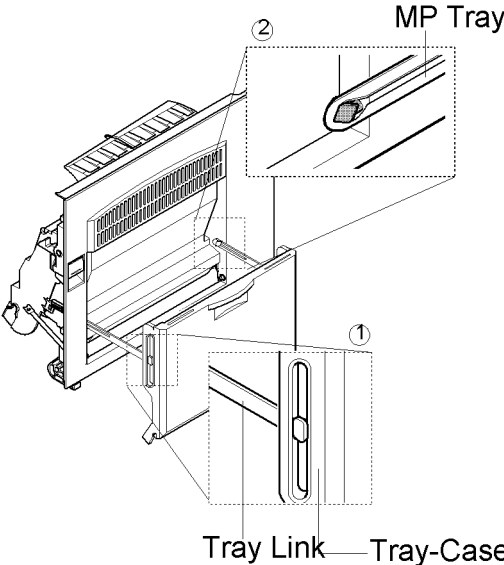


**MP-Tray**

- 1. Pull both sides of the tray to release from the pivots.

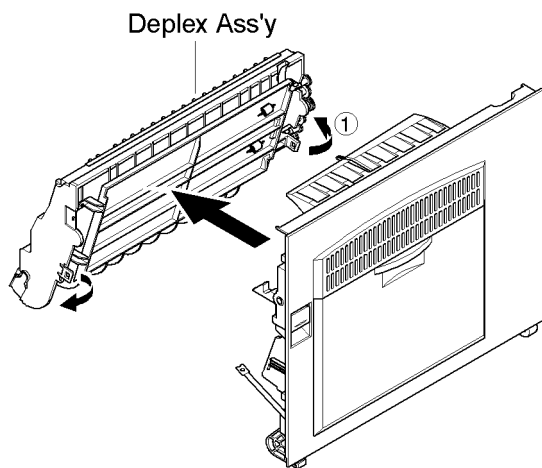


- 2. Hold the Tray in an upright position as shown at 1, then release each Tray Link from the tray. Hold each Tray link at 45 degrees, as shown at 2, to release from the side cover.



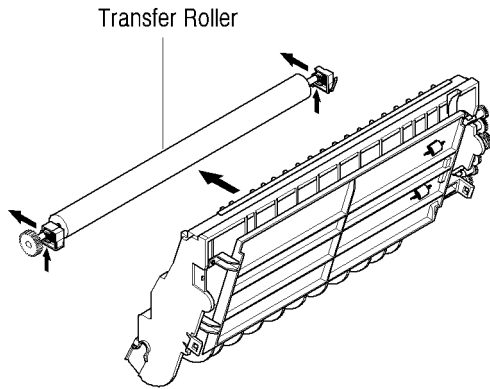
## Duplex Assembly

1. To remove the Duplex Assembly, open the Side Cover Assembly, then gently but firmly pull part 1 out until the Duplex Assembly can be pulled away. Do not use excessive force, check that all clips are released.



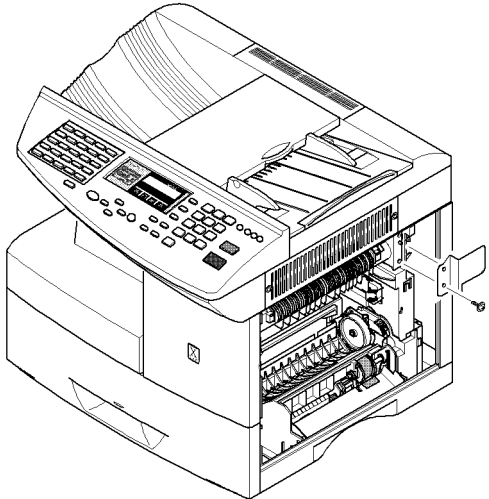
## Transfer Roller Assembly

1. Take out the Transfer Roller, as shown below.

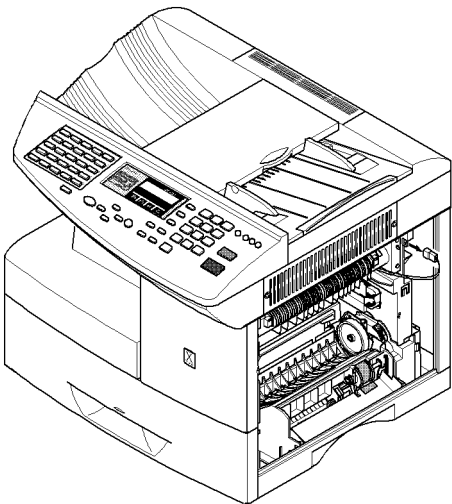


## 6-2-9 Fuser Assembly

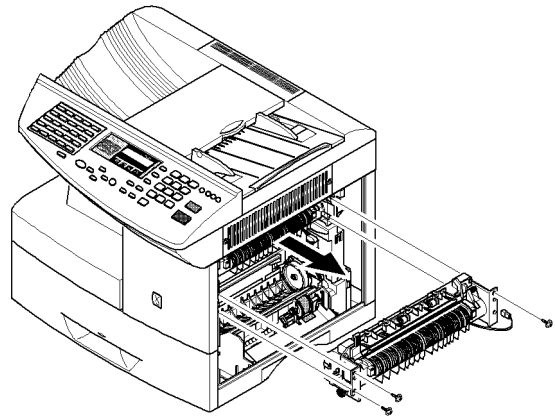
1. Before you remove the Fuser Assembly, you should power off then remove the Side Cover Assembly (see page 6-36)
2. Remove one screw and take out the Cover Sheet Connector as shown below.



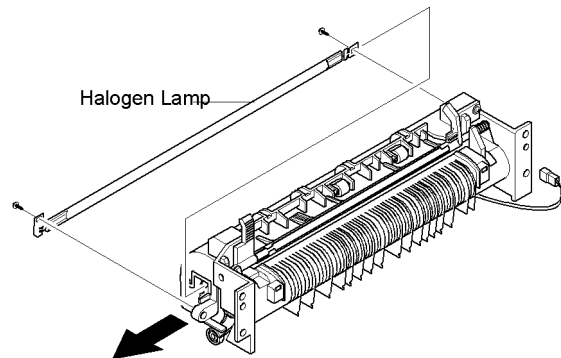
3. Unplug the connector as shown below.



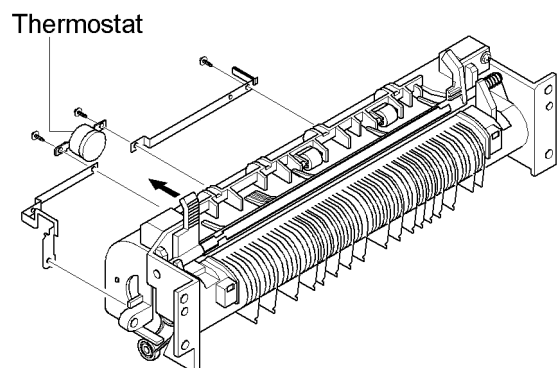
4. Remove three screws and take out the Fuser Assembly.



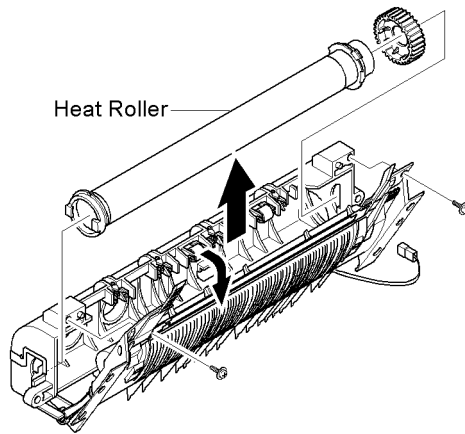
5. Remove two screws and take out the Halogen Lamp.



6. Remove four screws and take out the Thermostat.



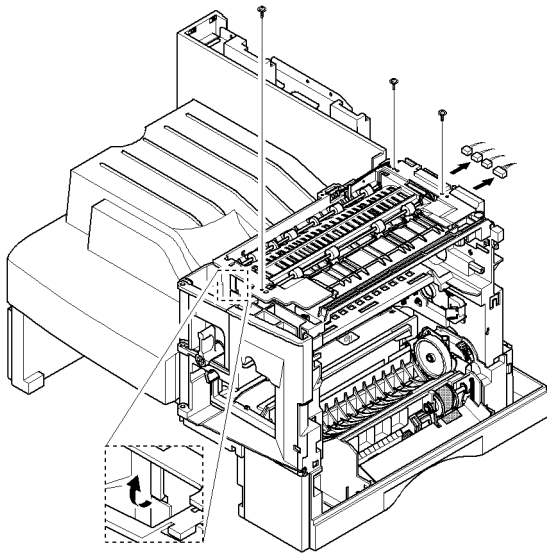
7. Remove two screws and open the Lower Assembly and remove the Heat Roller Assembly from Upper Fuser Assembly.



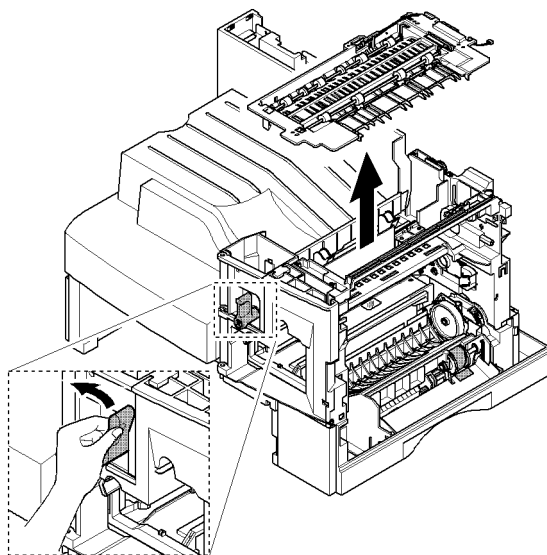
## 6-2-10 Exit Assembly

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1. Before you remove Exit Assembly, you should remove:
  - Rear Cover (see page 6-26)
  - Cover Rear Assembly (see page 6-25)
  - Scanner Assembly (see page 6-27)
  - Side Cover Assembly (see page 6-36)
2. Remove three screws, unplug four connectors and unlatch the Dummy Base Frame, as shown below.

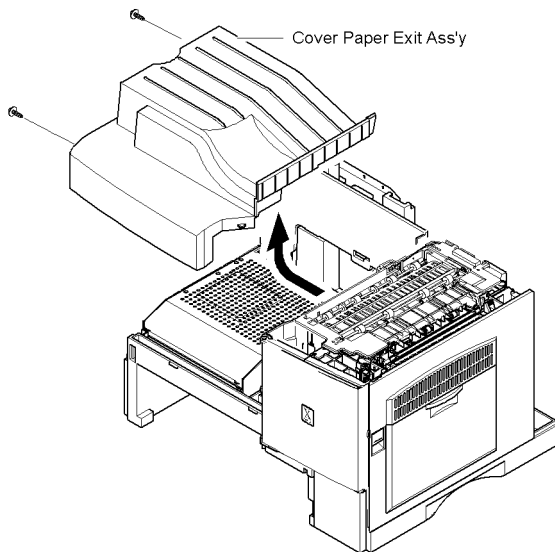


3. Pull the Exit Assembly and remove it.



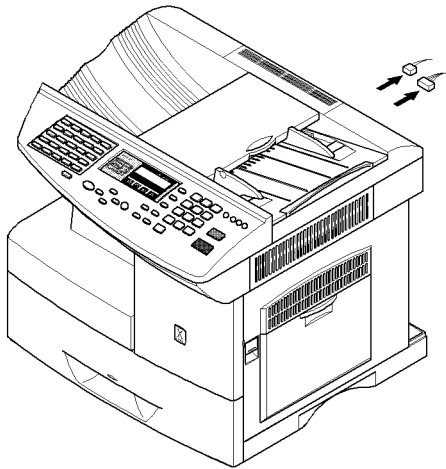
## 6-2-11 Cover Paper Exit Assembly

1. Before you remove the Cover Paper Exit Assembly, you should remove:
  - Rear Cover (see page 6-26).
  - Cover Rear Assembly (see page 6-25).
  - Scanner Assembly (see page 6-27).
2. Remove two screws and Cover Paper Exit Assembly, as shown below.

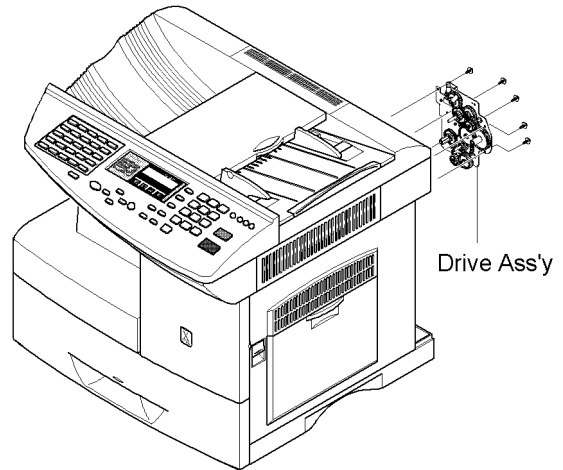


## 6-2-12 Drive Assembly

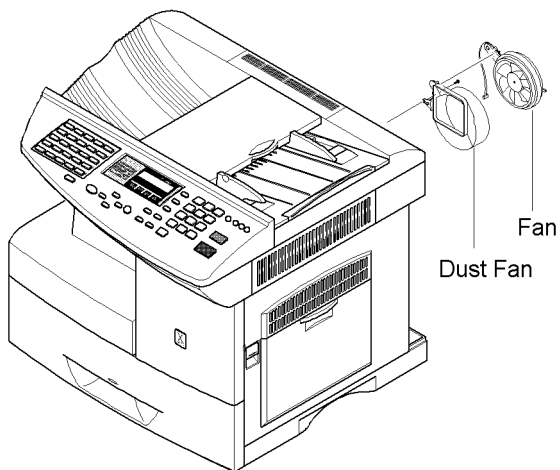
1. Before you remove the Drive Assembly, you should remove:
  - Rear Cover (see page 6-26)
  - Shield Main Upper
2. Unplug two connectors. (Main Motor: 9pin, Duplex Solenoid: 2pin)



4. Remove five screws and take out the Drive Assembly.



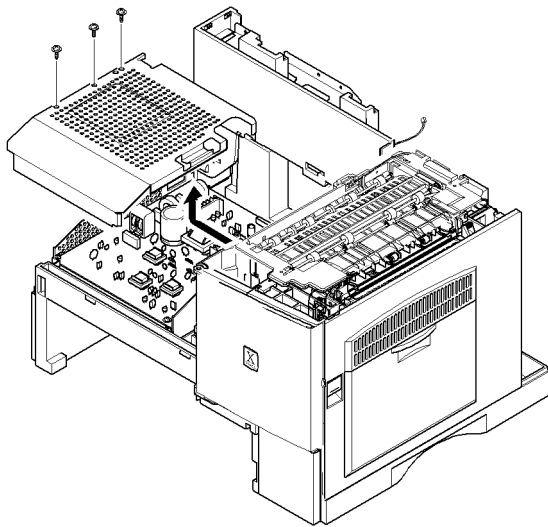
3. Remove one screw and take out the Fan and Dust Fan.



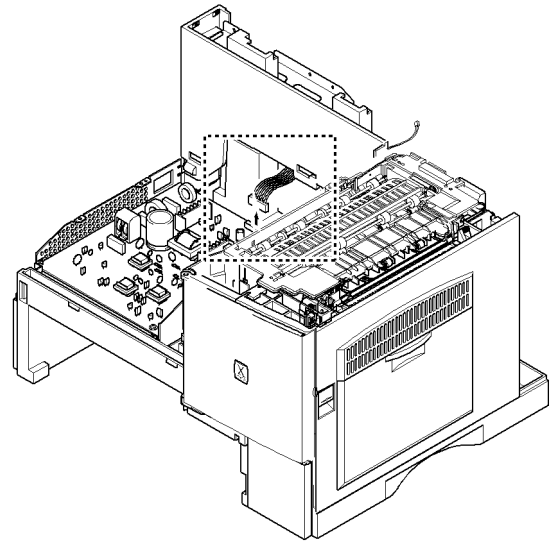


## 6-2-13 SMPS

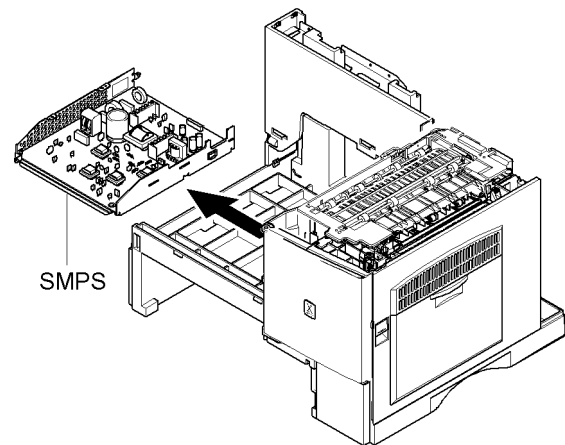
1. Before you remove the LSU, you should remove:
  - Rear Cover (see page 6-26).
  - Cover Rear Assembly (see page 6-25).
  - Scanner Assembly (see page 6-27).
  - Side Cover Assembly (see page 6-36).
  - Exit Assembly (see page 6-42).
  - Cover Paper Exit Assembly (see page 6-43).
2. Remove three screws and take out the Shield SMPS Upper.



3. Unplug the all connectors.



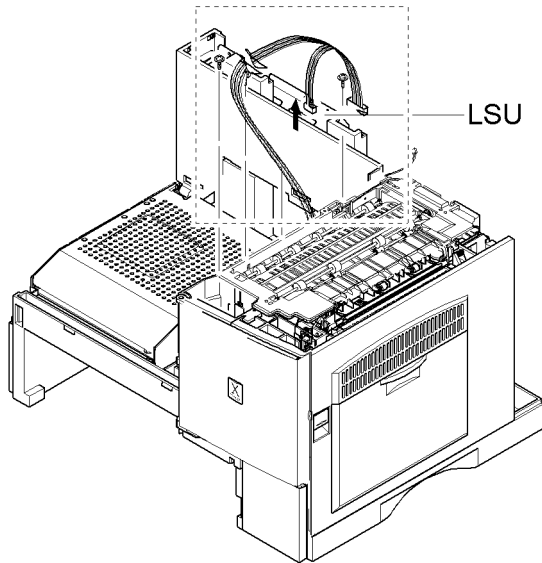
4. Remove the SMPS, as shown below.



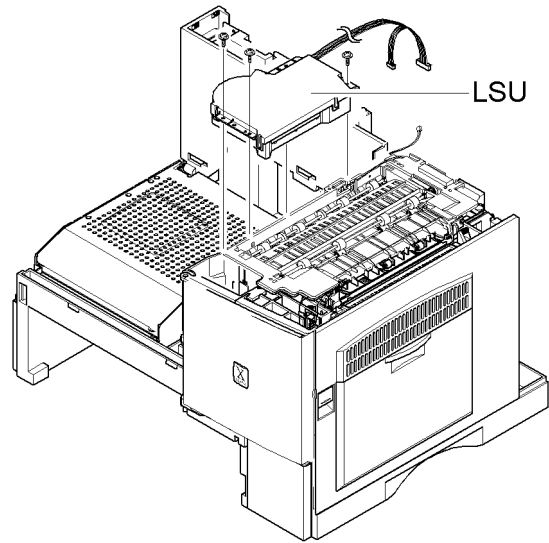
## 6-2-14 LSU

---

1. Before you remove the LSU, you should remove:
  - Rear Cover (see page 6-26).
  - Cover Rear Assembly (see page 6-25).
  - Scanner Assembly (see page 6-27).
  - Side Cover Assembly (see page 6-36).
  - Exit Assembly (see page 6-42).
2. Unplug two connectors.

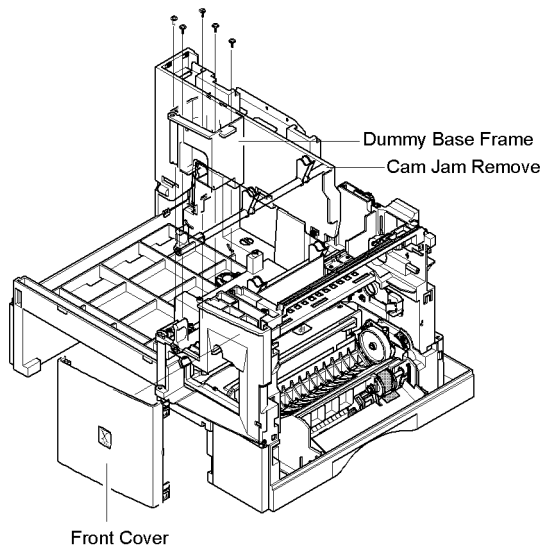


3. Remove three screws and take out the LSU.

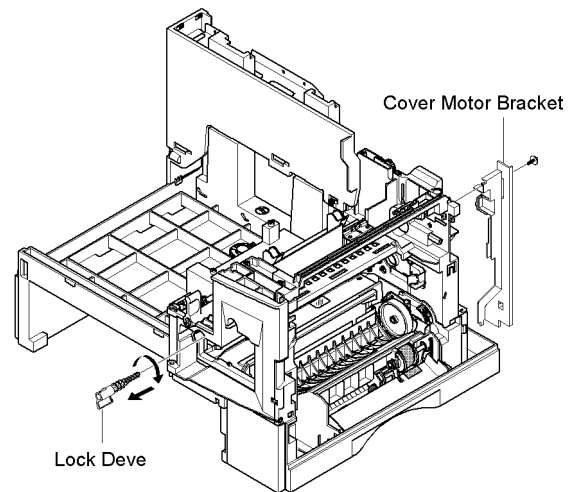


## 6-2-15 Main Frame Assembly

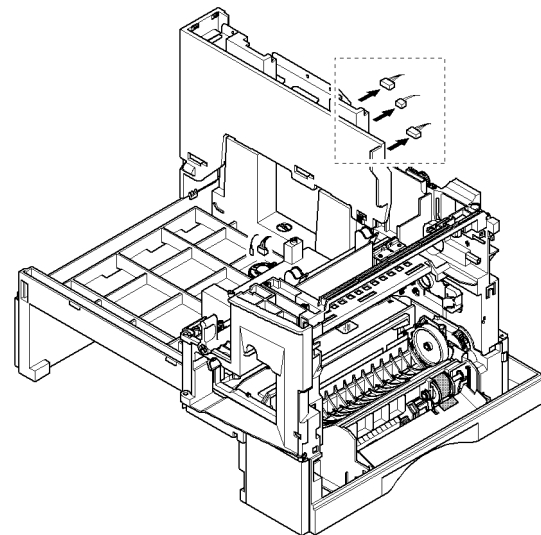
1. Before you remove the LSU, you should remove:
  - Rear Cover (see page 6-26).
  - Cover Rear Assembly (see page 6-25).
  - Scanner Assembly (see page 6-27).
  - Side Cover Assembly (see page 6-36).
  - Exit Assembly (see page 6-42).
  - Cover Paper Exit Assembly (see page 6-43).
  - SMPS (see page 6-45).
  - LSU (see page 6-46).
2. Remove one screw in the Channel Base Frame from the lower section of the Cover Dummy Lower, and then remove four screws to disassemble the Dummy Scan Lower.



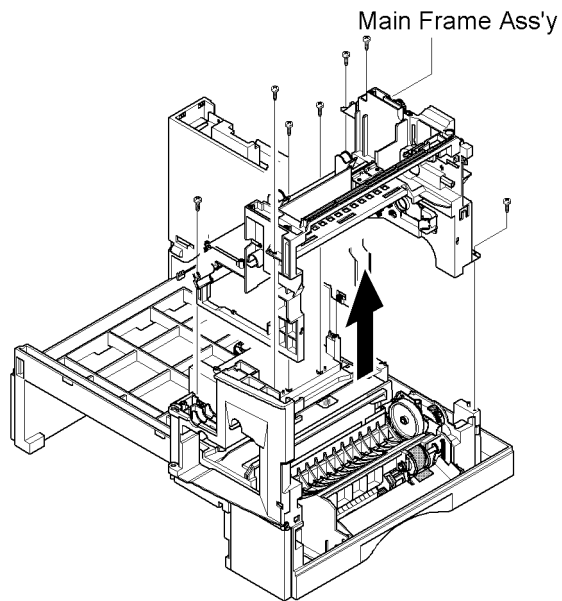
3. Remove the Locker Deve.



4. Unplug all the connectors.

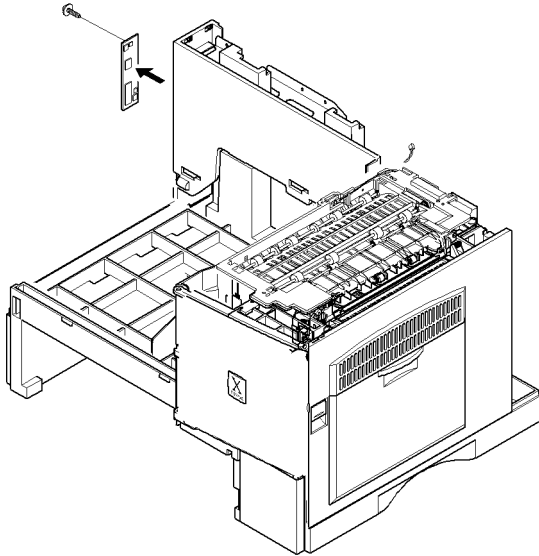


5. Remove seven screws and take out the Main Frame Assembly.

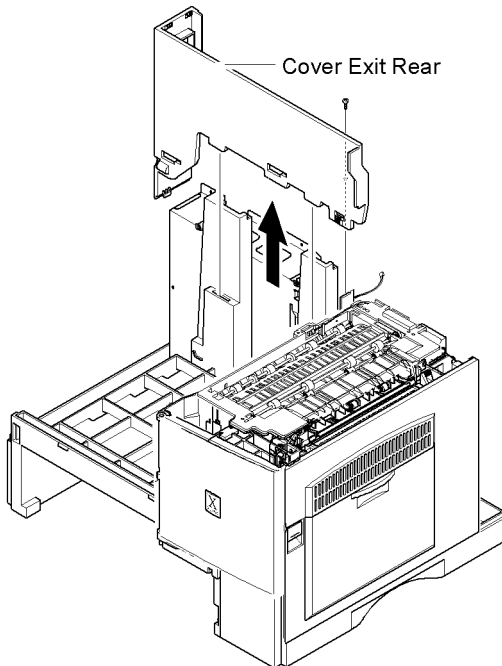


## Cover Exit Rear

1. Remove one screw and take out the Panel Connect MPF.

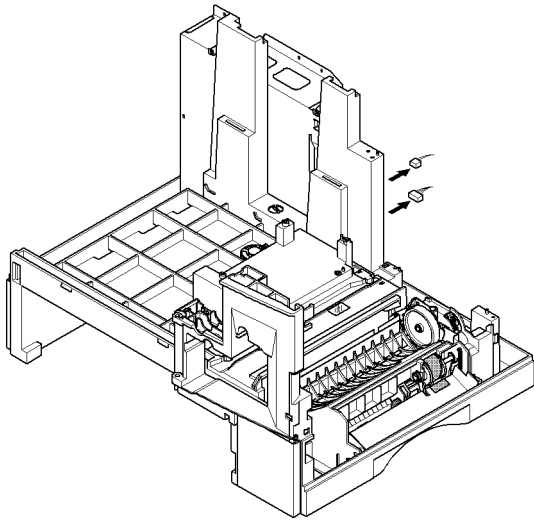


2. Remove one screw and Cover Exit Rear, as shown below.

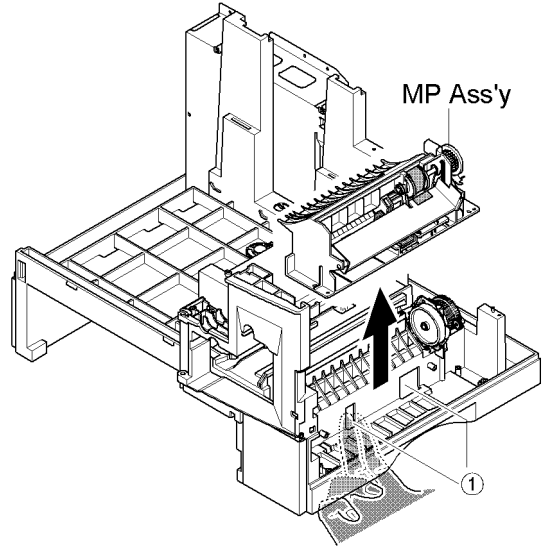


## MP Assembly

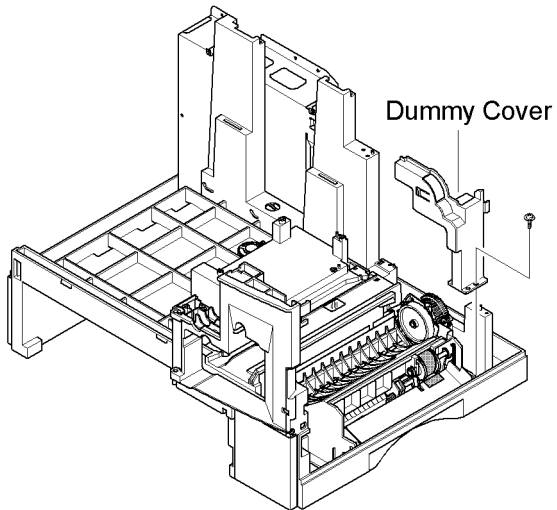
1. Unplug two connectors.



3. Release the SMPS. Pull the MP Assembly upward and remove it.

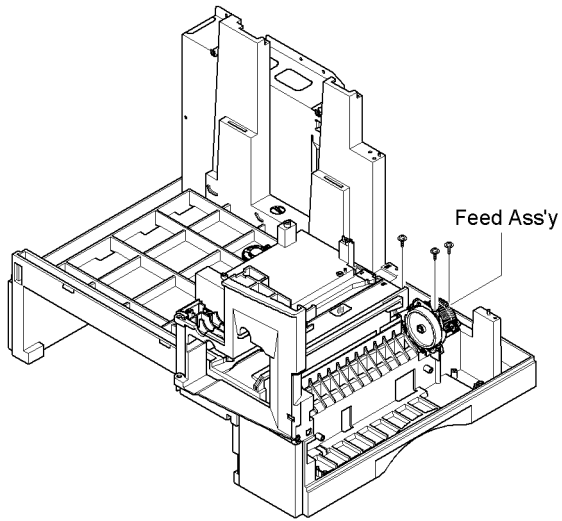


2. Remove four screws and take out the Dummy Cover.

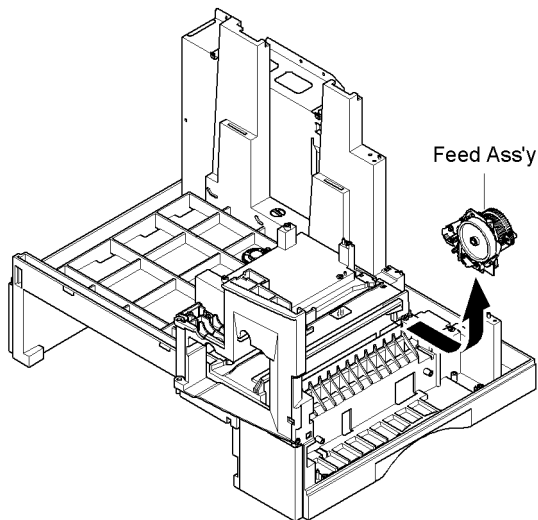


## Feed Assembly

1. Remove three screws.

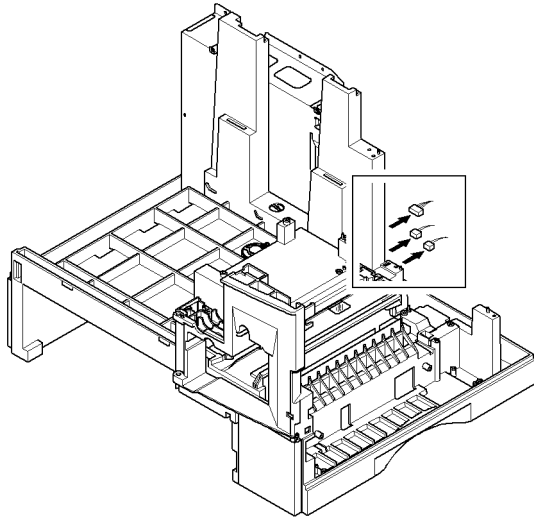


2. Pull the Feed Assembly upward and remove it.

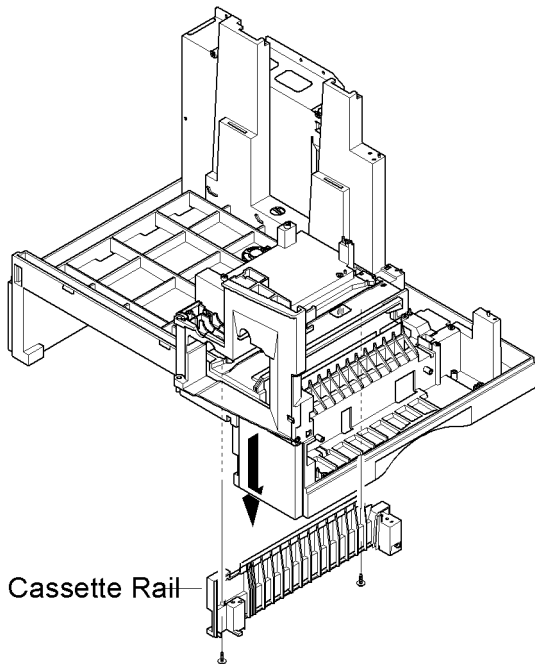


## Pick Up Assembly

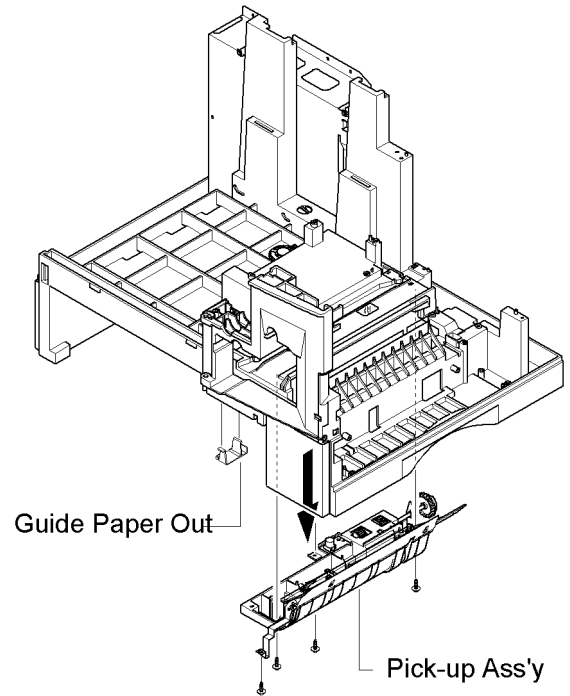
1. Unplug three connectors.



2. Remove two screws and take out the Cas-  
sette Rail.



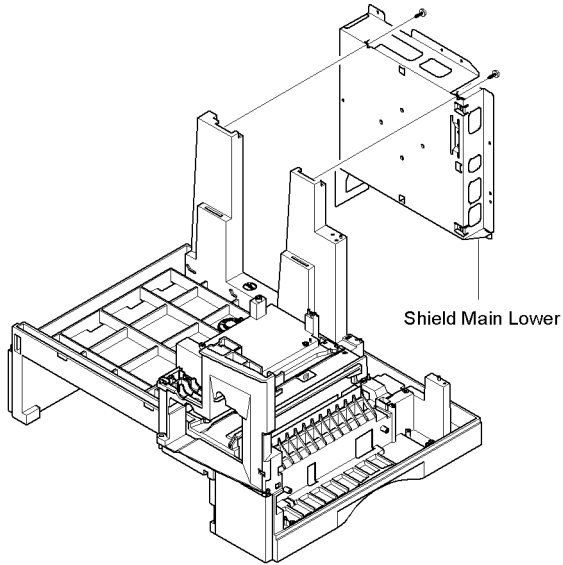
3. Remove four screws and take out the Pick Up  
Assembly, as shown below.



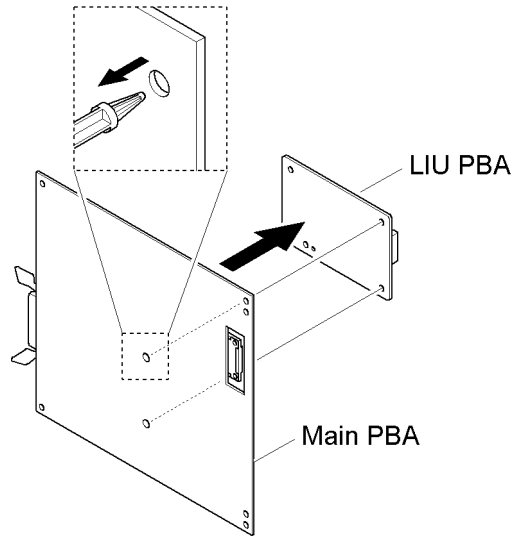


## Main PBA

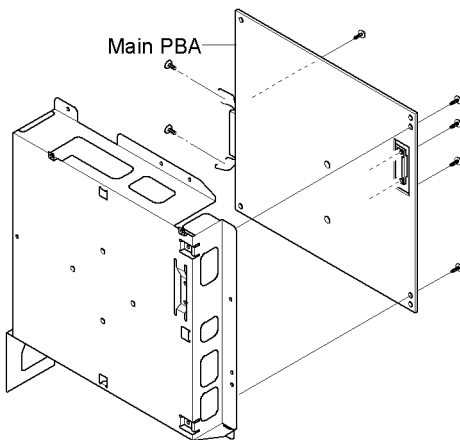
1. Remove two screws and take out the Shield Main Lower.



3. Remove one screw and unlatch the LIU PBA securing the Main PBA and remove it.

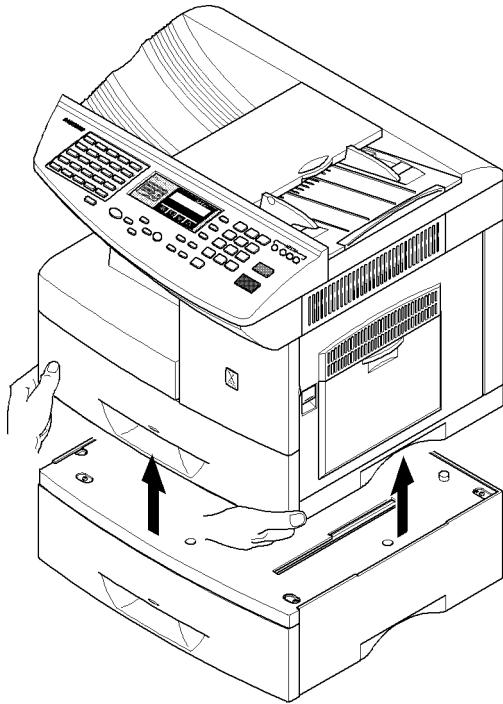


2. Remove five screws and take out the Main PBA from the Shield Main Lower.

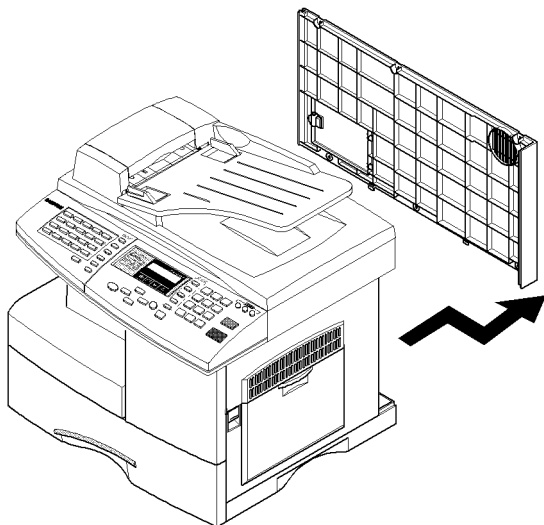


## 6-2-16 SCF Assembly

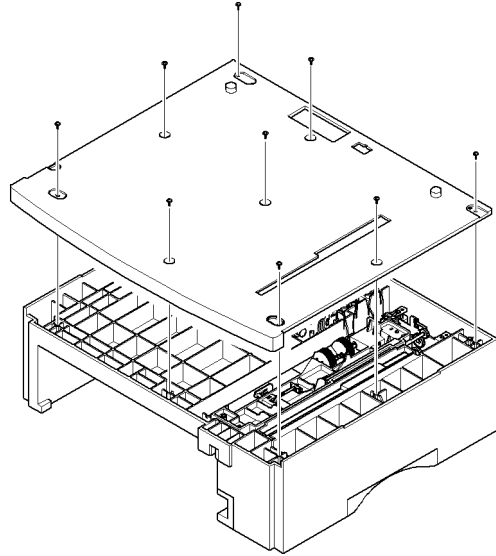
1. Lift the Main Set from the SCF.



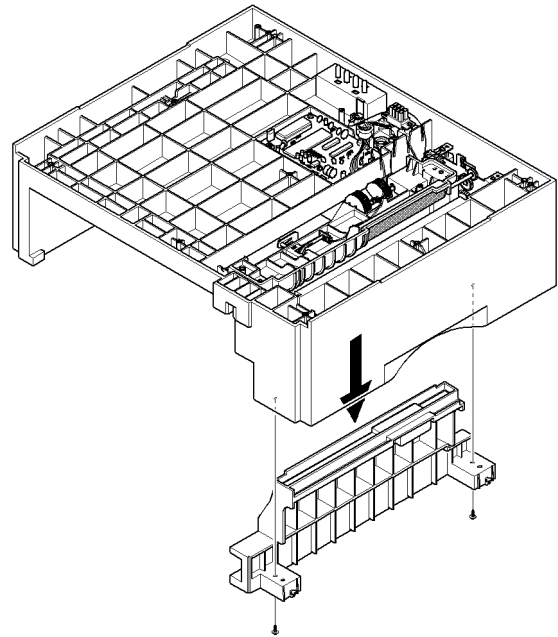
2. Take out the Cassette Assembly from the SCF.



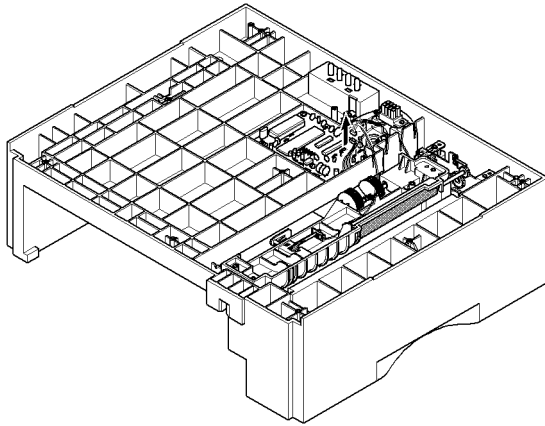
3. Remove nine screws securing the Top Cover and remove it.



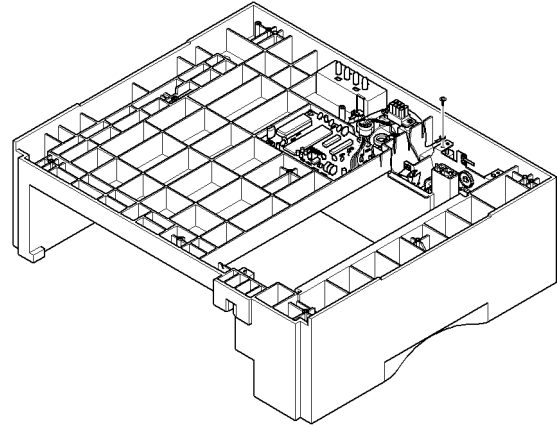
4. Remove two screws securing the Guide Paper Lower and remove it, as shown below.



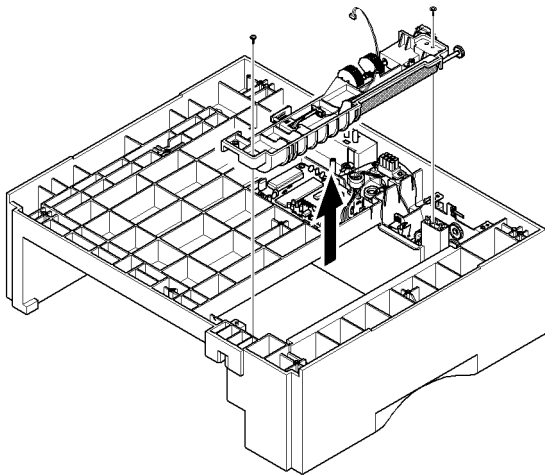
5. Unplug one connector from the Main PBA, as shown below.



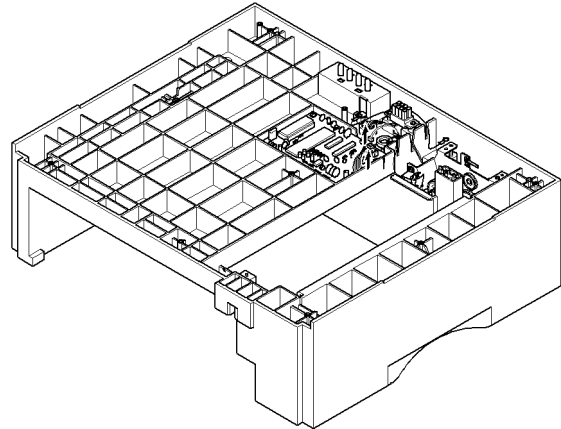
7. Remove one screw securing the Ground Cable from the Motor Assembly and remove the Ground Cable.



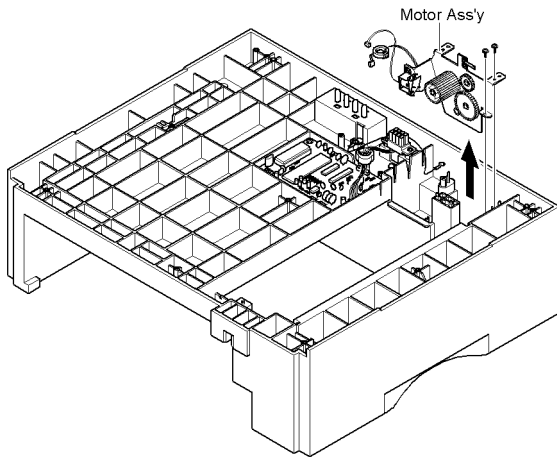
6. Remove two screws securing the Guide Paper Upper and remove it.



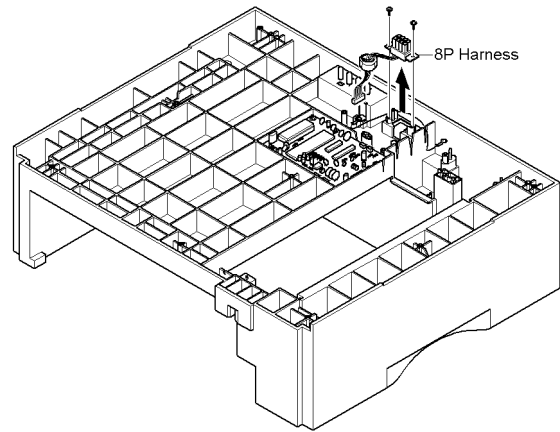
8. Unplug two connectors from the Main PBA, as shown below.



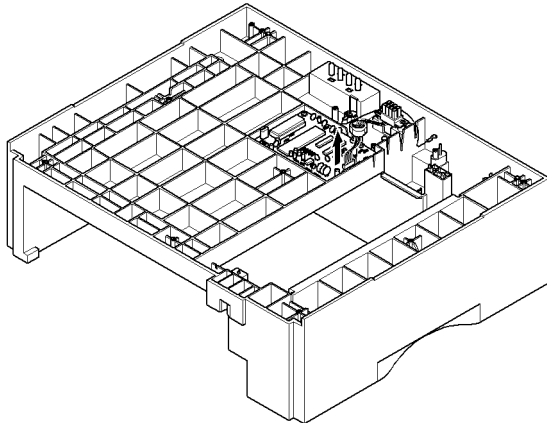
9. Remove two screws securing the Motor Assembly and remove it.



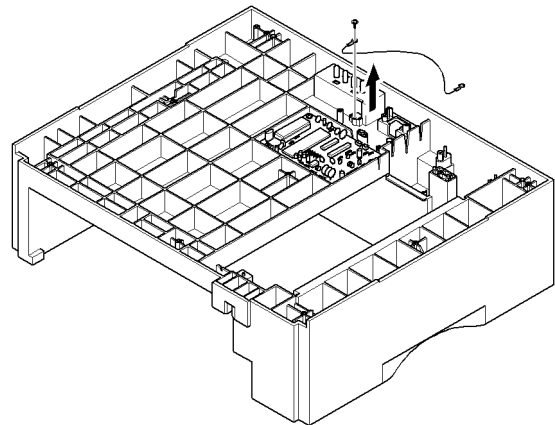
11. Remove two screws securing the SCF 8P Harness and remove it.



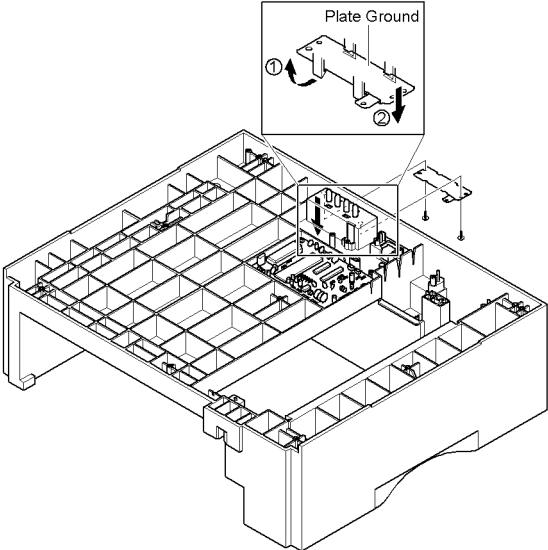
10. Unplug one connector from the Main PBA, as shown below.



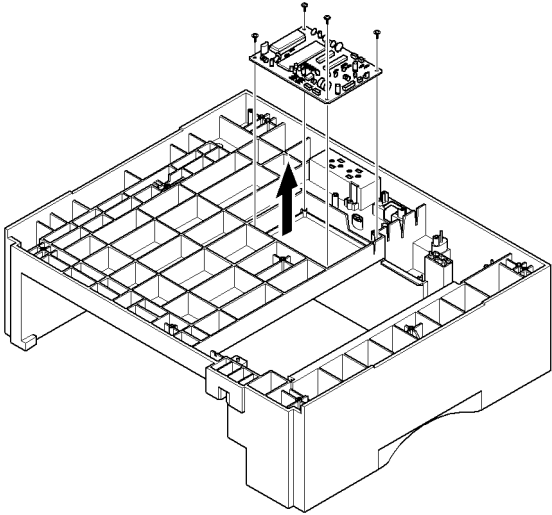
12. Remove one screw securing the Ground Cable. Remove the Ground Cable from the Plate Ground.



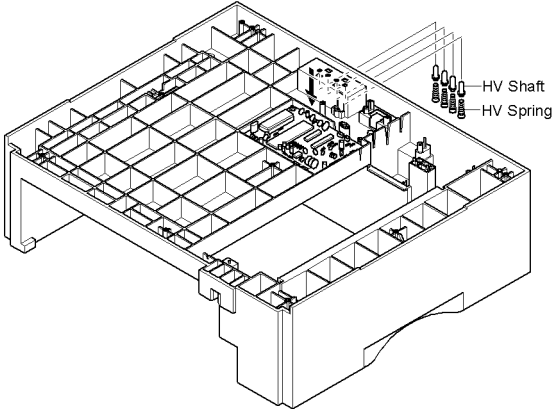
13. Remove two screws securing the Plate Ground and remove it, as shown below.



15. Remove four screws securing the Main PBA and remove it.



14. Remove four HV Shafts and HV Springs, as shown below.





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## 7. Maintenance & Troubleshooting

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### 7-1 Preventative Maintenance

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The cycle period outlined below is a general guideline for maintenance. The example list is for an average usage of 50 transmitted and received pages per day. Environmental conditions and actual use will vary these factors. The cycle period given below is for reference only.

<b>COMPONENT</b>	<b>REPLACEMENT CYCLE</b>
ADF roller	50,000 pages
Feed roller	50,000 pages
Transfer	50,000 pages
Fuser	50,000 pages
Toner CRU	6,000 pages
Drum DRU	15,000 pages

### 7-2 Diagnostics

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This section describes methods and procedures to isolate the cause of a malfunction in the machine. This machine displays diagnostic information on the LCD. In addition, it can perform a series of tests that allow the machine to observe individual machine functions.

## 7-2-1 Error Messages

<b>Error Message</b>	<b>Description</b>	<b>Solution</b>
RETRY REDIAL?	The machine is waiting for the programmed interval to automatically re-dial.	You can press START to immediately re-dial, or STOP to cancel the re-dial operation.
COMM. ERROR	A problem with the FAX communications has occurred.	Try again.
DOCUMENT JAM	A document has jammed in the ADF feeder	Clear the document Jam.
DOOR OPEN	The side cover is not securely latched.	Close the cover until it clicks in place.
GROUP NOT AVAILABLE	You have tried to select a group location where only a single location number can be used, such as when adding locations for a multi-dial operation.	Try again, check location for group.
LINE ERROR	Your unit cannot connect with the remote machine, or has lost contact because of a problem on the phone line.	Try again. If failure persists, wait an hour or so for the line to clear then try again.
LOAD DOCUMENT	You have attempted to send a FAX document with no document loaded.	Load a document and try again.
MEMORY FULL	The memory has become full.	Either delete unnecessary documents, or re-transmit after more memory becomes available, or split the transmission into more than one operation.
NO ANSWER	The remote machine did not answer after all the re-dial attempts.	Try again. Make sure the remote machine is OK.
NO. NOT ASSIGNED	The speed dial location you tried to use has no number assigned to it.	Dial the number manually with the keypad, or assign the number to the speed dial and try again.
NO PAPER [ADD PAPER]	The paper has run out. The printer system stops.	Load new paper in the paper tray.



<b>Error Message</b>	<b>Description</b>	<b>Solution</b>
OVERHEAT	The printer has overheated.	The machine will automatically return to the standby mode when it cools down to normal operating temperature. If failure persists, install a new ELA HOU-FUSER, PL 1-1 item14.
PAPER JAM 0 OPEN/CLOSE DOOR	paper has jammed in paper feeding area. paper is jammed in pick-up unit	Press STOP and clear the jam.
PAPER JAM 1/2 OPEN/CLOSE DOOR	paper has jammed inside the unit. paper has jammed in paper exit unit.	Clear the jam.
TONER EMPTY	The machine has encountered the toner empty condition.	Install a new ELA -TONER UNIT SET, PL 8-1 item 8
DRUM WARNING	The machine has encountered the drum life,14000 print pages.	The drum is nearing the end of it's life.
REPLACE DRUM	When the machine has encountered the end of life, 15000 print pages.	The drum has reached the end of it's life, install a new ELA-OPC UNIT SET, PL 8-1 item 7.
NO CARTRIDGE	The machine detected the toner cartridge has not been installed.	Check that the toner cartridge is fully seated in the machine.
BYPASS JAM	The machine has detected no feed from bypass Tray.	Clear the jam.
DUPLEX JAM	The machine detected a duplex jam in the middle of machine.	Clear the jam.
LINE BUSY	The remote FAX didn't answer	Try again.

## 7-2-2 Tech Mode

The tech mode is used to test certain functions of the machine. The available tests are:

- User mode: Clean drum, Notify toner low
- tech mode: switch test, modem test, SRAM test, DRAM test, ROM test, Pattern test, Clear count, Answer On CNG, Adjust shading, Flash upgrade.

### To enter the Tech Mode:

1. Enter the Tech mode by pressing **Menu, #, 1, 9, 3, 4**. The letter "T" will appear in the top right of the display.
2. In Tech mode, press **Menu**, 'Maintenance [System]' is displayed on the LCD.
3. Press the **Select** key
4. Scroll to the options by pressing **Up** and **Down** navigation key repeatedly until the correct selection is found.
5. Press the **Select** key to initiate the tech mode.
6. Perform step 1 to return to user mode.

## 7-2-2-1 Maintenance Menu Functions

### Dialing Mode

Select the dialing mode according to the user's line status.

- TONE: Electrical type of dial
- PULSE: Mechanical type of dial

### Silence Time

In ANS/FAX mode, after a call is picked up by the answering machine, the machine monitors the line. If a period of silence is detected on the line at any time, the call will be treated as a fax message and the machine begins receiving.

Silence detection time is selectable between limited (about 12 seconds) and unlimited time.

When '12 sec' is selected, the machine switches to receiving mode as soon as it detects a period of silence. When 'unlimited' is selected, the machine waits until the answering operation is concluded even though a period of silence is detected. After the answering operation is concluded, the machine switches to receiving mode.

### Set Fax Level

You can set the level of the transmission signal. Typically, the Tx level should be under -12 dBm.

### CAUTION

*The Send Fax Level is set at the best condition in the shipment from factory. Never change settings arbitrarily.*

### Error Rate

When the error rate is about to be over the setting value, the Baud rate automatically lowers up to 2400 bps to make the error rate remain below the setting value. You can select the rate between 5% and 10%.

### Modem Speed

You can set the maximum modem speed.

Communication is done with modem speed automatically set at lower speed when communicating with the modem with lower speed since communication is done on the standard of the side where modem speed is low for transmission/reception. It is better set 33.6Kbps as default setting.

## Cleaning Drum

This procedure removes excess toner on the OPC drum.

1. Make sure that paper is loaded in the automatic feeder or document glass (platen).
2. Press **Menu**, -> **Up** or **Down** key -> **Maintenance** -> **Select** -> **Up** or **Down** key -> **Clean Drum**
3. Press '**Select**'. The machine automatically feeds a sheet of paper, and prints out. The excess toner on the OPC drum surface is fused to the paper.

## Notify Toner Low

With this feature enabled, when the toner becomes low, the toner low information will be sent to the specified contact point, for example, the service company. After you access this menu, select **on**, and when the LCD prompts, enter the name and the number of the contact point, the customer's FAX number, the model name, and the serial number.

## Switch Test

This test checks the operation of the LCD display and the LED indicators that interface the switches on the operation panel.

## Modem Test

This test causes the machine to generate a particular frequency to verify the operation of the modem and its control circuits.

## SRAM Test

This test is used for checking the Random Access Memory (RAM) on the main PBA. If all memory is working normally, the LCD shows TESTING OK!.

When this testing is carried out, any picture data stored in memory is erased.

## ROM Test

This test mode will display and check the current ROM level in your machine.

## DRAM Test

Use this feature to test the machine's DRAM. The result appears in the LCD display.

If all memory is working normally, the LCD shows << O K >>

## Pattern Test

1. Select **Pattern Test**.
2. There are 4 different pattern tests. Scroll to the options by pressing **Up** or **Down** repeatedly until you find the correct selection.
3. Press **Select** key.

## Adjust Shading

The function is to control to get the optimum scan quality by the specific character of the CIS (Contact Image Sensor) If the copy image quality is unsatisfied, perform the function to check the condition of the print out for checking whether or not having CIS trouble.

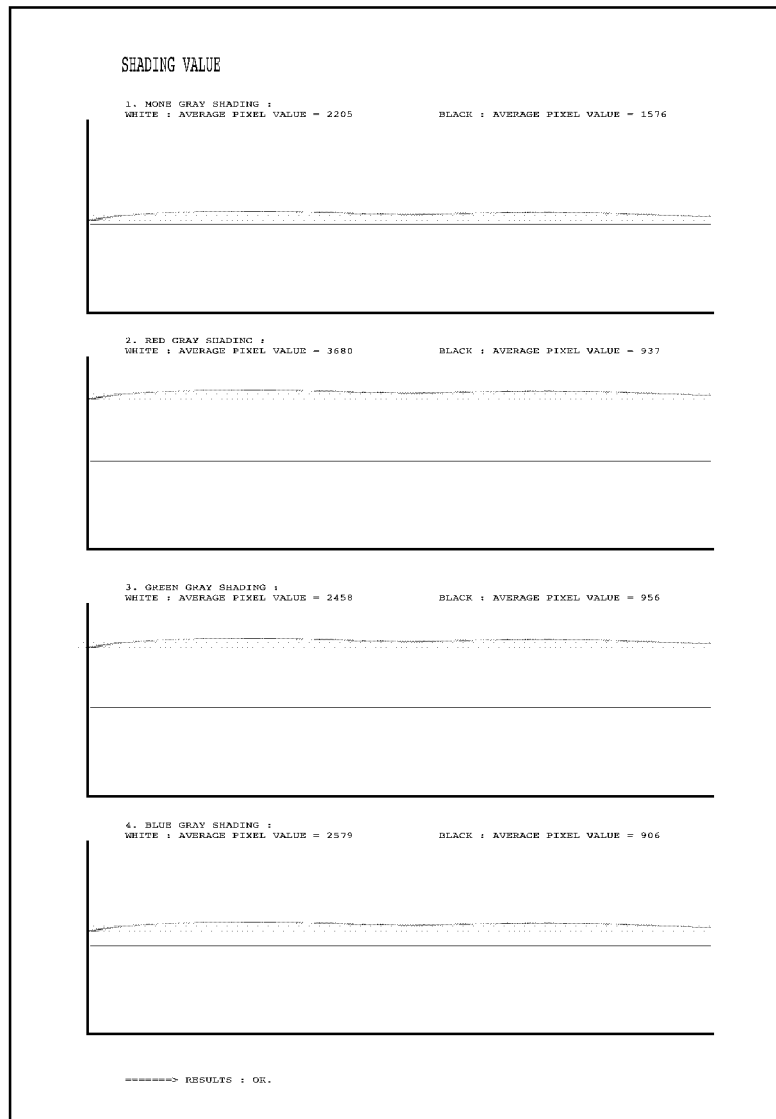
### Method

1. Select [ADJUST SHADING] from the TECH MODE.
2. Insert a clean white original [A4 or Letter Size] into the paper loading part.
3. Original is scanned if pressing the Enter button.
4. If the original scan is completed, message is displayed on the LCD window and CIS SHADING PROFILE is output.
5. If the output image is different from the normal screen, the CIS is poor.

### CAUTION:

1. *Always perform ADJUST SHADING after downloading Firmware. Otherwise, the system may not operate properly.*
2. *Always perform ADJUST SHADING after replacing the CIS.*

3. Always use a clean white paper in ADJUST SHADING (Maximum paper width: A4 or Letter Size). ADJUST SHADING may be performed even in the User Mode but ADJUST SHADING profile is output only in the TECH MODE.



Adjust Shading

## 7-2-2-2 Memory Clear

### Clear All Memory

The function resets the system as its very first condition as setting in at the factory.

This function is needed to operate to reset the system to the initial value when the product is abnormally operated or malfunction. All the values are returned to the default values, and all the information, which set in by user, will be erased.

#### < Method >

1. Select the [MEMORY CLEAR] at the TECH MODE.
2. Push the ENTER button.
3. Select you country.
4. Push the ENTER button then it will be all memory clear.

*NOTE: Always perform the memory clear after replacing the main board. Otherwise, the system may not operate properly.*

### Answer On CNG

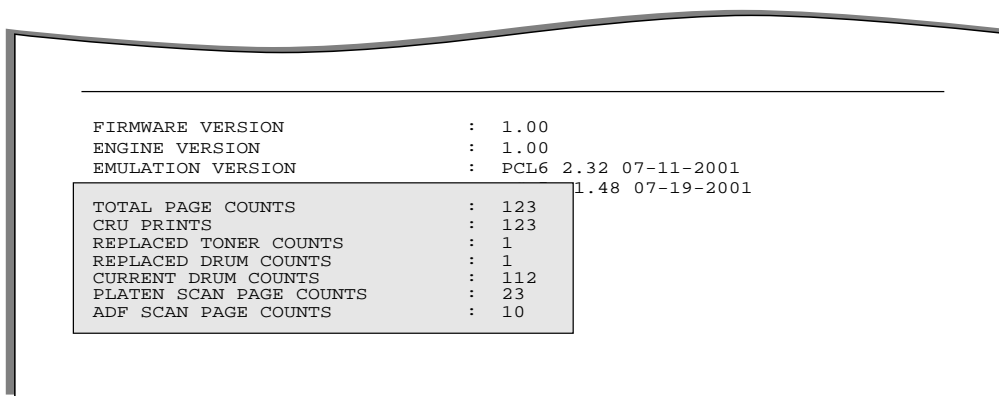
The function is to control the CNG TONE cognition times for entering receiving mode from the AUTO MODE or ANS/FAX MODE

### Clear Count

This function erases information of history such as replacement times of Developing part and OPC drum, total printing pages, scan times, etc.

- The items are in the below section of the System Data List, printed at TECH MODE.
- Password: 1934
- Current Drum Page Count cannot be erased.

It is possible to erase at NEW DRUM function (USER MODE ⇒ MINTENANCE ⇒ NEW DRUM)



< SYSTEM DATA LIST >



### 7-2-4 Engine Test Mode

The Engine Tests Mode supplies useful functions to check conducting condition of engine. It tests the conducting condition of each device and displays the result of the test at the LCD. It is classified in 6. items (0~5), and the functions of items are as bellows.

**To enter the Engine Test Mode.** Press **MENU, #, 1, 9, 3, 1** in sequence, and the LCD briefly displays 'T', the machine has entered service (tech) mode.

#### 7-2-4-1 Diagnostic

No.	Sub No.	Engine test	Remark
0	1	Motor Test	1: On, 2: Off
	2	PTL Test	1: On, 2: Off
	3	Fan Test	1: On, 2: Off
	4	Fuser Test	1: On, 2: Off If its temperature is lower than the Standby (160°C), the fuser is on, but if it is higher than the Standby, the fuser is off.
1	1	LSU Motor Test	1: On, 2: Off
	2	LSU Hsync Test	1: On, 2: Off
	3	LD On Test	1: On, 2: Off
	4	LSU Operation	1: On, 2: Off
2	1	Feed Sensor Test	Sensor On : FEED SENSOR ON Display Sensor Off : FEED SENSOR OFF Display
	2	Exit Sensor Test	Sensor On : EXIT SENSOR ON Display Sensor Off : EXIT SENSOR OFF Display
	3	Cover Sensor Test	Sensor On : COVER SENSOR ON Display Sensor Off : COVER SENSOR OFF Display
	4	1'st CAST Empty Test	Sensor On : 1'st PAPER Empty Display Sensor Off : 1'st PAPER No Empty Display
	5	MP Empty Sen Test	Sensor On : MP PAPER Empty Display Sensor Off : MP PAPER No Empty Display
	6	BIN FULL Sen TEST	Sensor On : BIN FULL SEN ON Display Sensor Off : BIN FULL SEN OFF Display
3	1	1'st CAST Solenoid Test	1: On, 2: Off
	2	MP Solenoid Test	1: On, 2: Off
	3	Duplex Solenoid Test	1: On, 2: Off
4	1	MHV Test	1: On, 2: Off (-1450v)
	2	DevBias Test	1: On, 2: Off (-450v)
	3	THV EN/NEG Test	1: On, 2: Off
	4	THV Test	1: On, 2: Off (1300v)
	5	THV Trigger Test	1: On, 2: Off
5	1	SCF Motor Test	1: On, 2: Off
	2	SCF Solenoid Test	1: On, 2: Off
	3	SCF Paper Empty Test	Sensor On : SCF Paper Empty Display Sensor Off : SCF Paper No Empty Display
	4	SCF Installed Test	SCF installed : SCF READY ON SCF not installed : SCF READY OFF
6	1	All Function Test	For SMD Test, Push up key : Next function All Function : No.0~4

#### 7-2-4-2 Engine Print

This function is used by manufacturing and is not of any use to the Engineer.

#### 7-2-5 Firmware Upgrade

1. Upgrade Local Machine.



- By using Control Centre Application (Parallel & USB).
  - Activate Control Centre 5.0.
  - Select **Firmware Upgrade** Window.
  - Click **Browse** Icon to search the Upgrade Firmware.
  - Click **Upgrade** Icon.
  - The message "Upgrading Firmware" will be displayed.
  - Wait until the machine is initialised, this will happen automatically after completion of the upgrade.
  - Click the **Refresh** icon when the machine has been initialized.
  - The machine is now updated with new firmware.

## 2. Upgrade the Remote Fax.

- Performed on the Local Machine in the Service Center.
- Go to the **Tech Mode** -Search for the Flash Upgrade in Maintenance Item, select **REMOTE**.
- Enter Remote Fax Number to be upgraded.
- Multiple remote FAXs can be upgraded sequentially if you enter the multiple FAX numbers.
- Select **All Remote Fax Number** if required.
- Confirm Input. - Machine will start dialing and send its own image codes to remote **fax** machine(s).
- It will take 10 to 15 minutes to send the image to each remote FAX machine.
- The Remote Fax machine will automatically program the received image on its flash memory.
- If ECM mode is off, or Received Memory is not empty, or machine is being used, the remote upgrade will not be performed.

## 7-3 Scanner

### 7-3-1 Copy

PROBLEM	ITEMS TO BE CHECKED.	HOW TO SOLVE
White copy	<ul style="list-style-type: none"> <li>• Check the scan-cover is not open.</li> </ul>	<ul style="list-style-type: none"> <li>• Ambient light can cause image problems</li> </ul>
	<ul style="list-style-type: none"> <li>• Check shading profile.</li> </ul>	<ul style="list-style-type: none"> <li>• Remake shading profile in the Tech mode.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check white/black reference voltage in Main PBA.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace Main PBA if it is defective.</li> <li>- U16-97 = 3.3V - U16-98 = 3.3V</li> <li>- U16-99 = 1.5V</li> </ul>
	<ul style="list-style-type: none"> <li>• Check the CCD lamp is on when scanning.</li> </ul>	<ul style="list-style-type: none"> <li>• If the CCD is defective, replace it.</li> <li>- CN3-19 is 5.8V when white original copying for R, B and 3.5V for G.</li> </ul>
Black copy	<ul style="list-style-type: none"> <li>• Check for CCD problem in Main PBA.</li> </ul>	<ul style="list-style-type: none"> <li>• Check the CCD harness contacts.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check shading profile.</li> </ul>	<ul style="list-style-type: none"> <li>• Remake shading profile in the Tech mode.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check the CCD problem in Main PBA.</li> </ul>	<ul style="list-style-type: none"> <li>• If the CCD is defective, install a new ELEC/MECH-SCANNER MODULE, PL 2-2-21.</li> <li>- Cn3-19 is 7.3V when idle for R, B, and 5V for G.</li> </ul>
Defective image quality	<ul style="list-style-type: none"> <li>• Check shading profile.</li> </ul>	<ul style="list-style-type: none"> <li>• Remake shading profile in the Tech mode.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check the gap between original and scanner glass.</li> </ul>	<ul style="list-style-type: none"> <li>• A gap greater than 0.5mm can cause a blurred image.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check printing quality.</li> </ul>	<ul style="list-style-type: none"> <li>• See "Print" troubleshooting.</li> </ul>

PROBLEM	ITEMS TO BE CHECKED.	HOW TO SOLVE
Abnormal noise	<ul style="list-style-type: none"> <li>• Check the scanner glass and any mechanical disturbance.</li> </ul>	<ul style="list-style-type: none"> <li>• Check the scanner glass is correctly located and clean, check that the CCD carriage moves smoothly.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check the motor driver in Driver PBA.</li> </ul>	<ul style="list-style-type: none"> <li>• If any driver is defective, replace the main PBA.</li> <li>- U55 or U55-1, 15 = 0V to 24V swing signal when operating.</li> </ul>

### 7-3-2 PC-Scan

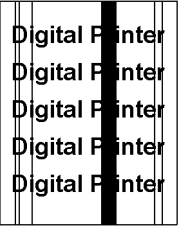
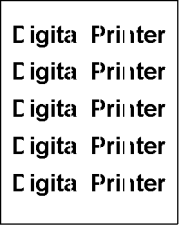
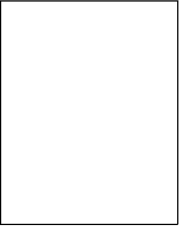

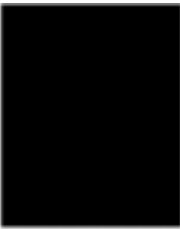
PROBLEM	ITEMS TO BE CHECKED.	HOW TO SOLVE
Scanning error	<ul style="list-style-type: none"> <li>• Check the printer cable.</li> </ul>	<ul style="list-style-type: none"> <li>• Check correct installation, and use standard IEEE1284 cable.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check how TWAIN driver is installed.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove any other scanner driver.</li> <li>• Reboot after reinstallation of the TWAIN driver.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check harness contact.</li> </ul>	<ul style="list-style-type: none"> <li>• Check CN14 contact in Main PBA</li> </ul>
	<ul style="list-style-type: none"> <li>• Check the IEEE1284 signal level.</li> </ul>	<ul style="list-style-type: none"> <li>• If any signal level is defective, install a new Main PBA.</li> <li>- U36-66~74 in Main PBA = 0.8V to 2.4V TTL signal.</li> <li>• If necessary, install a new PBA MAIN-MAIN, PL 8-1 item 19</li> </ul>
Defective image quality	<ul style="list-style-type: none"> <li>• Check shading profile.</li> </ul>	<ul style="list-style-type: none"> <li>• Remake shading profile in the Tech mode.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check the gap between original and scanner glass.</li> </ul>	<ul style="list-style-type: none"> <li>• A gap greater than 0.5mm can cause a blurred image.</li> </ul>
Abnormal noise	<ul style="list-style-type: none"> <li>• Check the scanner glass and any mechanical disturbance.</li> </ul>	<ul style="list-style-type: none"> <li>• Check the scanner glass is correctly located and clean, check that the CCD carriage moves smoothly.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check the motor driver in Driver PBA.</li> </ul>	<ul style="list-style-type: none"> <li>• If any driver is defective, replace the Main PBA.</li> <li>- U55 or U56-19 = 0V to 24V swing signal when operating.</li> </ul>




## 7-4 FAX


### 7-4-1 FAX/Telephone Precautions

PROBLEM	ITEMS TO BE CHECKED.	HOW TO SOLVE
TEL LINE CANNOT BE ENGAGED (NO DIAL TONE)	<ul style="list-style-type: none"> <li>• When you press the “OHD” key:</li> <li>a) Check line cord connection.</li> <li>b) Check MAIN LIU harness, and CN1(LIU PBA).</li> <li>c) Check relay operation of LIU PBA: Is the control signal of CN20-7(main) low?</li> </ul>	<ul style="list-style-type: none"> <li>a) Insert plug into the socket named “line”.</li> <li>b) Replace defective parts.</li> <li>c) Replace main PBA IF the control signal of CN20-7(main) is high. Replace LIU PBA if high but phone line cannot be connected.</li> </ul>
Cannot MF dial	<ul style="list-style-type: none"> <li>• Check CN20 (main PBA), main-LIU harness, and CN1 (LIU PBA)</li> </ul>	<ul style="list-style-type: none"> <li>• Replace defective parts.</li> </ul>
MF dial is possible but not DP dial.	<ul style="list-style-type: none"> <li>• Check DP control signal of CN20-11 of MAIN PBA and the circuit around R15. U6 and Q2 of LIU PBA.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace LIU PBA.</li> </ul>
Defective FAX transmission	<ul style="list-style-type: none"> <li>• Check CN20 (main PBA), main LIU harness, and CN1(LIU PBA).</li> <li>• Is the external phone off the hook?</li> <li>• Check ‘hook off’: Refer to ‘TEL LINE CANNOT BE ENGAGED’ above.</li> <li>• Check the control signals of CN20-11.</li> <li>• Check transmission path: Check output of CN20-3.4 and T2-4(LIU PBA).</li> <li>• Check reception path: Check output CN1-1 (LIU PBA) and input of CN20-1(main PBA).</li> </ul>	<ul style="list-style-type: none"> <li>• Replace defective parts.</li> <li>• Replace LIU PBA if low.</li> <li>• Refer to ‘TEL LINE CANNOT BE ENGAGED’ above.</li> <li>• Replace main PBA, if the signals of CN8-11 (MAIN PBA) is low.</li> <li>• Replace main PBA, if abnormal.</li> <li>• Replace LIU PBA if CN1-1(LIU PBA) is not confirmed. Replace main PBA if CN20-1(MAIN PBA) is not confirmed.</li> </ul>
Defective automatic FAX reception	<ul style="list-style-type: none"> <li>• Is the ring checked? Check ring pattern at CN1-9 (LIU PBA).</li> <li>• Refer to ‘Defective FAX Transmission.’</li> </ul>	<ul style="list-style-type: none"> <li>• Replace LIU PBA if it cannot be checked.</li> <li>• Refer to ‘Defective FAX Transmission’.</li> </ul>

## 7-5 Print Quality

Error Status	Check	Solution
Vertical black line and band 	1. Damaged blade of Toner cartridge 2. LSU	1. Change Toner cartridge 2. Replace LSU
Vertical white line 	1. LSU window contamination 2. Toner cartridge	1. Clean LSU window 2. If not LSU, change Toner cartridge.
No image 	1. Seal tape is removed? 2. GND OPC is well grounded?  3. LSU running well? 4. Biss voltage is normal? 5. Low toner?  6. Is there video data from Main PBA	1. Remove seal tape 2. Measure the resistance between frame ground and the ground spring attached to the frame. If necessary, detach cabinet, to correct the ground problem 3. Adjust LSU or replace it 4. Normal Dev bias = -350V 5. Shake toner cartridge and print. If there is a small improvement, the toner is empty, install new toner cartridge/ 6. Test engine test pattern, replace Main PBA
Light image 	1. Check seal tape removing 2. LSU light power normal?  3. Enough toner? 4. High charger voltage? 5. Lower bias voltage 6. Contamination of high voltage contact.	1. Check and remove tape 2. LSU light power check is difficult. Compare with new one and check. 3. Check toner and developer counter 4~5. Measure all high voltage outputs.  6. Leaking toner can cause bad electrical contact and increase contact resistance. Clean contaminated area.
Dark image 	1. LSU light power normal? 2. Bias voltage output is high? 3. Video data is always supplied?	1. Check the rated level and replace. 2. Set to power rating. 3. Replace defective board.

Error Status	Check	Solution
Background 	1. High voltage output is normal? 2. C/R of Toner cartridge is contaminated?	1. Adjust to the rated value. 2. Replace Toner cartridge.
Ghost 	1. High voltage output. 2. Pre-Transfer Lamp. 3. Bad high voltage contact.	1. Check every high voltage. 2. Check the turn-on PTL, LED crash. 3. Clean the inside of the machine or replace toner cartridge.
Stains on back of paper	1. Contamination of transfer roller. 2. Stains of paper path. 3. Pressure roller contamination.	1. Clean the transfer roller with vacuum cleaner. 2. Clean the area of paper path with cloth or air cleaner. 3. Remove fuser and replace it.
Poor Fusing	1. Use recommended paper? 2. Check fusing temperature. 3. The machine was under the low temperature for a long time?	1. Should use recommended paper. 2. Check engine controller board. If you have no thermometer, measure the thermistor voltage to CPU, If $2.3V \pm 5\%$ in printing CPU works well. Then, disassemble fuser and check the thermistor contact and thermistor. 3. Re-check after putting the machine in a warm place for 2 hours
Partial blank image (not periodic)	1. Toner is low? 2. The toner cartridge is out of position?	1. Replace Toner cartridge. 2. Check and adjust.
Partial blank image (periodic)	1. Developer roller scar or particle (repeated every 94mm). 2. Transfer roller scar or particle (repeated every 47mm).	1. Replace toner cartridge. 2. Replace transfer roller.
Different image density (left and right) 	1. Charge roller's pressure force unbalanced 2. Dev. roller and OPC or Dev. roller and blade's pressure force unbalance 3. Transfer roller's pressure force unbalanced each side	1~2. Change toner cartridge 3. Check left and right spring of transfer roller and the spring pressing the developer inside the machine

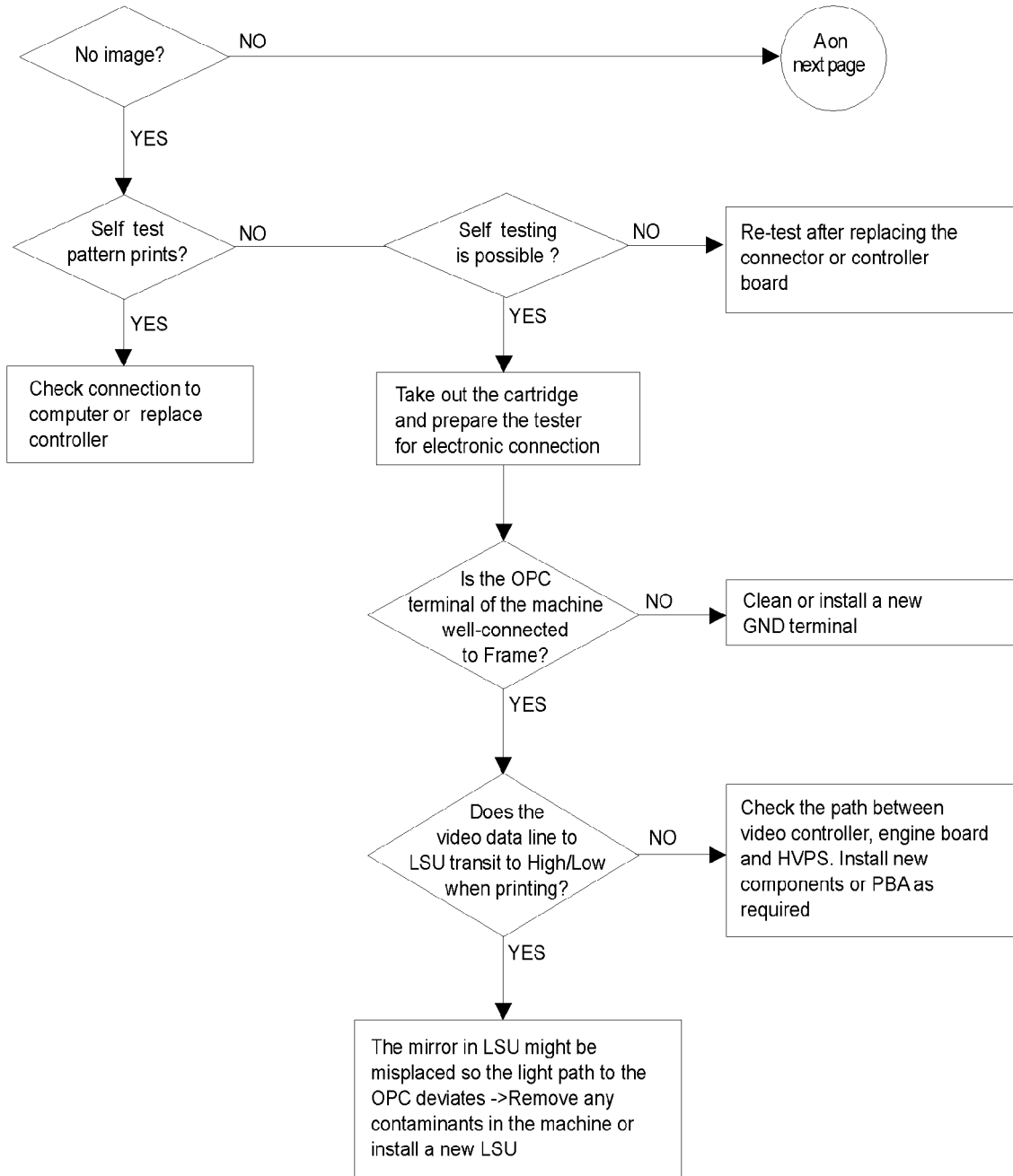
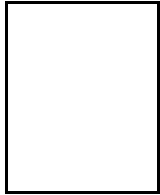
Error Status	Check	Solution
Horizontal band 	<ol style="list-style-type: none"> <li>1. Unstable high voltage contact</li> <li>2. Charge roller's contamination</li> <li>3. Contamination of heat roller</li> <li>4. Malfunction of LSU</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean each contact and check good contact</li> <li>2. Clean charge roller</li> <li>3. Replace fuser unit</li> <li>4. Check Main PBA.</li> </ol>

### Abnormal Image Printing and Defective Roller

If abnormal image prints periodically, check the parts shown below.

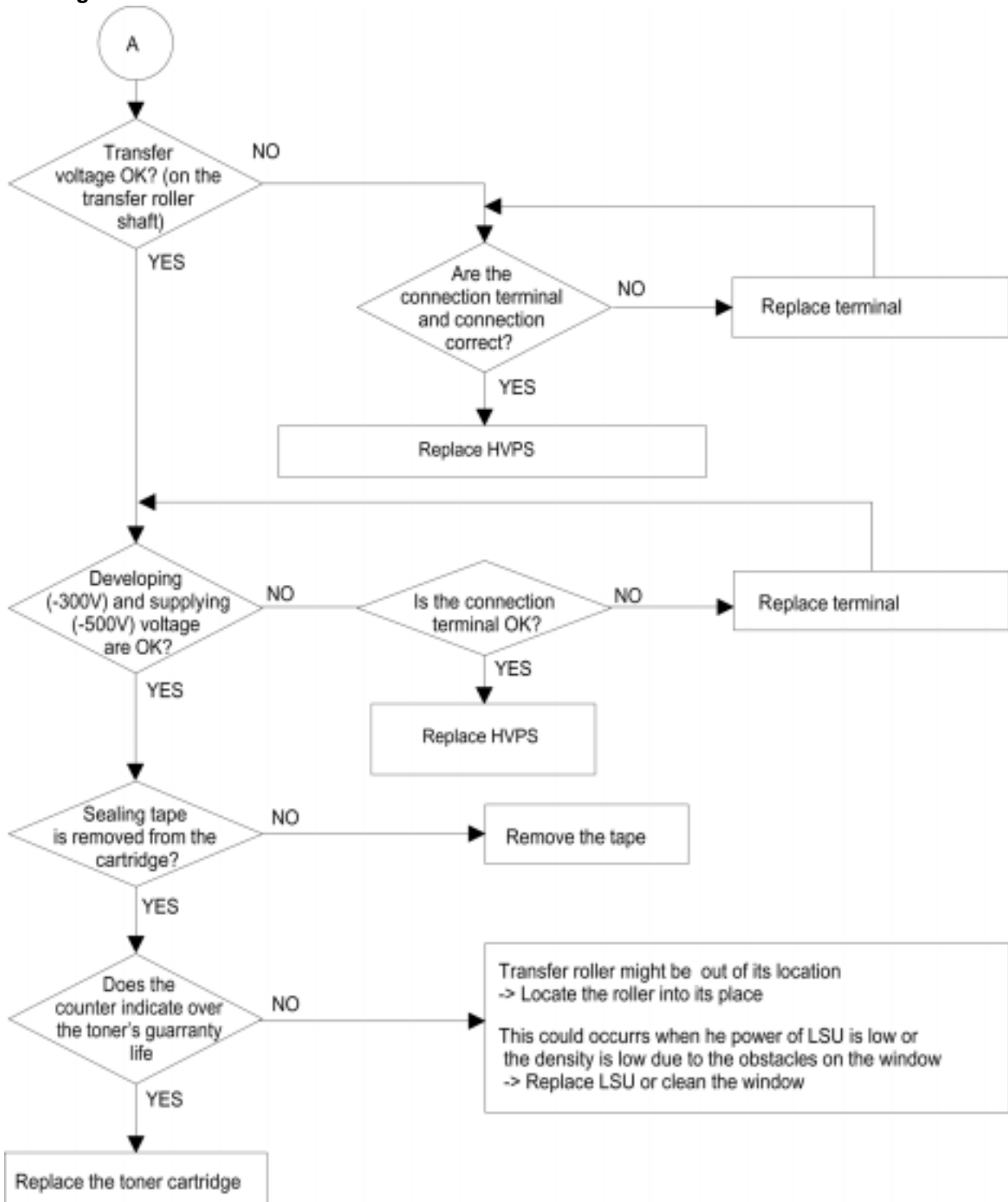
NO	Roller	Abnormal image period	Kind of abnormal image
1	OPC Drum	94.3 mm	White spot. Black spot
2	Charge Roller	37.7 mm	White spot. Black spot
3	Supply Roller	35.8 mm	Horizontal dark band
4	Developer Roller	44.8 mm	Horizontal dark band
5	Transfer Roller	57.8 mm	Black side contamination/transfer fault
6	Heat Roller	82.5 mm	Black spot, White spot
7	Pressure Roller	78.5 mm	Black side contamination

No Image Part 1

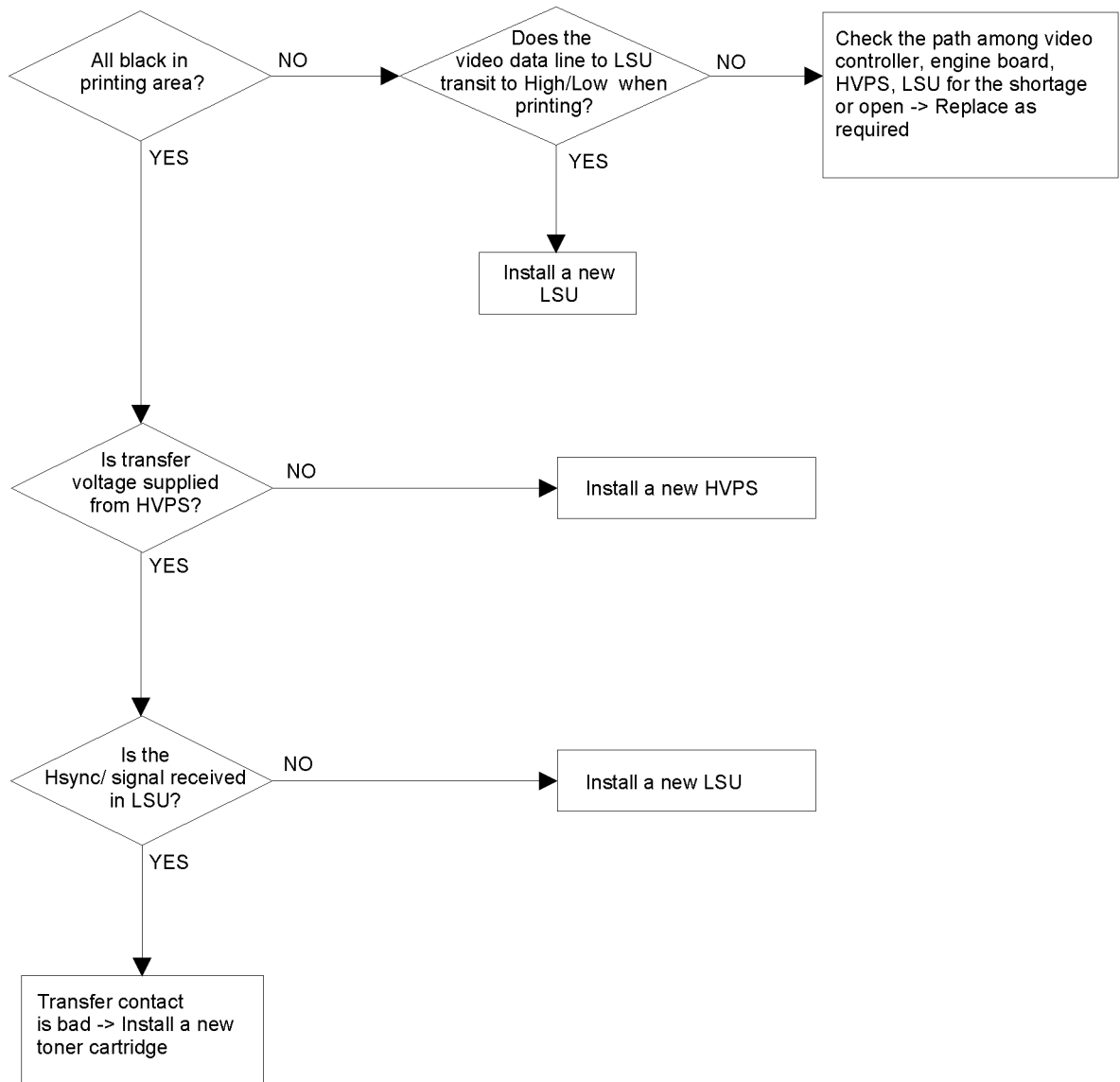
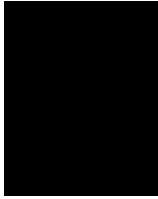




## No Image Part 2

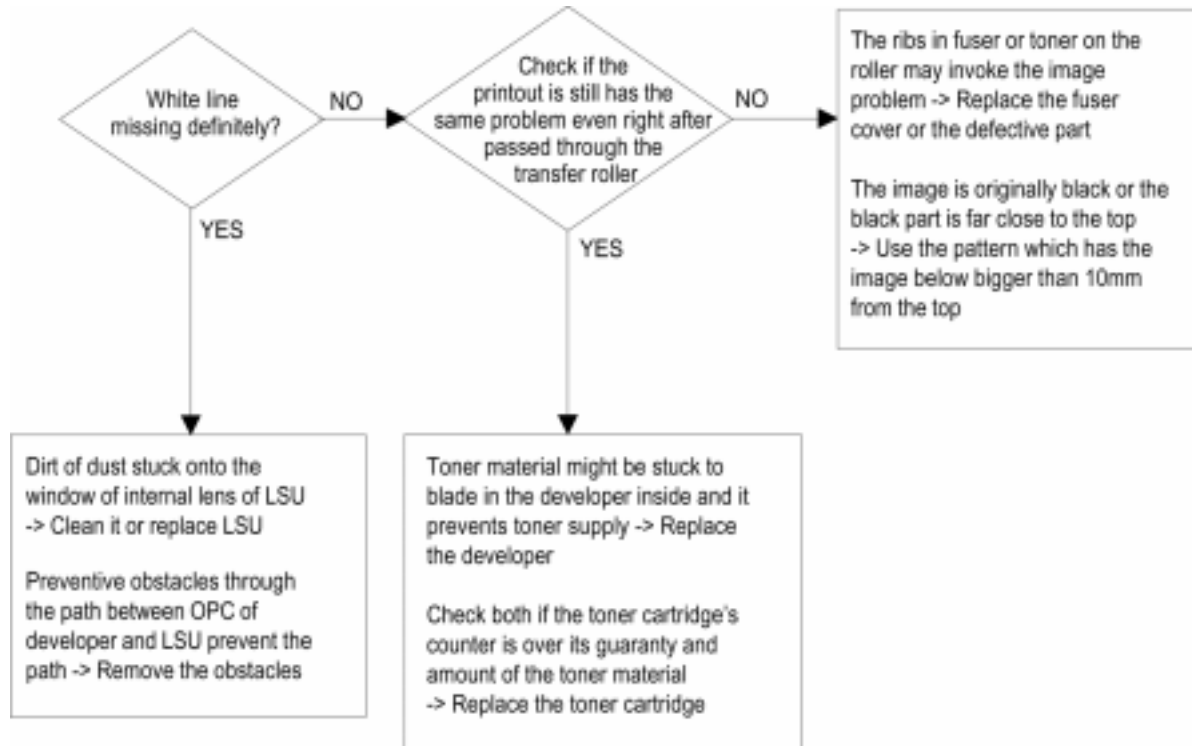


All Black

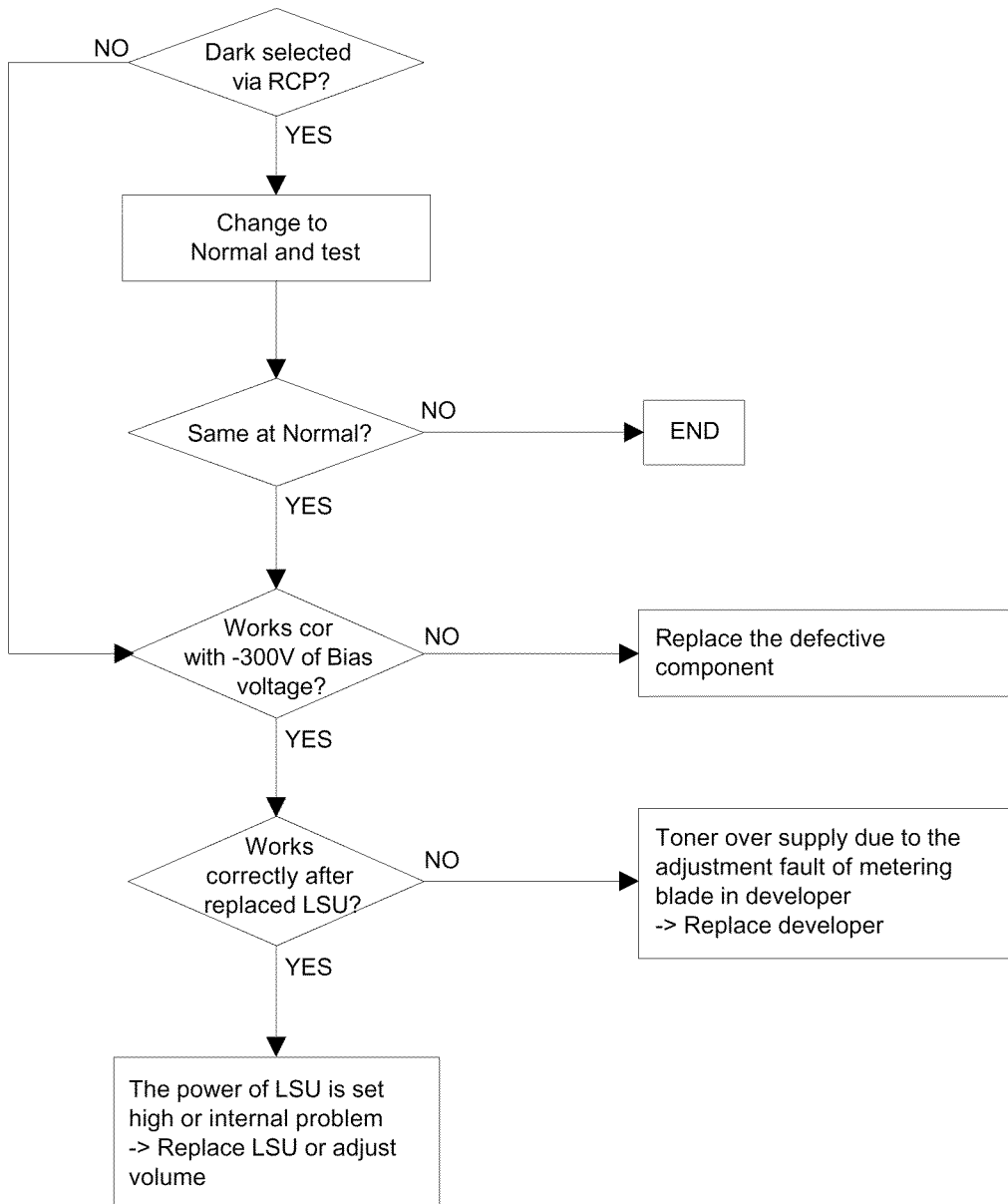
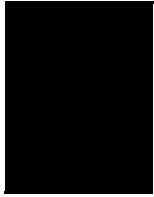


## Vertical White Line (Band)

Digital Printer  
 Digital Printer  
 Digital Printer  
 Digital Printer  
 Digital Printer

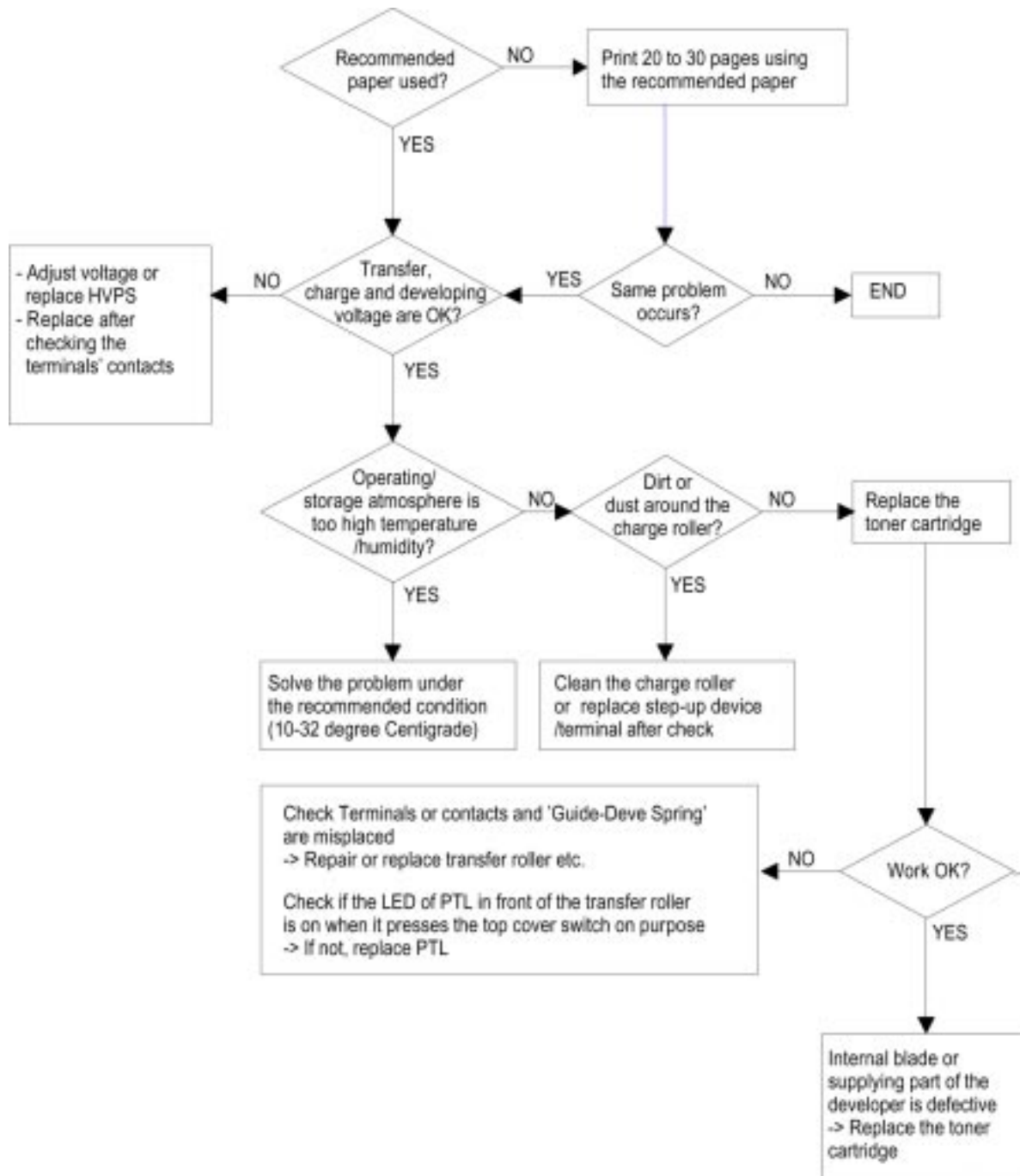


### Dark Image

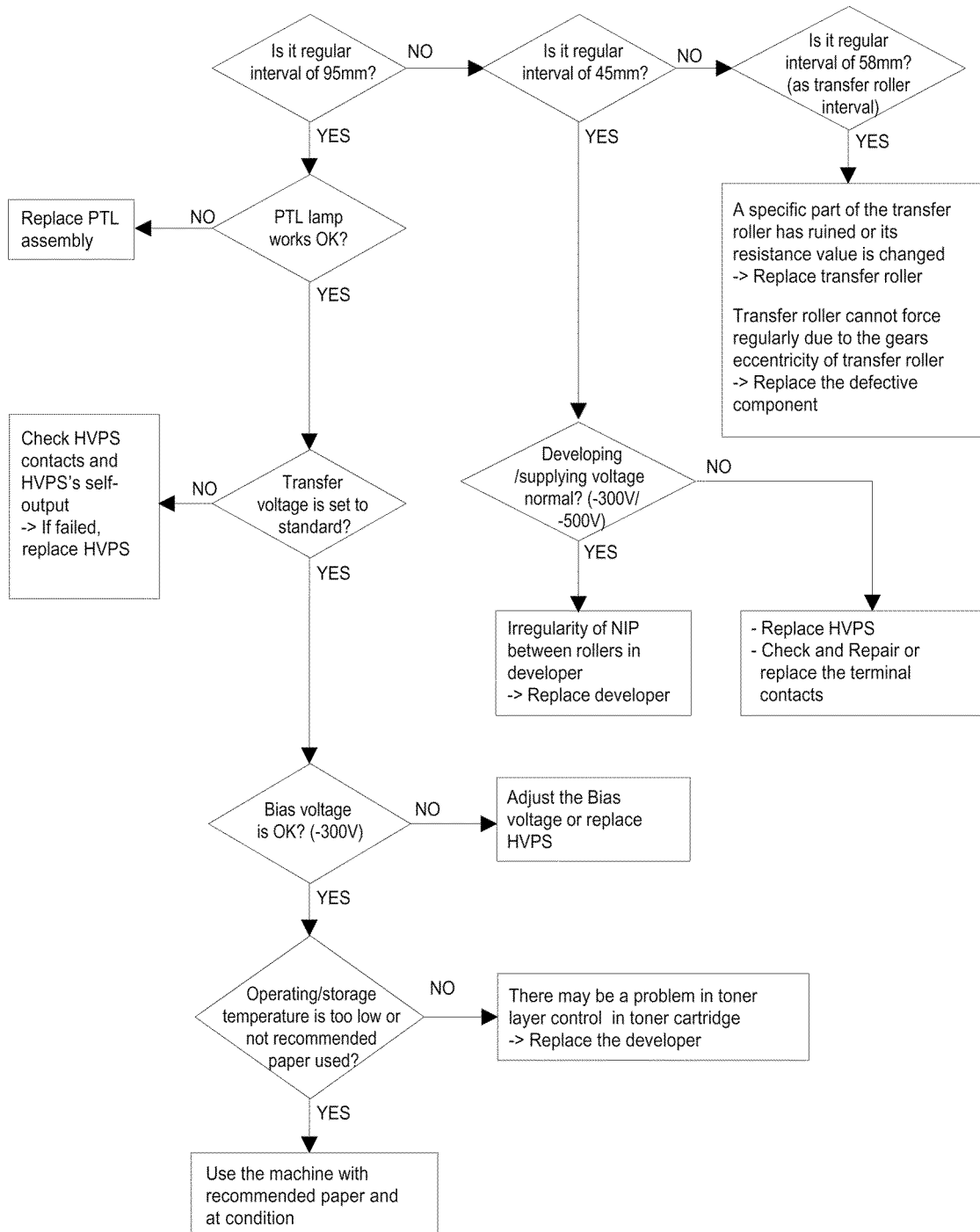


Background

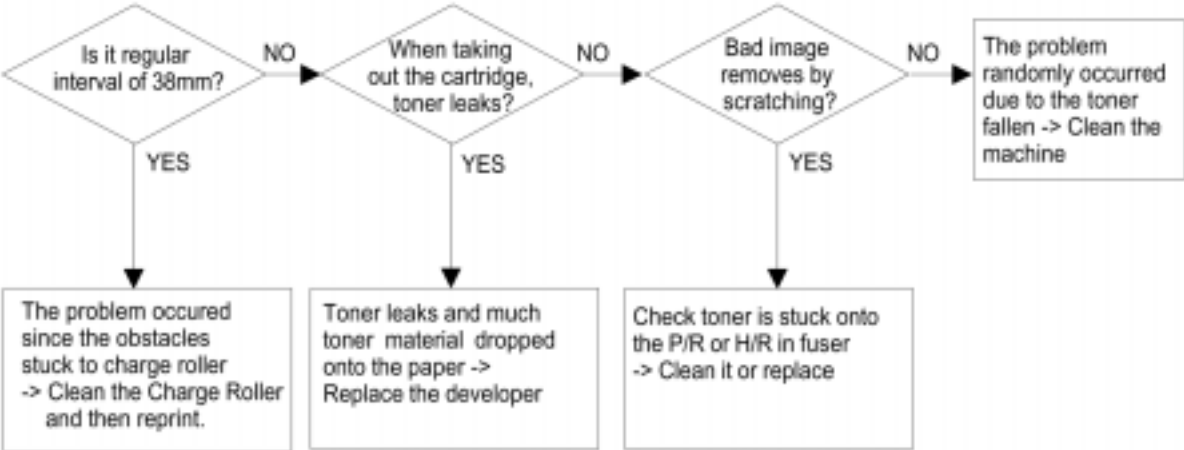
Digital Printer  
 Digital Printer  
 Digital Printer  
 Digital Printer  
 Digital Printer



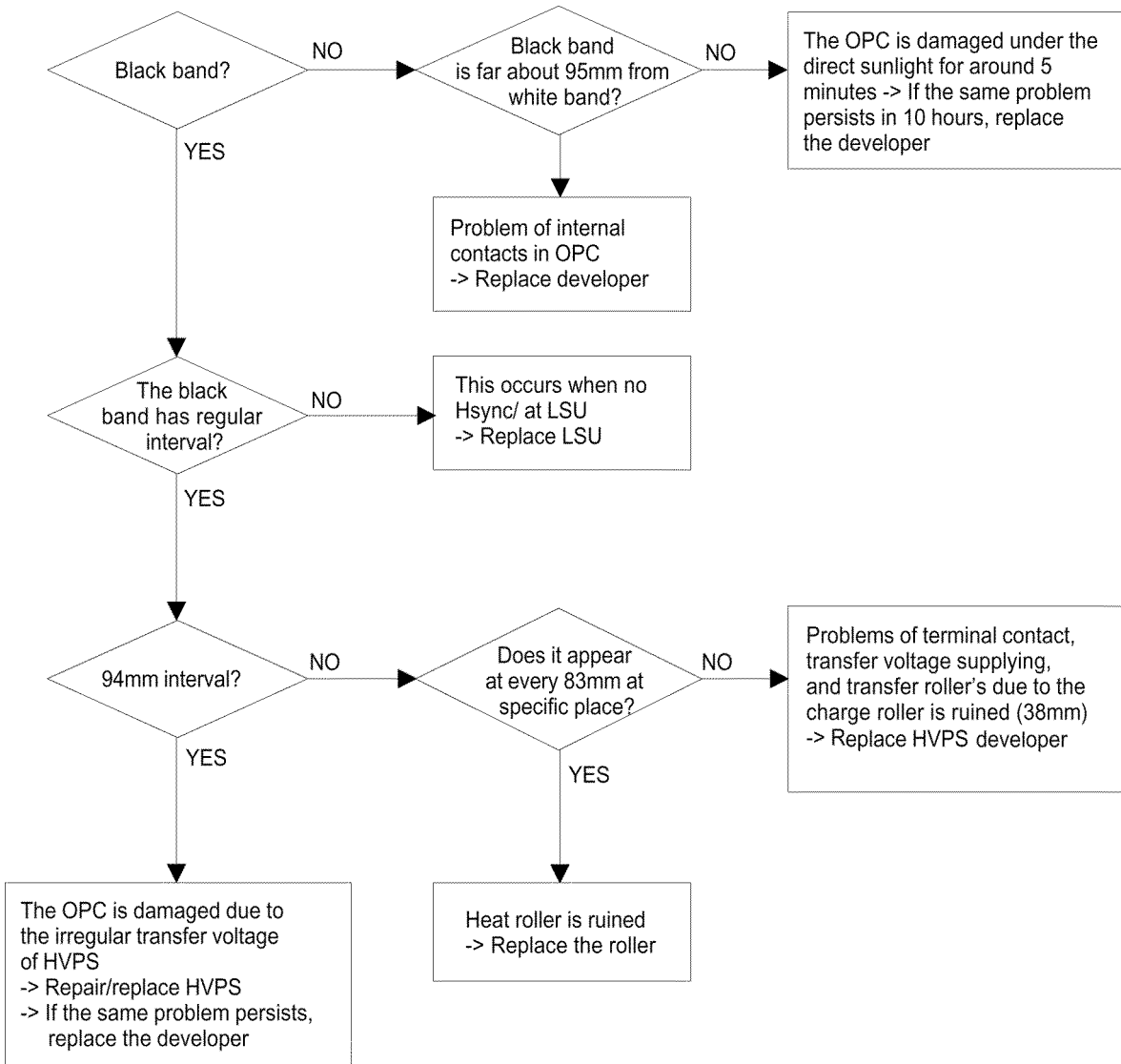
Ghost



Black Spot



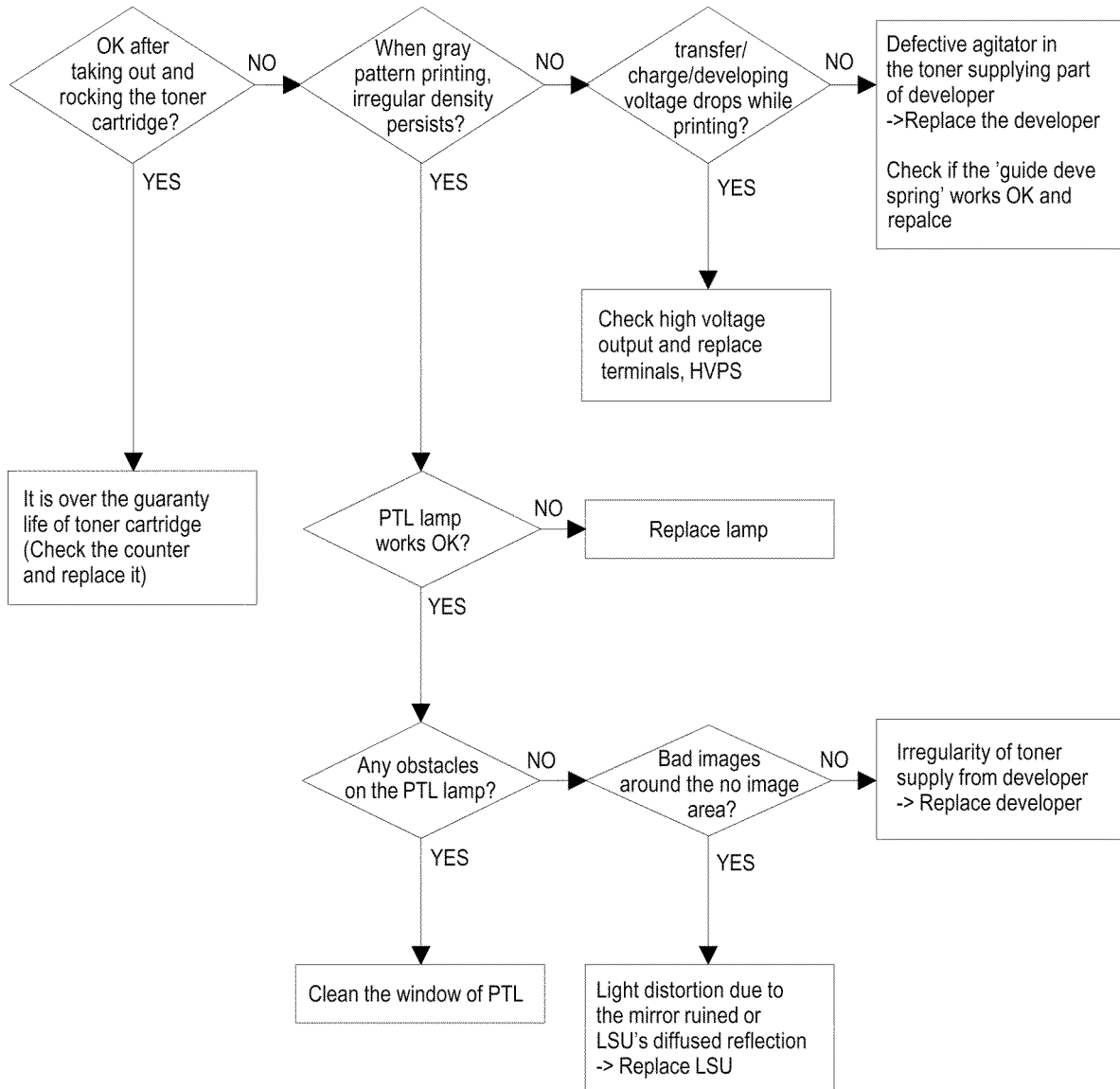
Horizontal Band





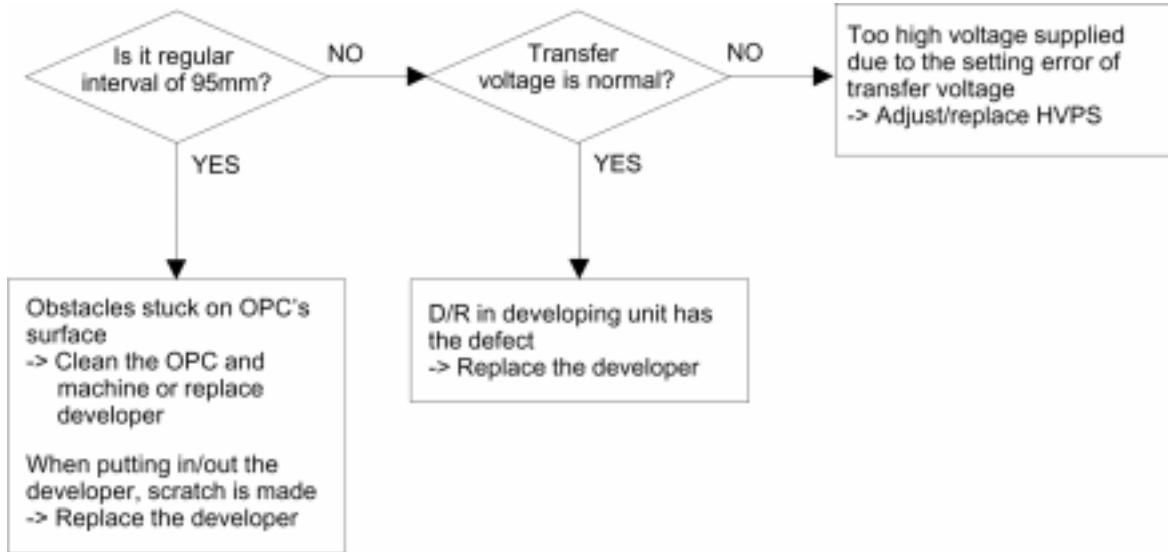
**Irregular Density**

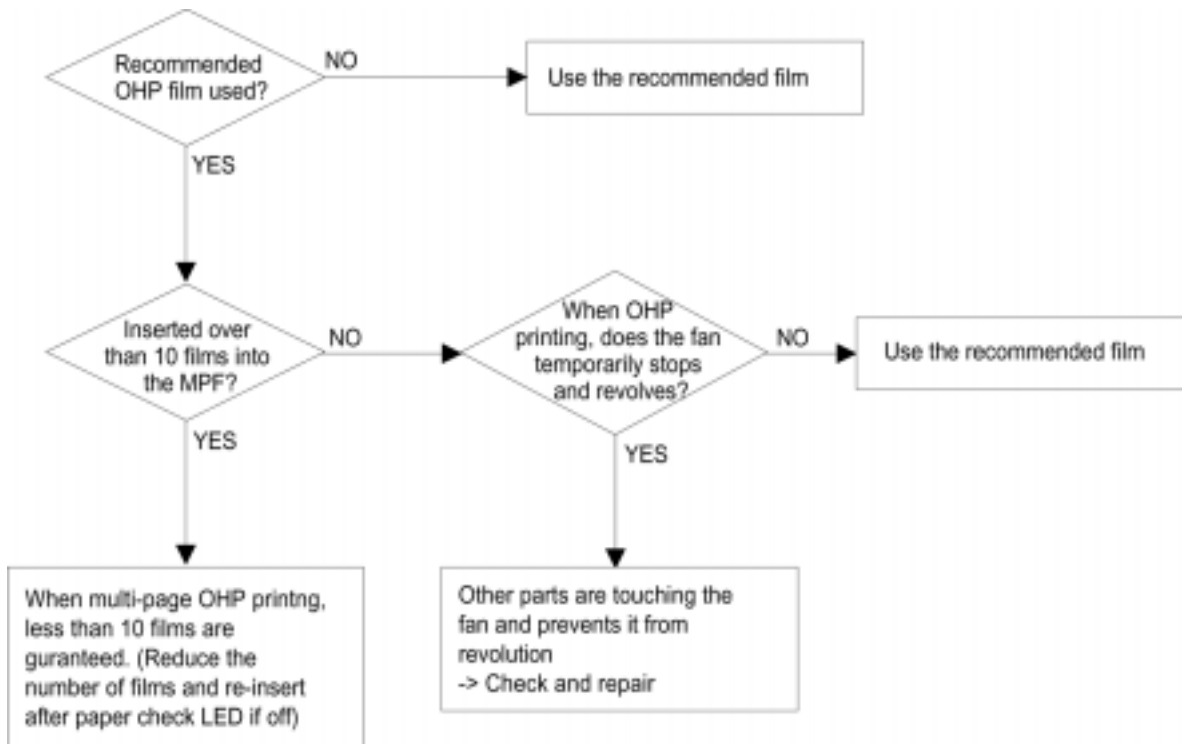
Digital Printer  
 Digital Printer  
 Digital Printer  
 Digital Printer  
 Digital Printer



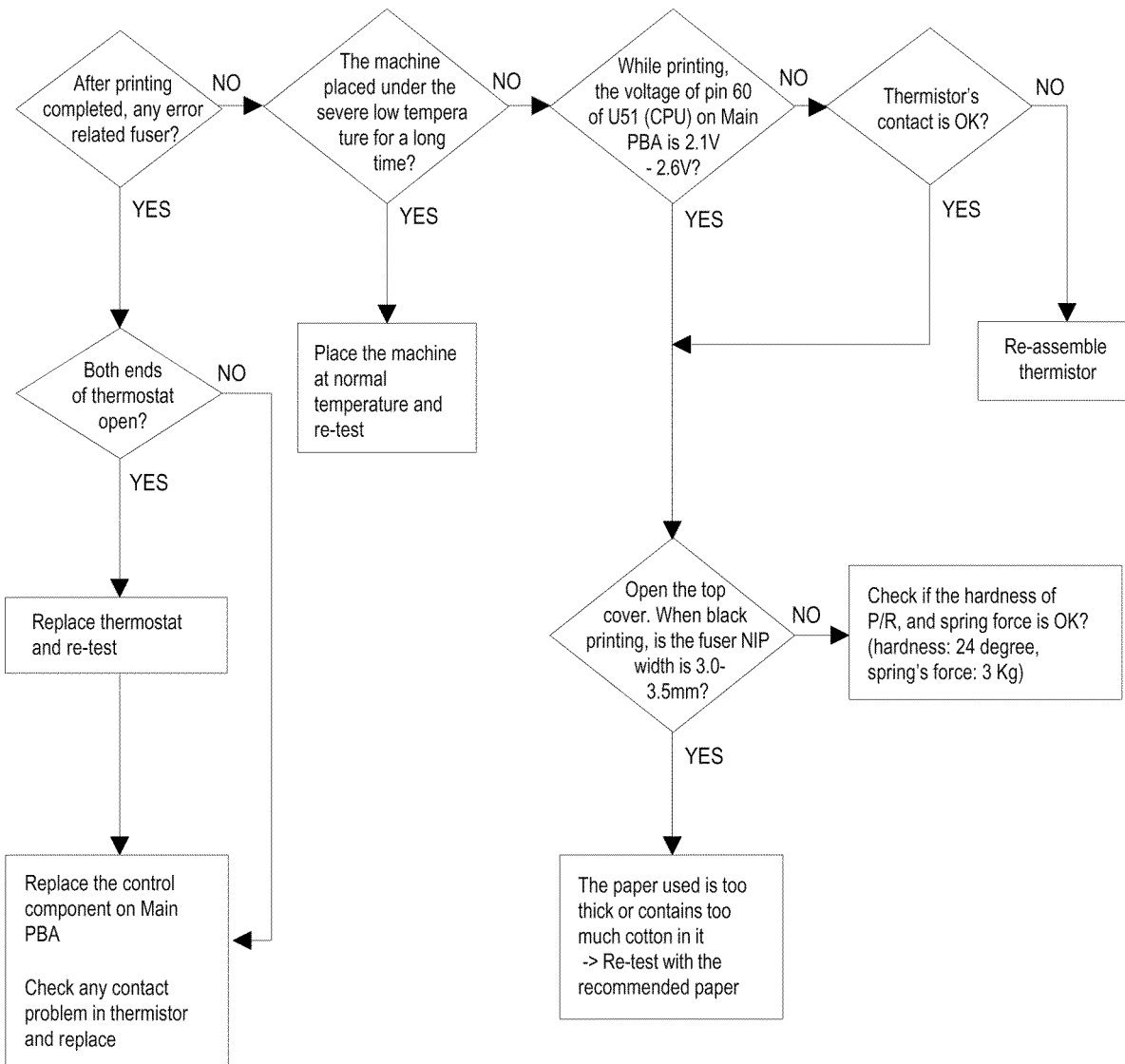
### White Spot

Digital Printer  
Digital Printer  
Digital Printer  
Digital Printer  
Digital Printer



**Trailing Edge Disturbance When Printing Transparencies**

Poor Fusing



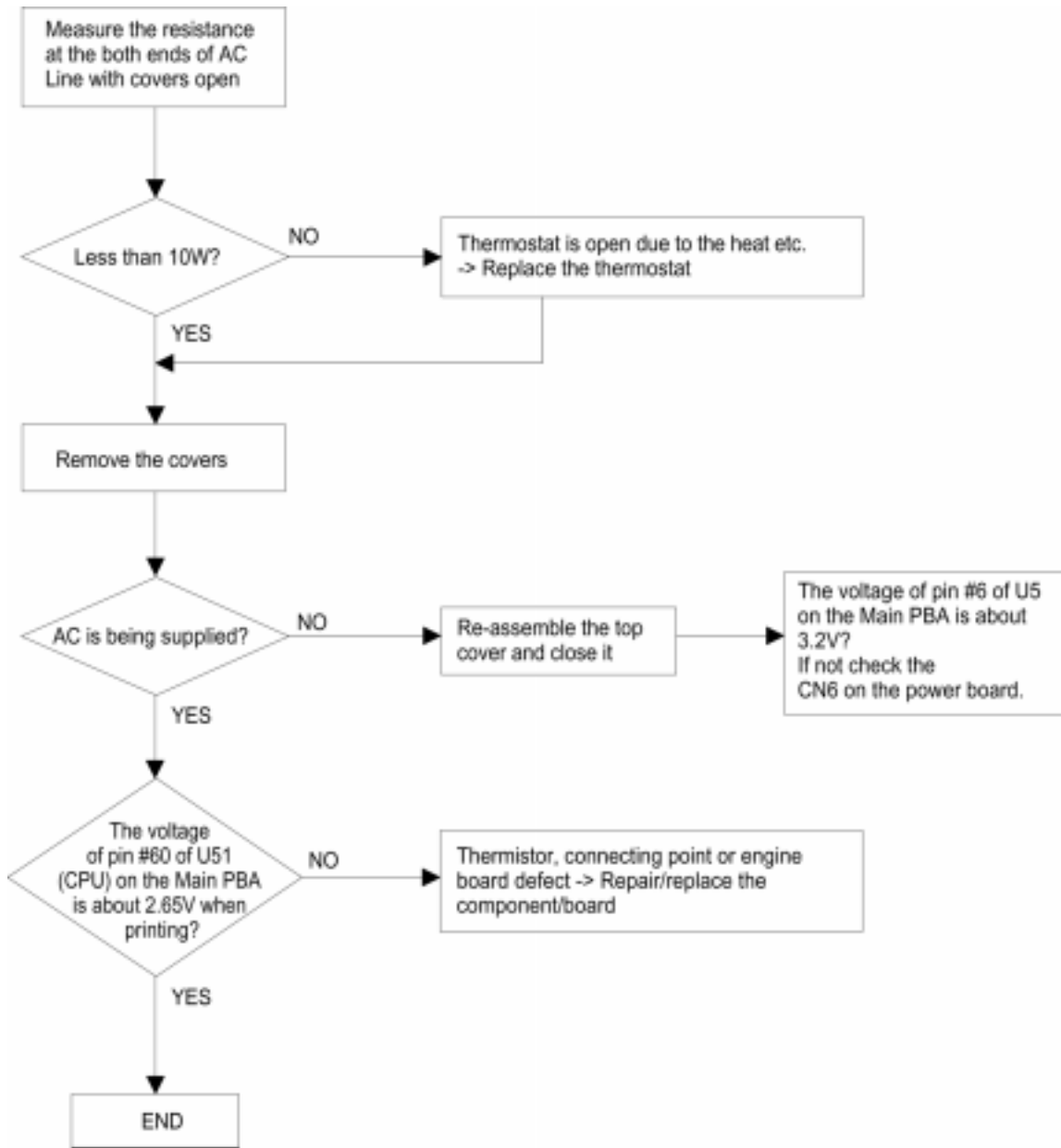
## 7-6 Malfunction

Error Status	Check	Solution
No power	<ol style="list-style-type: none"> <li>1. Check the power supply to the machine.</li> <li>2. Check fuse F1 open.</li> </ol>	<ol style="list-style-type: none"> <li>1. If power supply differs from machine spec. contact the dealer.</li> <li>2. Install a new fuse F1.</li> </ol>
Fuser Error	<ol style="list-style-type: none"> <li>1. Thermostat open.</li> <li>2. AC wire open.</li> <li>3. Thermistor wire open.</li> <li>4. Main PBA.</li> </ol>	<ol style="list-style-type: none"> <li>1. Detach AC connector and test for an open circuit across thermostat, if necessary install a new thermostat.</li> <li>2. Install new wiring.</li> <li>3. Install new wiring.</li> <li>4. Install a new Main PBA.</li> </ol>
Cover open	<ol style="list-style-type: none"> <li>1. Check the lever is pressed when the top cover is closed.</li> <li>2. Micro switch's contact.</li> <li>3. CPU and related circuit.</li> </ol>	<ol style="list-style-type: none"> <li>1, 2 and 3. Open top cover and press the lever. If CPU detects cover close, check for mechanical problem in top cover and lever assembly. If not there is an electrical problem.</li> </ol>
Jam 0	<p>Check where Jam 0 happens.</p> <ol style="list-style-type: none"> <li>1. Paper is not picked up.</li> <li>2. Paper is located in feed sensor.</li> <li>3. Jams when inserting specific papers such as envelope into the MPF.</li> <li>4. Jams when inserting specific papers such as envelope into the Manual Feeder.</li> <li>5. The stacker extender is unfolded.</li> <li>6. The adjustable guide can grip the paper.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether solenoid is working or not by using Engine Test Mode</li> <li>2. Check the operation of the feed sensor. Check if it is misplaced with paper width sensor.</li> <li>3. Re-try using fewer sheets of paper. <ul style="list-style-type: none"> <li>•Fan the paper and align.</li> <li>•Turn the paper stack.</li> </ul> </li> <li>4. Turn the paper stack <ul style="list-style-type: none"> <li>•Use paper as recommended for manual feeding.</li> <li>•When loading, ensure the paper detect sensor senses loading</li> </ul> </li> <li>5. When using long paper, use the stacker extender</li> <li>6. Adjust guide to fit the paper width</li> </ol>
Jam 1	Paper is jammed just after fuser unit.	<ol style="list-style-type: none"> <li>1. This is mainly caused by double feeding. Check paper is well stacked in feeder.</li> <li>2. Check the mechanical actuation of the feed sensor. Check the electrical operation of feed sensor using the Engine Test Mode.</li> <li>3. Check exit operation. Remove jam and check actuator moves freely by hand. If actuator is too stiff, paper can wrap around the heat roller. Install new parts if necessary.</li> </ol>
Jam 2	<p>Check where Jam 2 happens</p> <ol style="list-style-type: none"> <li>1. Paper is curled and cannot exit.</li> <li>2. Paper is curled in the exit cover.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the paper jam and check for paper path obstructions</li> <li>2. Check the ribs of exit cover for obstructions to the paper path, clean the ribs or install a new cover.</li> </ol>

<b>Error Status</b>	<b>Check</b>	<b>Solution</b>
Jam 2 at face-up tray	<ol style="list-style-type: none"> <li>1. Tried to print and stack thick paper in the face-up tray.</li> <li>2. Tried to print and stack thin paper in the face-up tray.</li> </ol>	<ol style="list-style-type: none"> <li>1. When using thick paper such as envelope, card stock, label and transparencies, one-sheet printing is recommended.</li> <li>2. Face-down tray is recommended for thin paper.</li> </ol>
Jam 2 at face-down tray	<ol style="list-style-type: none"> <li>1. Face down tray is full.</li> <li>2. Paper curls in the face down tray.</li> </ol>	<ol style="list-style-type: none"> <li>1. Empty the face down tray.</li> <li>2. Open the cover front and check that the roller and spring, are correctly located.</li> </ol>
Clutch error	<ol style="list-style-type: none"> <li>1. Check the solenoid spring.</li> <li>2. Check the armature assembly/cushion</li> <li>3. Check the harness and connectors to the clutch.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the spring is expanded or not.</li> <li>2. Check for the correct assembly of the armature.</li> <li>3. Install new parts as necessary.</li> </ol>
High voltage error	<ol style="list-style-type: none"> <li>1. Check the terminal output voltage</li> <li>2. Check HVPS</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the toner cartridge, open the cover and press cover open switch lever. Measure the voltage with high voltage probe during print cycle. If the voltage is normal, install a new toner cartridge.</li> <li>2. Disassemble the left side cover, and check HV of the solder side of HVPS, if necessary, install a new HVPS.</li> </ol>
Feeding obstacles	<ol style="list-style-type: none"> <li>1. Check for paper path obstructions.</li> <li>2. Does the plate-knock-up prevent paper feeding.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clear obstructions from the paper path.</li> <li>2. Turn the power off and on. Open and close the Top cover to return to the original state.</li> </ol>
Skew	Is the width guide adjusted to the paper width?	Correctly adjust the width guide.
Stacking	<ol style="list-style-type: none"> <li>1. Took out the Stacker extender to support long papers?</li> <li>2. Too much paper in the stacker</li> <li>3. Face-up stacker does not neatly stack the papers and stack not in order.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use extender as per the paper length.</li> <li>2. The Face-up stacker normally can hold 100 pages when using 75gsm, however, stacking capacity will be lower with thicker paper.</li> <li>3. Face-down stacking is recommended for specific papers and one-sheet feed.</li> </ol>
Engine Error	1. Check CBF Harness (Main PBA to LSU), CN7 on WCP421, CN1 on F12.	Refer to troubleshooting "ENGINE ERROR".
Document jam	Document is not picked up in ADF	<ol style="list-style-type: none"> <li>1. Check document is correctly stacked in ADF</li> <li>2. Check and remove any staples or clips from the documents</li> <li>3. Do not exceed recommended quantity of documents</li> </ol>
	Document has stopped after it has fed into the ADF	<ol style="list-style-type: none"> <li>1. Check the operation of the Reg. sensor</li> <li>2. Check the operation of the Feed Roller</li> </ol>
	Does the document curl upon exit	<ol style="list-style-type: none"> <li>1. Check the document path in the ADF</li> <li>2. Check the ADF is correctly assembled</li> </ol>

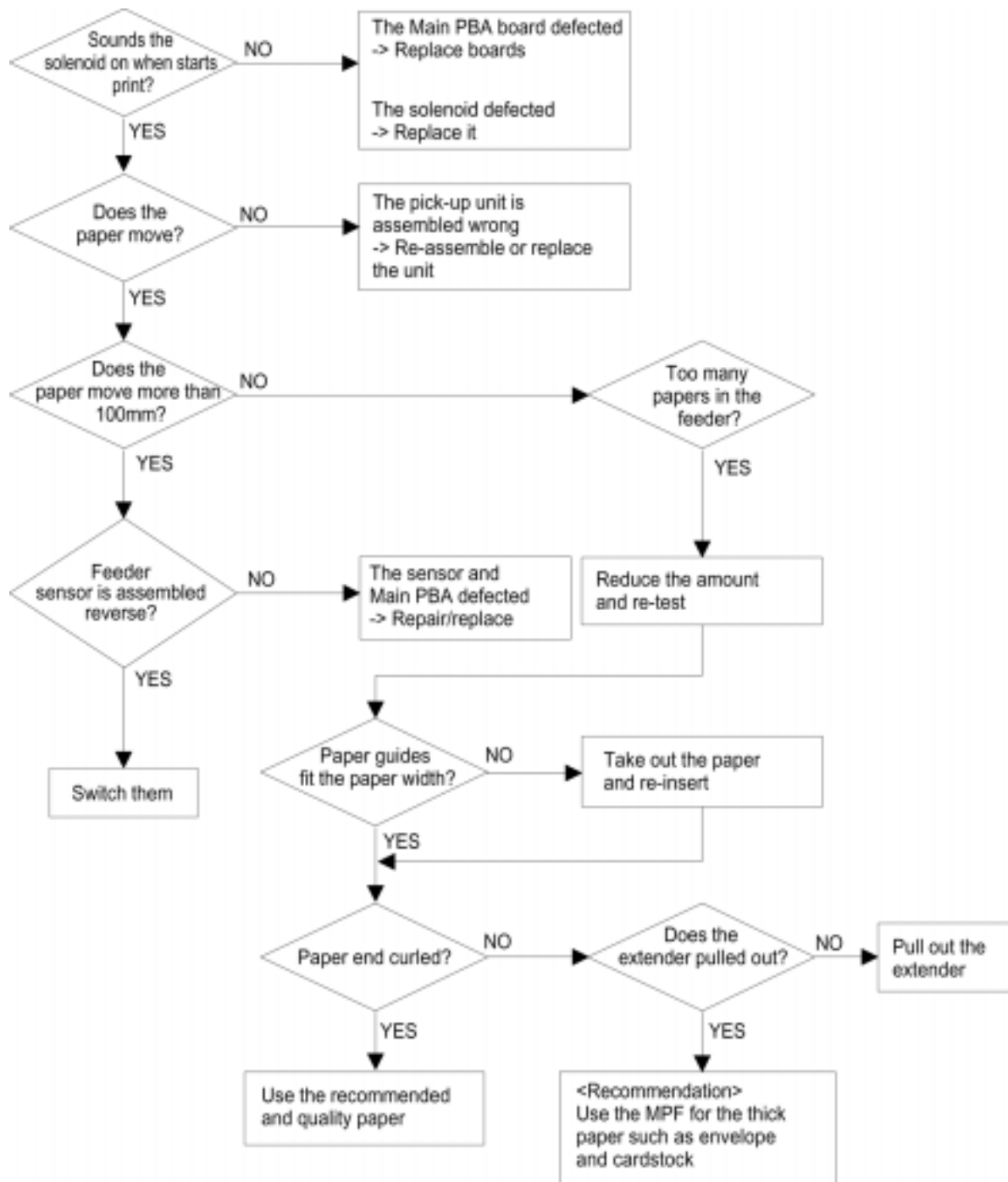


### Fuser Error

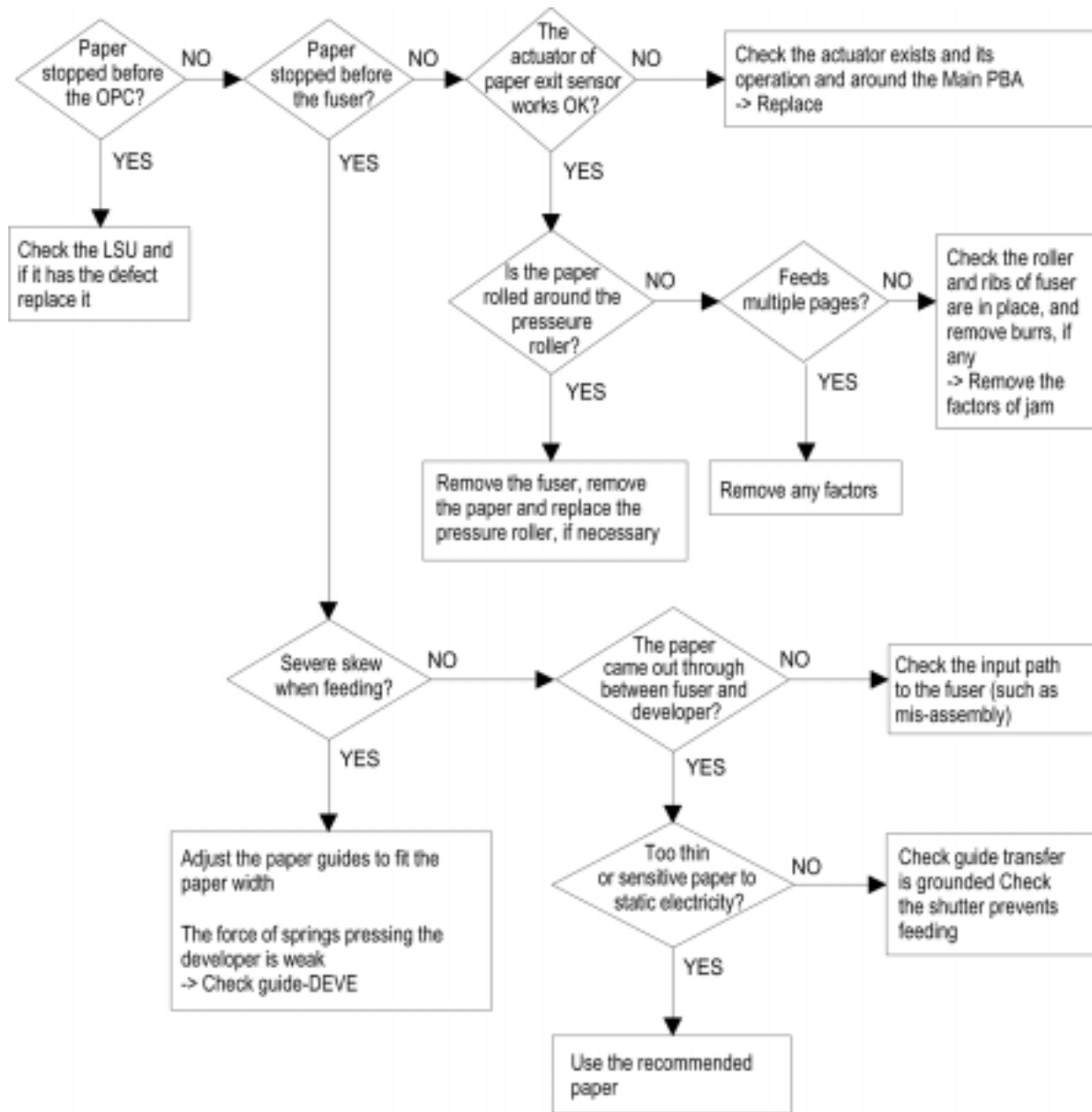




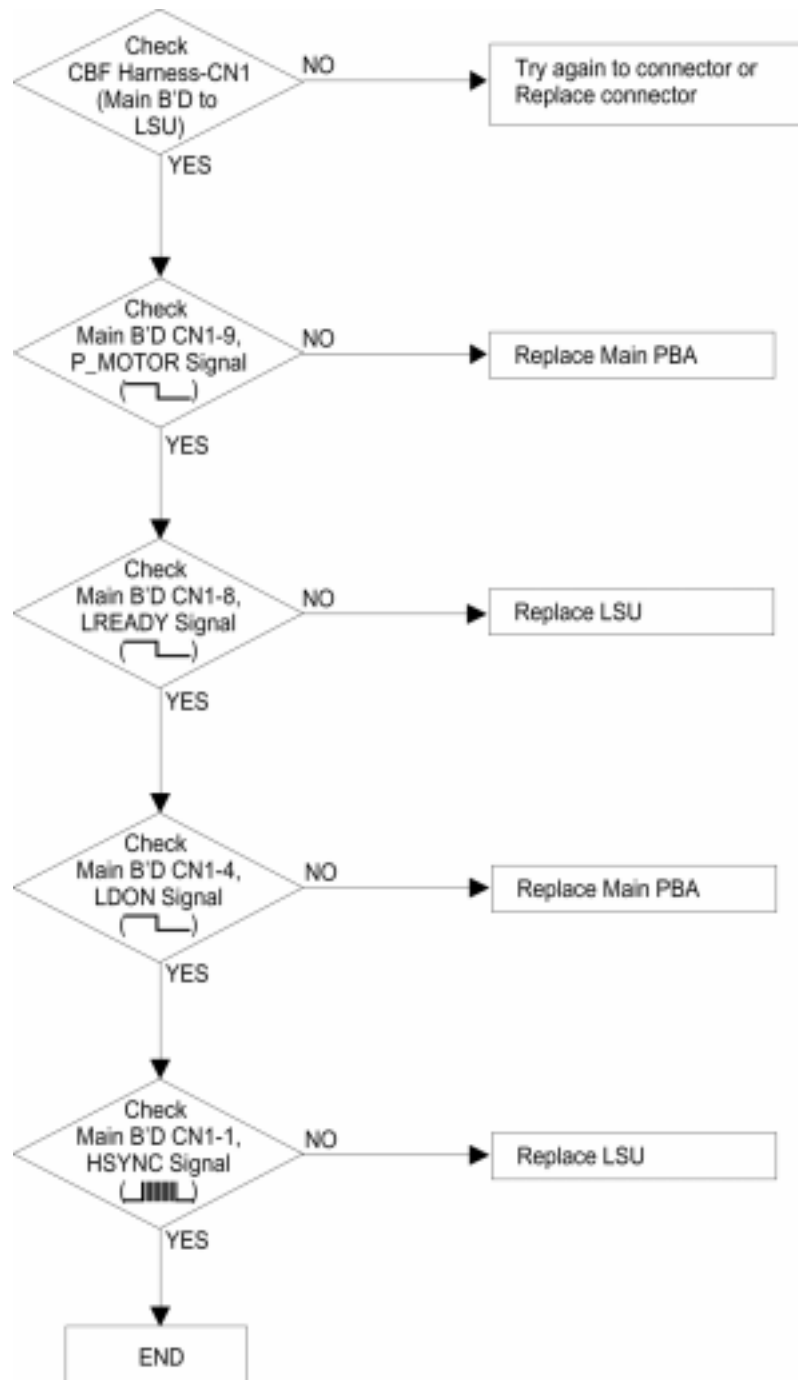
Paper Jam (Mis-feeding)



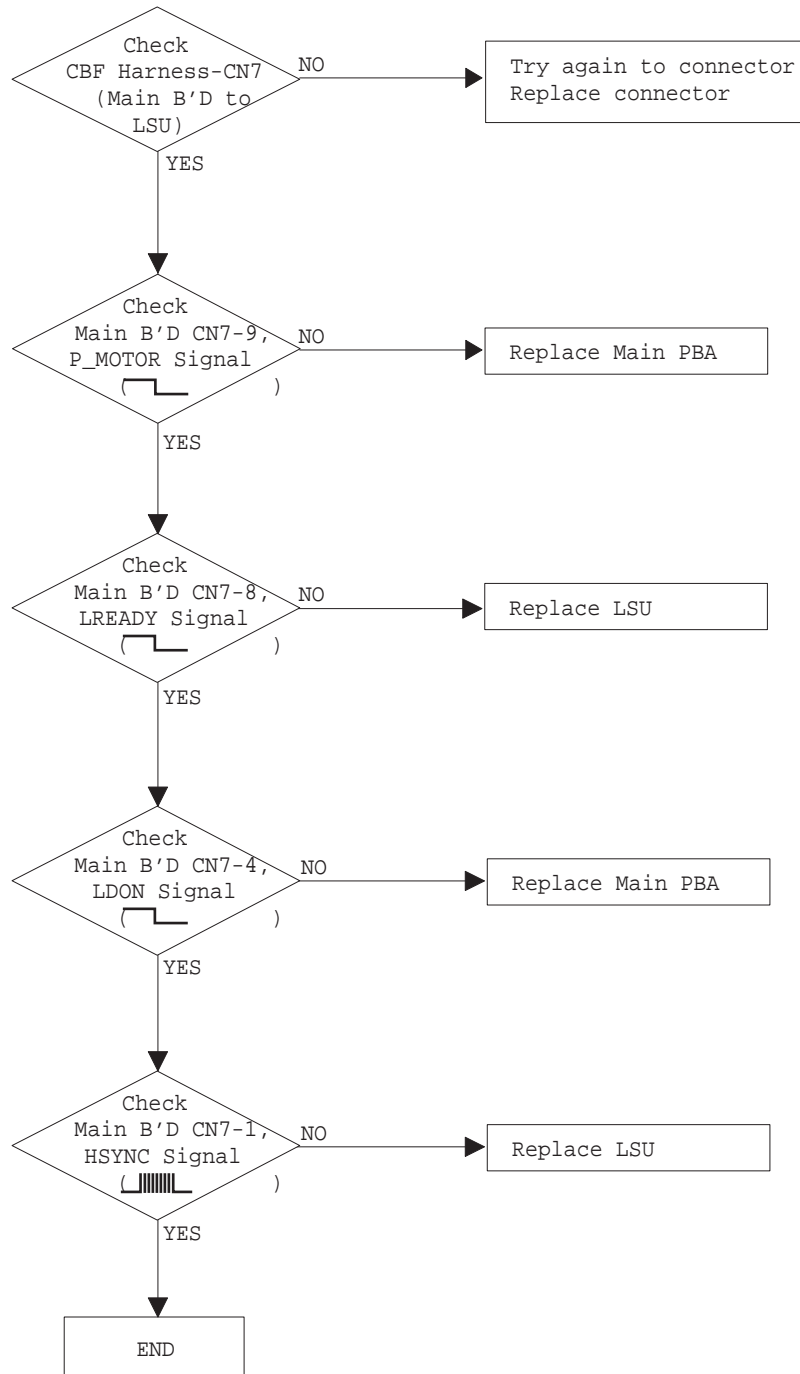
Paper Jam (Jam 1)



## Engine Error (WorkCentre Pro 412 &amp; FaxCentre F12)



Engine Error (WorkCentre M15/M15i)



## 7-7 Other Faults

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This section contains details of other faults that can occur with either WorkCentre Pro 412 or the Fax-Center F12. These procedures have previously been issued as service bulletins.

### 7-7-1 "Scan to PC" Errors (PC based software package) (WCP 412 Only)

**Operational Groups:**

OmniFax (USA), NASG-Canada, ESG

**Problem:**

When using the "Scan to PC" software it has been known to crash while displaying a dialog box on screen. The dialog box cannot be closed and will stay in front of everything else.

**Cause:**

Problems with PC based drivers earlier than 1.12.

**Solution:**

Load the latest drivers on to the PC. Current version 1.12, dated October 4, 2001. This can be found on the [www.xerox.com](http://www.xerox.com) website.

**Software Version:**

PCL Printer Driver before v 1.12 dated September 10, 2001.

### 7-7-2 PCL6 Printing Errors (WCP 412 Only)

**Operational Groups:**

OmniFax (USA), NASG-Canada, ESG

**Problem:**

When printing a file with complex graphics and large amounts of text the printer will fail to complete the job and print a PCL6 Error.

**Cause:**

Problems with the Firmware earlier than 0994.

**Solution:**

Load the latest firmware on to the machine. Current version 1.01 dated September 21, 2001. This can be found on the [www.xerox.com](http://www.xerox.com) website.

**Software Version:**

Firmware before 0994 v 1.00, dated September 21, 2001.

### 7-7-3 US/Canada Country Set on European Machine Causes Fax Problems (WCP 412 Only)

**Operational Groups:**

OmniFax (USA), NASG-Canada, ESG

**Problem:**

The country code has been set to US/Canada, which resets the machine and LIU board to work reliably only in a US/Canadian environment. The menu has also removed the option to allow the user to return the machine to a European model.

**Cause:**

User has set the machine up incorrectly and this has resulted in the fax failing to work properly.

**Solution:**

A service engineer will be required to perform the following steps.

1. Backup the customer phone book then enter TECH Mode
2. Press the MENU key
3. Locate the option MEMORY CLEAR and press the Select button.
4. Using the left and right cursor keys locate the desired country code.
5. Press Select to activate the choice. The machine will reset back to factory defaults.
6. Choose the correct language from the Maintenance menu and upload the phone book.

### **7-7-4 Drum Counter Reset After Changing Faulty Drum (WCP 412 Only)**

**Operational Groups:**

OmniFax (USA), NASG-Canada, ESG

**Problem:**

If the customer has changed their drum for a new one, the printer has no way of resetting the drum counter to zero. This will cause problems with the future page counters if the drum has not achieved a life of 14k copies. This facility is required to prevent drum counter discrepancies at a later date.

**Cause:**

There is no facility on the machine or procedure in the firmware that allowed the user or engineer to reset the drum counter.

**Solution:**

1. Confirm the presence of Firmware Level 1.01 or higher, if not present then upgrade the firmware on the machine. This can be found on the [www.xerox.com](http://www.xerox.com) website.
2. Press the "Menu" button
3. Press either the "Up" or "Down" cursor arrows until the LCD screen shows Maintenance - [System....], then press the "Select" button.
4. Press either the "Up" or "Down" cursor arrows until the LCD screen shows Maintenance - [New Drum...], then press the "Select" button.
5. To clear the Drum counter Press "1" followed by "Select". To cancel press "2" followed by "Select".

**Software Version:**

Control Panel Management and Machine Control Firmware, v 1.01, dated September 25, 2001.

### **7-7-5 Toner Warning Message Does not Indicate Empty Toner Cartridge**

**Operational Groups:**

Omnifax (USA), ESG, NASG-Canada

**Problem:**

The cartridge is empty, but the printer does not register an empty condition.

**Cause:**

It is possible that if the toner sensor windows in the printer become contaminated, the printer will fail to register an empty cartridge.

**Solution:**

The location of both the send and receive sensor windows are shown in Figure 1. Using a lint-free cloth, clean both windows and try the empty cartridge again.

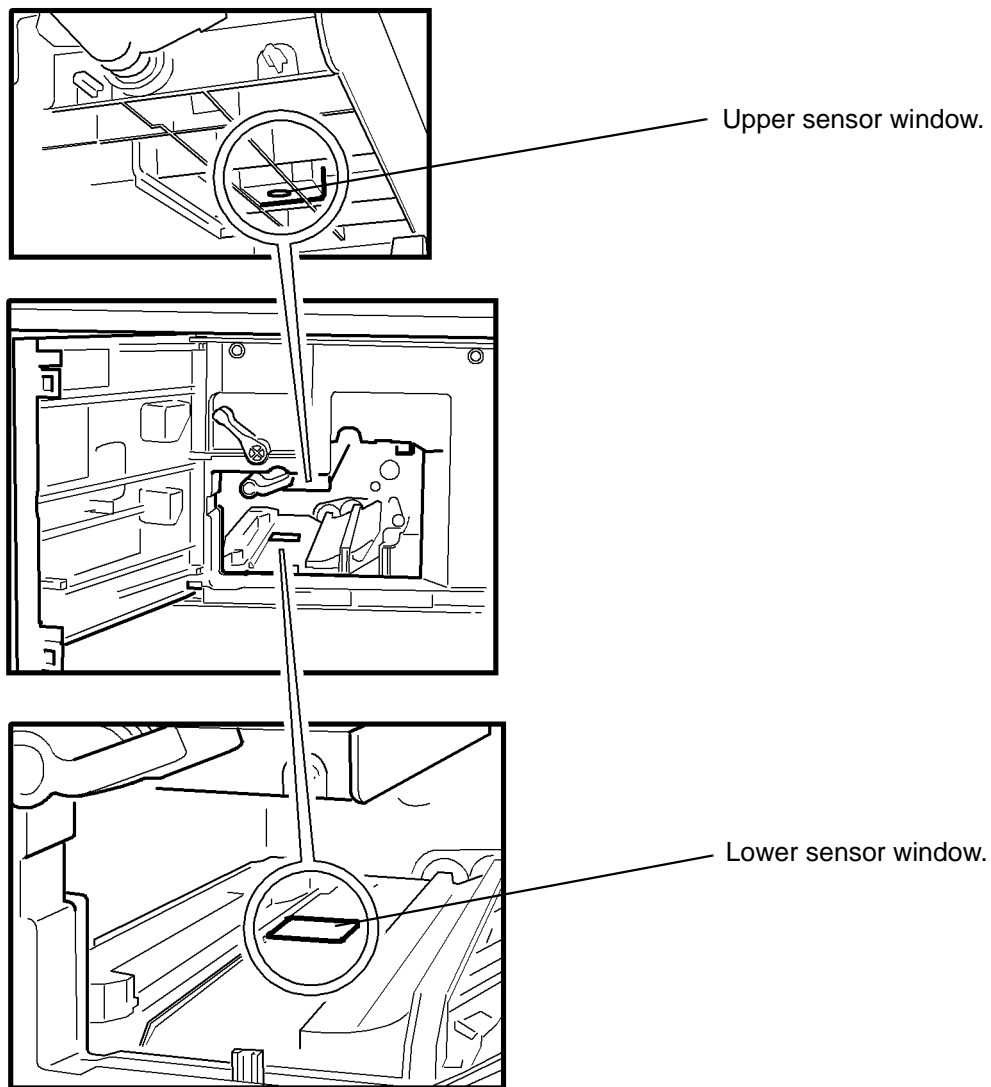


Figure 1 Sensor windows

### 7-7-6 Compaq Laptop Scanning Problems

**Operational Groups:**

Omnifax (USA), ESG, NASG-Canada

**Problem:**

On some Compaq Laptops it has been noticed that when you are scanning from the Twain Driver using the Parallel port connected to the WorkCentre Pro 412 the process can fail to work properly.

**Cause:**

It has been found that the chipsets that control the Compaq portable's I/O ports have some problems with certain devices.

**Solution:**

To remedy this problem visit the Compaq website by typing in the following address:

<http://www.compaq.com/support/files/notebooks/us/download/8379.html>

Download the SP2158.EXE program that contains the file SETPORT.EXE.

Follow the instructions laid out in the accompanying documentation that is in SP2158.EXE. This will enable you to correctly configure the Parallel port on the machine.

### **7-7-7 Scanning Problems (WCP 412 Only)**

**Operational Groups:**

Omnifax (USA), ESG, NASG-Canada

**Problem:**

In some extreme cases the WCP412 can stop responding to both scanning functions and keypad input. You may also receive an error message on the PC when trying to scan "System Warming up... Remaining Time: 1".

**Cause:**

The WorkCentre Pro 412 has hung. It may still function correctly as a fax/printer.

**Solution:**

To remedy this problem you will need to Power Off and Power On the WCP 412. When you have restored the power to the machine you will then be able to scan correctly and use the keypad on the machine.

### **7-7-8 Black Lines Showing on all Copied Pages (WCP 412 Only)**

**Operational Groups:**

All

**Problem:**

Black lines appear on copied sheets that are not present on the original when using the ADF or Platen to make a copy.

**Cause:**

The cause has been identified as the Scanner CCD that has a misfiring pixel(s). This will cause all pages that are copied with either the ADF or the Platen to have black lines running from the leading edge all the way down the trailing edge of the copied page.

**Solution:**

First check that the printer is not creating the lines, by printing one of the built in reports. If this is clear, check both the CVT and Platen glass for contamination. If after all the checks show clear areas, make a copy on both the platen and the ADF and compare them for similar lines. After comparison, if the image problem still exists the only solution we have been able to provide is a complete replacement of the Scanner CCD assembly, Part Number: 109N00584.

Figure 1 shows the kind of problem that can be seen if the machine has a faulty CCD assembly.



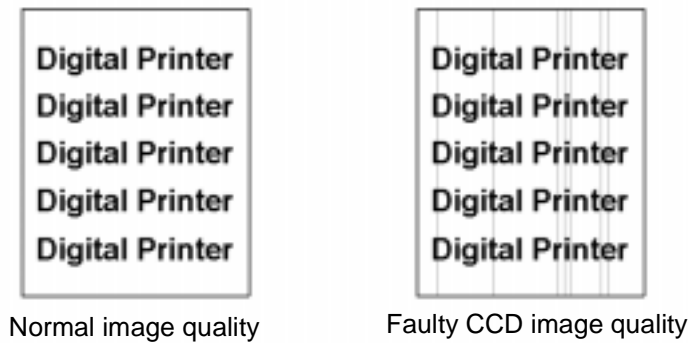


Figure 1 Image quality examples

### 7-7-9 Document Continuously Jammed in the ADF Paper Path (WCP 412 Only)

**Operational Groups:**

All

**Problem:**

The ADF paper path becomes blocked and in some cases the paper path sensors become dislodged. This creates a paper jam in the ADF when the next job is fed.

**Cause:**

When paper becomes jammed in the ADF paper path, it has been found that users will remove the paper using a great deal of force in an incorrect fashion. This has caused small pieces of paper to be left in the paper path or for the sensors to be dislodged and no longer function correctly.

**Solution:**

In some cases the customer is able to remove the paper blockage and the machine will function correctly. In other cases an engineer has to be called out to re-seat the sensors in the ADF feed assembly or clear the blockage. The corrective action is to advise the customer on the correct way to clear paper jams in the printer and ADF. For further information the customer should be shown the WCP412 User Manual's troubleshooting guide located on the User Manual CD-ROM supplied with the machine.

### 7-7-10 ADF Paper Feed Problem (WCP 412 Only)

**Operational Groups:**

All

**Problem:**

The ADF pick-up roller fails to engage the clutch and paper will not be drawn into the ADF paper path.

**Cause:**

The cause has been diagnosed as a problem, with some of the grease on the shaft migrating into the clutch. This will prevent the clutch engaging the pick-up roller and feeding paper into the ADF paper path.

**Solution:**

The proposed solution involves cleaning the gear and clutch assembly. This procedure is described below.

**Procedure**

*NOTE: If this procedure fails to cure the problem, order a new ADF assembly. The Part Number is 002N02054. If an order is placed using the old part number, the correct part number will be issued.*

1. Remove the ADF pick-up assembly from the ADF unit. Place the ADF pick-up assembly on a clean surface.
2. Remove the first pin, Figure 1.

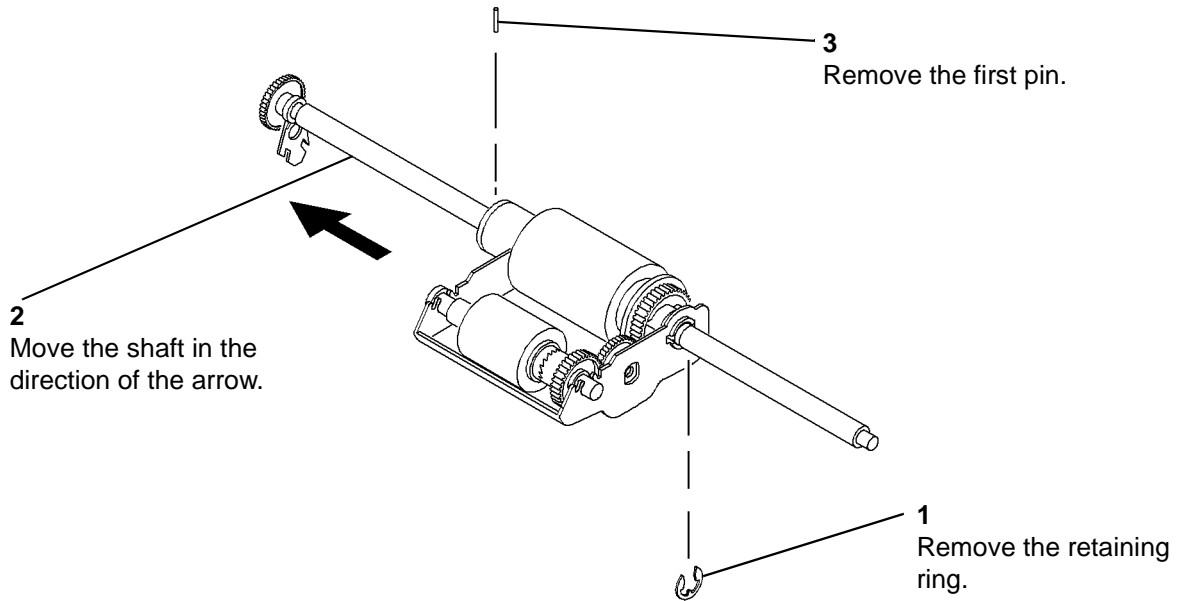


Figure 1 First pin

3. Remove the second pin, Figure 2.

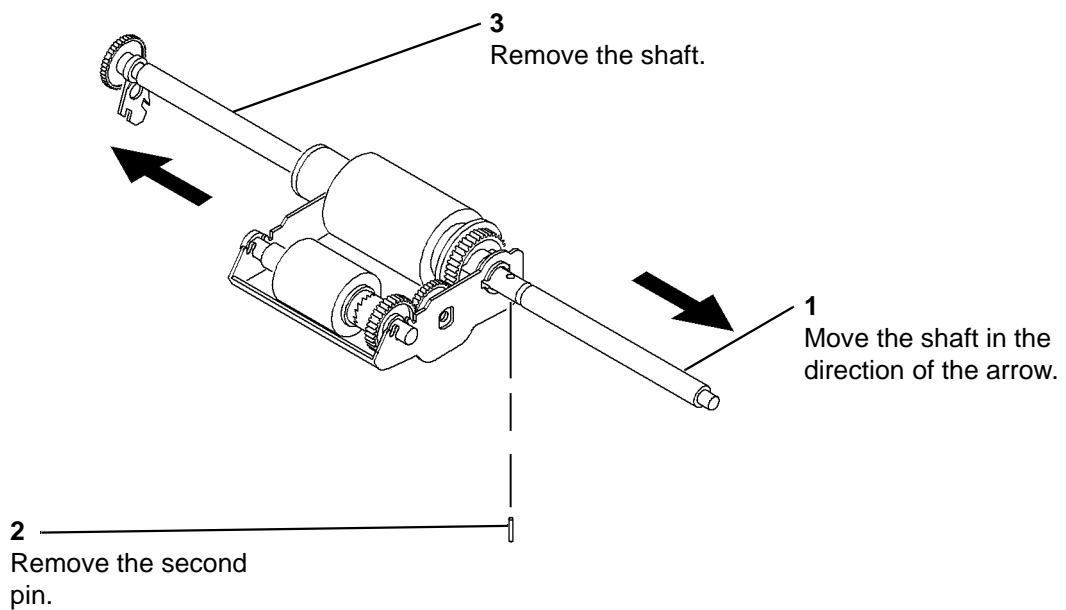


Figure 2 Second pin

4. Remove the pick-up roller assembly, Figure 3.

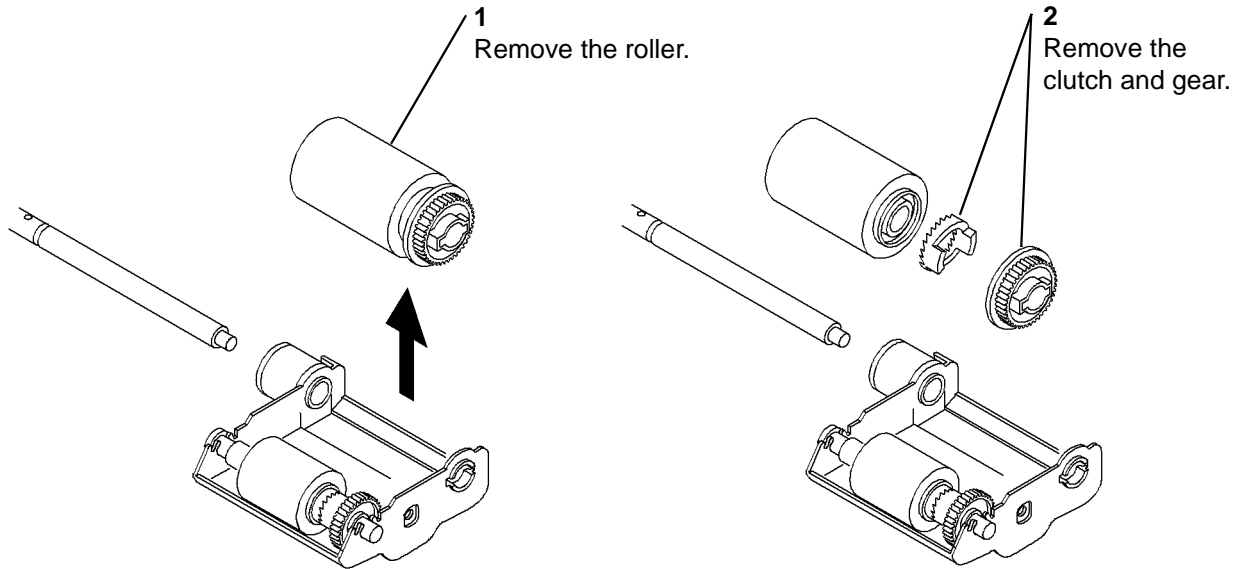


Figure 3 Pick-up roller assembly

5. Thoroughly clean any grease from the shaft, gear, clutch and the inside of the pick-up roller.

### Replacement

Replacement is the reverse of the removal procedure. If the friction bearing has detached from the ADF pick-up assembly, perform the following procedure.

1. Re-position the spring clip in the centre of the 5 indentations, Figure 4.

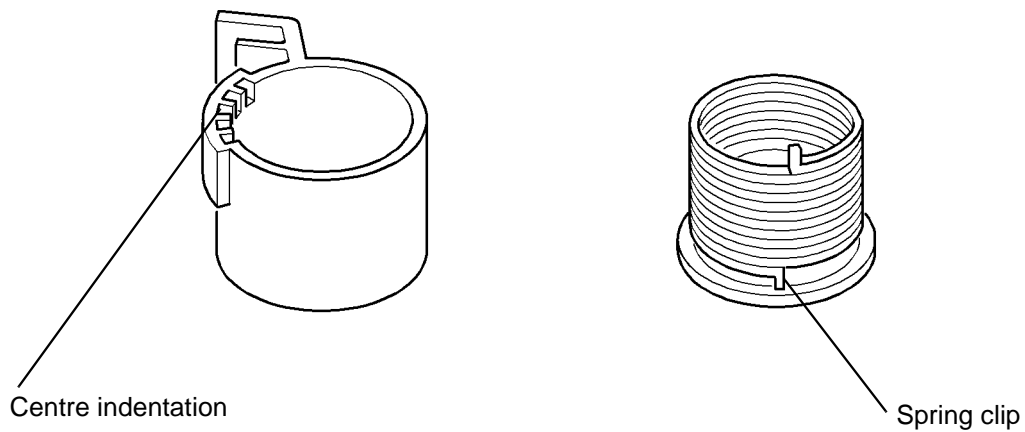


Figure 4 Friction bearing spring clip

2. When re-installing the friction bearing onto the ADF pick-up assembly, ensure that the end of the spring is inserted into the slot in the pick-up assembly, Figure 5.

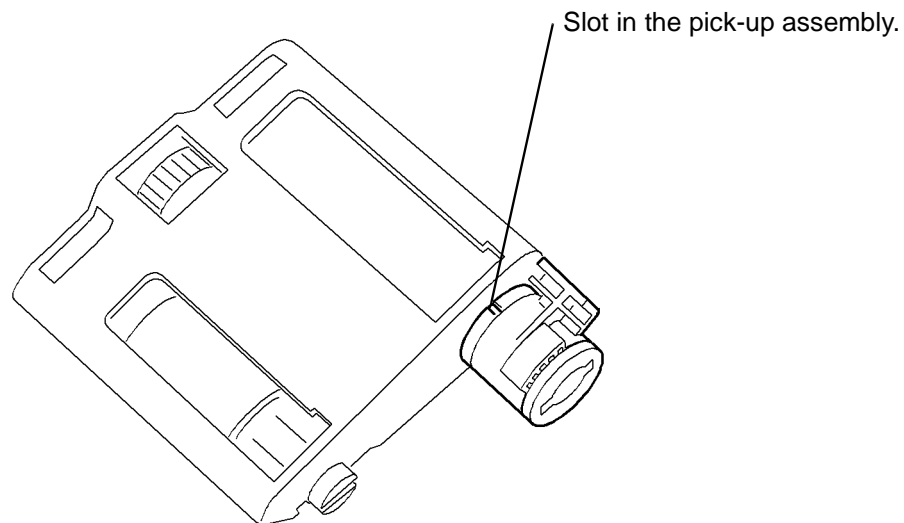


Figure 5 Friction bearing

## 7-7-11 Firmware Upgrade (WCP 412 Only)

### Operational Groups:

All

### Problem:

NONE: Informational Bulletin

### Cause:

NONE: Informational Bulletin

### Solution - Information

#### Introduction

The following information outlines the recent firmware that has been cut into the production line.

#### ***Firmware - Fixes included***

- It is possible to set a default time that allows the machine to reset the copy count back to default. This can be found under SYSTEM SETUP and is listed as [TIMEOUT]
- Image & shading quality have been improved.
- The HELP report has been updated to account for changes to UI.
- Image registration has been added to allow a Technician to modify the left and right margins of the image on the page. This can only be modified in Tech mode. This is to be located in TECH mode under MAINTENANCE a new entry has been added [ IMAGE REGI ]

#### ***Engine - Fixes included***

- Fuser, Transfer voltages and printing speed have been modified to take into account various paper types.
- Corrected the problem of printing blank pages when sending a print job.



## **7-7-12 Toner Cartridge and Drum Cartridge Service**

### **Precautions on Safe-keeping of the Drum Cartridge**

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Excessive exposure to direct light for more than a few minutes may cause damage to the drum.

### **Service for the Life of Toner Cartridge**

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If the printed image is light due to the life of the toner, you can temporarily improve the print quality by shaking the toner cartridge to redistribute the toner. However, only replacement of the toner cartridge will solve the problem.

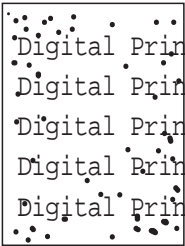
### **Service for Judgement of Inferior Expendables and the Standard of Guarantee**

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Please refer to User's Manual or Instructions on Fax/Printer Expendables SVC for the judgement of inferior expendables and the standard of guarantee besides this service manual.

## 7-7-12-1 Signs of Low toner cartridge

Fault	Signs	Cause & Check	Solution
<p>Light image and partially blank image (The life is ended.)</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>Digital Printer Digital Printer Digital Printer Digital Printer Digital Printer</p> </div>	<ul style="list-style-type: none"> <li>• The printed image is light or unclean and untidy.</li> <li>• Some part of the image is not printed.</li> <li>• Periodically a noise as "tick tick" occurs.</li> </ul>	<ol style="list-style-type: none"> <li>1. If the image is light or unclean and untidy - Shake the developer and then recheck. (1)NG: Check the weight of the developer (2)OK: Lack of toner, so the life is nearly finished.</li> <li>2. Some part of image is not printed - Shake the developer and then recheck. (1)NG: Check the weight of the developer and clean the LSU window with a cotton swab, then recheck. (2)OK: Lack of toner, so the life is nearly finished.</li> <li>3. Periodically "tick s" occur - Measure the cycle and the weight of the developer.</li> <li>4. White vertical stripes on the whole screen or partly : Check the weight of the developer.</li> </ol>	<ol style="list-style-type: none"> <li>1. All of 1, 2, 3 above- If it become better by shaking, replace with a new developer after 50-100 sheets in the closing state of the life span.</li> <li>2. In case of 2- If it becomes better after cleaning the LSU window, then the developer is not the problem. (Because of foreign substance on the LSU window, the image has not been printed partly.)</li> <li>3. In case of 3- If the cycle of noise is about 2 seconds, the toner inside the developer has been nearly exhausted.( Purchase and replace with a new developer after using about 200 sheets at the point of occurrence)</li> <li>4. In case of 3- This is a phenomenon caused by lack of toner, so replace with a new developer.</li> </ol>
<p>Toner Contamination</p>	<ul style="list-style-type: none"> <li>• Toner is fallen on the papers periodically.</li> <li>• Contaminated with toner on prints partly or over the whole surface.</li> </ul>	<ol style="list-style-type: none"> <li>1. Toner is fallen on the paper periodically. (1)Check the cycle of contamination. (2)Check the appearance of both ends of the developer OPC drum.</li> <li>2.The center of the printed matter is contaminated with toner. (1)Check whether foreign substances or toner are stuck to the terminal (contact point) of the developer. (2)Check whether the state of the terminal assembly is normal.</li> </ol>	<ol style="list-style-type: none"> <li>1. If both ends of the OPC drum are contaminated with toner: Check the life of the developer.</li> <li>2. Check whether it could be recycled.</li> </ol>

Fault	Signs	Cause & Check	Solution
<p>White Black spot</p> 	<ul style="list-style-type: none"> <li>• Light or dark black dots on the image occur periodically.</li> <li>• White spots occur in the image periodically.</li> </ul>	<ol style="list-style-type: none"> <li>1. If light or dark periodical black dots occur, this is because the developer rollers are contaminated with foreign substance or paper particles.               <ul style="list-style-type: none"> <li>(1)37.7mm interval : Charged roller</li> <li>(2)94.3mm interval : OPC cycle</li> </ul> </li> <li>2. If white spots occur in a black image at intervals of 94, 29mm, or black spots occur elsewhere, the OPC drum is damaged or foreign substance is stuck to the surface.</li> <li>3. If a black and white or graphic image is partially broken at irregular intervals, the transfer roller's life has expired or the transfer voltage is abnormal.</li> </ol>	<ol style="list-style-type: none"> <li>1. In case of 1 above -               <ul style="list-style-type: none"> <li>Run OPC Cleaning Mode Print 5-5 times repeatedly to remove. Especially check foreign substance on the OPC surface, then remove them with a clean gauze moistened with IPA(Isopropyl Alcohol) not to damage OPC if necessary.</li> <li>Caution : Never use usual alcohol.</li> </ul> </li> <li>2. In case of 2               <ul style="list-style-type: none"> <li>If they have not disappeared by running OPC Cleaning Mode Print 5-5 times.                   <ul style="list-style-type: none"> <li>: at intervals of 94.3mm - Replace the developer.</li> <li>: at intervals of 37.7mm - Remove foreign substance, Clean the Charged Roller</li> </ul> </li> <li>: Broken image - Replace the developer according to carelessness.</li> </ul> </li> <li>3. In case of 3 - Exchange the transfer roller because the life of the transfer roller in use has been expired. (Check the transfer voltage and readjust if different.)</li> </ol>
<p>Recycled product</p>	<ul style="list-style-type: none"> <li>• Poor appearance of the developer.</li> <li>• Unclean and rough printouts.</li> <li>• Bad background in the image.</li> </ul>	<ol style="list-style-type: none"> <li>1. Poor appearance of the developer.               <ul style="list-style-type: none"> <li>(1)Check the damage to label and whether different materials are used.</li> <li>(2)Check the appearance of parts of the developer, such as the frame or the hopper.</li> </ul> </li> <li>2. Unclean and rough printouts.               <ul style="list-style-type: none"> <li>(1)Check whether foreign substance or toner are stuck to the terminal (contact point) of the developer.</li> <li>(2)Check whether the state of the terminal assembly is normal.</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. In case of 1 -               <ul style="list-style-type: none"> <li>(1)If there is an evidence of disassembling the developer.</li> <li>(2)If materials other than normal parts of the developer are added or substituted.</li> </ul> </li> <li>2. In case of 2 - If there are any abnormalities in connection with the situation of 1.               <ul style="list-style-type: none"> <li>(1)It occurs when the developer is recycled more than twice.</li> </ul> </li> </ol>



Fault	Signs	Cause & Check	Solution
Ghost & Image Contamination	<ul style="list-style-type: none"> <li>• The printed image is too light or dark, or partially contaminated black.</li> <li>• Totally contaminated black. (Black image printed out)</li> </ul>	<p>1. The printed image is too light or dark, or partially contaminated black.</p> <p>(1) Check whether foreign substance or toner are stuck to the terminal (point of contact) of the developer.</p> <p>(2) Check whether the terminal assembly is normal.</p> <p>2. Totally contaminated black. (Black image printed out)</p> <p>(1) Check whether foreign substances are stuck to the terminal (point of contact) of the developer and the state of assembly. (Especially check the charged roller terminal.)</p>	<p>1. All of 1, 2, 3 above</p> <p>(1) Remove toner and foreign substances adhered to the contact point of the developer.</p> <p>(2) The contact point of the unit facing that of the developer also must be cleaned.</p> <p>(3) If the terminal assembly is unsafe:</p> <ul style="list-style-type: none"> <li>• Secure the terminal to or reassemble it after disassembling.</li> <li>• Disassemble the side plate and push the terminal that is stuck, then reassemble it.</li> </ul> <p>2. In case of 2</p> <p>It is a phenomenon when the OPC drum of the developer is not electrically charged. Clean the terminals of the charged roller, then recheck it.</p>

## 7-7-13 The cause and solutions of bad environment of the software

### 7-7-13-1 The printer is not working (1)

Description: While Power turned on, the printer is not working in the printing mode.

Check and Cause	Solution
<ol style="list-style-type: none"> <li>1. Check if the PC and the printer are properly connected and the toner cartridge installed.</li> <li>2. Printing is not working in the Windows.</li> <li>3. Check if the printer cable is directly connected to peripheral devices</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the printer cable. If the problems is not solved even after the cable is replaced, check the amount of the remaining toner.</li> <li>2. Check if the connection between PC and printer port is correct. If you use windows, check if the printer driver in the controller is set up. If the printer driver is properly set up, check in which program the printing is not working. The best way to find out is to open the memo pad to check the function of printing. If it is not working in a certain program, adjust the setup of the program. Sometimes, the printout is normal within the Windows basic programs, but it's not working in a particular program. In such case, install the new driver again. If not working in the Windows basic program, Check the setup of the port of CMOS is on ECP. And check the address of IRQ 7 and 378</li> <li>3. If the scanner needs to be connected to the printer, first remove the scanner from the PC to see if the printer is properly working.</li> </ol>

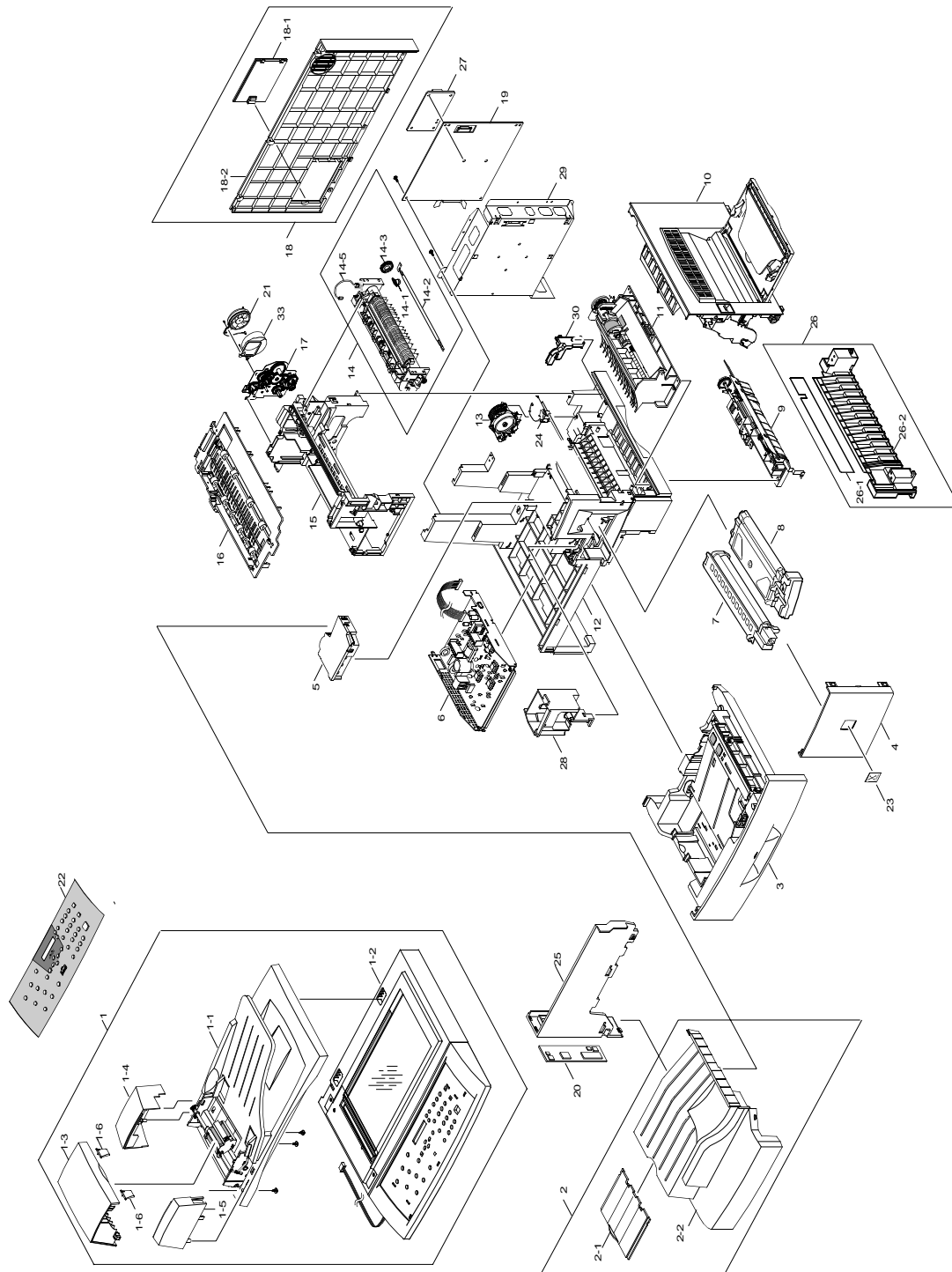
### 7-7-13-2 The printer is not working (2)

Description: After receiving the printing order, no response at all or the low speed of printing occurs due to wrong setup of the environment rather than malfunction of the printer itself

Check and Cause	Solution
<ol style="list-style-type: none"> <li>1. Secure more space of the hard disk.</li> <li>2. Printing error occurs even if there is enough space in the hard disk.</li> <li>3. Check the parallel-port-related items in the CMOS Setup of the PC.</li> <li>4. Reboot the system to print.</li> </ol>	<ol style="list-style-type: none"> <li>1. Not working with the message 'insufficient printer memory' means hard disk space problem rather than the RAM problem. In this case, provide more space for the hard disk.</li> <li>2. The connection of the cable and printer port is not proper. Check if the connection is properly done and if the parallel port in CMOS is rightly set up.</li> <li>3. As a printer port, Select ECP or SPP among SPP(Normal), ECP, and EPP modes (increase printing speed) SPP normal mode support 8-bit data transfer, while ECP Mode transfer the 12-bit data.</li> <li>4. Check the cable or the printer driver may be defective. Turn the PC and printer off, and reboot the system to print again. If not solved, double-click the printer in my computer. If the regular fonts are not printed this time again. the cable must be defective so replace the cable with new one.</li> </ol>

## 8. Exploded View & Parts List

### 8-1. Main Exploded View & Parts List



**8-1-1 Main Parts List**

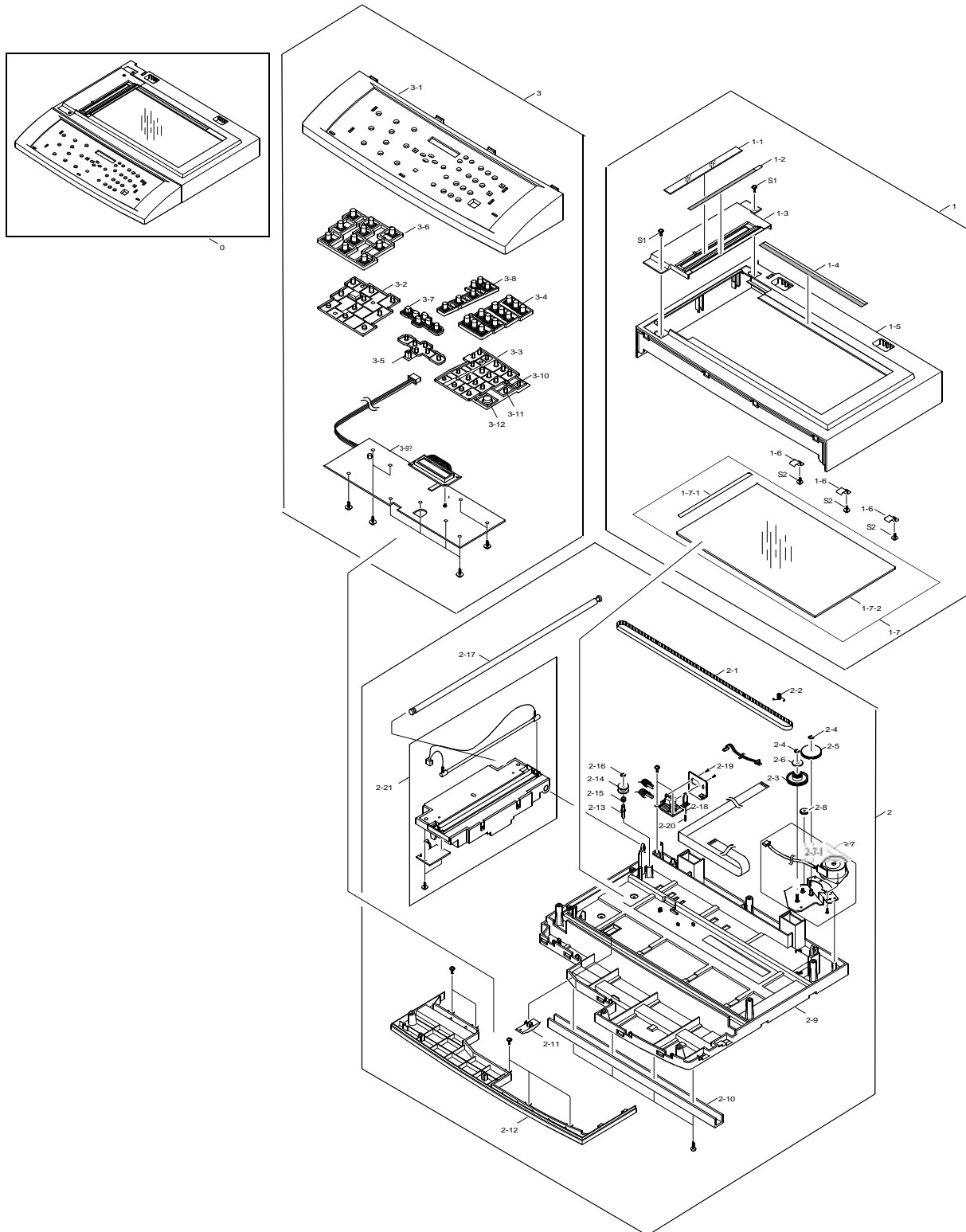
ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	ELA HOU-SCANNER ASS'Y	109N00585	1	<b>WCP 412 ONLY</b>
1-1	ELA HOU-ADF ASS'Y	022N01482	1	<b>WCP 412 ONLY</b>
1-2	ELA HOU-PLATEN ASS'Y	090N00151	1	<b>WCP 412 ONLY</b>
1-3	PMO-COVER OPEN	002N02002	1	<b>WCP 412 ONLY</b>
1-4	PMO-COVER SIDE L	002N02003	1	<b>WCP 412 ONLY</b>
1-5	PMO-COVER SIDE R	002N02004	1	<b>WCP 412 ONLY</b>
1-6	PMO-GUIDE PAPER	038N00370	2	<b>WCP 412 ONLY</b>
2	MEA RACK-COVER PA EXIT ASS'Y	002N02013	1	<b>WCP 412 ONLY</b>
2-1	PMO-TRAY EXTENTION MP NE	050N00392	1	
2-2	PMO-COVER PAPER EXIT	002N02005	1	<b>WCP 412 ONLY</b>
3	MEC-CASSETTE ASS'Y	050N00393	1	<b>WCP 412 ONLY</b>
4	PMO-COVER FRONT	002N02006	1	
5	UNIT-LSU	122N00207	1	
6	PBA POWER(SMPS US)	105N01464	1	
-	PBA POWER(SMPS Europe)	105N01465	1	<b>WCP 412 ONLY</b>
7	ELA-OPC UNIT SET	113R00663	1	
8	ELA-TONER UNIT SET	106R00586	1	XE
	ELA-TONER UNIT SET	106R00584	1	NASG/XCL
9	ELA HOU-PICKUP ASS'Y	022N01485	1	<b>WCP 412 &amp; FC F12 ONLY</b>
10	ELA HOU-SIDE COVER ASS'Y	002N02016	1	<b>WCP 412 &amp; FC F12 ONLY</b>
11	ELA HOU-MP ASS'Y	600N01741	1	<b>WCP 412 &amp; FC F12 ONLY</b>
12	ELA HOU-BASE FRAME ASS'Y		1	NOT SPARED
13	MEC-FEED ASS'Y	022N01472	1	
14	ELA HOU-FUSER(110V)ASS'Y	126N00182	1	NASG/XCL
	ELA HOU-FUSER(220V)ASS'Y	126N00183	1	XE
14-1	THERMOSTAT	130N01214	1	
14-2	LAMP-HALOGEN (110V)	122N00208	1	NASG/XCL
	LAMP-HALOGEN(220V)	122N00209	1	XE
14-3	GEAR-FUSER	126N00184	1	
14-4	PMO-GUIDE DUPLEX		1	NOT SPARED
14-5	THERMISTOR-FUSER	126N00185	1	
15	ELA HOU-FRAME MAIN ASS'Y	600N01743	1	
16	MEC-EXIT ASS'Y	600N01736	1	
17	ELA HOU-DRIVE ASS'Y	007N01117	1	
18	MEA RACK-COVER REAR ASS'Y	002N02014	1	
18-1	"PMO-COVER SIMM,XRX	002N02007	1	
18-2	PMO-COVER REAR	002N02008	1	
19	PBA MAIN-MAIN	140N05938	1	<b>WCP 412 ONLY</b>
20	PMO-CONNECT PAPER MFP	002N02012	1	
21	FAN-DC	127N01375	1	
22	PPR-OVERLAY		1	NOT SPARED
-	PPR-OVERLAY (English)	892E62830	1	<b>WCP 412 ONLY</b>
-	PPR-OVERLAY (English/French)	892E80010	1	<b>WCP 412 ONLY</b>

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
-	PPR-OVERLAY (French)	892E62840	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (German)	892E62870	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Italian)	892E62860	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Spanish)	892E62850	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Portuguese)	892E62880	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Finnish)	892E79920	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Dutch)	892E62890	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Danish)	892E79910	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Norwegian)	892E79930	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Swedish)	892E79940	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Hungarian)	892E79990	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Czech)	892E79950	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Polish)	892E79960	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Romanian)	892E79980	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Bulgarian)	892E79970	1	<b>WCP 412 ONLY</b>
	PPR-OVERLAY (Greek/English)	892E79900	1	<b>WCP 412 ONLY</b>
23	MPR-NAME/PLATE XRX	015N00436	1	
24	SOLENOID-PICK UP	022N01486	1	
25	PMO-COVER EXIT REAR	002N02009	1	
26	MEA UNIT GUIDE CST PA ASS'Y	001N00384	1	
26-1	PMO-SHEET GUIDE PAPER		1	NOT SPARED
26-2	PMO-GUIDE CASSETTE RAIL		1	NOT SPARED
27	PBA LIU (US/Canada)	140N05939	1	
-	PBA LIU (Western Europe)	140N05945	1	
-	PBA LIU (Eastern Europe)	140N05946	1	
-	PBA LIU (Poland/Romania)	140N06037		
28	PMO-DUMMY BASE FRAME		1	NOT SPARED
29	IPR-SHIELD MAIN LOWER		1	NOT SPARED
30	PMO-COVER FEED AY		1	NOT SPARED
31	PMO-COVER BRKT MOTER	002N02017	1	
32	PMO-GUIDE PAPER OUT	038N00371	1	
33	PMO-DUCT FAN		1	NOT SPARED

NOTE: For FaxCentre F12 unique spare parts, refer to parts list 8-14. For WorkCentre M15/M15i unique spare parts, refer to parts list 8-22.

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## 8-2. Platen Assembly Exploded View & Parts List (WorkCentre Pro 412 and WorkCentre M15/M15i)



**8-2-1 Platen Assembly Parts List (WorkCentre Pro 412 and WorkCentre M15/M15i)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-PLATEN ASS'Y	090N00151	1	
1	MEA RACK-SCAN UPPER ASS'Y	600N01737	1	
1-1	MCT-GLASS ADF	118N00171	1	
1-2	LABEL(L)-REGISTRATION EDGE (L)	091N00678	1	
1-3	PMO-DUMMY UPPER	019N00615	1	
1-4	LABEL(R)-REGISTRATION EDGE (R)		1	NOT SPARED
1-5	PMO-COVER SCAN UPPER		1	NOT SPARED
1-6	IPR-HOLDER GLASS		3	NOT SPARED
1-7	MEA RACK-GLASS PLATEN ASS'Y	118N00172	1	
1-7-1	LABEL(P)-SHEET SHADING		1	NOT SPARED
1-7-2	MCT-GLASS SCANNER(LEGAL)		1	NOT SPARED
1-8	A/S MATERIAL-DUMMY UPPER	019N00629	1	
2	ELA HOU-SCAN LOWER ASS'Y		1	NOT SPARED
2-1	BELT-TIMING GEAR		1	NOT SPARED
2-2	SPRING-BELT	023N00955	1	
2-3	GEAR-TIMING		1	NOT SPARED
2-4	RING-E	005N00781	3	
2-5	GEAR-REDUCTION		1	NOT SPARED
2-6	PMO-HOLDER BELT		1	NOT SPARED
2-7	ELA HOU-SCAN MOTOR ASS'Y	127N01376	1	
2-7-1	MOTOR-SCAN		1	NOT SPARED
2-8	GEAR-IDLE		1	NOT SPARED
2-9	PMO-COVER PUMMY LOWER		1	NOT SPARED
2-10	IPR-CHANNEL BASE FRAME		1	NOT SPARED
2-11	PMO-HOLDER CCD		1	NOT SPARED
2-12	PMO-DUMMY SCAN LOWER		1	NOT SPARED
2-13	ICT-INSERT SHAFT		1	NOT SPARED
2-14	PMO-PULLEY		1	NOT SPARED
2-15	PMO-HOLDER BELT		1	NOT SPARED
2-16	RING-E	005N00781	1	
2-17	ICT-SHAFT CCD		1	NOT SPARED
2-18	PMO-LEVER SENSOR	011N00473	1	
2-19	IPR-BRK SCAN B'D	140N05936	1	
2-20	SPRING-EXIT		1	NOT SPARED
2-21	ELEC/MECH-SCANNER MODULE	109N00584	1	
2-22	CBF SIGNAL-CCD-FFC	117N01594	1	



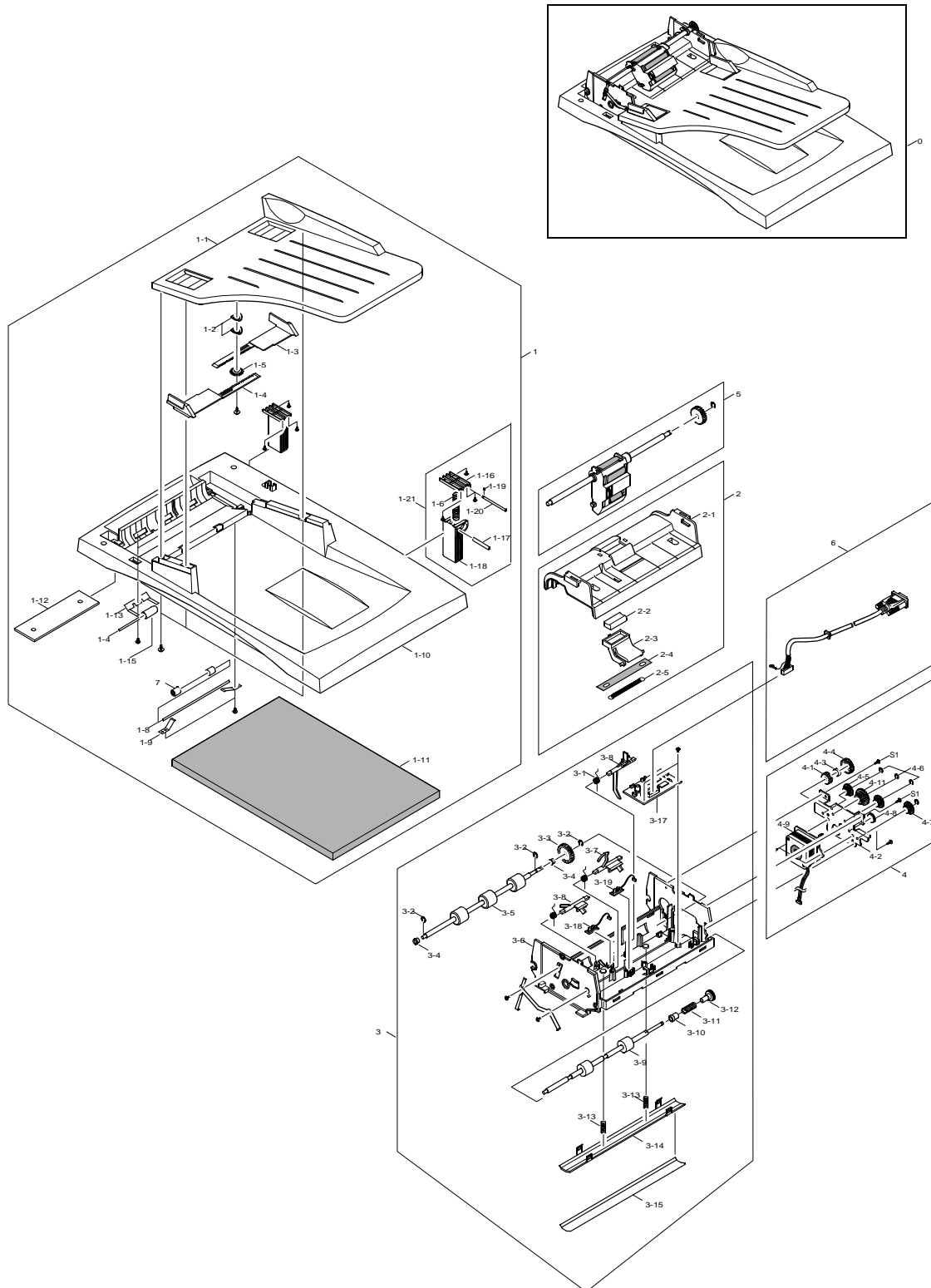
### 8-2-1 Platen Assembly Parts List (WorkCentre Pro 412 and WorkCentre M15/M15i) (Cont.)

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
3	ELA HOU-OPE COVER ASS'Y	002N02015	1	
3-1	PMO-OPE COVER	002N02010	1	
3-2	RMP-RUBBER FUNCTION	019N00616	1	
3-3	RMO-RUBBER TEL	019N00617	1	
3-4	PMO-KEY TEL	029N00274	1	
3-5	RMO-RUBBER SCROLL	019N00618	1	
3-6	PMO-KEY FUNCTION(A)	029N00275	1	
3-7	PMO-KEY SCROLL	029N00280	1	
3-8	PMO-KEY FUNCTION(B)	029N00276	1	
3-9	PBA SUB-OPE(XEROX)	140N05947	1	
3-10	PMO-KEY REPORT	029N00277	1	
3-11	PMO-KEY STOP	029N00278	1	
3-12	PMO-KEY START	029N00279	1	

NOTE: For WorkCentre M15/M15i unique spare parts, refer to parts list 8-23.

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### 8-3. ADF Assembly Exploded View & Parts List (WorkCentre Pro 412 & WorkCentre M15/M15i)



**8-3-1 ADF Assembly Parts List (WorkCentre Pro 412 & WorkCentre M15/M15i)**

ITEM	DESCRIPTION	SEC. CODE	Q'TY	REMARK
0	ELA HOU-ADF ASS'Y		1	
1	MEA RACK-PLATEN COVER ASS'Y	090N00152	1	
1-1	PMO-TX STACKER	022N01478	1	
1-2	IPR-WASHER SPRING CY		2	NOT SPARED
1-3	PMO-DOC GUIDE L	038N00372	1	
1-4	PMO-DOC GUIDE R	038N00373	1	
1-5	GEAR PINION		1	NOT SPARED
1-6	SPRING-HINGE PLATE		1	NOT SPARED
1-7	ROLLER EXIT IDLE		2	NOT SPARED
1-8	IPR-SHAFT EXIT		1	NOT SPARED
1-9	NPR-SPRING PINCH DRIVE		2	NOT SPARED
1-10	PMO-COVER PLATEN		1	NOT SPARED
1-11	PPR-SPONGE SHEET	025N00081	1	
1-12	PPR-SHEET PLATEN		1	NOT SPARED
1-13	IPR-SPRING PINCH		3	NOT SPARED
1-14	IPR-SHAFT PINCH		3	NOT SPARED
1-15	PMO-ROLL PINCH		3	NOT SPARED
1-16	PMO-HINGE PLATEN		1	NOT SPARED
1-17	PMO-BUSHING HINGE		1	NOT SPARED
1-18	PMO-HSG HINGE		1	NOT SPARED
1-19	ICT-SHAFT HINGE		1	NOT SPARED
1-20	RING-C		1	NOT SPARED
1-21	MEA-RACK-HINGE ASS'Y	600N01799	1	
2	MEA RACK-ADF UPPER ASS'Y	600N01799	1	
2-1	COVER ADF UPPER		1	NOT SPARED
2-2	ADF RUBBER	022N01487	1	
2-3	HOLDER ADF	019N00610	1	
2-4	SPONG ADF		1	NOT SPARED
2-5	SPRING ADF		1	NOT SPARED
3	ELA HOU-ADF LOWER ASS'Y	600N01740	1	
3-1	SPRING TORSION DOC		1	NOT SPARED
3-2	E-RING		3	NOT SPARED
3-3	GEAR-ADF 38		1	NOT SPARED
3-4	PMO-BUSH	013N00513	2	
3-5	MEC-ROLLER DRIVE	007N01113	1	
3-6	COVER ADF LOWER		1	NOT SPARED
3-7	PMO-ACTUATOR SENSOR DOC	130N01202	1	
3-8	PMO ACTUATOR SENSOR REG	130N01217	1	
3-9	MEC-ROLLER EXIT	022N01473	1	
3-10	BUSHING HOLDER		1	NOT SPARED

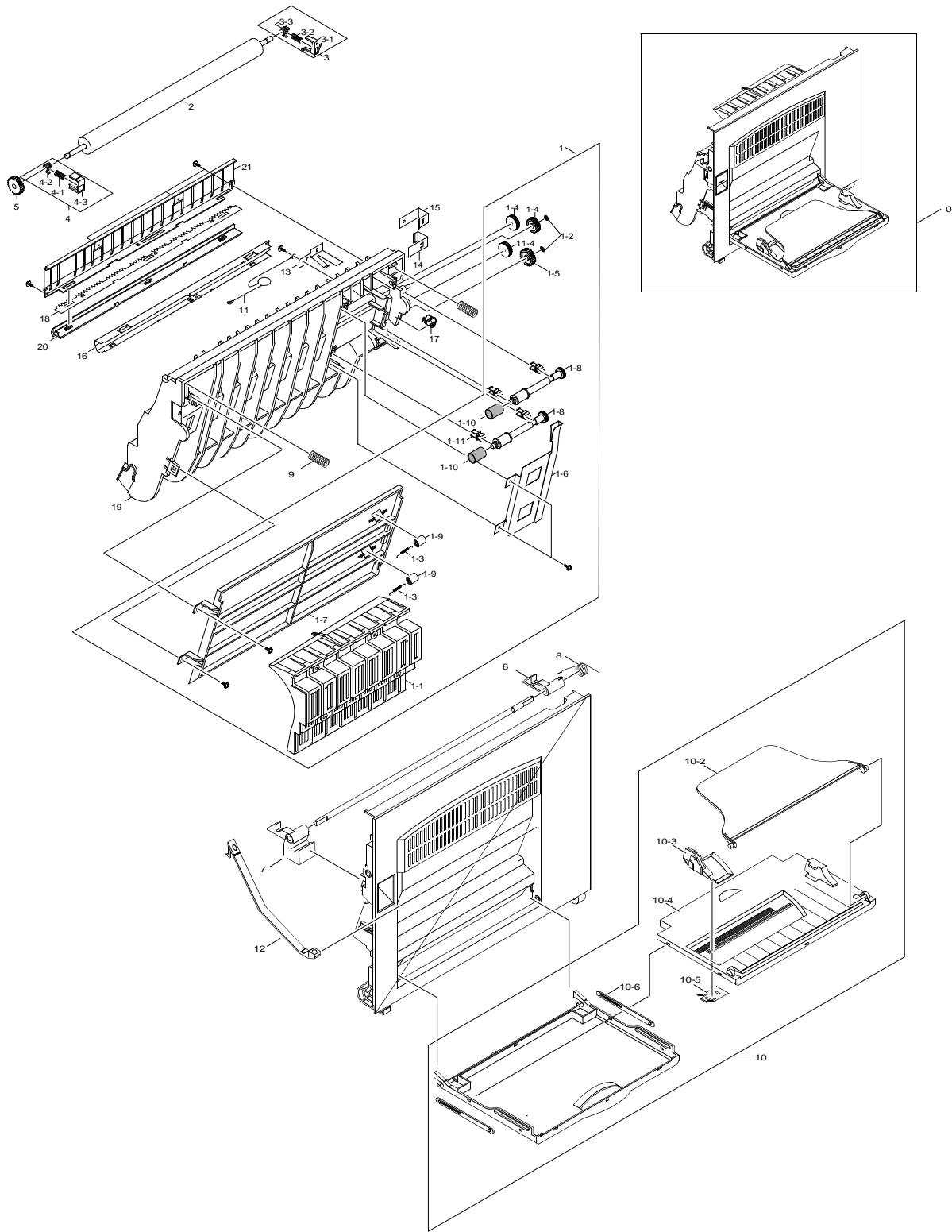
**8-3-1 ADF Assembly Parts List (Cont.)**

ITEM	DESCRIPTION	SEC. CODE	Q'TY	REMARK
3-11	SPRING CLUTCH		1	NOT SPARED
3-12	GEAR-EXITE 23		1	NOT SPARED
3-13	SPRING WHITE BAR		2	NOT SPARED
3-14	BRKT WHITE BAR	025N00079	1	
3-15	PPR-WHITE BAR SHEET	025N00080	1	
3-16	PMO-ACTUATOR SENSOR REGI		1	NOT SPARED
3-17	PBA SUB-ADF	022N01471	1	
3-18	PBA SUB-ADF POS SEN	130N01199	1	
3-19	PBA SUB-ADF DET SEN	130N01200	1	
3-20	PMO-ACTUATOR SENSOR SCAN	130N01201	1	
4	ELA HOU-ADF MOTOR ASS'Y	127N01377	1	
4-1	GEAR CLUTCH 29		1	NOT SPARED
4-2	BRKT ADF MOTOR		1	NOT SPARED
4-3	PMO-WHITE CLUTCH SUB 29		1	NOT SPARED
4-4	GEAR-CLUTCH IDLE 39		1	NOT SPARED
4-5	GEAR DOUBLE 33/20		2	NOT SPARED
4-6	E-RING		6	NOT SPARED
4-7	GEAR-DOUBLE 17/35		2	NOT SPARED
4-8	GEAR IDLE 25		1	NOT SPARED
4-9	MOTOR ADF		1	NOT SPARED
4-10	GEAR-JAM NOB		1	NOT SPARED
4-11	GEAR REDUCTION45/19		1	NOT SPARED
5	MEC RACK-PICK UP ASS'Y	002N02054	1	
6	CBF D SUB CBL_ADF_MAIN (ADF CABLE)	117N01586		
S1	SCREW-TAPTITE		2	NOT SPARED

NOTE: For WorkCentre M15/M15i unique spare parts, refer to parts list 8-24.

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## 8-4. Side Cover Assembly Exploded View & Parts List



**8-4-1 Side Cover Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-SIDE COVER ASS'Y	002N02016	1	
1	MEA RACK-DUPLEX ASS'Y		1	NOT SPARED
1-1	PMO-GUIDE DP SIDE		1	NOT SPARED
1-2	RING-CS		2	NOT SPARED
1-3	SPRING-FUSER EXIT		2	NOT SPARED
1-4	GEAR-DUP IDLER 17		3	NOT SPARED
1-5	GEAR-MP/DUP DRV		1	NOT SPARED
1-6	IPR-BRKT G DUP		1	NOT SPARED
1-7	PMO-GP LOWER DP		1	NOT SPARED
1-8	PMO-SHAFT DUP DRIVER		2	NOT SPARED
1-9	PMO-ROLLER_EXIT		2	NOT SPARED
1-10	RPR-RUBBER EXIT		2	NOT SPARED
1-11	PMO-BUSHING TX(B4)		4	NOT SPARED
1-12	PMO-GUIDE DP SIDE		1	NOT SPARED
2	MEC-ROLLER TRANSFER	022N01475	1	
3	MEA UNIT-HOLDER TR:R	007N01116	1	
3-1	SPRING-PLATE TR		1	NOT SPARED
3-2	SPRING-TR_R		1	NOT SPARED
3-3	PMO-BUSH		1	NOT SPARED
3-4	PMO-HOLDER TR R		1	NOT SPARED
4	MEA UNIT-HOLDER TR:L	007N01363	1	
4-1	SPRING-TR_L		1	NOT SPARED
4-2	PMO-BUSH		1	NOT SPARED
4-3	PMO-HOLDER TR L		1	NOT SPARED
5	GEAR-TRANSFER	007N01114	1	
6	PMO-LOCKER SIDE R	019N00619	1	
7	PMO-LOCKER OPEN	019N00620	1	
8	SPRING-LOCKER TORSION	009N01366	1	
9	SPRING-FEED	022N01476	2	
10	MEA RACK-TRAY ASS'Y	002N02011	1	
10-1	PMO-TRAY CASE, MP		1	NOT SPARED
10-2	PMO-SIDE EXIT, MP		1	NOT SPARED
10-3	PMO-SIDE GUIDE, MP		1	NOT SPARED
10-4	PMO-TRAY COVER, MP		1	NOT SPARED
10-5	IPR-GUIDE LATCH, MP		1	NOT SPARED
10-6	PMO-TRAY LINK,MP	012N00139	1	



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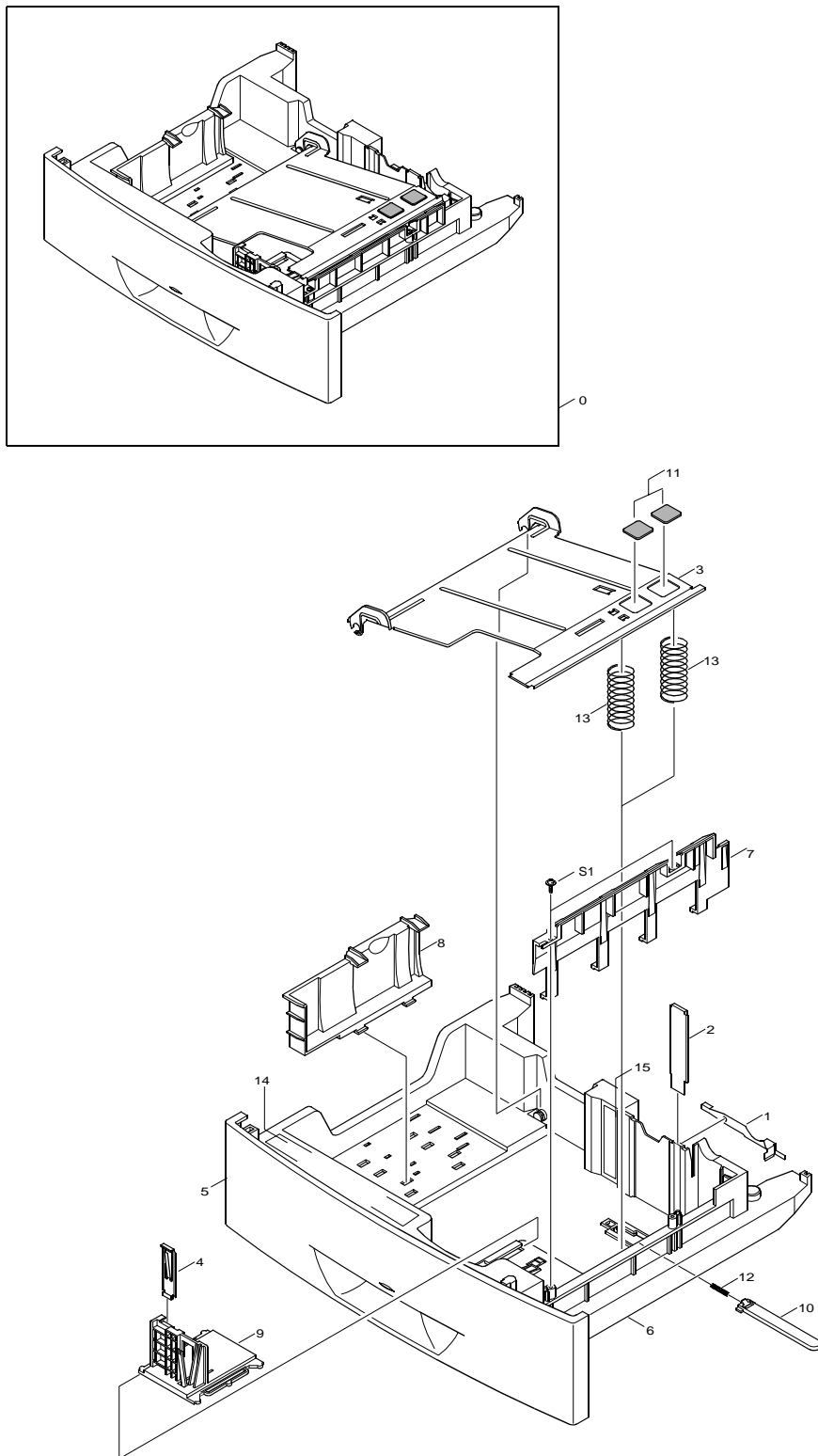
**Side Cover Assembly Parts List (Cont.)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
11	CBF HARNESS-OPE GND		1	NOT SPARED
11-1	PMO-GUIDE DP SIDE		1	NOT SPARED
12	PMO-TIE STOPPER	120N00394	2	
13	IPR-BRKT GROUND B		1	NOT SPARED
14	IPR-BRKT GROUND TR		1	NOT SPARED
15	IPR-BRKT GROUND A		1	NOT SPARED
16	IPR-BRACKET GUIDE B		1	NOT SPARED
17	PMO-BUSHING FEED		1	NOT SPARED
18	IPR-PLATE SAW		2	NOT SPARED
19	PMO-FEED FRAME		1	NOT SPARED
20	PMO-HOLDER SAW		1	NOT SPARED
21	IPR-BRACKET GUIDE A		1	NOT SPARED

NOTE: For WorkCentre M15/M15i unique spare parts, refer to parts list 8-25.

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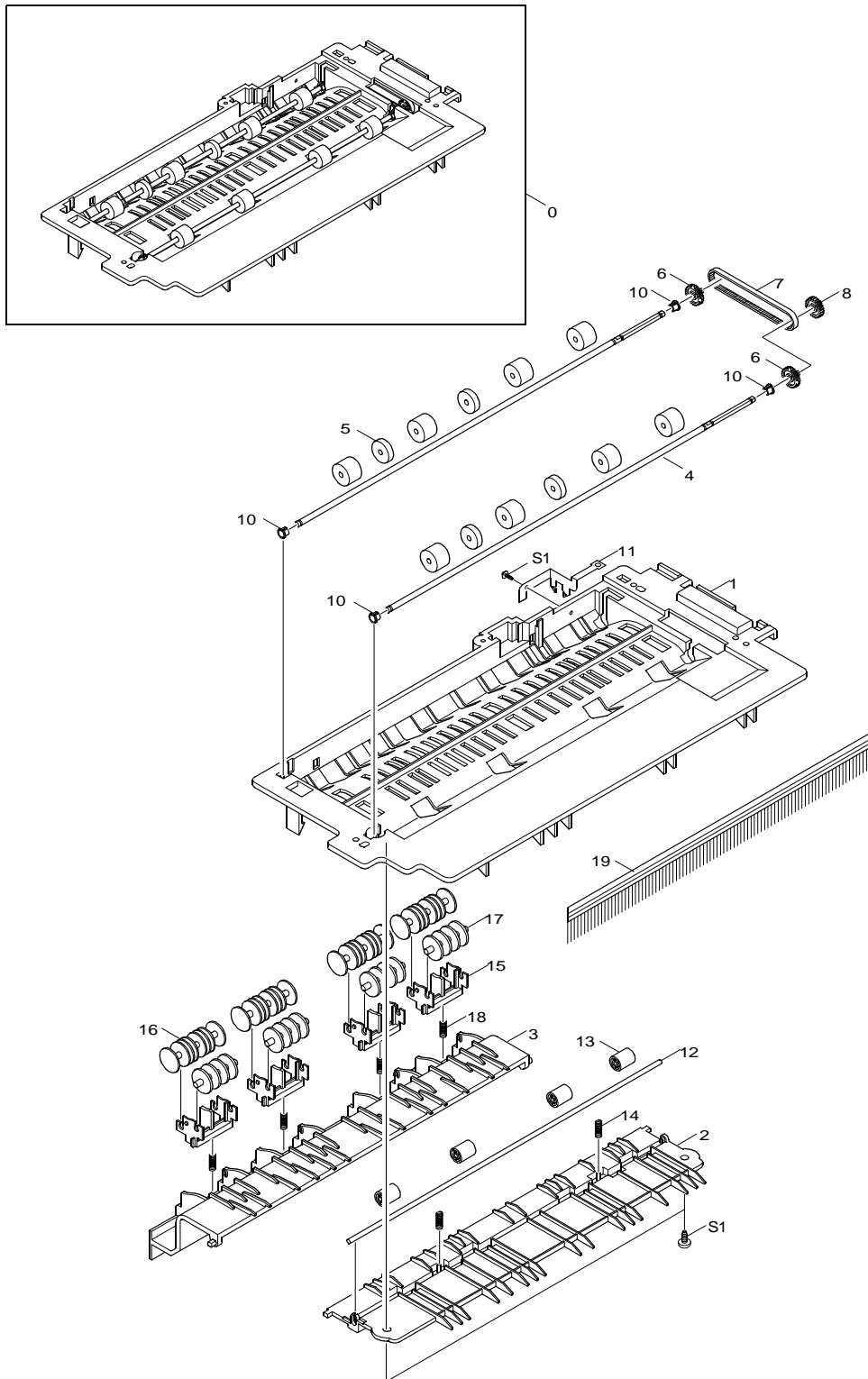
## 8-5. Cassette Assembly Exploded View & Parts List



**8-5-1 Cassette Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	MEC-CASSETTE ASS'Y	050N00393	1	
1	IPR-FINGER		1	NOT SPARED
2	IPR-GUIDE PLT PAPER		1	NOT SPARED
3	IPR-PLATE K/UP		1	NOT SPARED
4	IPR-SPR PLT G/SIDE	015N00437	1	
5	PMO-COVER CASSETTE		1	NOT SPARED
6	PMO-FRAME CASSETTE		1	NOT SPARED
7	PMO-GUIDE FRONT CST		1	NOT SPARED
8	PMO-GUIDE REAR	032N00351	1	
9	PMO-GUIDE/SIDE CST	032N00352	1	
10	PMO-LOCKER PLATE	015N00438	1	
11	PRP-PAD CAST	019N00611	2	
12	SPRING-LOCKER PLATE	015N00439	1	
13	SPRING-PLATE K/UP	015N00435	2	
14	LABEL(R)-INSTRUCTION CST		1	NOT SPARED
15	LABEL(R)-HEIGHT CST		1	NOT SPARED
S1	SCREW-TAPTITE		5	NOT SPARED

## 8-6. Exit Assembly Exploded View & Parts List

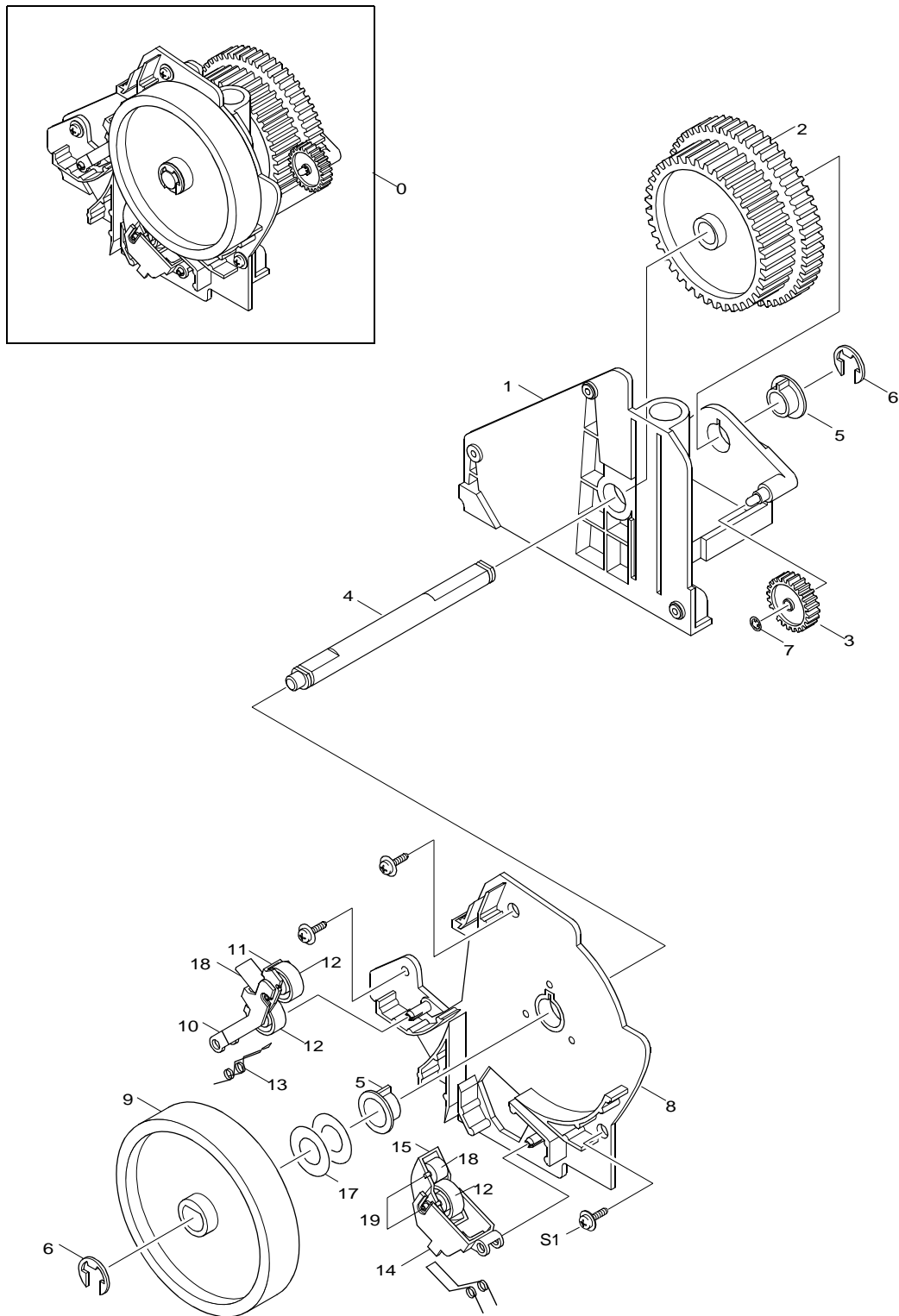


**8-6-1. Exit Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	MEC-EXIT ASS'Y	600N01736	1	
1	PMO-GUIDE-EXIT UPPER		1	NOT SPARED
2	PMO-GUIDE-EXIT LOWER		1	NOT SPARED
3	PMO-GUIDE-JAM REMOVE		1	NOT SPARED
4	MEC-ROLLER EXIT DRV	007N01115	2	
5	PMO-ROLLER DECURL	022N01474	4	
6	PMO-PULLEY DUPLEX		2	NOT SPARED
7	BELT-TIMING GEAR		1	NOT SPARED
8	GEAR-DUPLEX		1	NOT SPARED
9	PMO-BEARING LARGE DP	013N00514	1	
10	PMO-BEARING LARGE DP	013N00514	4	
11	IPR-GROUND-EXIT		1	NOT SPARED
12	ICT-SHAFT-EXIT LOWER ID		1	NOT SPARED
13	PMO-ROLLER_EXIT		4	NOT SPARED
14	SPRING-EXIT ROLL FD		2	NOT SPARED
15	PMO-HOLDER EXIT ROLL		4	NOT SPARED
16	PMO-ROLLER FD F		4	NOT SPARED
17	PMO-ROLLER FD R		4	NOT SPARED
18	SPRING-EXIT LOWER IDLE		4	NOT SPARED
19	MEC- BRUSH ANTISTATIC	115N00354	1	
S1	SCREW-TAPTITE		3	NOT SPARED

NOTE: For FaxCentre F12 unique spare parts, refer to parts list 8-19.

## 8-7. Feeder Assembly Exploded View & Parts List

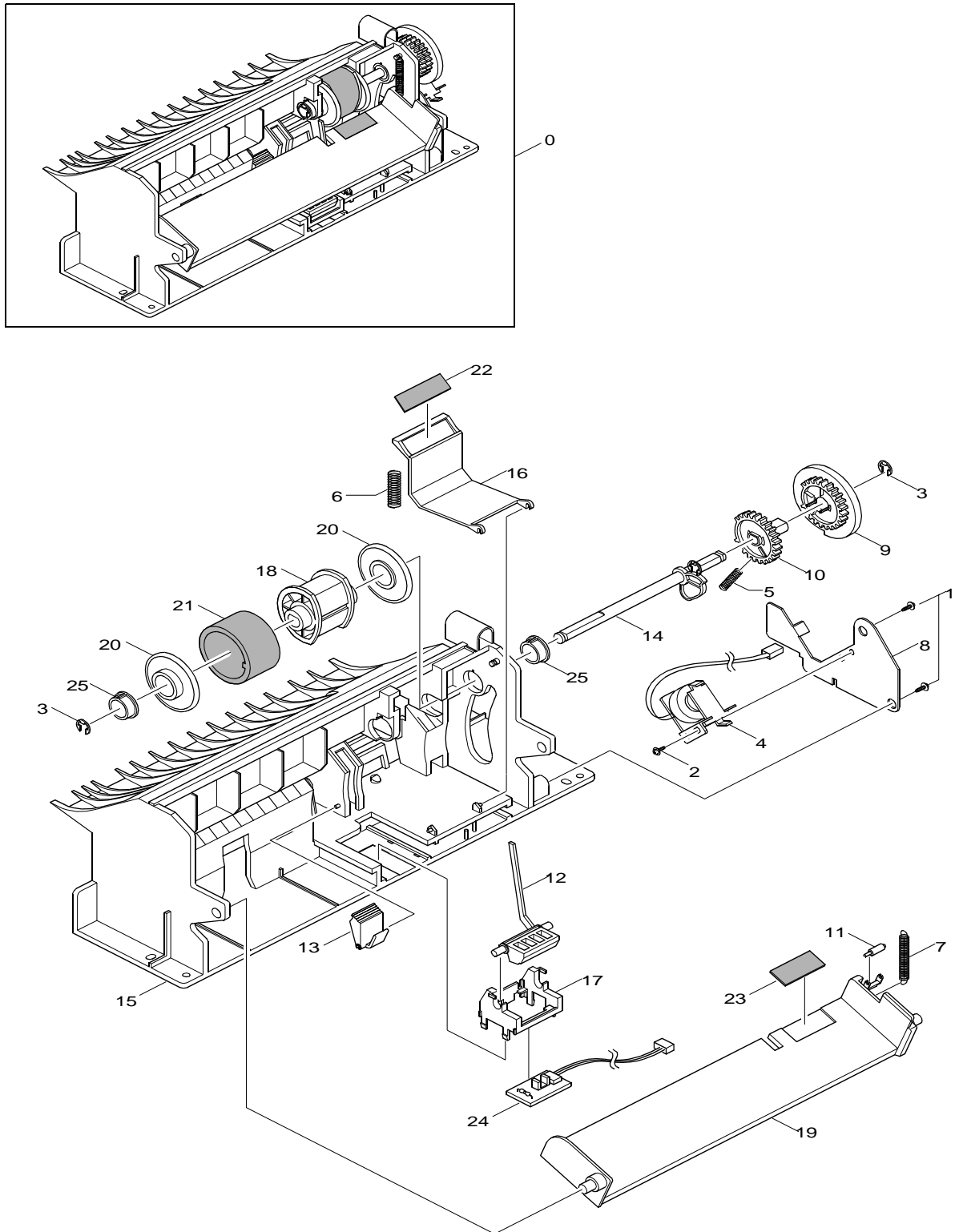


**8-7-1 Feeder Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	MEC-FEED ASS'Y	022N01472	1	
1	PMO-FRAME FEED		1	NOT SPARED
2	GEAR-FEED		1	NOT SPARED
3	GEAR-MP/DUP DRV		1	NOT SPARED
4	ICT-SHAFT FEED		1	NOT SPARED
5	PMO-BUSHING_P/U,MP	013N00515	1	
6	E-RING		1	NOT SPARED
7	C-RING		1	NOT SPARED
8	PMO-BRKT FEED		1	NOT SPARED
9	PMO-ROLLER FEED	022N01470	1	
10	PMO-HOLDER PINCH C		1	NOT SPARED
11	PMO-HOLDER PINCH SUB		1	NOT SPARED
12	PMO-ROLLER FEED L		3	NOT SPARED
13	SPRING-FEED CAST		1	NOT SPARED
14	PMO-HOLDER PINCH M		1	NOT SPARED
15	PMO-SUB HOLDER FEED		1	NOT SPARED
16	SPRING-FEED MP		1	NOT SPARED
17	WASHER-PLAIN		2	NOT SPARED
18	PMO-ROLLER FEED S		1	NOT SPARED
19	IPR-SHAFT FEED IDLER		4	NOT SPARED
S1	SCREW-TAPTITE		3	NOT SPARED



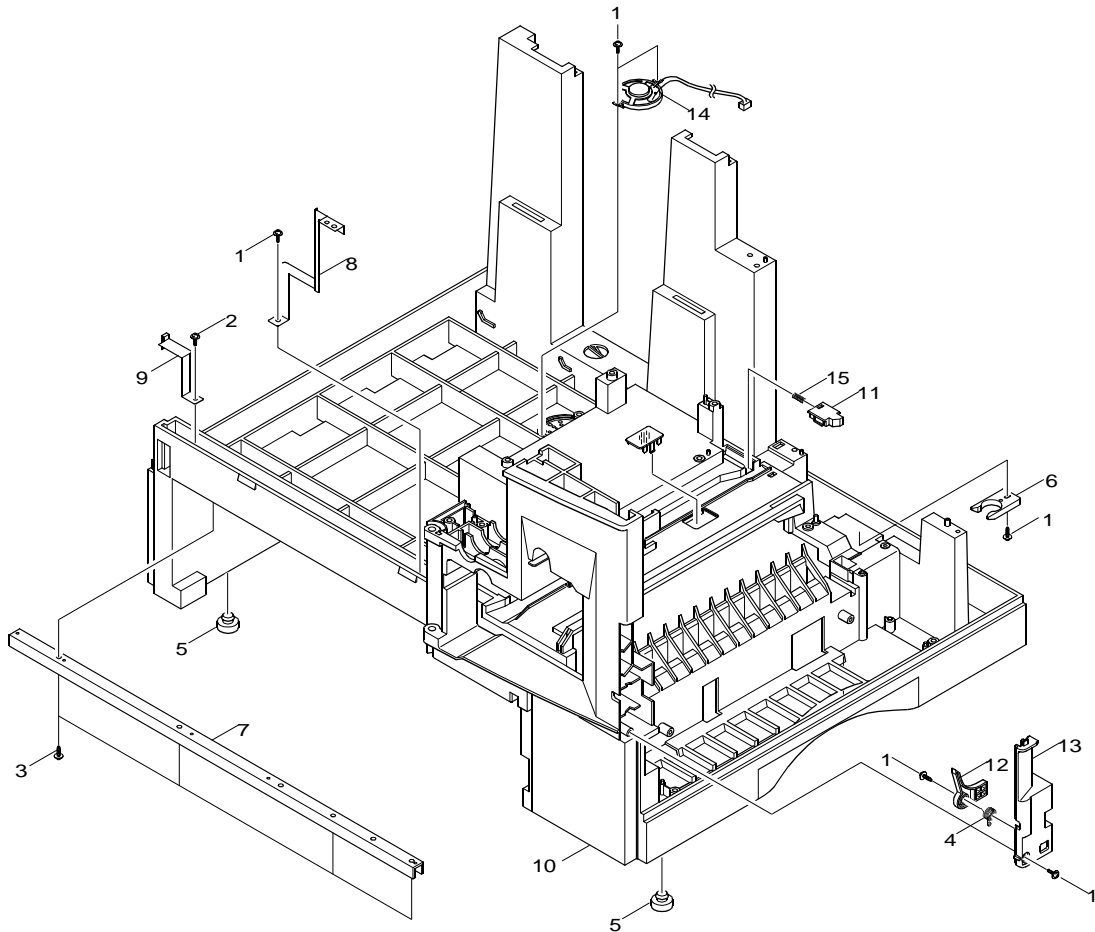
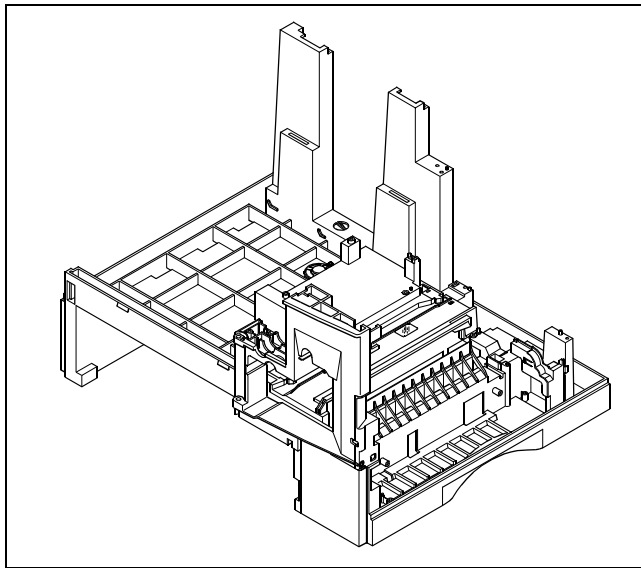
## 8-8. MP Assembly Exploded View & Parts List



**8-8-1 MP Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-MP ASS'Y	600N01741	1	
1	SCREW-TAPTITE		2	NOT SPARED
2	SCREW-TAPTITE		1	NOT SPARED
3	RING-E	005N00781	2	
4	SOLENOID-MP	121N00595	1	
5	SPRING--CAM MP	009N01364	1	
6	SPRING-PICK UP MP		1	NOT SPARED
7	SPRING-KNOCKUP,MP	009N01365	1	
8	IPR-BRACKET SOLENOIDE		1	NOT SPARED
9	PMO-HOLDER CAM MPF		1	NOT SPARED
10	PMO-GEAR P/U MPF		1	NOT SPARED
11	PMO-ROLLER CAM.MP		1	NOT SPARED
12	PMO-ACTUATOR,MP	120N00392	1	
13	PMO-ADJUSTER,MP	022N01479	1	
14	PMO-CAM PICK UP,MP	022N01480	1	
15	PMO-FRAME,MP		1	NOT SPARED
16	PMO-HOLDER PAD,MP	019N00613	1	
17	PMO-HOLDER SENSOR,MP	130N01206	1	
18	PMO-HOUSING PICK UP,MP		1	NOT SPARED
19	PMO-PLATE KNOCK UP,MP		1	NOT SPARED
20	PMO-IDLE PICK UP MP	013N00516	2	
21	RPR-RUBBER PICK UP,MP		1	NOT SPARED
22	RPR-RCT-PAD-PICKUP,MP	019N00612	1	
23	RPR-PAD KNOCK UP MP	019N00614	1	
24	PBA SUB-MP SEN	130N01203	1	
25	PMO-BUSHING PICKUP,MP	013N00515	1	
26	A/S MATERAL-PICKUP,MP	022N01483	1	

## 8-9. Base Frame Exploded View & Parts List

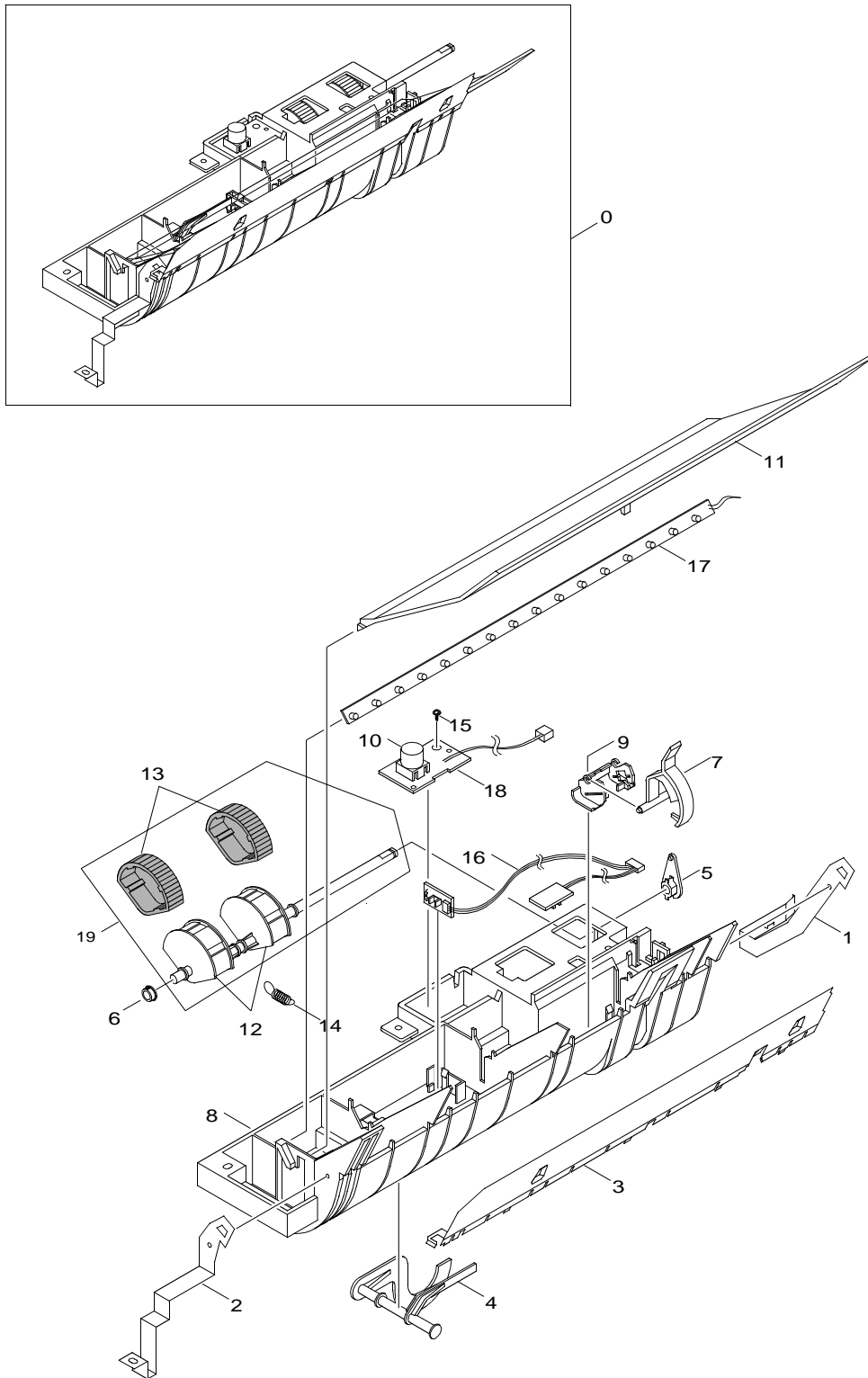


**8-9-1 Base Frame Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-BASE FRAME ASS'Y		1	NOT SPARED
1	SCREW-TAPTITE		5	NOT SPARED
2	SCREW-TAPTITE		2	NOT SPARED
3	SCREW-TAPTITE		4	NOT SPARED
4	SPRING-TORSION		1	NOT SPARED
5	FOOT-RUBBER	017N00212	2	
6	CAM-CATCH	003N00867	1	
7	IPR-CHANNEL BASE FRAME		1	NOT SPARED
8	IPR-GROUND PLATE A(OPC)	015N00440	1	
9	IPR-GROUND PLATE B(BASE)	015N00441	1	
10	PMO-BASE FRAME		1	NOT SPARED
11	PMO-BRACKET PUSH DEVE		2	NOT SPARED
12	PMO-BRACKET SIDE OPEN	030N00606	1	
13	PMO-COVER FRONT DUMMY		1	NOT SPARED
14	ELA M/MEDIO AUD-SPEAKER	130N01213	1	
15	SPRING-DEVE		2	NOT SPARED

NOTE: For FaxCentre F12 unique spare parts, refer to parts list 8-20.

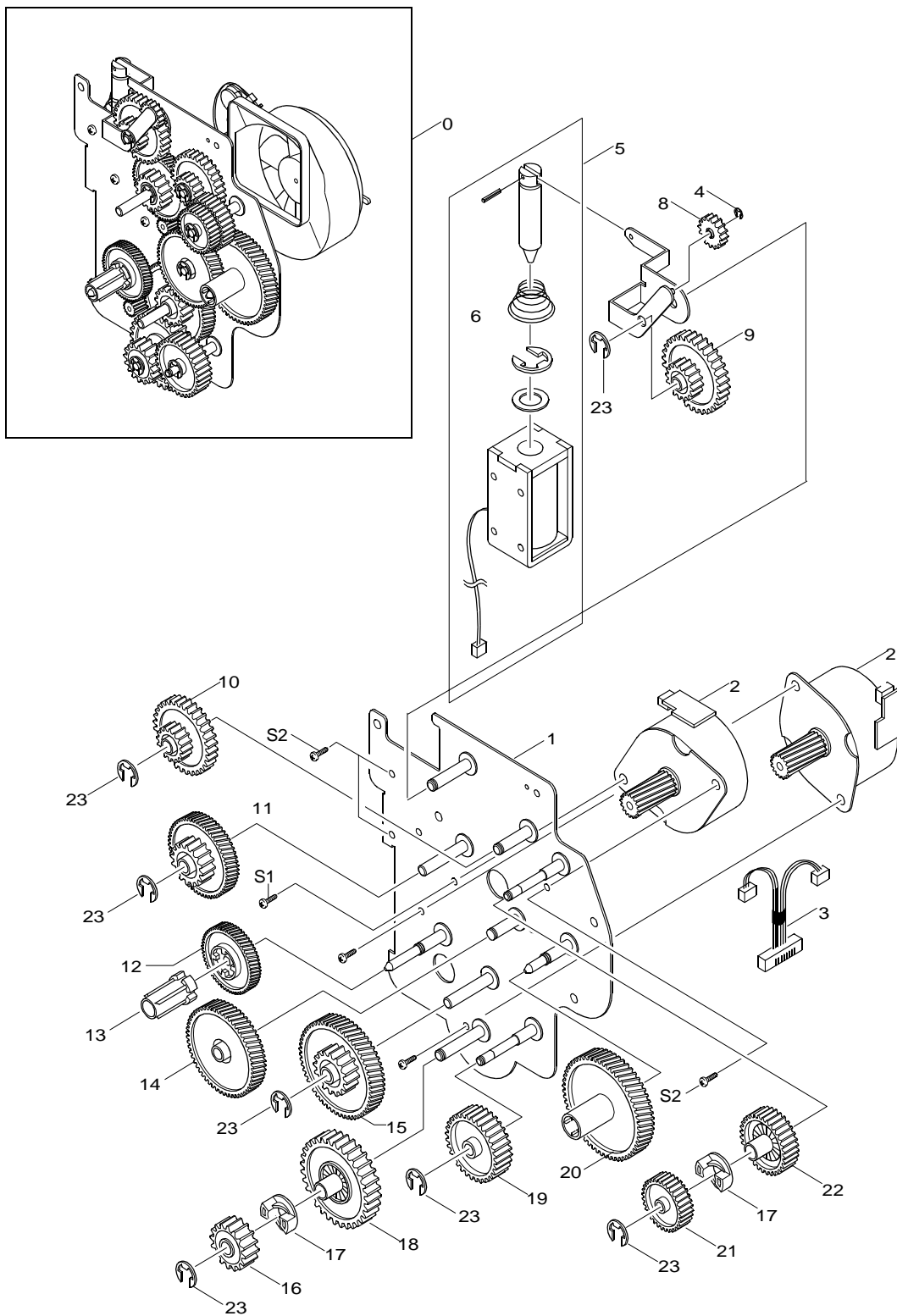
## 8-10. Pick-up Assembly Exploded View & Parts List



**8-10-1 Pick-up Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-PICKUP ASS'Y	022N01485	1	
1	IPR-GND FEED		1	NOT SPARED
2	IPR-GND INPUT	152N01895	1	
3	IPR-GUIDE INPUT	022N01481	1	
4	PMO-ACTUATOR EMPTY	120N00393	1	
5	PMO-BEARING SHAFT	006N01093	1	
6	PMO-BUSHING PICK UP MP	013N00515	1	
7	PMO-FEED SENSOR		1	NOT SPARED
8	PMO-GUIDE PAPER		1	NOT SPARED
9	PMO-HOLDER SENSOR FEED		1	NOT SPARED
10	PMO-LENS TONER SENSOR		1	NOT SPARED
11	PMO-PTL PATH		1	NOT SPARED
12	PMO-SHAFT PICK UP		1	NOT SPARED
13	RPR-RUBBER PICK UP	022N01477	2	
14	SPRING-PICKUP	009N01362	1	
15	SCREW-TAPTITE		1	NOT SPARED
16	PBA SUB-FEED+P.EMP SEN.	130N01204	1	
17	PBA SUB-PTL	140N05940	1	
18	PBA SUB-TONER_TX	130N01207	1	
19	A/S MATERAL-PICKUP,CST	022N01484	1	

## 8-11. Drive Assembly Exploded View & Parts List



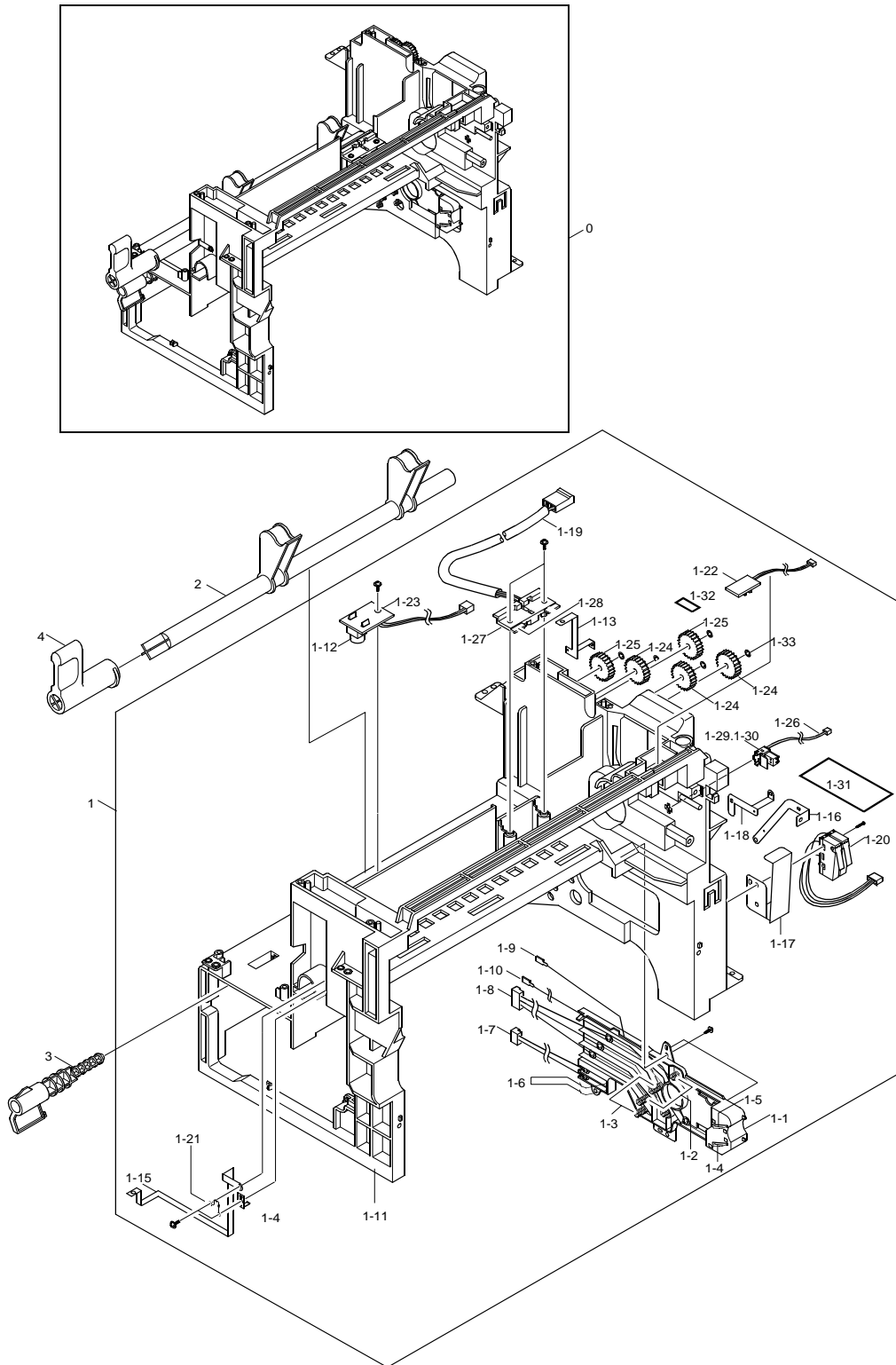
**8-11-1 Drive Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-DRIVE ASS'Y	007N01117	1	
1	IPR-BRKT MOTOR		1	NOT SPARED
2	MOTOR-STEP	127N01378	2	
3	HARNESS-MOTOR		1	NOT SPARED
4	RING-E		1	NOT SPARED
5	SOLENOID-DUPLEX	121N00596	1	
6	SPRING SOLENOID DP		1	NOT SPARED
7	IPR-LINK SOLENOID		1	NOT SPARED
8	GEAR-EXIT/U,ID		1	NOT SPARED
9	GEAR-SWING DRV		1	NOT SPARED
10	GEAR-35/19		1	NOT SPARED
11	GEAR-71/23		1	NOT SPARED
12	GEAR-DEVE DRV		1	NOT SPARED
13	PMO-DEV/COUPLING		1	NOT SPARED
14	GEAR-RDCN,OPC		1	NOT SPARED
15	GEAR-86/23		1	NOT SPARED
16	GEAR-RDCN FEED OUTER		1	NOT SPARED
17	GEAR-HUB CLUTCH		2	NOT SPARED
18	GEAR-RDCN FEED INNER		1	NOT SPARED
19	GEAR-FEED DRV		1	NOT SPARED
20	GEAR-OPC DRV		1	NOT SPARED
21	GEAR-GEAR FUSER DRV OUTER		1	NOT SPARED
22	GEAR-FUSER DRV INNER		1	NOT SPARED
23	RING-E		8	NOT SPARED
S1	SCREW-TAPTITE		5	NOT SPARED
S2	SCREW-TAPTITE		7	NOT SPARED

NOTE: For WorkCentre M15/M15i unique spare parts, refer to parts list 8-26.



## 8-12. Main Frame Assembly Exploded View & Parts List



## 8-12-1 Main Frame Assembly Parts List

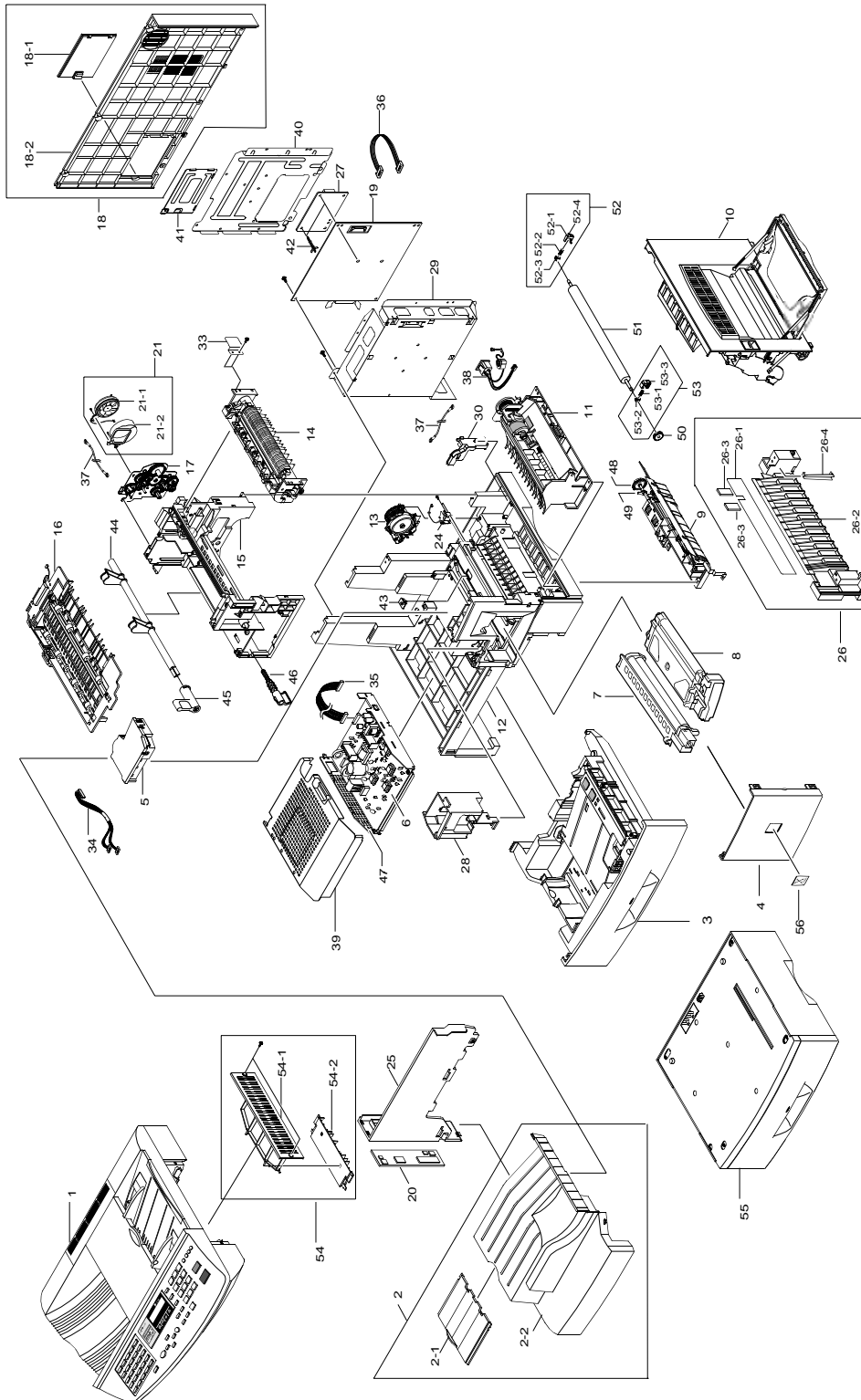
ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	ELA HOU-FRAME MAIN ASS'Y	600N01743	1	
1-1	PMO-HOUSING TERMINAL	116N00227	1	
1-2	IPR-TERMINAL BLADE		2	NOT SPARED
1-3	IPR-TERMINAL SUPPLY		2	NOT SPARED
1-4	IPR-TERMINAL TR		1	NOT SPARED
1-5	IPR-TERMINAL GND		1	NOT SPARED
1-6	IPR-TERMINAL DEVE KEY		2	NOT SPARED
1-7	CBF-HARNESS;MAIN-DEV_KEY		1	NOT SPARED
1-8	CBF-HARNESS; HVPS OUTPUT-FRAME		5	NOT SPARED
1-9	CBF-HARNESS;MAIN-THV		1	NOT SPARED
1-10	CBF-HARNESS;MAIN-MHV		1	NOT SPARED
1-11	PMO-FRAME MAIN		1	NOT SPARED
1-12	PMO-LENS TONER SENSOR		2	NOT SPARED
1-13	IPR-GND EXIT		1	NOT SPARED
1-14	IPR-GND OPC		1	NOT SPARED
1-15	IPR-GND OPC BASE		1	NOT SPARED
1-16	IPR-GND FUSER		1	NOT SPARED
1-17	IPR-GUARD C/O S/W		1	NOT SPARED
1-18	IPR-GND TERMINAL		1	NOT SPARED
1-19	CBF HARNESS-;FUSER(2PIN,550mm)		1	NOT SPARED
1-20	CBF-HARNESS;SWITCH-MICRO	110N01041	2	
1-21	CBF-HARNESS MOTOR		1	NOT SPARED
1-22	PBA SUB-EXIT SENSOR	130N01205	1	
1-23	PBA SUB-TONER_RX	130N01208	1	
1-24	GEAR-EXIT/U,ID		3	NOT SPARED
1-25	GEAR-EXIT,IDLE(Z17)		2	NOT SPARED
1-26	CBF-HARNESS THERMISTOR_JOINT	011N00463	1	
1-27	PMO-HOUSING TERMINAL	116N00227	1	
1-28	IPR-TERMINAL FU		2	NOT SPARED
1-29	PMO-CAP CONNECTOR L	113N00364	1	
1-30	PMO-CAP CONNECTOR U	113N00365	1	
1-31	CBF-HARNESS; RESISTOR ASS'Y (100Mohm)		1	NOT SPARED
1-32	SPRING-CLUTCH		2	NOT SPARED
1-33	RING-CS		5	NOT SPARED
S	NUT-HEXAGON		2	NOT SPARED
S	SCREW-TAPPING,M2x18		1	NOT SPARED
S	SCREW-ASS'Y MACH		2	NOT SPARED
S	SCREW-TAPTITE,M3x8 BLACK,BINDER		17	NOT SPARED
2	PMO-CAM JAM REMOVE	011N00464	1	
3	PMO-LOCKER DEVE	007N01118	1	
4	PMO-LEVER JAM REMOVE	011N00465	1	



**8-13-1 Fuser Assembly Parts List**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-FUSER(110V)ASS'Y	126N00182	1	110V
	ELA HOU-FUSER(220V)ASS'Y	126N00183	1	220V
1	PMO-UPPER FUSER		1	NOT SPARED
2	RMO-ROLLER HEAT		1	NOT SPARED
3	PMO-BEARING H/R-F		1	NOT SPARED
4	BEARING-H/R L		1	NOT SPARED
5	GEAR-FUSER	126N00184	1	
6	MEA RACK-CLAW ASS'Y		1	NOT SPARED
6-1	SPRING-SAPERATION		4	NOT SPARED
6-2	PMO-GUIDE CLAW		4	NOT SPARED
7			1	NOT SPARED
8	IPR-PIN ROLLER EXIT		2	NOT SPARED
9	NPR-ELECTRODE GEAR		1	NOT SPARED
10	NPR-ELECTRODE M		1	NOT SPARED
11	NPR-ELECTRODE F		1	NOT SPARED
12	THERMOSTAT	130N01214	1	
13	THERMISTOR-FUSER		1	NOT SPARED
14	LAMP-HALOGEN (110V)	122N00208	1	110V
	LAMP-HALOGEN(220V)	122N00209	1	220V
15	PMO-LOWER FUSER		1	NOT SPARED
16	PRESSURE ROLLER SPRING		2	NOT SPARED
17	BEARING-PRESSURE/R		2	NOT SPARED
18	RMO-ROLLER PRESSURE		1	NOT SPARED
19	PMO-LEVER JAM R		1	NOT SPARED
20	PMO-LEVER JAM F		1	NOT SPARED
21	PMO-GUIDE INPUT		1	NOT SPARED
22	IPR-GROUND FU		1	NOT SPARED
23	PMO-ACTUATOR EXIT		1	NOT SPARED
24	PMO-GUIDE DUPLEX		1	NOT SPARED
25	PMO-ARM ACTUATOR		1	NOT SPARED
26	SPRING-PR(7300)		2	NOT SPARED
27	LABEL(R)-HV FUSER		1	NOT SPARED
S1	SCREW-TAPTITE		8	NOT SPARED
S2	SCREW-TAPTITE		4	NOT SPARED

## 8-14. Main Exploded View & Parts List (FaxCentre F12)

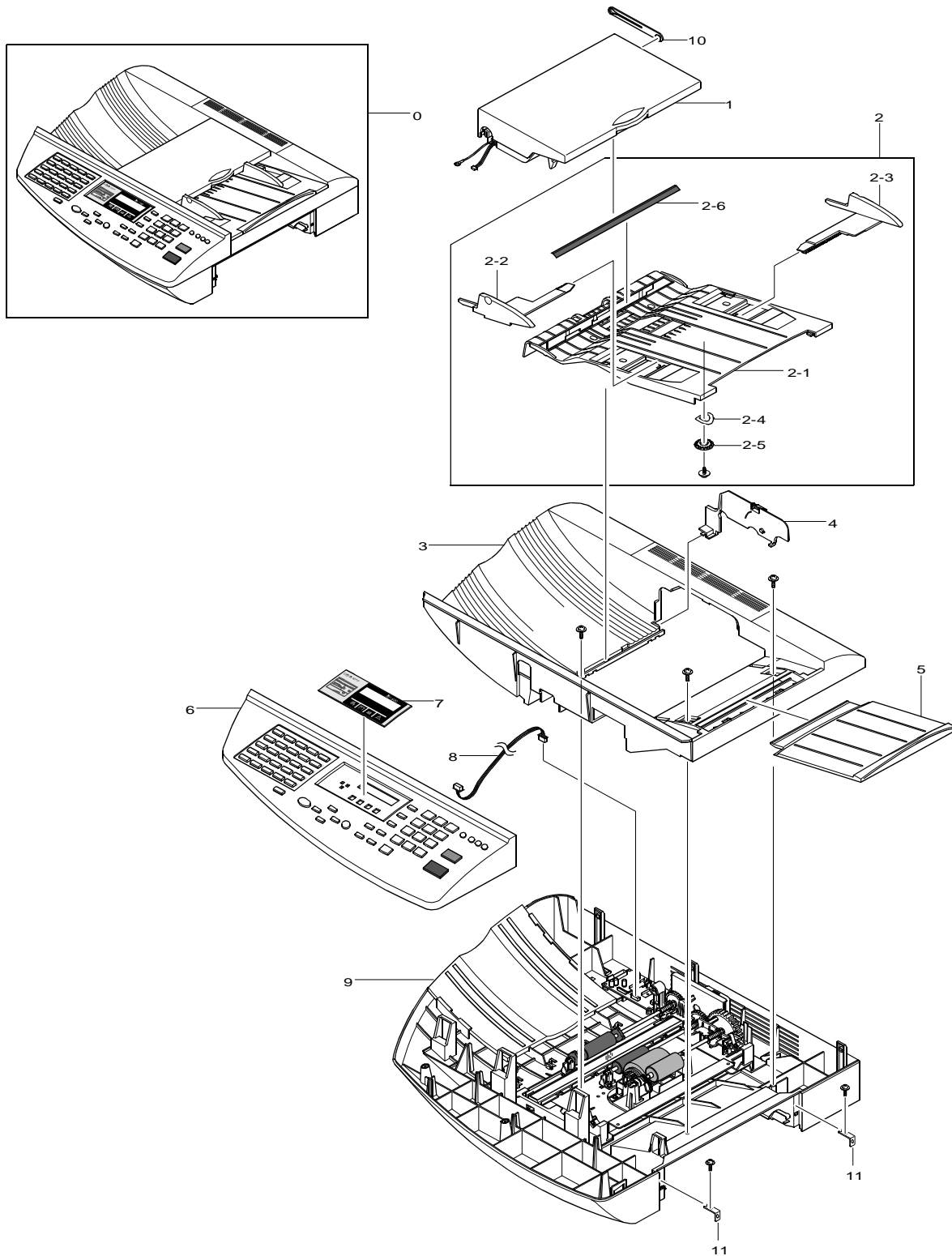


**8-14-1 Main Parts List (FaxCentre F12)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	AS-SCANNER ASS'Y	062N00242	1	835P/XAA
2	MEA UNIT-COVER PA EXIT ASS'Y	002N02107	1	
2-2	PMO-COVER PAPER EXIT	002N02108	1	
6	ELA ETC-SHIELD SMPS LOWER	055N00272	1	110V
16	MEC-UNIT EXIT ASS'Y	500N00100	1	
19	PBA MAIN-MAIN B'D	140N06056	1	<b>FAXCENTRE F12 ONLY</b>
26	MEA UNIT GUIDE CST PA ASS'Y	032N00376	1	
38	CBF HARNESS-INLET(KOR)	152N01987	1	
54	MEA ETC-COVER REAR ASS'Y		1	NOT SPARED
54-1	PMO-GUIDE-EXIT-OPEN	032N00377	1	
54-2	PMO-COVER REAR	002N02091	1	
56	NPR-NAME/PLATE XRX	015N00436	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-1.

## 8-15. Scanner Assembly Exploded View & Parts List (FaxCentre F12)

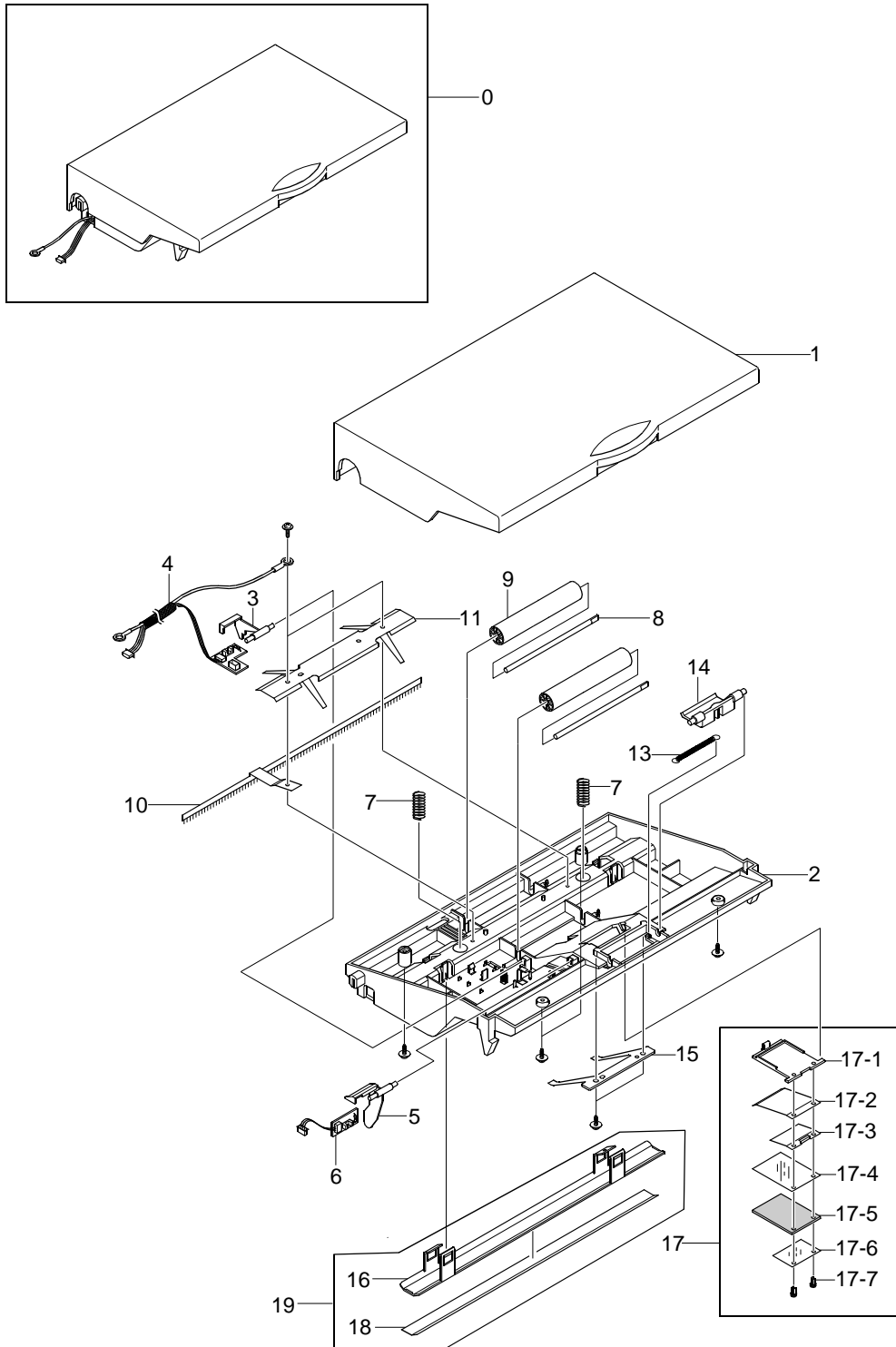


**8-15-1 Scanner Assembly Parts List (FaxCentre F12)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	AS SCANNER ASS'Y		1	NOT SPARED
1	ELA HOU-ADF UPPER ASS'Y	002N02092	1	
2	MEA HOU-GUIDE LOWER ASS'Y	002N02093	1	
2-1	PMO-GUIDE LOWER	032N00378	1	
2-2	PMO-GUIDE DOC R	032N00379	1	
2-3	PMO-GUIDE DOC L	032N00380	1	
2-4	IPR-WASHER SPRING CU	009N01406	1	
2-5	GEAR-PINION	007N01178	1	
2-6	PPR-FILM CIS	063N00095	1	
3	PMO-HOUSING UPPER ADF	002N02094	1	
4	PMO-COVER GEAR	002N02095	1	
5	PMO-TRAY INPUT DOC	050N00411	1	
6	AS ELA HOU-OPE ASS'Y		1	NOT SPARED
7	PCT-COVER LCD	002N02096	1	
8	CBF HARNESS-OPE		1	NOT SPARED
9	AS-HOU LOWER ASS'Y	002N02097	1	
10	PMO-TRAY LINK, MP		1	NOT SPARED
11	IPR B/K JOINT COVER	002N02098	2	



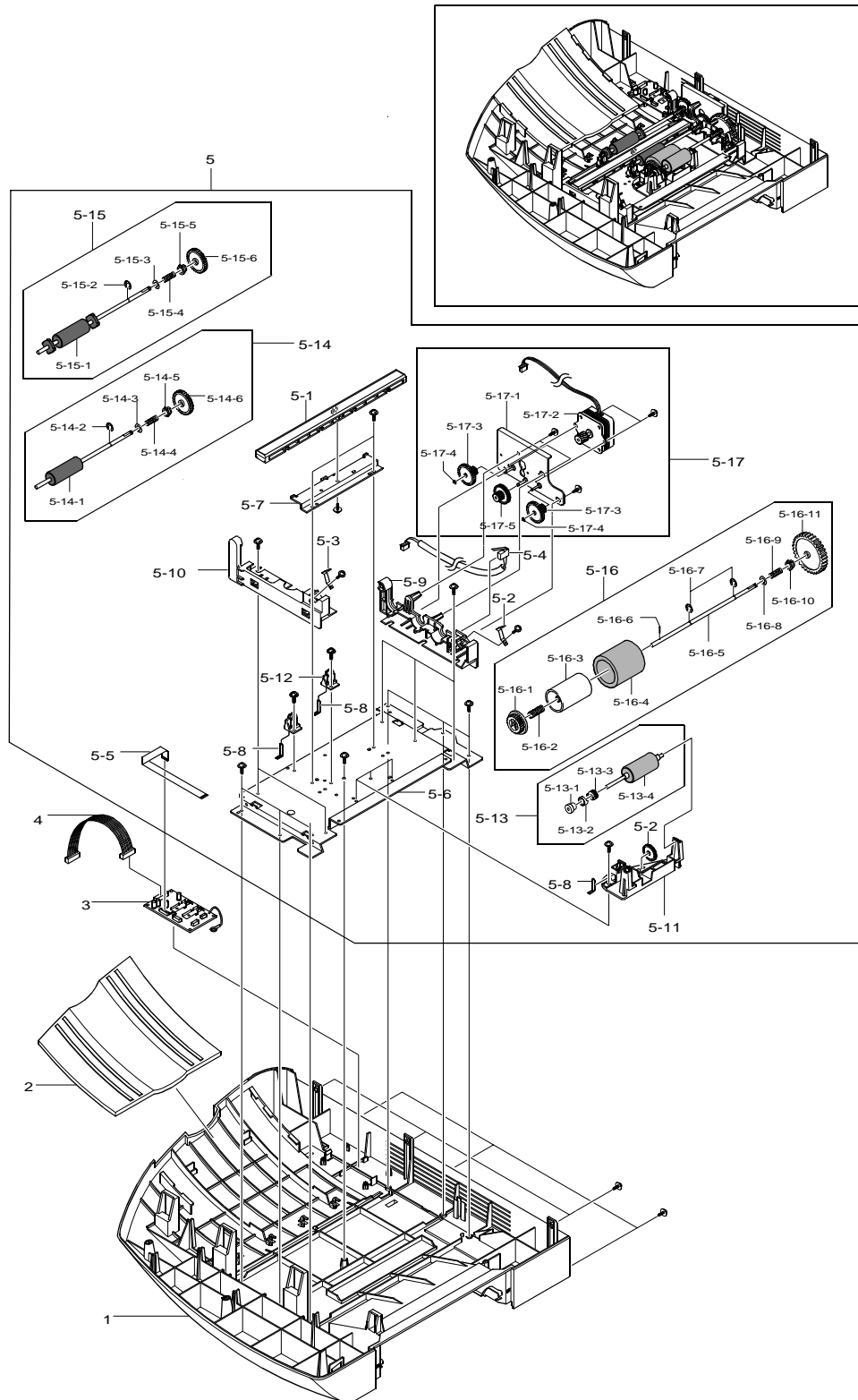
## 8-16. ADF Upper Ass'y Exploded View & Parts List (FaxCentre F12)



**8-16-1 ADF Upper Assembly Parts List (FaxCentre F12)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	PMO-COVER TOP	002N02099	1	
2	PMO-GUIDE UPPER	032N00376	1	
3	PMO-ACTUATOR SCAN	120N00411	1	
4	CBF HARNESS-ADF POS SCAN ASS'Y	152N01988	1	
5	PMO-ACTUATOR DOC	120N00412	1	
6	PBA SUB-ADF DET SEN		1	NOT SPARED
7	SPRING ETC-PICK UP MP	009N01407	2	
8	ICT-SHAFT IDLE ROLLER	022N01559	2	
9	MEC IDLE ROLLER	022N01560	2	
10	MEC-BRUSH ANTISTATIC		1	NOT SPARED
11	IPR-SPRING IDLE ROLLER	022N01561	1	
12	IPR-GROUND EXTENSION	001N00396	1	
13	SPRING ETC-PAPER OUT	009N01408	1	
14	PMO-HOLDER PICK UP	019N00660	1	
15	PMO-SPRING ADF SET	009N01409	1	
16	IPR-BRKT WHITE BAR		1	NOT SPARED
17	MEA HOU-PRESSER ADF ASSY	002N02100	1	
17-1	PMO-HOLDER ADF		1	NOT SPARED
17-2	IPR-SPRING ADF1		1	NOT SPARED
17-3	IPR-SPRING ADF2		1	NOT SPARED
17-4	PPR-FILM ADF2		1	NOT SPARED
17-5	SILICON/RUBBER-PAD ADF		1	NOT SPARED
17-6	PPR-FILM ADF1		1	NOT SPARED
17-7	RIVET-SNAP		2	NOT SPARED
18	PPR-WHITE BAR SHEET		1	NOT SPARED
19	IPR-WHITEBAR	025N00079	1	

## 8-17. Scan Lower Ass'y Exploded View & Parts List (FaxCentre F12)



**8-17-1 Scan Lower Assembly Parts List (FaxCentre F12)**

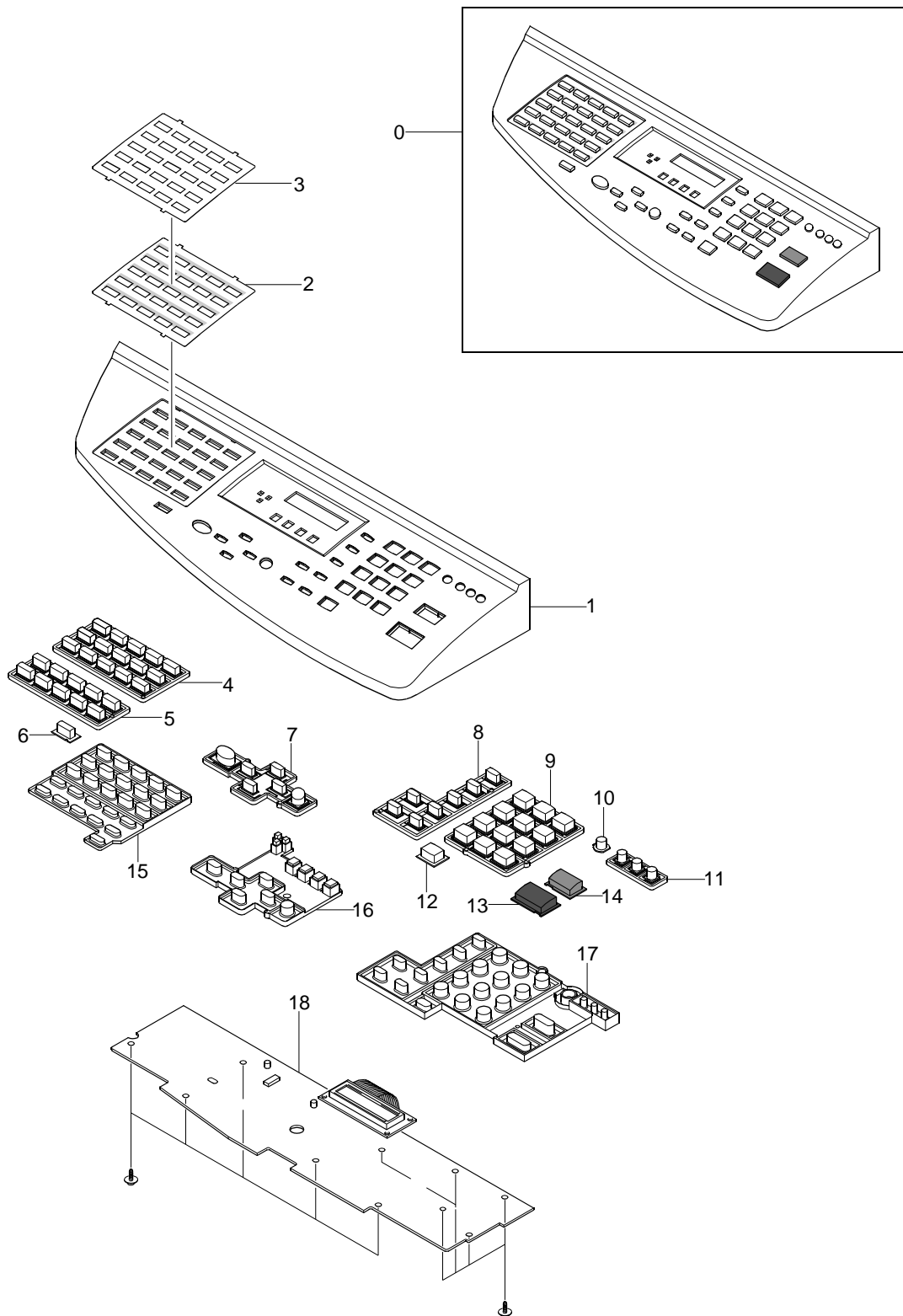
ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	PMO-HOUSING LOWER ADF	002N02101	1	
2	PMO-TRAY EXIT DOC	050N00412	1	
3	AS-SCAN PBA	140N06057	1	
4	CBF HARNESS-MAIN-ENGINE	152N01989	1	
5	AS-ADF LOWER ASSY	022N01562	1	
5-1	CONTACT IMAGE SENSOR	130N01251	1	
5-2	GEAR-PICK UP IDEL 38	007N01179	1	
5-3	IPR-LOKER TX	130N01252	2	
5-4	CBF HARNESS-COVER SW	152N01990	1	
5-5	CBF FLAT CBL-FFC	117N01593	1	
5-6	IPR-BRKT BASE	030N00630	1	
5-7	IPR-BRKT CIS	030N00631	1	
5-8	IPR-GROUND SHAFT	006N01183	3	
5-9	PMO-FRAME SIDE L	001N00397	1	
5-10	PMO-FRAME SIDE R	001N00398	1	
5-11	PMO-BRACKET PICK UP	030N00632	1	
5-12	PMO-HOLDER SHAFT	019N00661	2	
5-13	MEA HOU-PICK UP ASS'Y	002N02102	1	
5-13-1	PMO-BUSHING PICK UP		1	NOT SPARED
5-13-2	PMO-PICK UP CLUTCH SUB		1	NOT SPARED
5-13-3	GEAR-PICK UP		1	NOT SPARED
5-13-4	MEC-ROLLER PICK UP		1	NOT SPARED
5-14	MEA HOU-ROLLER SCAN ASS'Y	002N02103	1	
5-14-1	MEC-ROLLER SCAN		1	NOT SPARED
5-14-2	RING-E		1	NOT SPARED
5-14-3	WASHER-PLAIN		1	NOT SPARED
5-14-4	SPRING ETC-SHAFT		1	NOT SPARED
5-14-5	PMO-BUSHING SHAFT		1	NOT SPARED
5-14-6	GEAR-AGITATOR_1		1	NOT SPARED
5-15	MEA ETC-ROLLER EXIT ASS'Y	022N01563	1	
5-15-1	MEC-ROLLER EXIT		1	NOT SPARED
5-15-2	RING-E		1	NOT SPARED
5-15-3	WASHER-PLAIN		1	NOT SPARED
5-15-4	SPRING ETC-SHAFT		1	NOT SPARED
5-15-5	PMO-BUSHING SHAFT		1	NOT SPARED
5-15-6	GEAR-AGITATOR_1		1	NOT SPARED

**8-17-1 Scan Lower Assembly Parts List (FaxCentre F12) (Cont.)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
5-16-1	GEAR-ADF ROLL		1	NOT SPARED
5-16-2	SPRING ETC-CLUTCH		1	NOT SPARED
5-16-3	PMO-SLEEVE ADF		1	NOT SPARED
5-16-4	MEC-ROLLER ADF		1	NOT SPARED
5-16-5	ICT-SHAFT ADF		1	NOT SPARED
5-16-6	ICT-PIN ADF		1	NOT SPARED
5-16-7	RING-E		2	NOT SPARED
5-16-8	WASHER-PLAIN		1	NOT SPARED
5-16-9	SPRING ETC-SHAFT		1	NOT SPARED
5-16-10	PMO-BUSHING SHAFT		1	NOT SPARED
5-16-11	GEAR-ADF	007N01180	1	
5-17	AS-MOTOR ASSY	127N01419	1	
5-17-1	IPR-BRKT GEAR		1	NOT SPARED
5-17-2	MOTOR-STEPPING HELICAL		1	NOT SPARED
5-17-3	GEAR-REDUCTION 45/19		2	NOT SPARED
5-17-4	RING-C		2	NOT SPARED
5-17-5	GEAR-RDCN 4316		1	NOT SPARED

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## 8-18. OPE Assembly Exploded View & Parts List (FaxCentre F12)

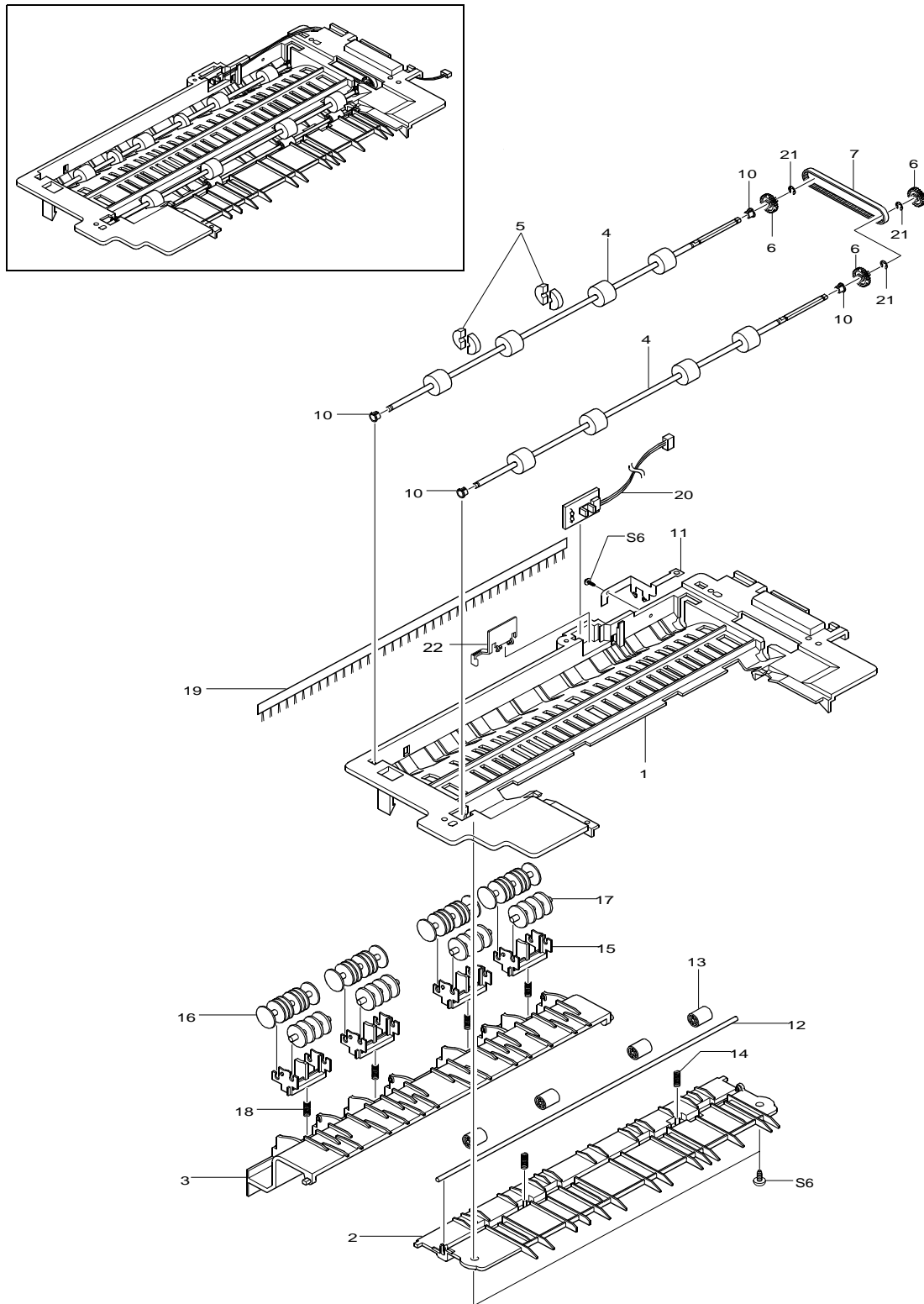


**8-18-1 OPE Assembly Parts List (FaxCentre F12)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	AS-OPE-ASS'Y	002N02105	1	
1	PMO-OPE COVER	002N02106	1	
2	PCT-PAPER MEMORY	091N00691	1	
3	PCT-CARD MEMORY	091N00692	1	
4	PMO-KEY MEMORY(A)	029N00306	1	
5	PMO-KEY MEMORY(B)	029N00307	1	
6	PMO-KEY SHIFT	029N00308	1	
7	PMO-KEY SCROLL	029N00322	1	
8	PMO-KEY FUNCTION	029N00310	1	
9	PMO-KEY TEL	029N00311	1	
10	PMO-KEY SAVE(T)	029N00312	1	
11	PMO-KEY SAVE	029N00313	1	
12	PMO-KEY OHD	029N00323	1	
13	PMO-KEY START	029N00315	1	
14	PMO-KEY STOP	029N00316	1	
15	RMO-KEY RUBBER MEMORY	029N00317	1	
16	RMO-KEY RUBBER NAVI	029N00318	1	
17	RMO-KEY RUBBER TEL	029N00319	1	
18	AS-OPE PBA	140N06058	1	



## 8-19. Exit Assembly Exploded View & Parts List (FaxCentre F12)

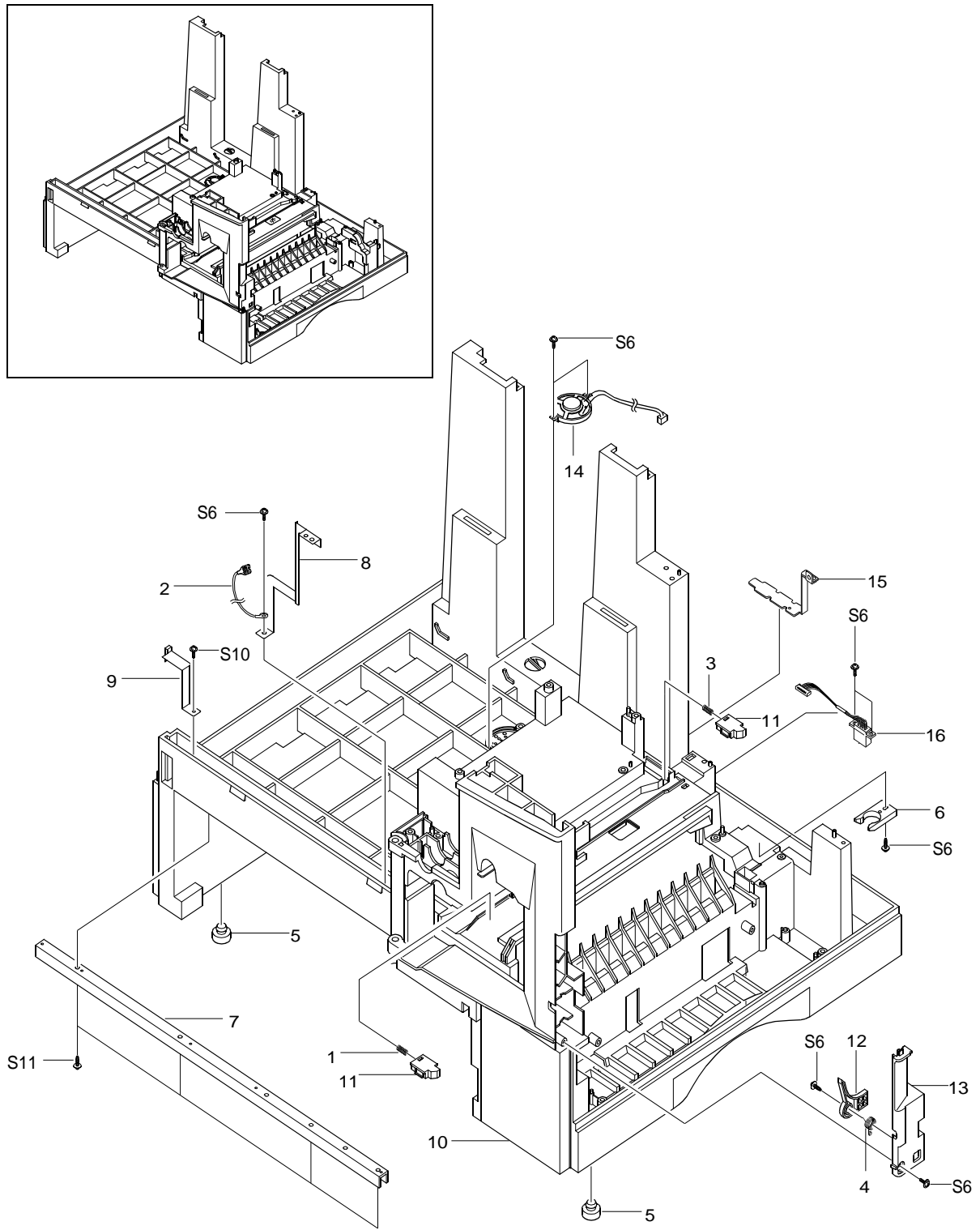


### 8-19-1 Exit Assembly Parts List (FaxCentre F12)

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
20	PBA SUB-BIN-FULL SENSOR	130N01253	1	
22	PMO-LEVER STACKING	011N00475	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-6.

## 8-20. Base Frame Exploded View & Parts List (FaxCentre F12)

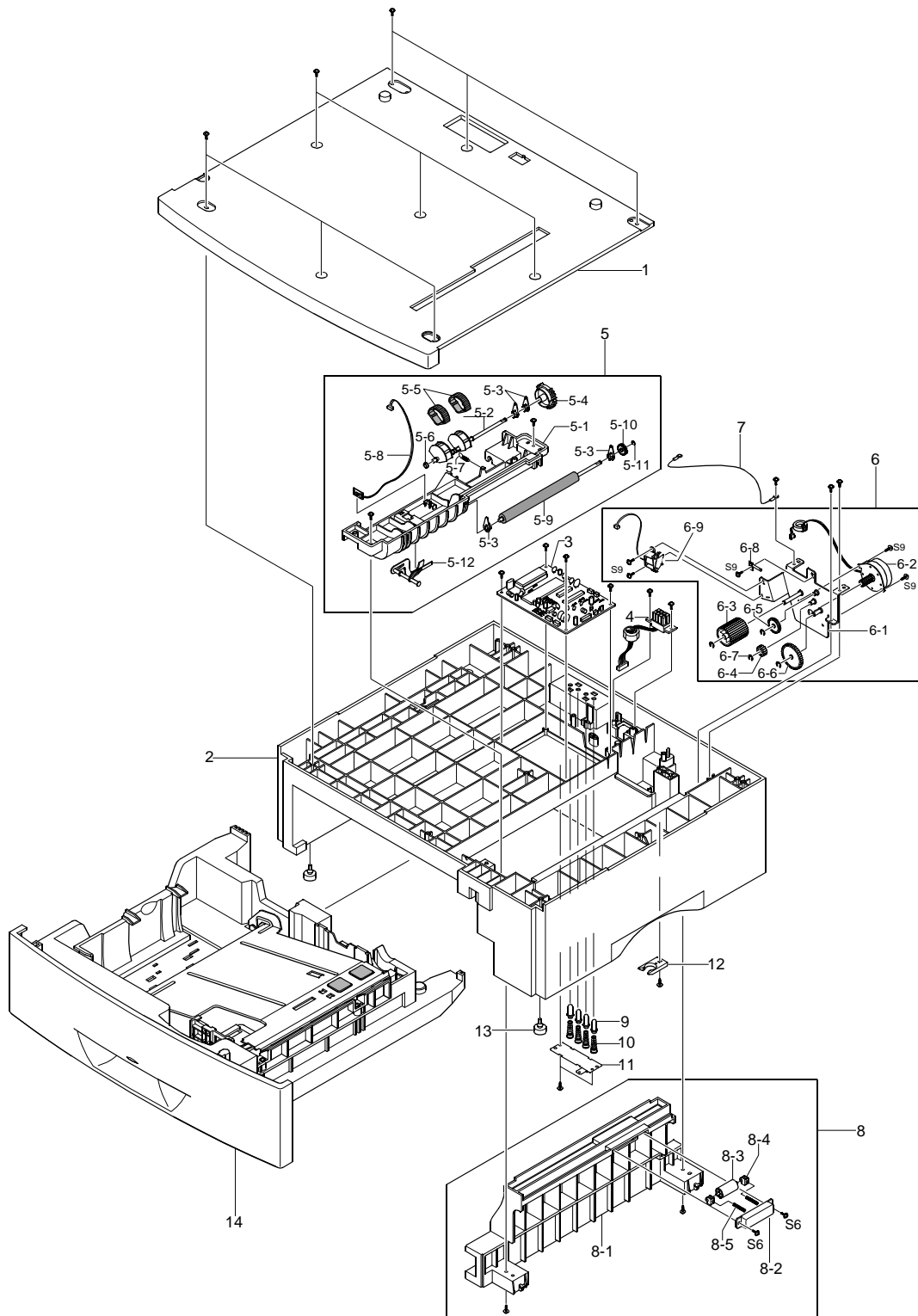


### 8-20-1. Base Frame Exploded View & Parts List (FaxCentre F12)

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
15	IPR-GROUND PLATE SCF	015N00485	1	
16	CBF HARNESS SCF	152N01991	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-9.

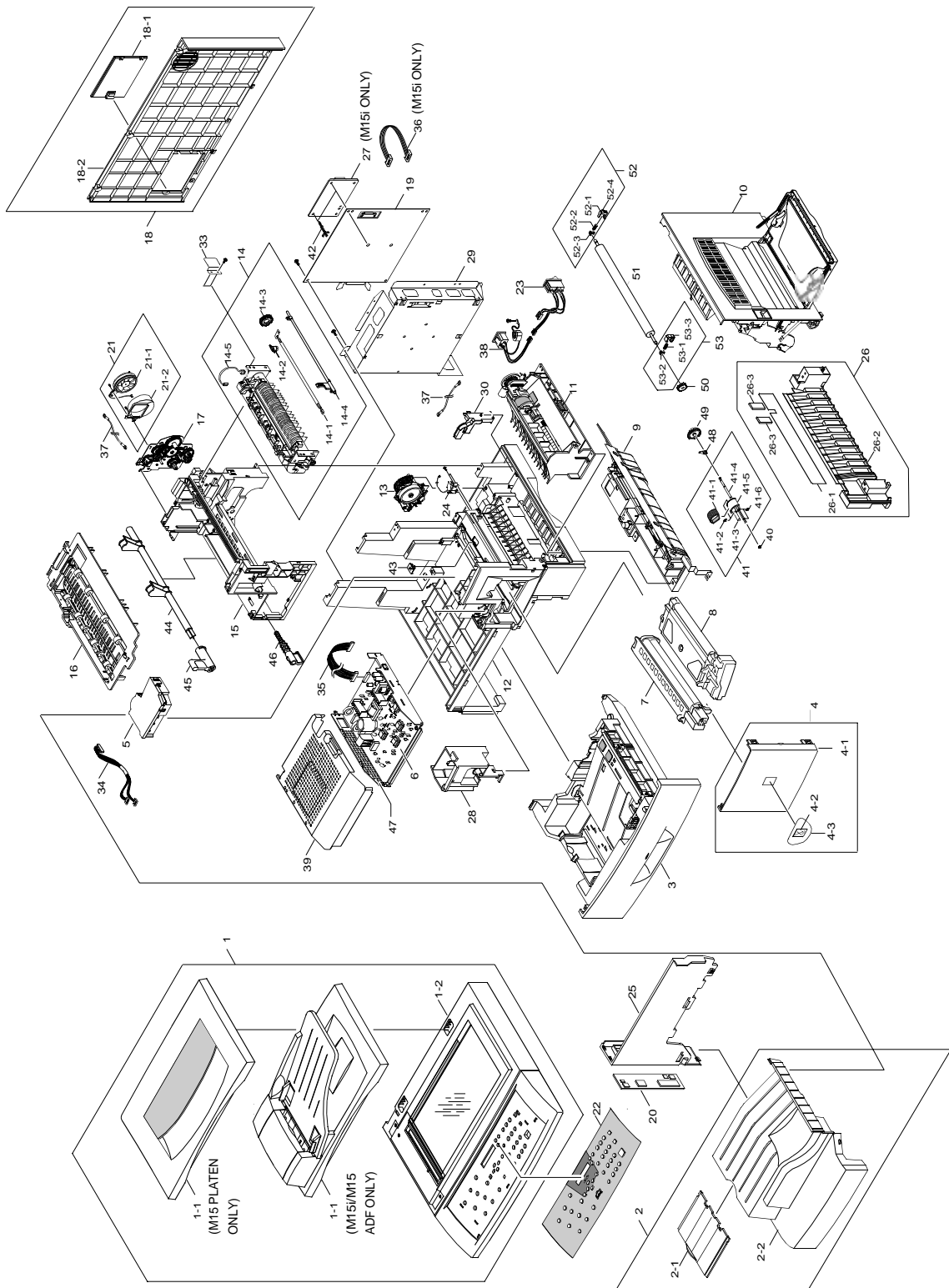
## 8-21. SCF Assembly Exploded View & Parts List (FaxCentre F12)



**8-21-1 SCF Assembly Parts List (FaxCentre F12 Unique)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA UNIT-SCF ASS'Y	500N00099	1	OPTIONAL
1	PMO-COVER TOP SCF		1	NOT SPARED
2	PMO-BASE FRAME-SCF		1	NOT SPARED
3	PBA MAIN-SCF	140N06059	1	
4	CBF HARNESS-SCF_8P	152N01992	1	
5	MEA ETC-GUIDE PAPERUPPER SCF	038N00381	1	
5-1	PMO-GUIDE PAPER UPPERSCF		1	NOT SPARED
5-2	PMO-SHAFT PICK UP		1	NOT SPARED
5-3	PMO-BEARING SHAFT		4	NOT SPARED
5-4	GEAR-PICK UP		1	NOT SPARED
5-5	RPR-RUBBER PICK UP		2	NOT SPARED
5-6	PMO-BUSHING_P/U,MP		1	NOT SPARED
5-7	SPRING ETC-PICKUP		1	NOT SPARED
5-8	PBA SUB-BIN_FULL_SEN.		1	NOT SPARED
5-9	RPR-ROLLER FEED SCF		1	NOT SPARED
5-10	GEAR-FEED (SCF)		1	NOT SPARED
5-11	RING-E		1	NOT SPARED
5-12	PMO-ACTUATOR EMPTY		1	NOT SPARED
6	ELA HOU-MOTOR SCF	127N01420	1	
6-1	IPR-BRKT GEAR		1	NOT SPARED
6-2	MOTOR-SCF		1	NOT SPARED
6-3	GEAR-P/UP DRV SCF		1	NOT SPARED
6-4	GEAR-IDLER OPTION		1	NOT SPARED
6-5	GEAR-IDLE(Z=30)		1	NOT SPARED
6-6	GEAR-IDLE(SCF)		1	NOT SPARED
6-7	RING-E		4	NOT SPARED
6-8	IPR-GROUND_ROLLER		1	NOT SPARED
6-9	SOLENOID-PICK UP		1	NOT SPARED
7	CBF HARNESS-GND		1	NOT SPARED
8	ELA HOU-GUIDE PAPER LOWERSCF	038N00382	1	
8-1	PMO-GUIDE PAPER LOWER		1	NOT SPARED
8-2	PMO-HOLDER IDLE ROLL16		1	NOT SPARED
8-3	PMO-IDLE ROLLER SCF16		1	NOT SPARED
8-4	PMO-BUSH IDLE ROLL-SCF16		2	NOT SPARED
8-5	SPRING ETC-PAD		2	NOT SPARED
9	ICT-SHAFT HV LARGE	006N01184	4	
10	SPRING ETC-HV LARGE	009N01410	4	
11	IPR-PLATE GROUND(A)	015N00486	1	
12	CAM-CATCH	003N00867	1	
13	FOOT-ML80		2	NOT SPARED
14	MEC-CASSETTE ASS'Y	050N00393	1	

## 8-22. Main Exploded View & Parts List (WorkCentre M15/M15i)



**8-22-1 Main Parts List (WorkCentre M15/M15i)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	SCANNER ASS'Y	002N02158	1	<b>WORKCENTRE M15i</b>
1	SCANNER ASS'Y	002N02159	1	<b>WORKCENTRE M15 ADF</b>
1	SCANNER ASS'Y	002N02160	1	<b>WORKCENTRE M15 PLATEN</b>
2	MEA UNIT-COVER PA EXIT ASS'Y	002N02107	1	
2-1	PMO-TRAY EXTENTION MP NE	050N00392	1	
3	MEC-CASSETTE ASS'Y (LETTER)	050N00418	1	
	MEC-CASSETTE ASS'Y (A4)	050N00419	1	
4	MEA UNIT-COVER FRONT ASS'Y	002N02161	1	
4-2	MPR-NAME/PLATE (XRX)	091N00699	1	
5	UNIT-LSU	062N00245	1	
6	SMPS-SMPS(V1)+HVPS	105N01464	1	110V
6	SMPS-SMPS(V2)+HVPS	105N01465	1	220V
9	ELA HOU-PICKUP ASS'Y	002N02162	1	
10	ELA HOU-SIDE COVER ASS'Y	002N02163	1	
14	ELA HOU-FUSER(110V)ASS'Y	108N00515	1	110V
	ELA HOU-FUSER(220V)ASS'Y	108N00516	1	220V
14-1	LAMP-HALOGEN (110V)	122N00222	1	110V
	LAMP-HALOGEN(220V)	122N00223	1	220V
17	ELA HOU-DRIVE ASS'Y	002N02164	1	
19	PBA MAIN-MAIN	140N06087	1	<b>WORKCENTRE M15i</b>
	PBA MAIN-MAIN	140N06088	1	<b>WORKCENTRE M15</b>



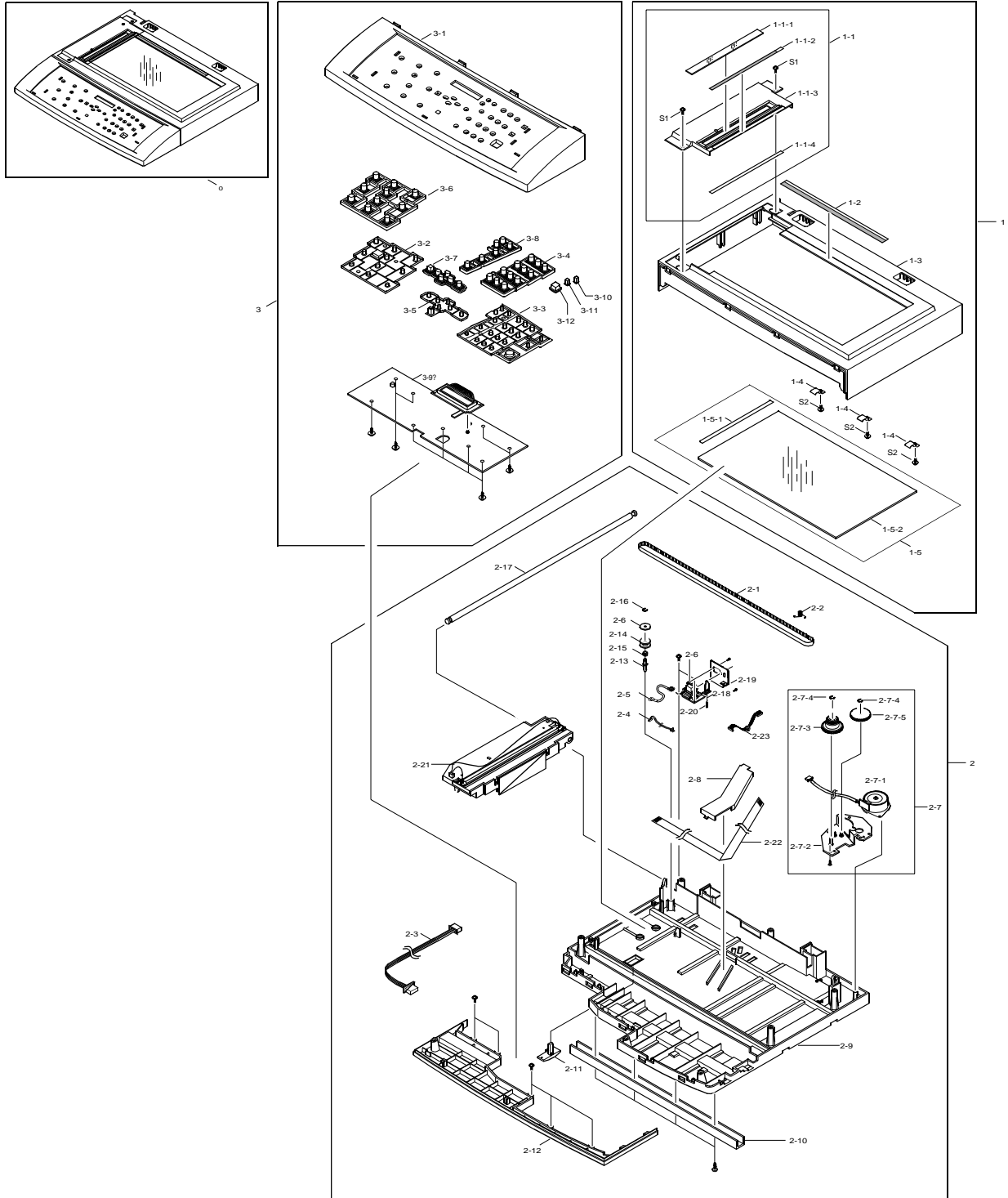
**8-22-1 Main Parts List (WorkCentre M15/M15i) (Cont.)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
22	SHEET-OVERLAY(ENGLISH)	096P11700	1	<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(ENGLISH)	096P11800		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(FRENCH)	096P11701		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(FRENCH)	096P11801		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(GERMAN)	096P11702		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(GERMAN)	096P11802		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(ITALIAN)	096P11704		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(ITALIAN)	096P11804		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(SPANISH)	096P11707		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(SPANISH)	096P11807		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(PORTUGUESE)	096P11706		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(PORTUGUESE)	096P11806		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(FINNISH)	096P11709		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(FINNISH)	096P11809		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(DUTCH)	096P11703		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(DUTCH)	096P11803		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(DANISH)	096P11708	1	<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(DANISH)	096P11808		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(NORWEGIAN)	096P11710		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(NORWEGIAN)	096P11810		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(SWEDISH)	096P11711		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(SWEDISH)	096P11811		<b>WORKCENTRE M15</b>
	SHEET-OVERLAY(GREEK/ENGLISH)	096P11705		<b>WORKCENTRE M15i</b>
	SHEET-OVERLAY(GREEK/ENGLISH)	096P11805		<b>WORKCENTRE M15</b>
41	MEA UNIT-PICKUP ROLLER	022N01599	1	
41-1	RUBBER-ROLLER PICKUP	022N01600	1	
41-5	HOUSING-PICK_UP	022N02165	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-1.

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# 8-23. Platen Assembly Exploded View & Parts List (WorkCentre M15/ M15i)

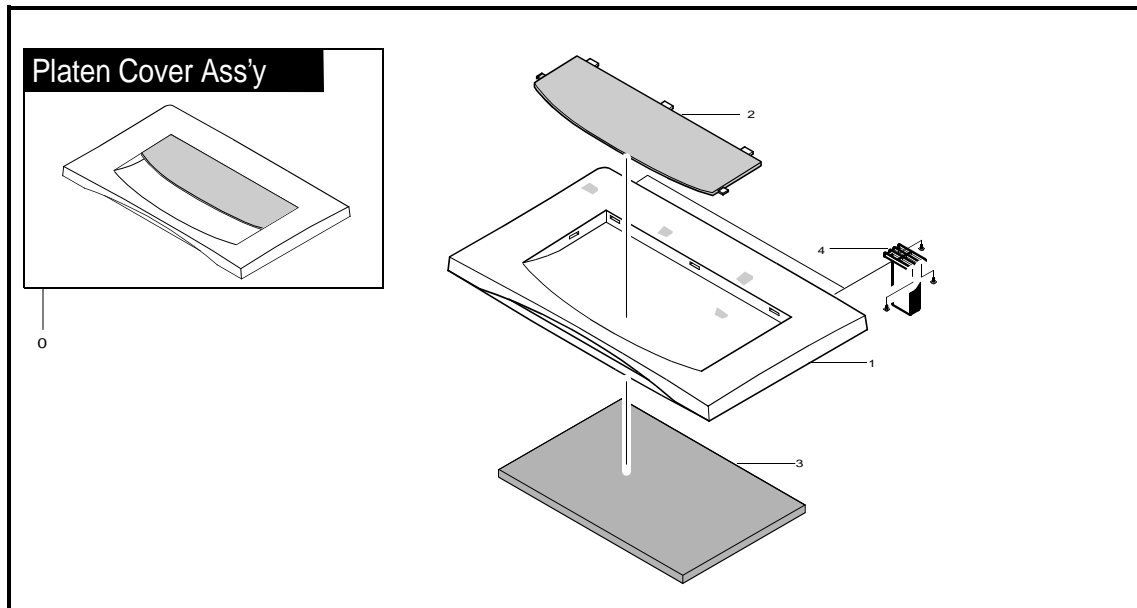
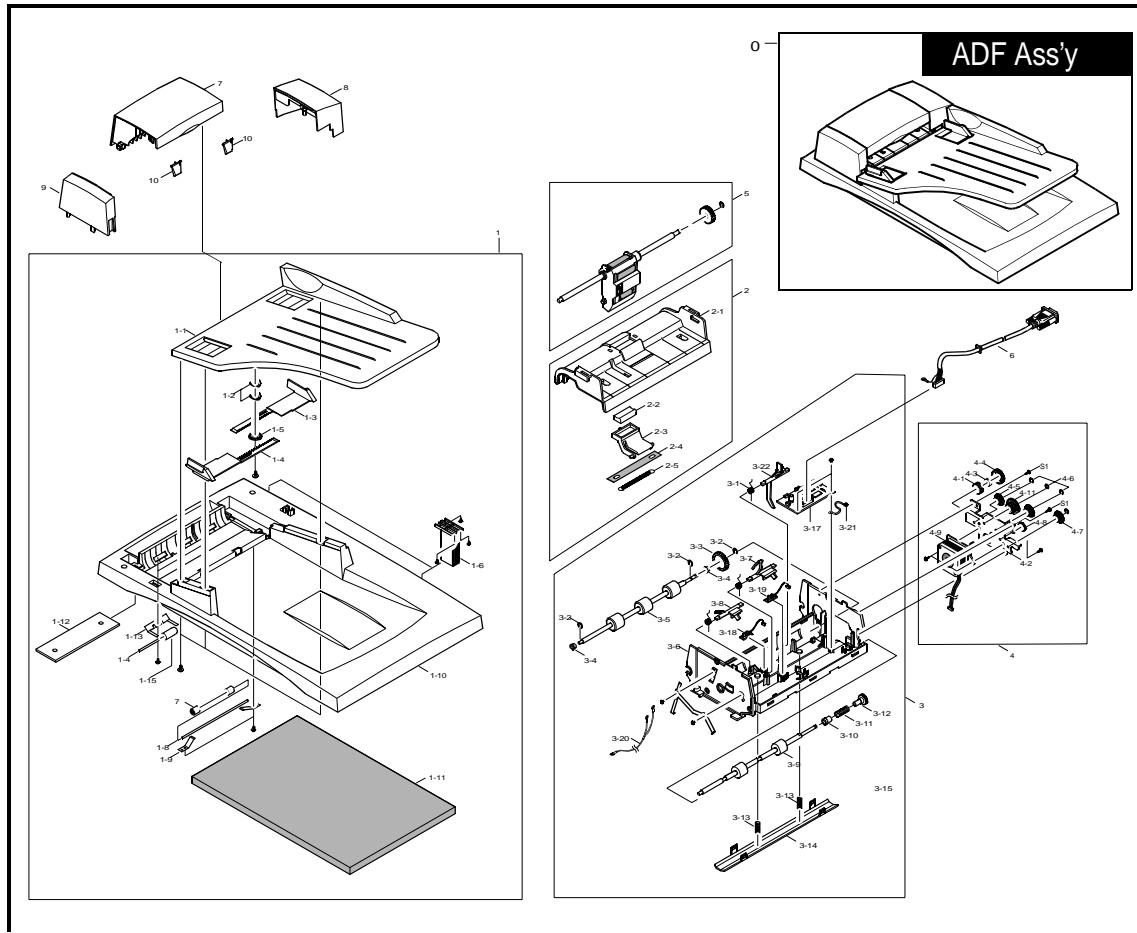


**8-23-1 Platen Assembly Parts List (WorkCentre M15/M15i)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	MEA UNIT-SCAN UPPER ASS'Y	002N02175	1	
2-6	PBA SUB-D_SUB		1	NOT SPARED
2-7	ELA HOU-SCAN MOTOR	002N02176	1	
2-8	COVER-M-CCD CABLE		1	NOT SPARED
2-18	PMO-LEVER SENSOR	011N00473	1	
2-20	SPRING ETC-EXIT		1	NOT SPARED
21	ELA HOU-CCD MODULE	002N02166	1	
2-22	CBF SIGNAL-CCD FFC	117N01605	3	
3	ELA HOU-OPE CVER ASS'Y	002N02167		<b>WORKCENTRE M15i</b>
	ELA HOU-OPE CVER ASS'Y	002N02168		<b>WORKCENTRE M15</b>
3-4	PMO-KEY TEL	029N00327	1	
3-6	PMO-KEY FUNCTION(A)	029N00328	1	NOT SPARED
	PMO-KEY FUNCTION(C)	029N00329	1	NOT SPARED
3-7	PMO-KEY SCROLL	029N00330	1	
3-8	PMO-KEY FUNCTION(B)	029N00331	1	<b>WORKCENTRE M15i</b>
3-11	PMO-KEY STOP	029N00332	1	
3-12	PMO-KEY START	029N00333	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-2.

# 8-24. ADF Ass'y & Platen Cover Ass'y Exploded View & Parts List (WorkCentre M15/M15i)

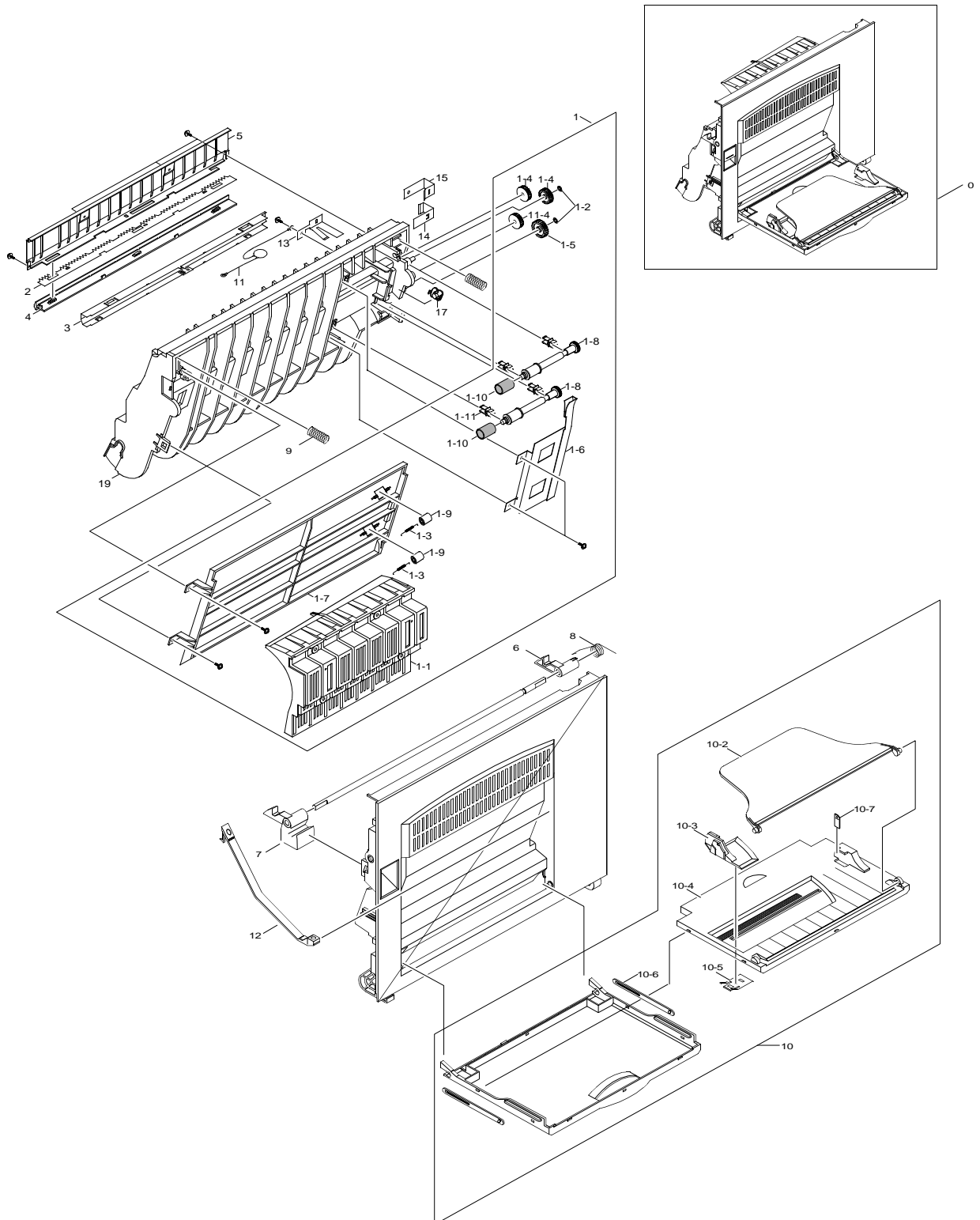


**8-24-1 ADF Ass'y & Platen Cover Ass'y Parts List (WorkCentre M15/M15i)**

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
1	MEC UNIT-PLATEN COVER ASS'Y	002N02169	1	
1-3	PMO-DOC GUIDE L	038N00398	1	
1-4	PMO-DOC GUIDE R	038N00397	1	
1-6	MEA UNIT-HINGE	003N00882	1	
11	MEA UNIT-PLATEN COVER ASS'Y(C)	002N02170	1	<b>WORKCENTER M15 PLATEN ONLY</b>
12	PMO-COVER PLATEN(C)		1	
13	PMO-COVER DUMMY PLATEN	090N00154	1	
14	PPR-SPONG SHEET		3	
15	MEA UNIT-HINES ASS'Y(C)	003N00880	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-3.

## 8-25. Side Cover Assembly Exploded View & Parts List (WorkCentre M15/M15i)



### 8-25-1 Side Cover Assembly Parts List (WorkCentre M15/M15i)

ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
7	PMO-LOCKER OPEN	019N00677	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-4.



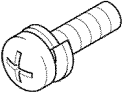
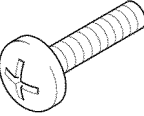
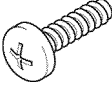

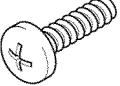
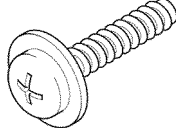
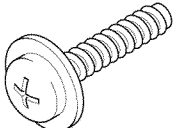
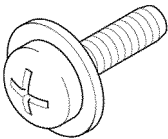
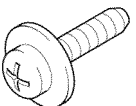


**8-26-1 Drive Assembly Parts List (WorkCentre M15/M15i)**

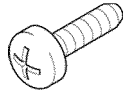
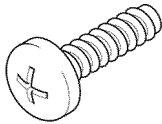
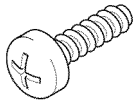
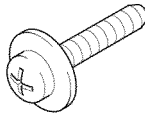
ITEM	DESCRIPTION	PART NUMBER	Q'TY	REMARK
0	ELA HOU-DRIVE ASS'Y	002N02177	1	
2	MOTOR-STEP	127N01443	1	

NOTE: All other part numbers are identical to the WorkCentre Pro 412. Refer to parts list 8-11.

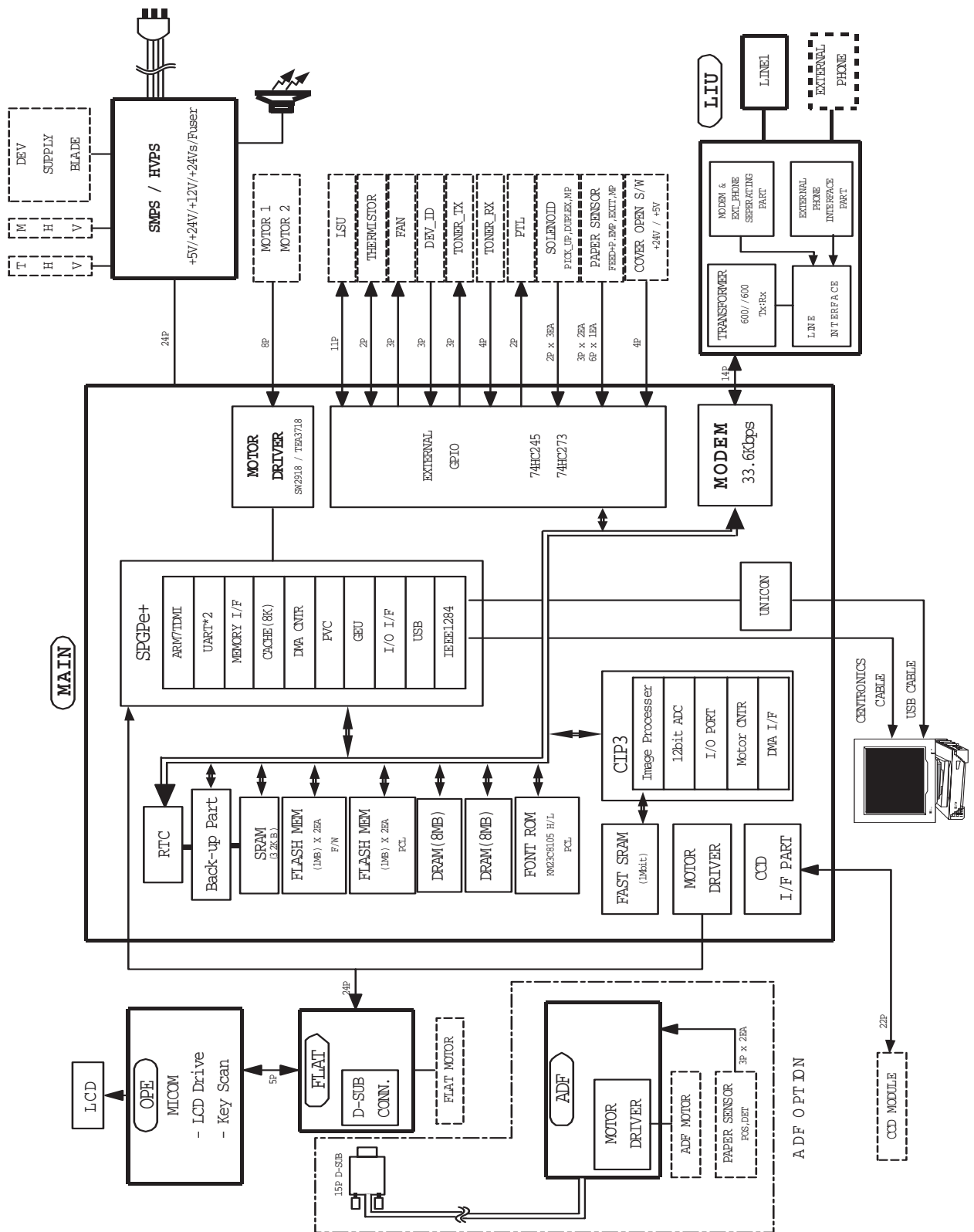
## 8-27. Screws

ITEM	DESCRIPTION	SPECIFICATION	
S1	SCREW-ASS'Y MACH	"WS,PH,+,M3,L6,ZPC(YEL),MSWR15"	
S2	SCREW-MACHINE	"PH,+,M3,L8,NI PLT,SM20C,-"	
S3	SCREW-TAPPING	"PWH,+,2,M3,L8,ZPC(YEL),SM20C"	
S4	SCREW-TAPPING	"PH,+,2,M2,L8,ZPC(YEL),SM20C"	
S5	SCREW-TAPTITE	"BH,+,B,M3,L8,CBLACK,SWRCH18A"	
S6	SCREW-TAPTITE	"PWH,+,B,M3,L10,NI PLT,SWRCH18A"	
S7	SCREW-TAPTITE	"PWH,+,B,M3,L12,ZPC(YEL),SWRCH1"	
S8	SCREW-TAPTITE	"PWH,+,S,M4,L8,ZPC(YEL),SWRCH18"	
S9	SCREW-TAPTITE	"PWH,+,S,M3,L6,ZPC(YEL),SWRCH18"	

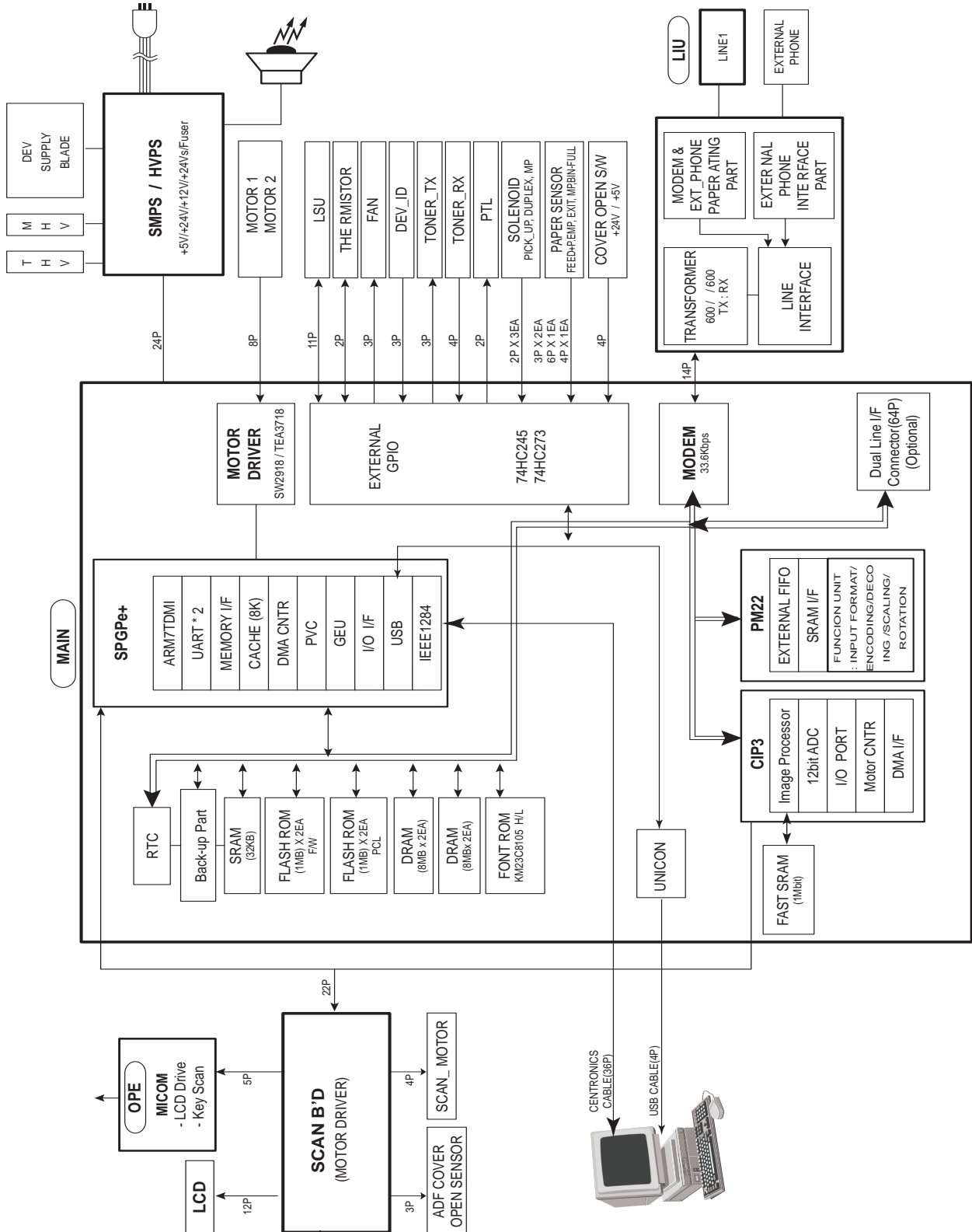
Exploded View & Parts List

ITEM	DESCRIPTION	SPECIFICATION	
S10	SCREW-TAPTITE	"BH,+,S,M3,L6,ZPC(YEL),SWRCH18A"	
S11	SCREW-TAPTITE	"BH,+,B,M4,L10,NI PLT,SWRCH18A"	
S12	SCREW-TAPPING	"PH,+,2,M3,L8,ZPC(YEL),SM20C"	
S13	SCREW-TAPTITE	"PWH,+,S,M3,L8,ZPC(YEL),SWRCH18"	

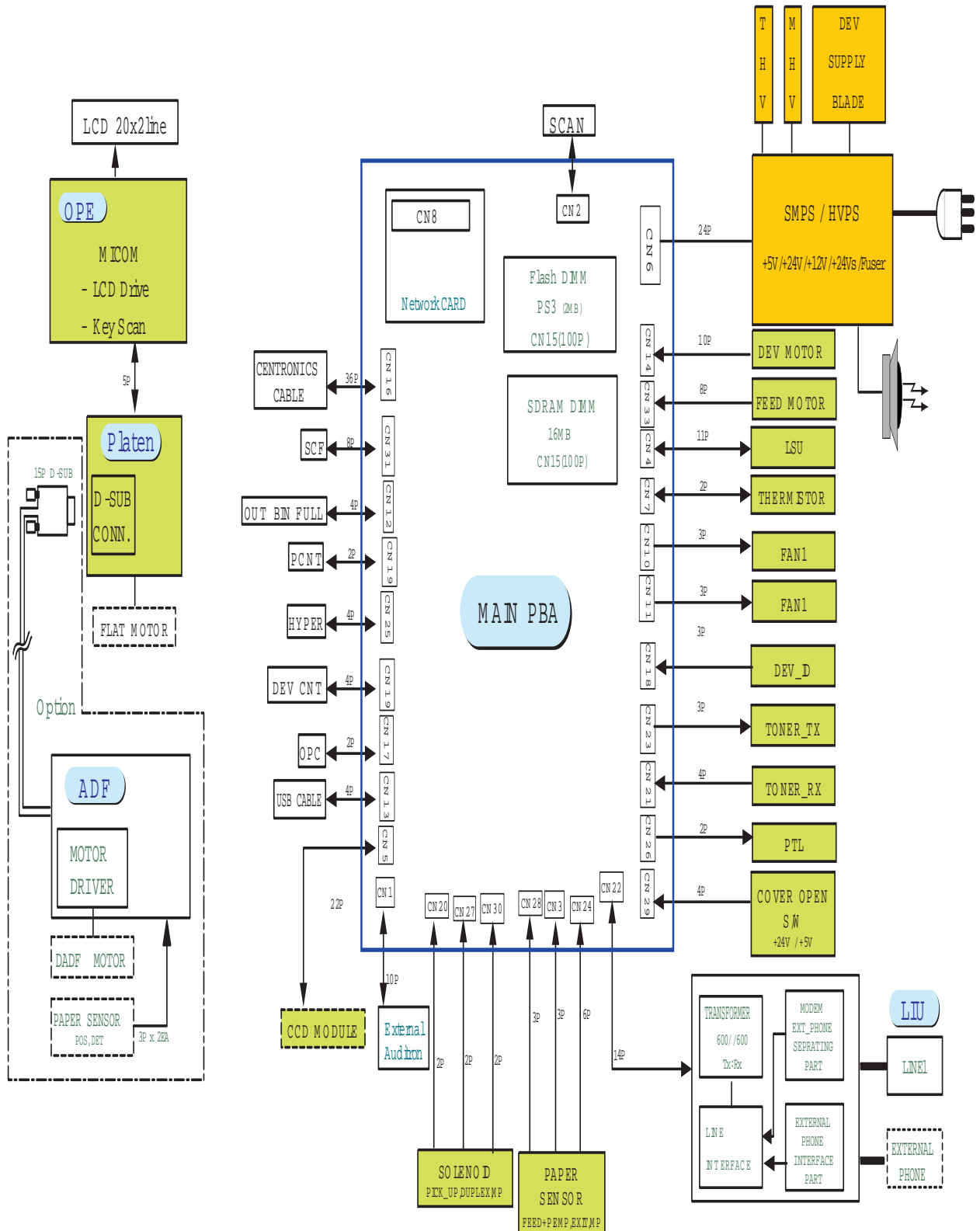
# 9. Block Diagram (WorkCentre Pro 412)



# 9. Block Diagram (FaxCentre 12)



## 9. Block Diagram (WorkCentre M15/M15i)

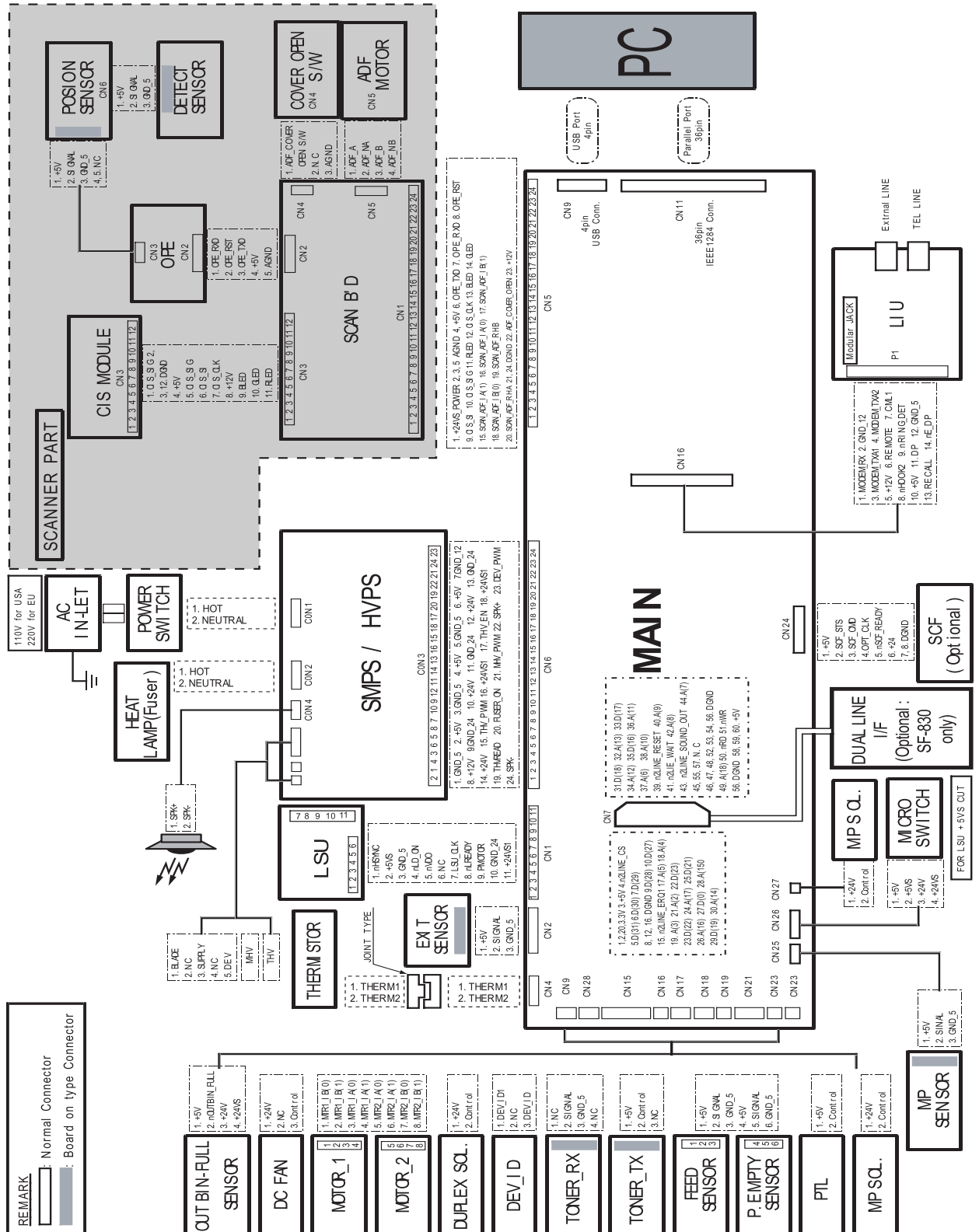




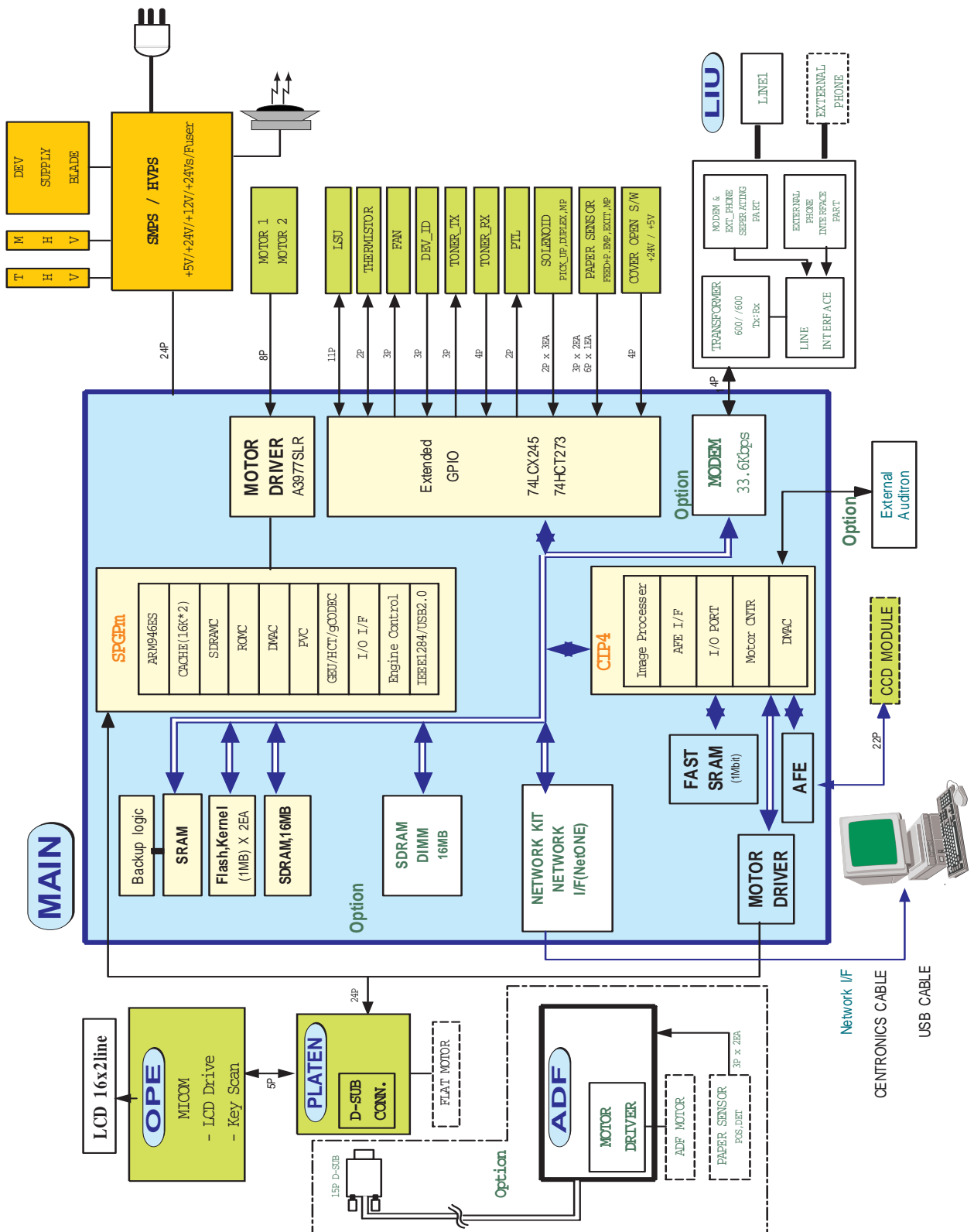




# 10. Connection Diagram (FaxCentre 12)



# 10. Connection Diagram (WorkCentre M15/M15i)



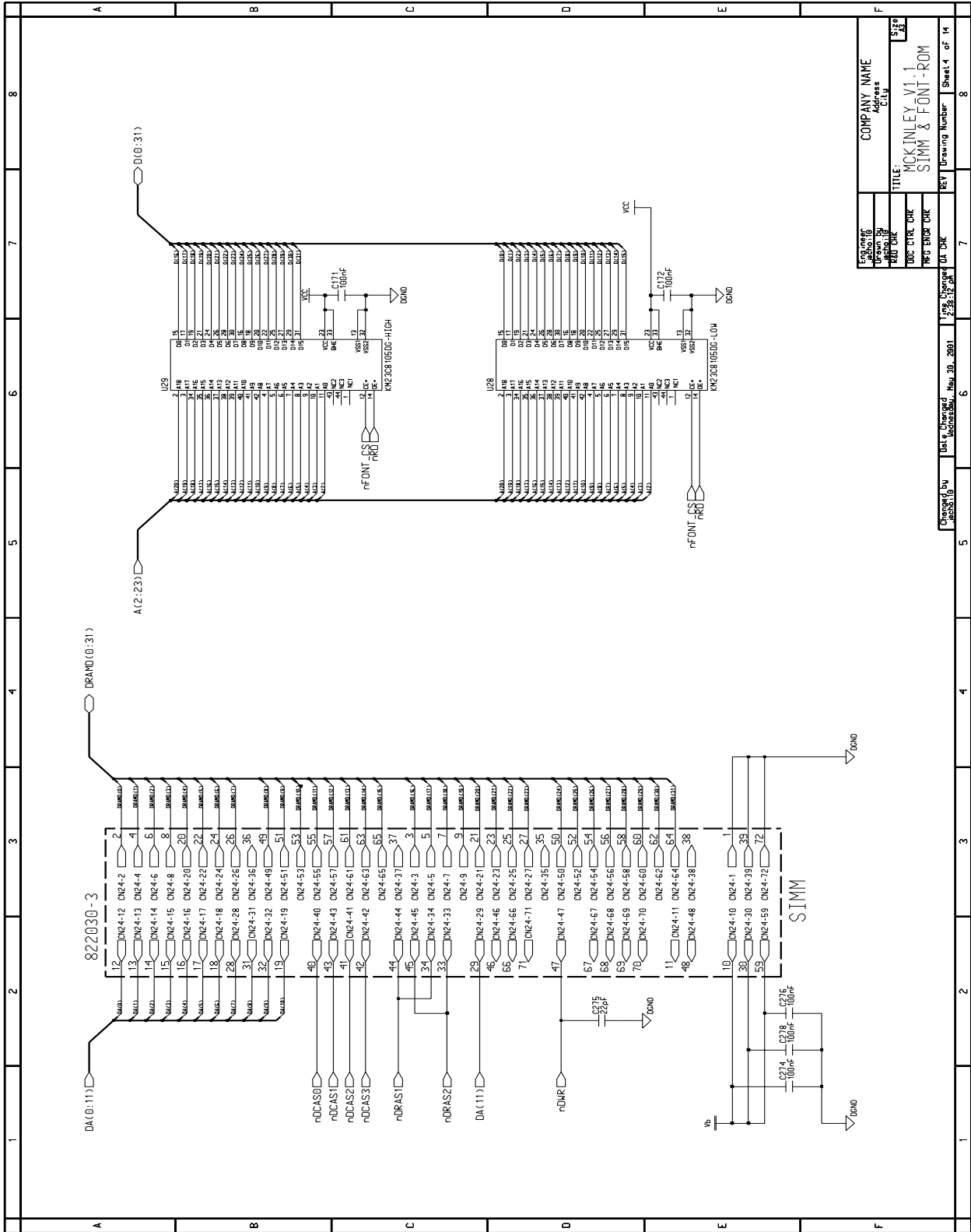








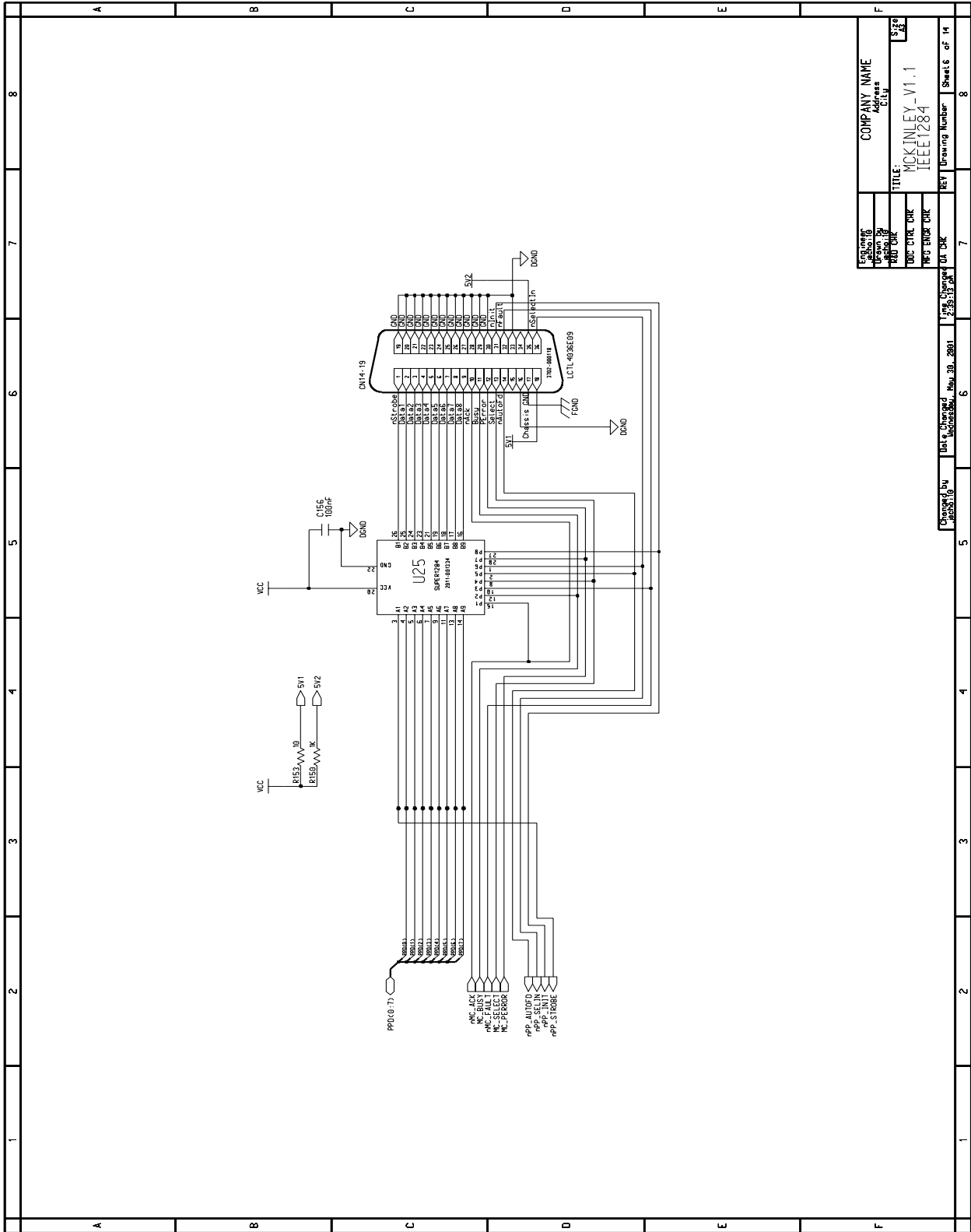
# 11-4 Main Circuit Diagram (4 of 14, WorkCentre Pro 412)







# 11-6 Main Circuit Diagram (6 of 14, WorkCentre Pro 412)

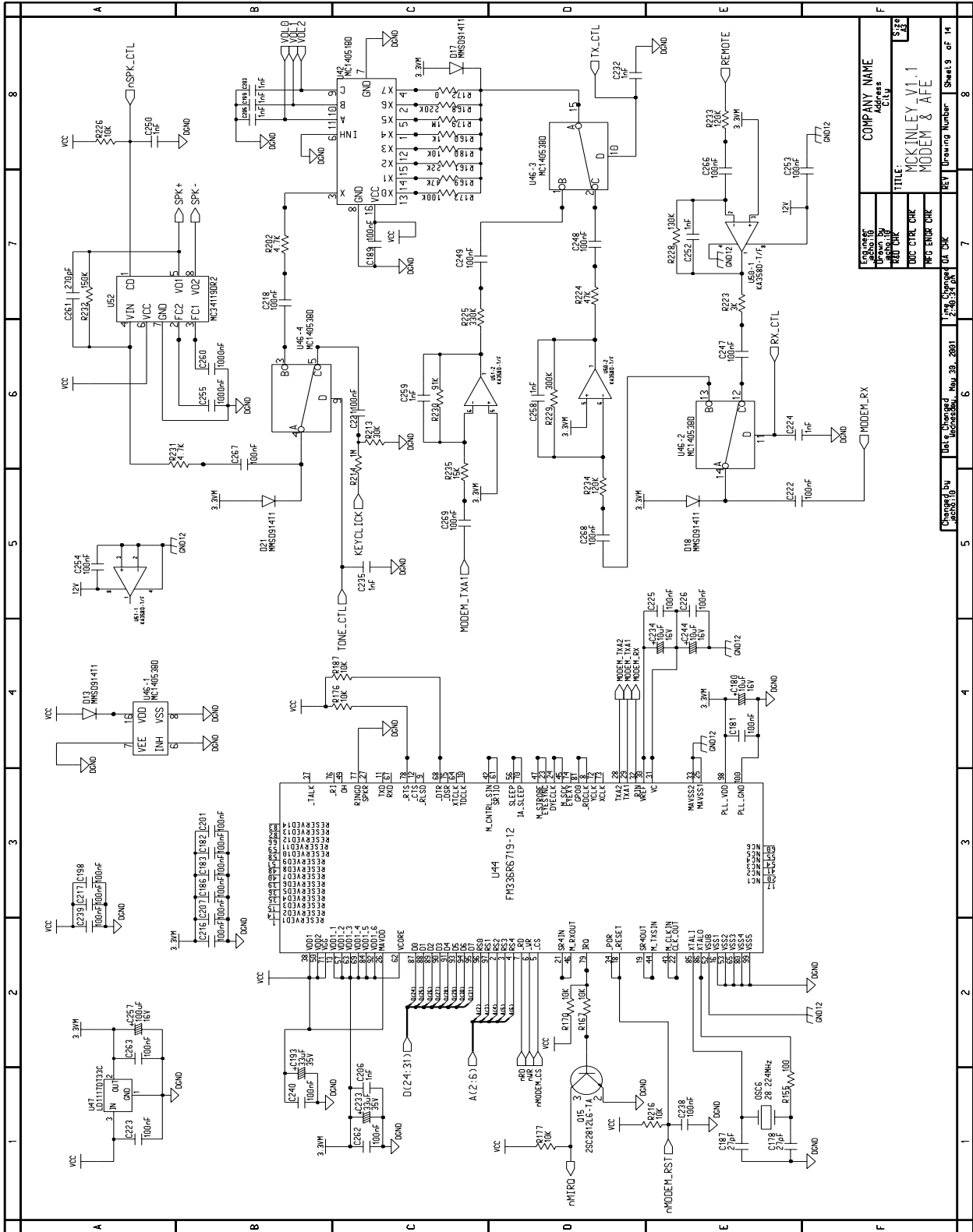


Engineering	COMPANY NAME
Design	Address
Drawn	City
Checked	STATE
DATE	TITLE
	MCKINLEY_V1.1
	IEEE1284
	Drawing Number
	REV
	Sheet 6 of 14





# 11-9 Main Circuit diagram (9 of 14, WorkCentre Pro 412)



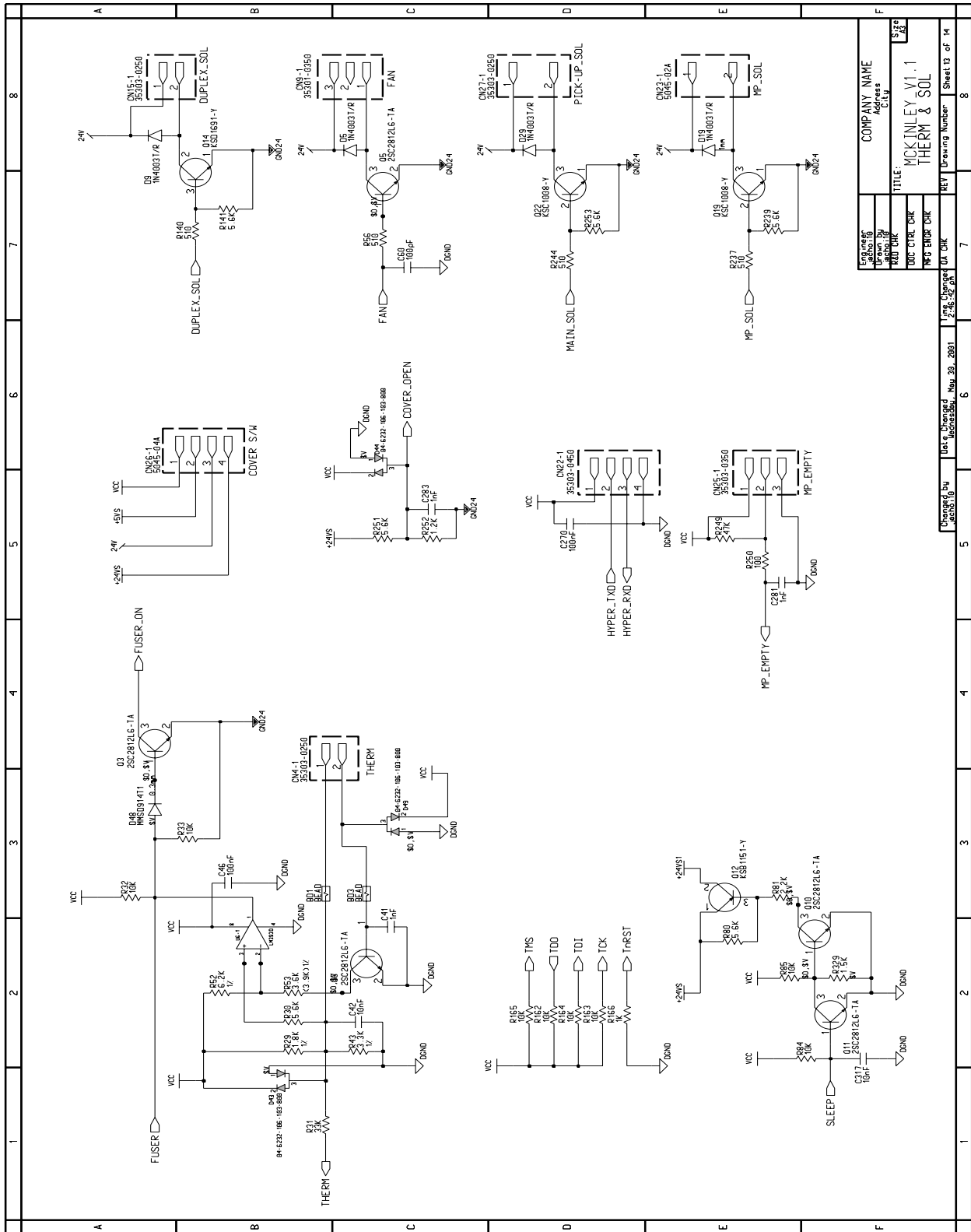






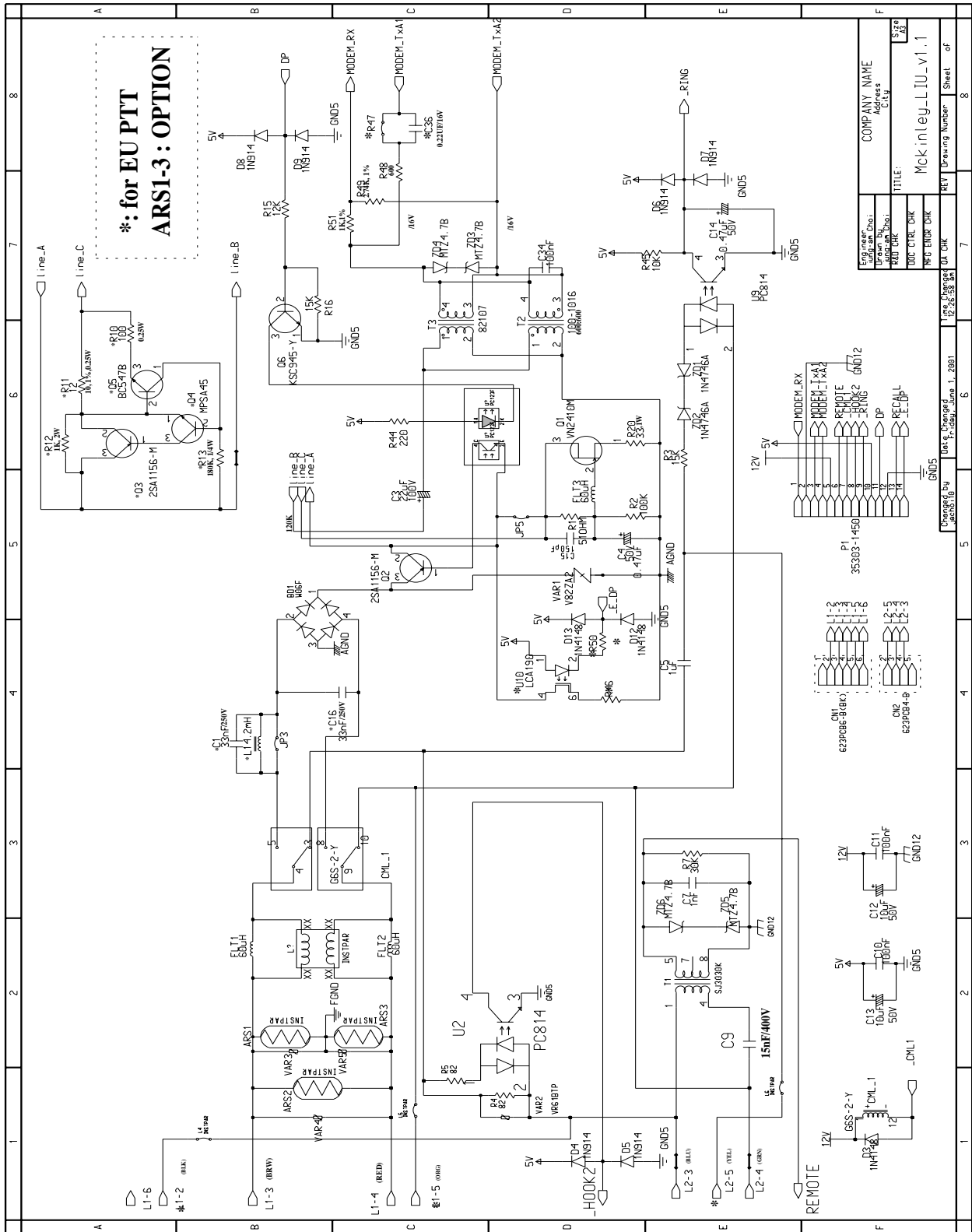


# 11-13 Main Circuit Diagram (13 of 14, WorkCentre Pro 412)

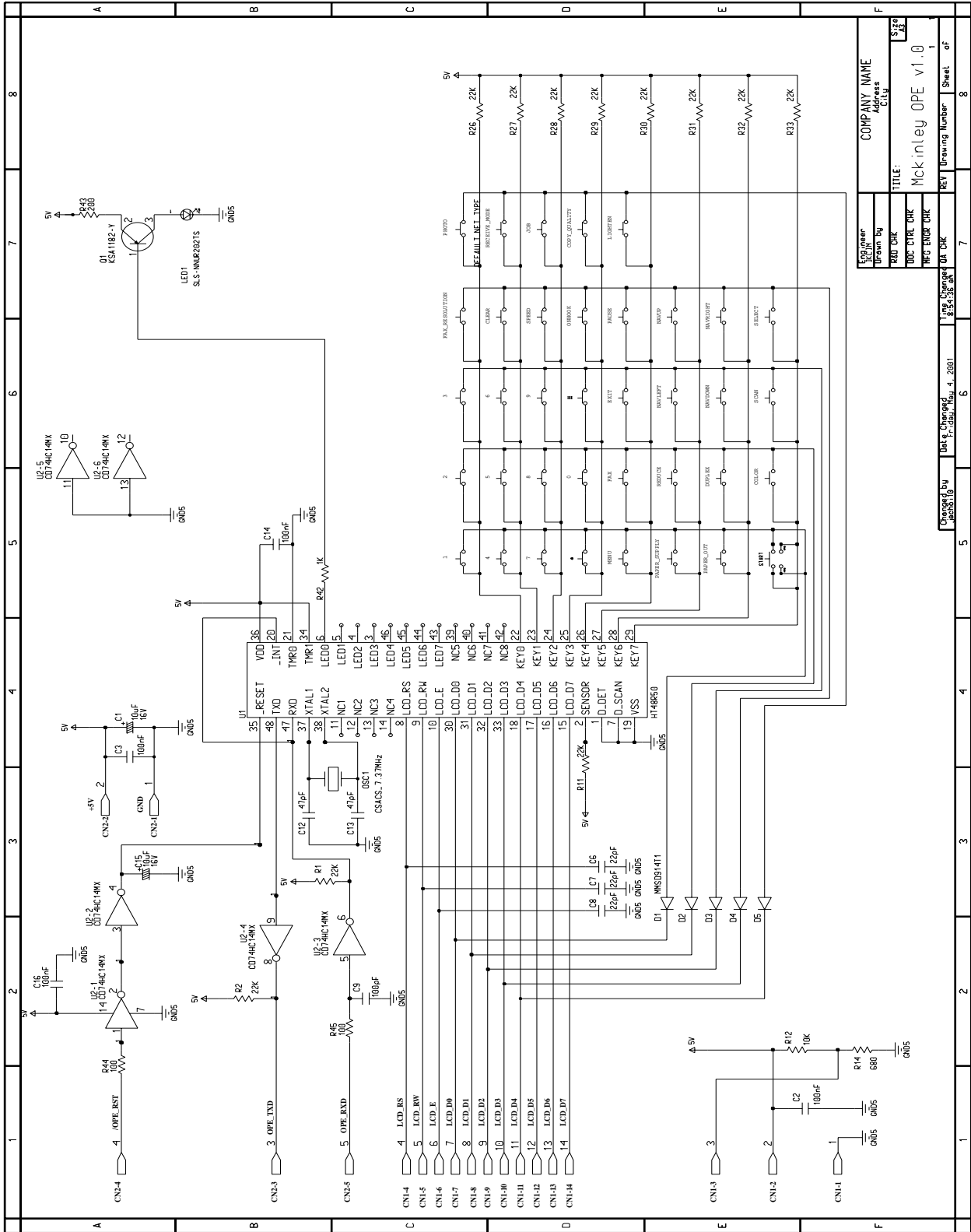




# 11-15 LIU Circuit Diagram, (WorkCentre Pro 412)

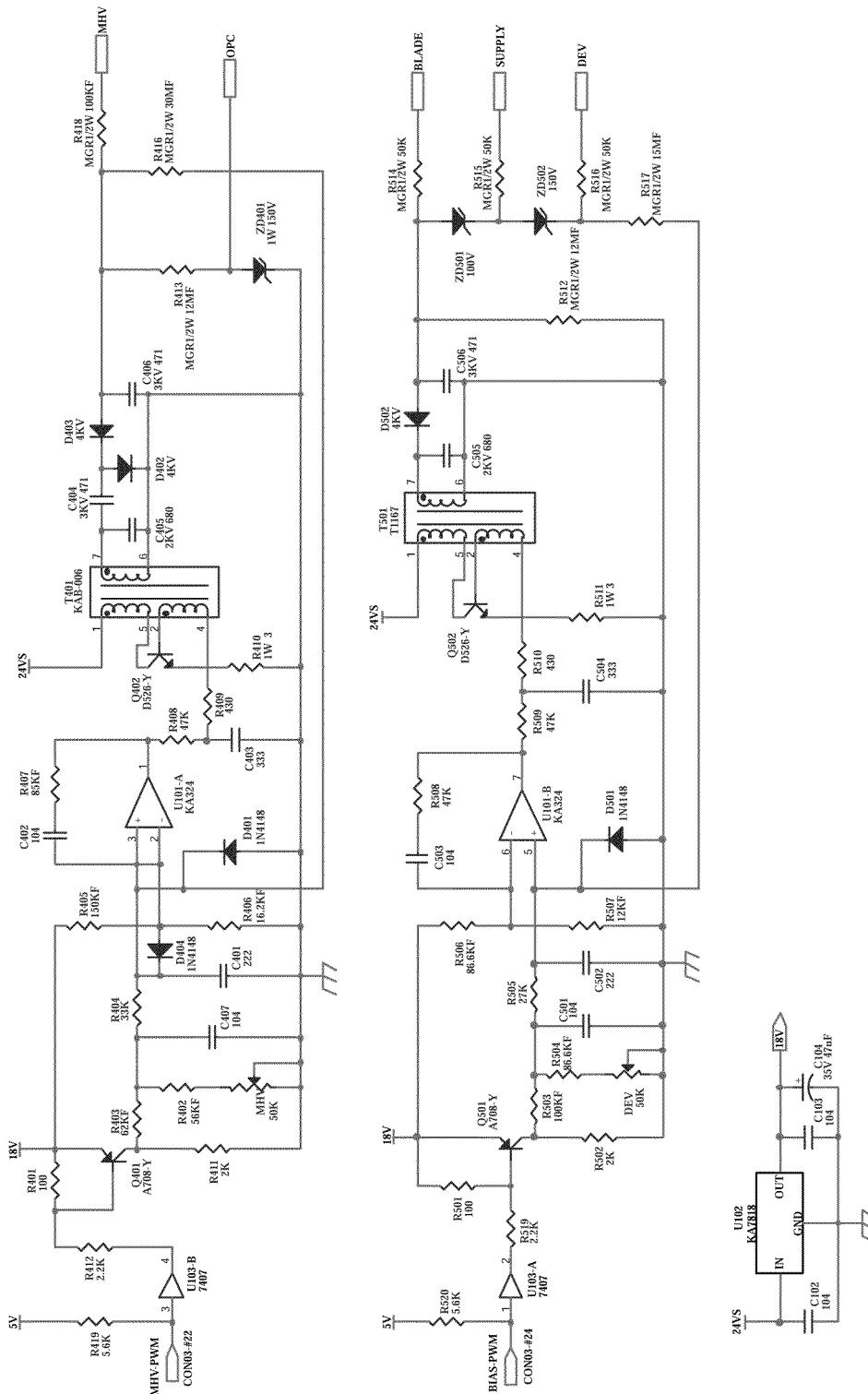


# 11-16 OPE Circuit Diagram, (WorkCentre Pro 412)

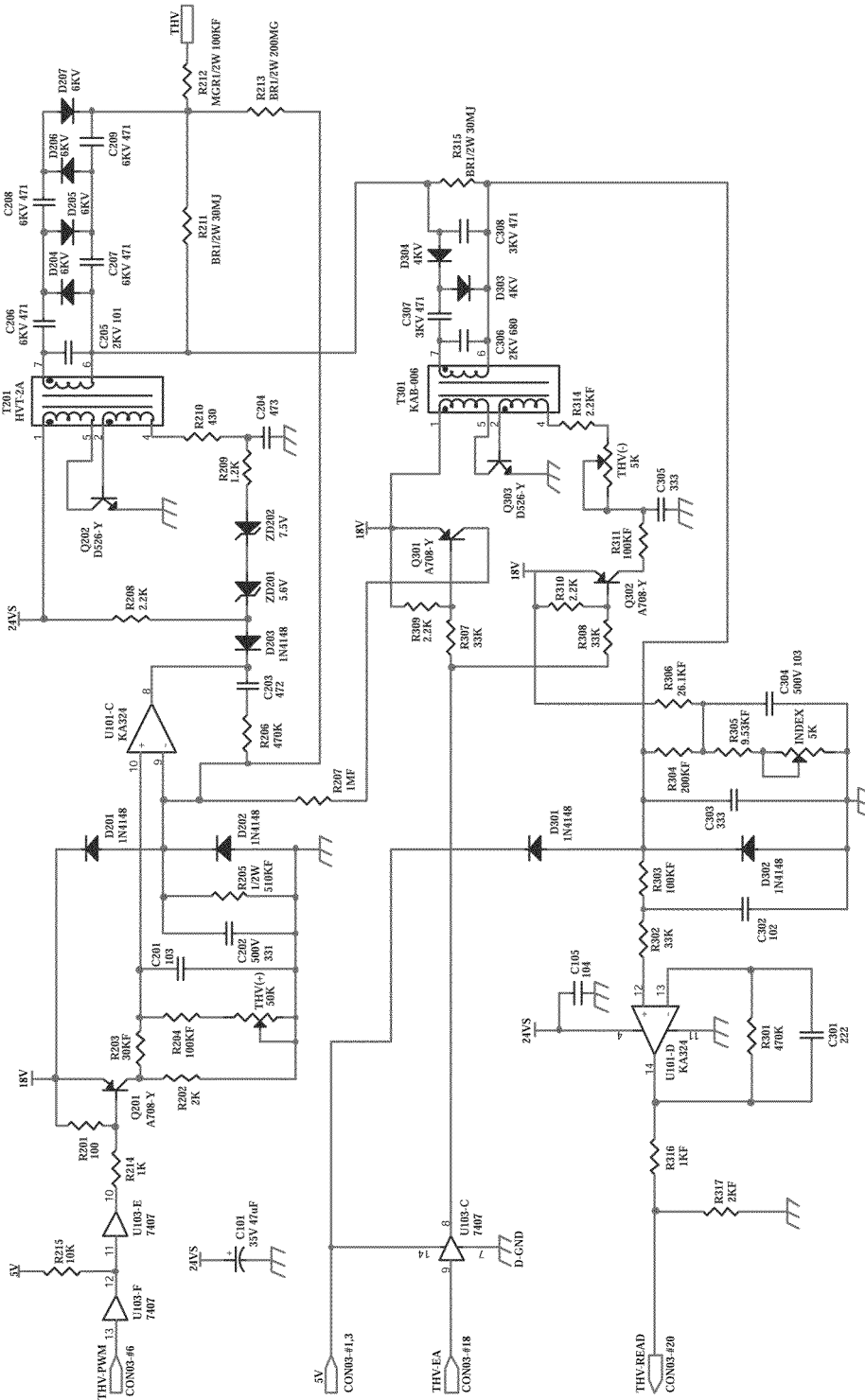


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Drawn By	CSJ
Checked	CSJ
DATE	11/16/01
REV	1
COMPANY NAME	Address
TITLE	McKinley OPE v1.0
DWG. NO.	11-16
REV. NO.	1
DRAWING NUMBER	11-16
SHEET	1
TOTAL SHEETS	8

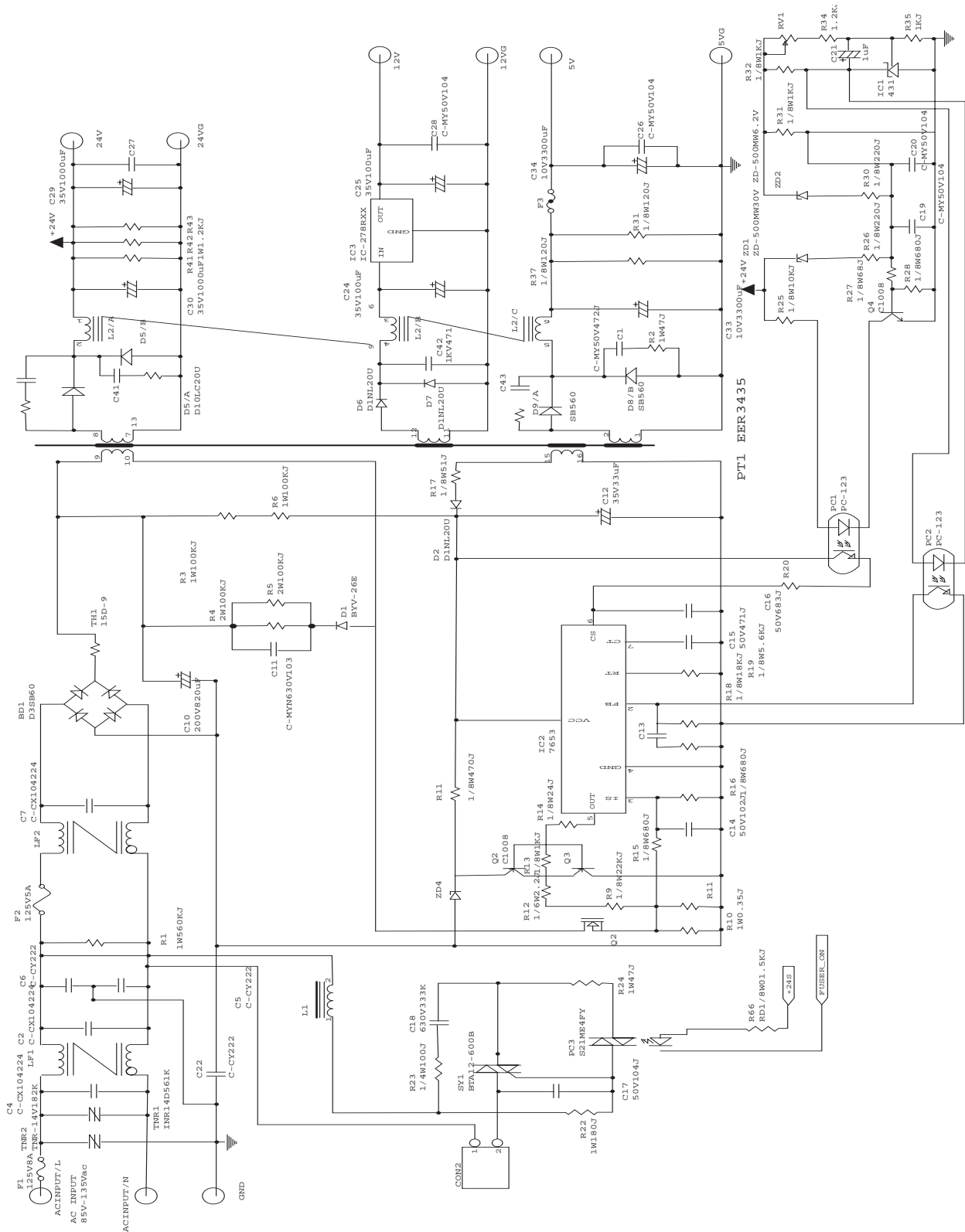
# 11-17 HVPS Circuit Diagram (1 of 2, WorkCentre Pro 412)



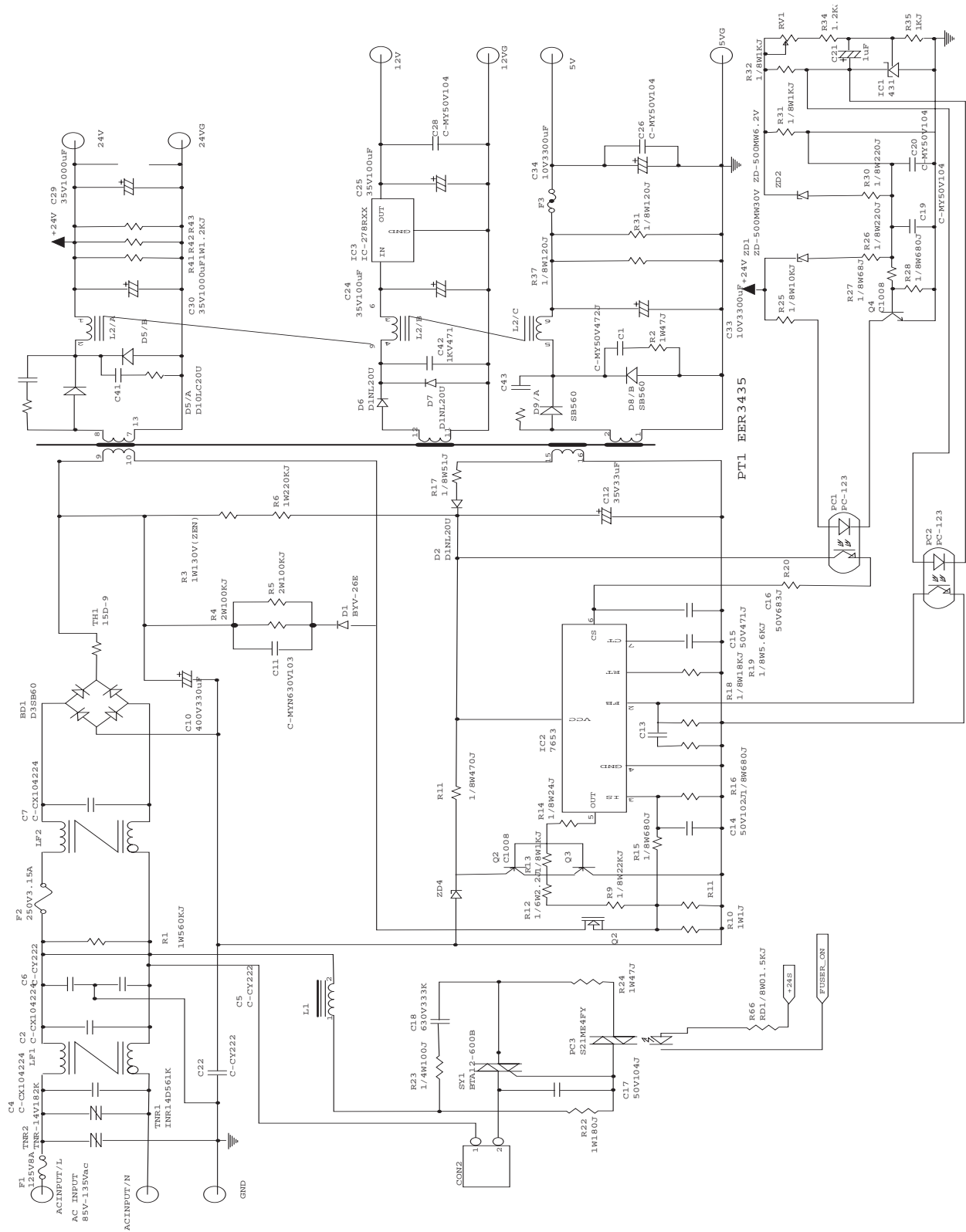
# 11-18 HVPS Circuit Diagram (2 of 2, WorkCentre Pro 412)



# 11-19 SMPS (110) Circuit Diagram, (WorkCentre Pro 412)

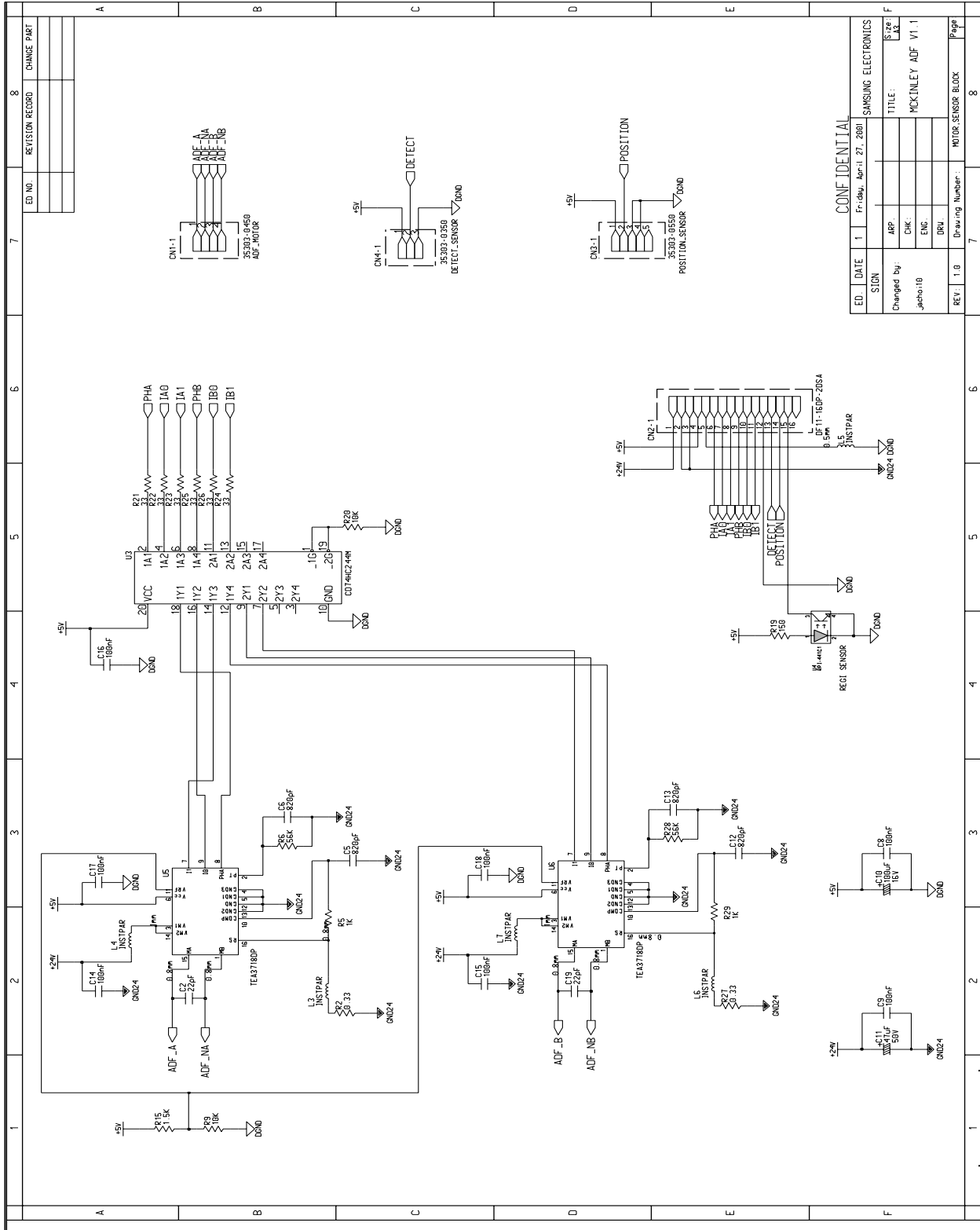


# 11-20 SMPS (220) Circuit Diagram, (WorkCentre Pro 412)



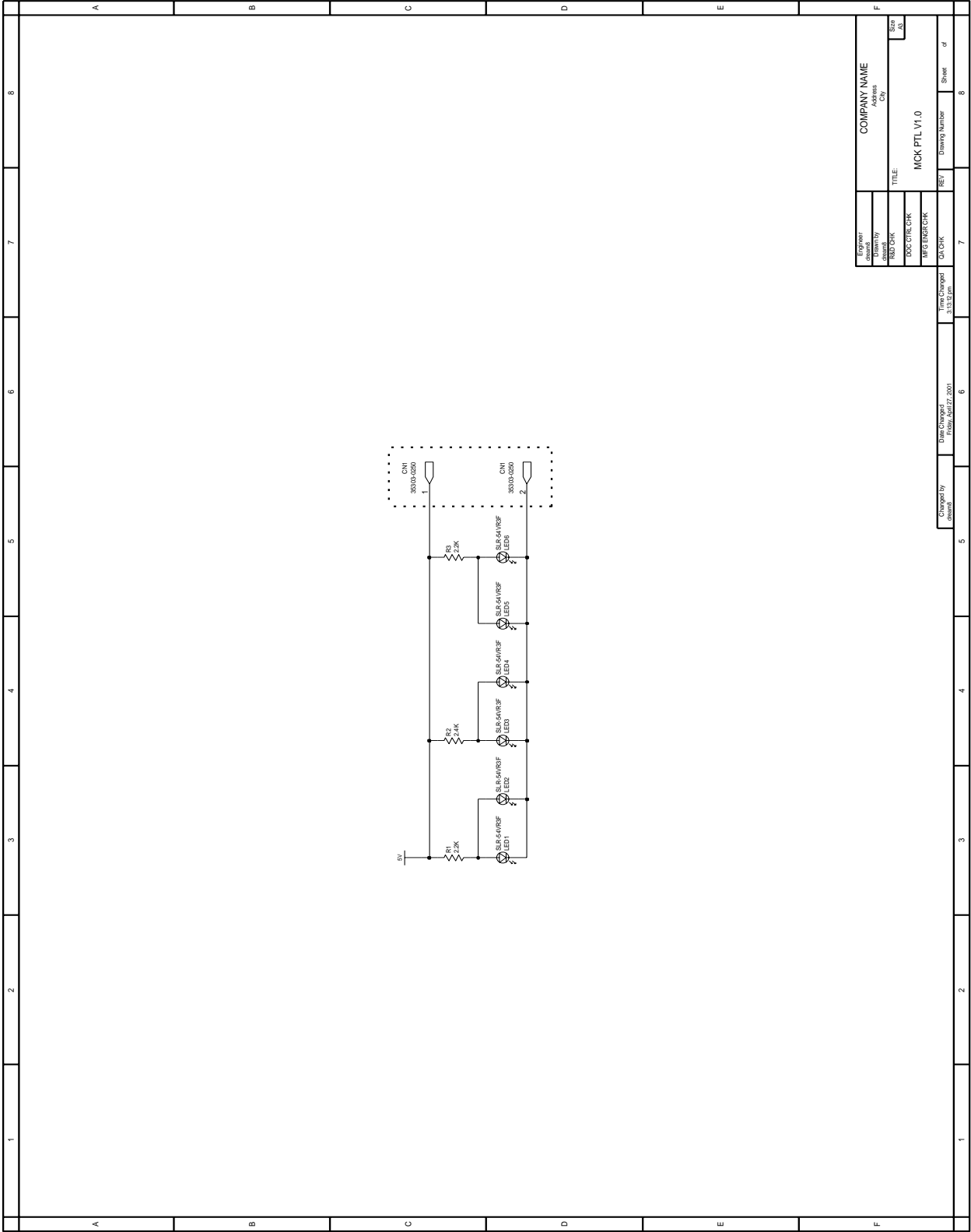


# 11-21 ADF Circuit Diagram, (WorkCentre Pro 412)



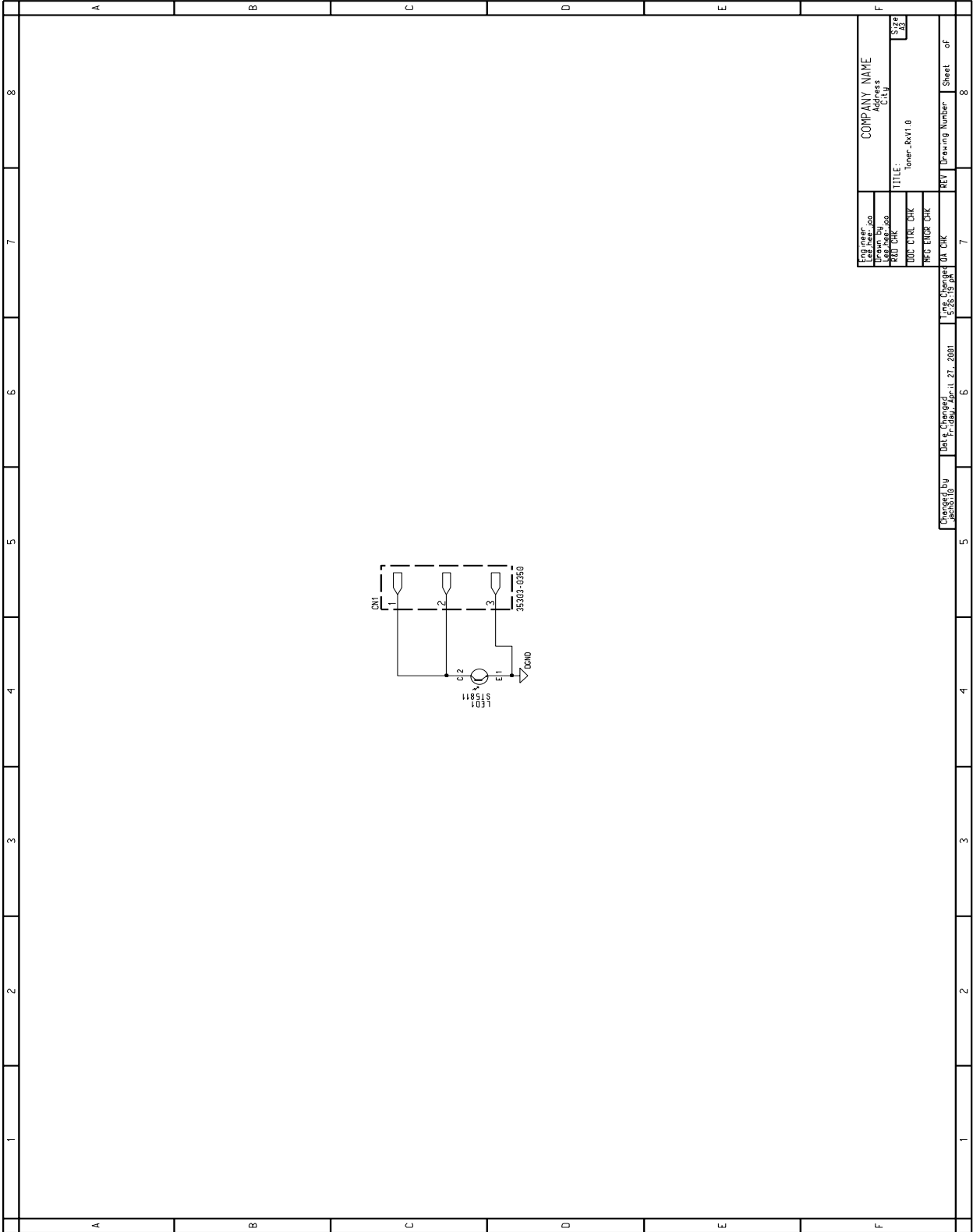


# 11-23 PTL Circuit Diagram, (WorkCentre Pro 412)





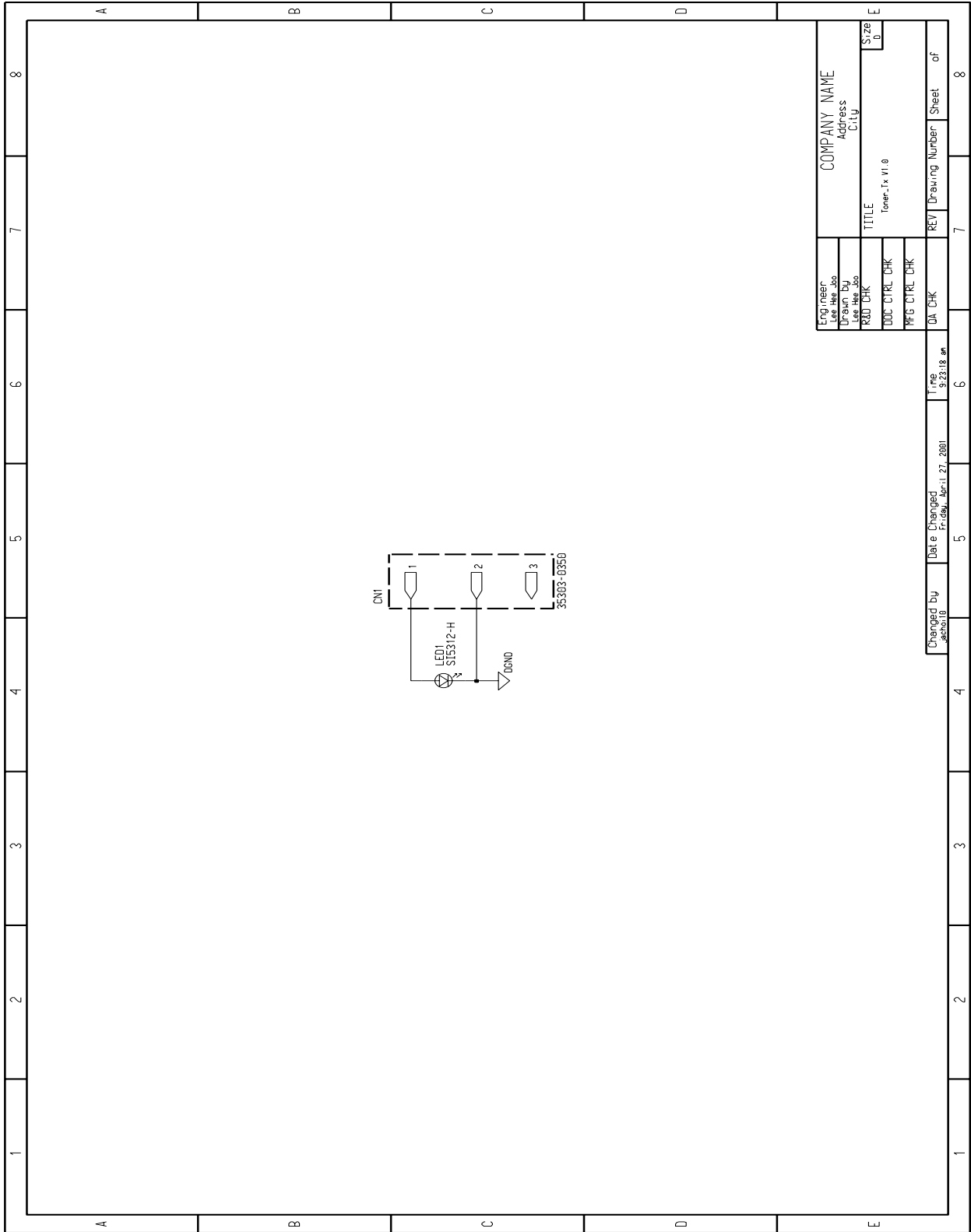
# 11-25 Toner RX Circuit Diagram, (WorkCentre Pro 412)



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Drawn By	Address
QA1 CHK	City
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DATE	Rev
1/24/03	1
DATE	Drawing Number
1/24/03	Sheet
1/24/03	of

Changed By	Date	Change
aps518	1/27/2003	1/25:19

# 11-26 Toner TX Circuit Diagram, (WorkCentre Pro 412)



Engineer Lee.Hae.Boo	COMPANY NAME	Size D
Drawn By Lee.Hae.Boo	Address	
R&D CHK	City	
DOC CTRL CHK	TITLE Toner Tx v1.0	
MFG CTRL CHK	REV	Sheet of
QA CHK	Drawing Number	8

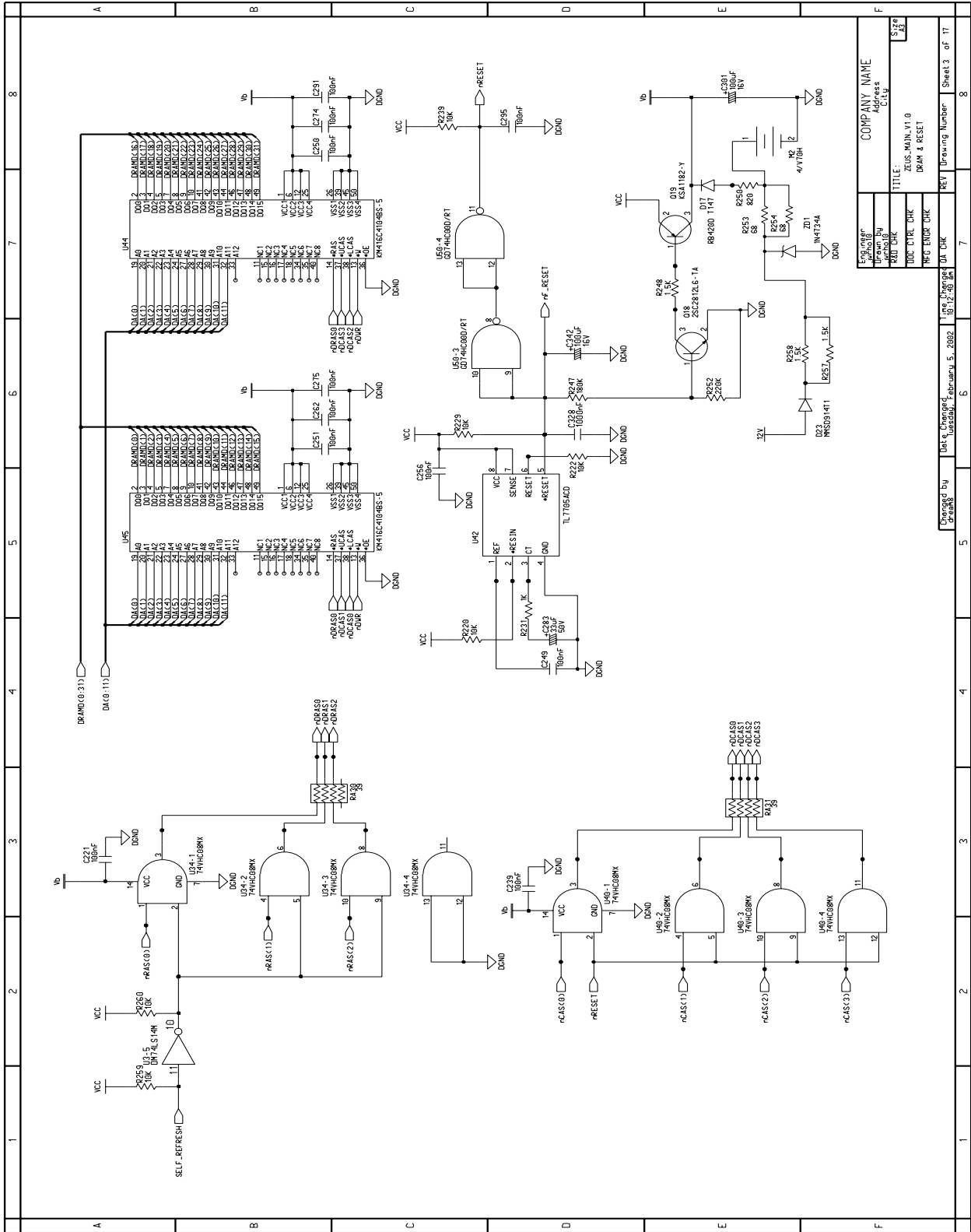
Changed By achho.lb	Date Changed Friday, April 27, 2001	Time 9:23:18 am
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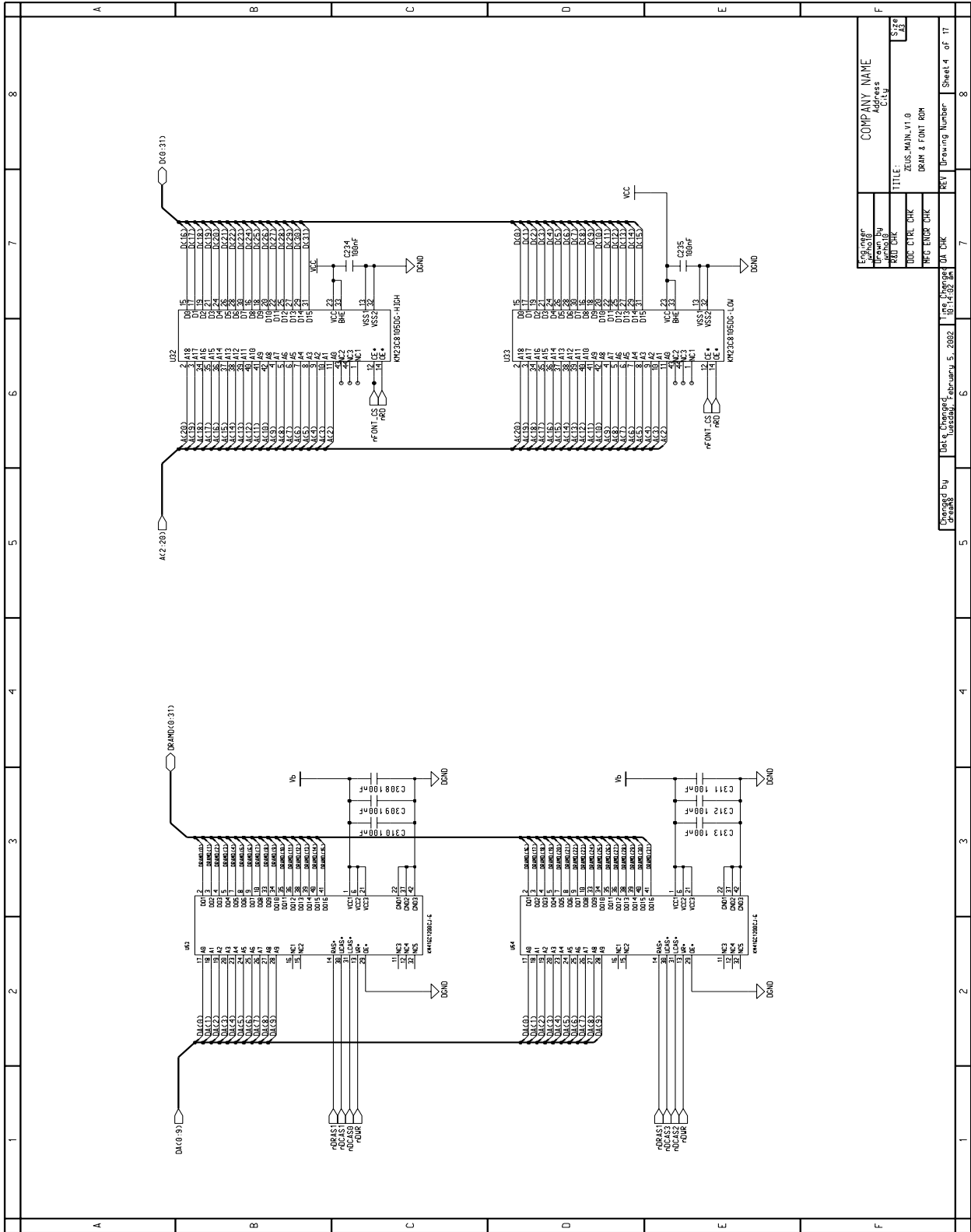




# 11-29 Main Circuit Diagram (3 of 17, FaxCentre F12)



# 11-30 Main Circuit Diagram (4 of 17, FaxCentre F12)



Company Name	Zeus Main V1.0
Address	DRAM & FONT ROM
Drawn By	WJ
Checked By	WJ
IDOC CIR. CHK	
PCB ENDR. CHK	
QA CHK	
Drawing Number	Sheet 4 of 11

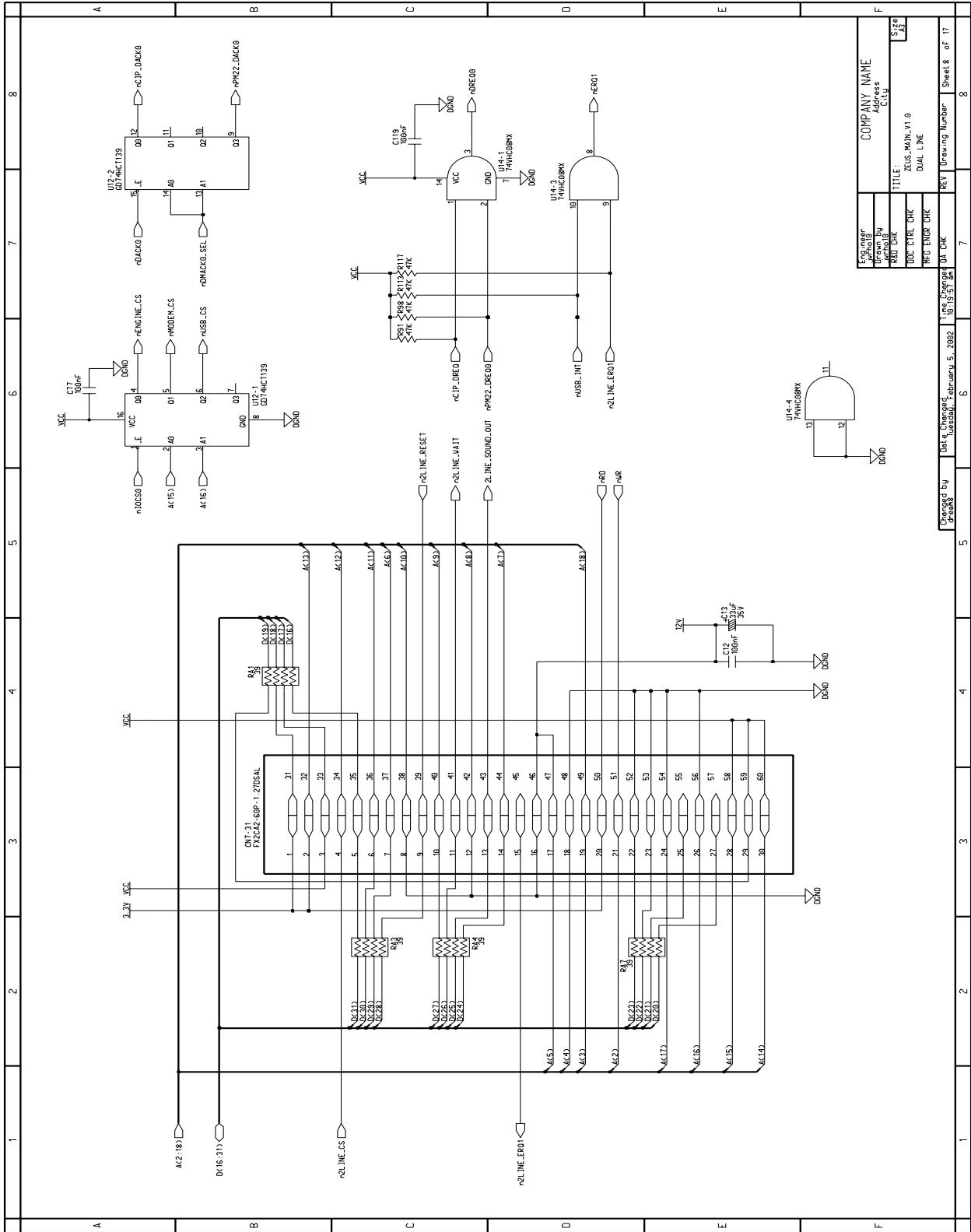
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 Date Changed: Tuesday, February 5, 2002  
 Time Changed: 10:14:02 AM





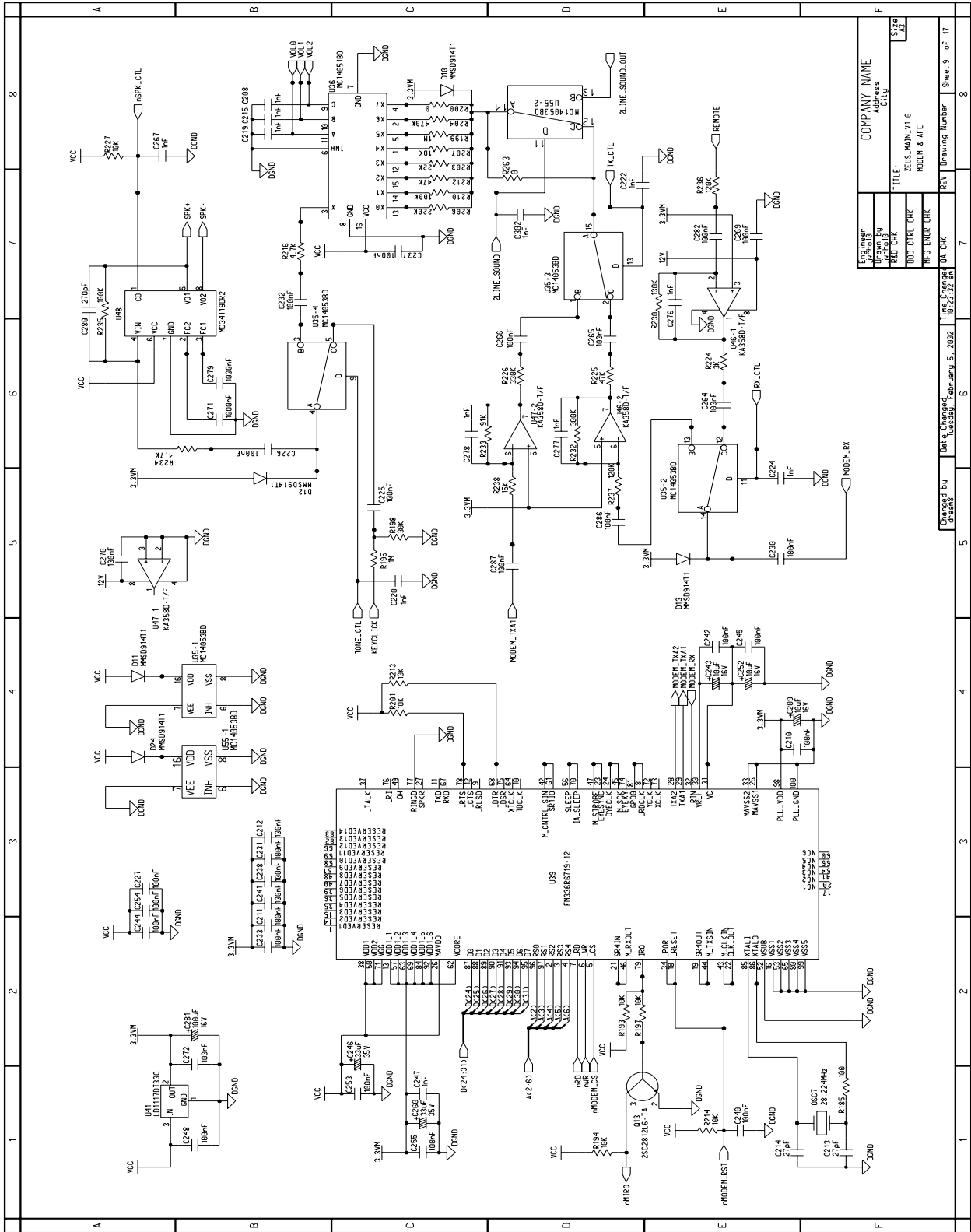


# 11-34 Main Circuit Diagram (8 of 17, FaxCentre F12)

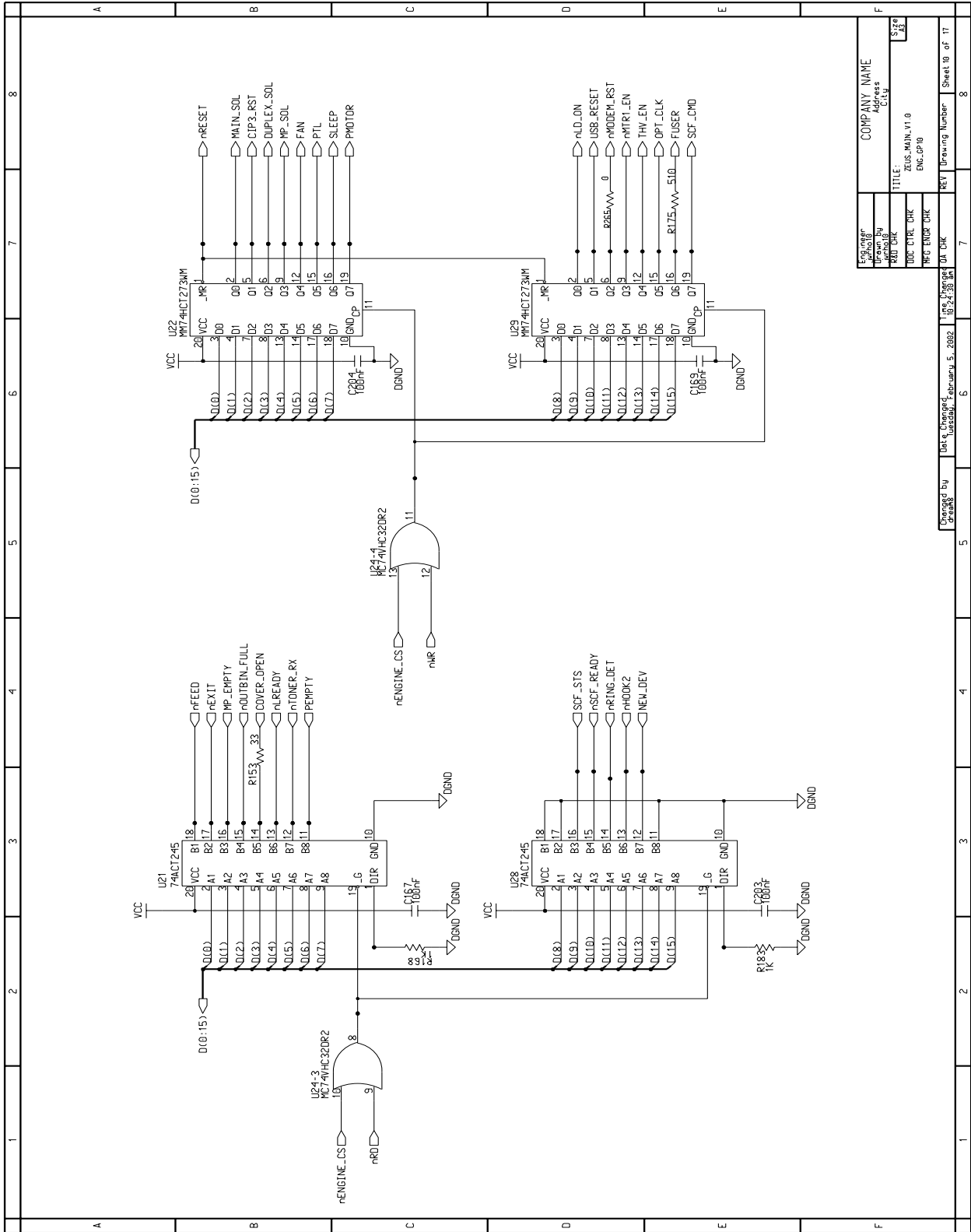


Company Name	Address
Zeus	1515 S. 11th St.
City	Phoenix, AZ
State	85004
Country	USA
Phone	602-998-1111
Fax	602-998-1112
Web	http://www.zeus.com
Part Number	11-34
Revision	1.0
Drawn By	CSJ
Checked By	
Approved By	
Date	02/15/01
Sheet	8 of 11

# 11-35 Main Circuit Diagram (9 of 17, FaxCentre F12)



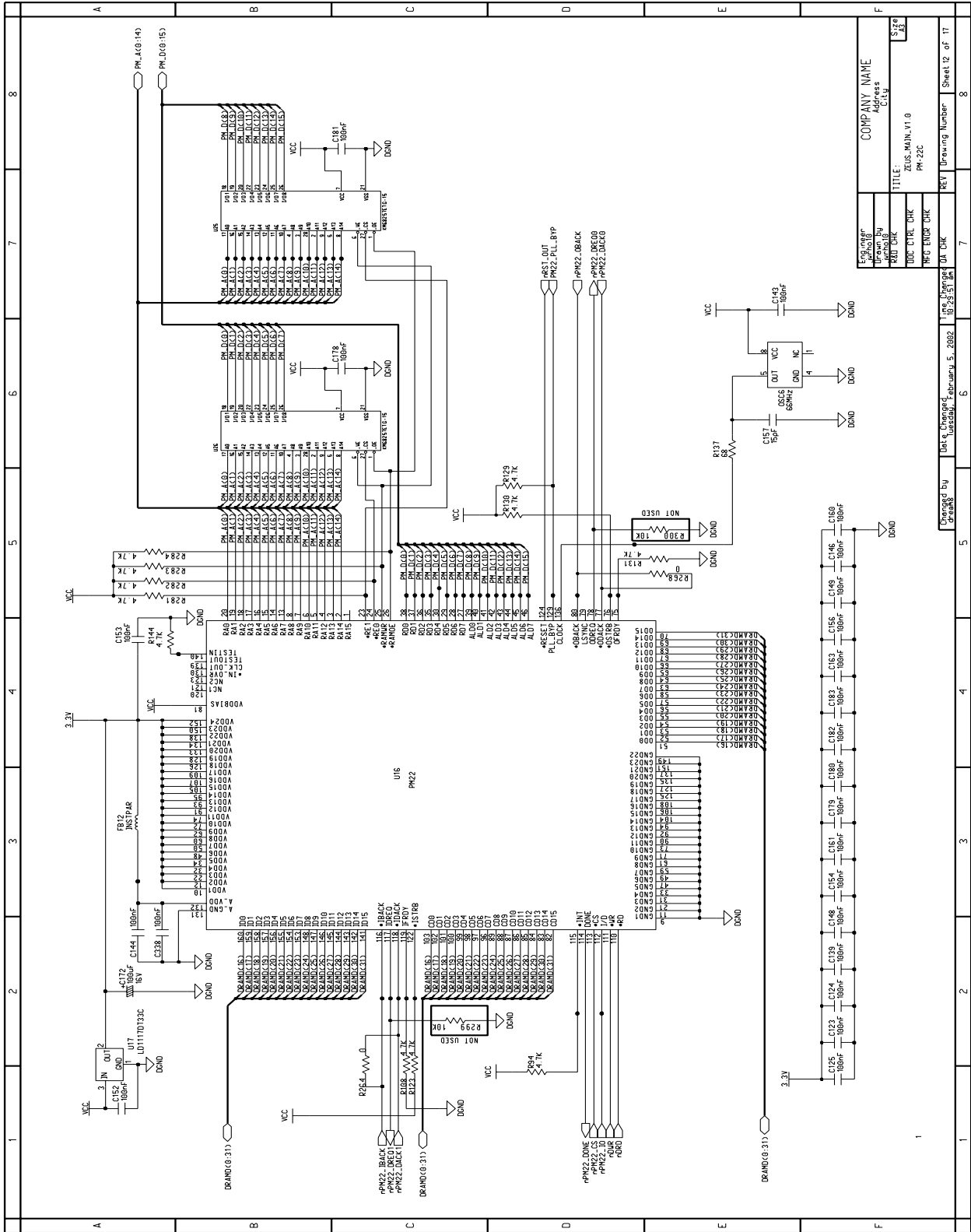
# 11-36 Main Circuit Diagram (10 of 17, FaxCentre F12)







# 11-38 Main Circuit Diagram (12 of 17, FaxCentre F12)





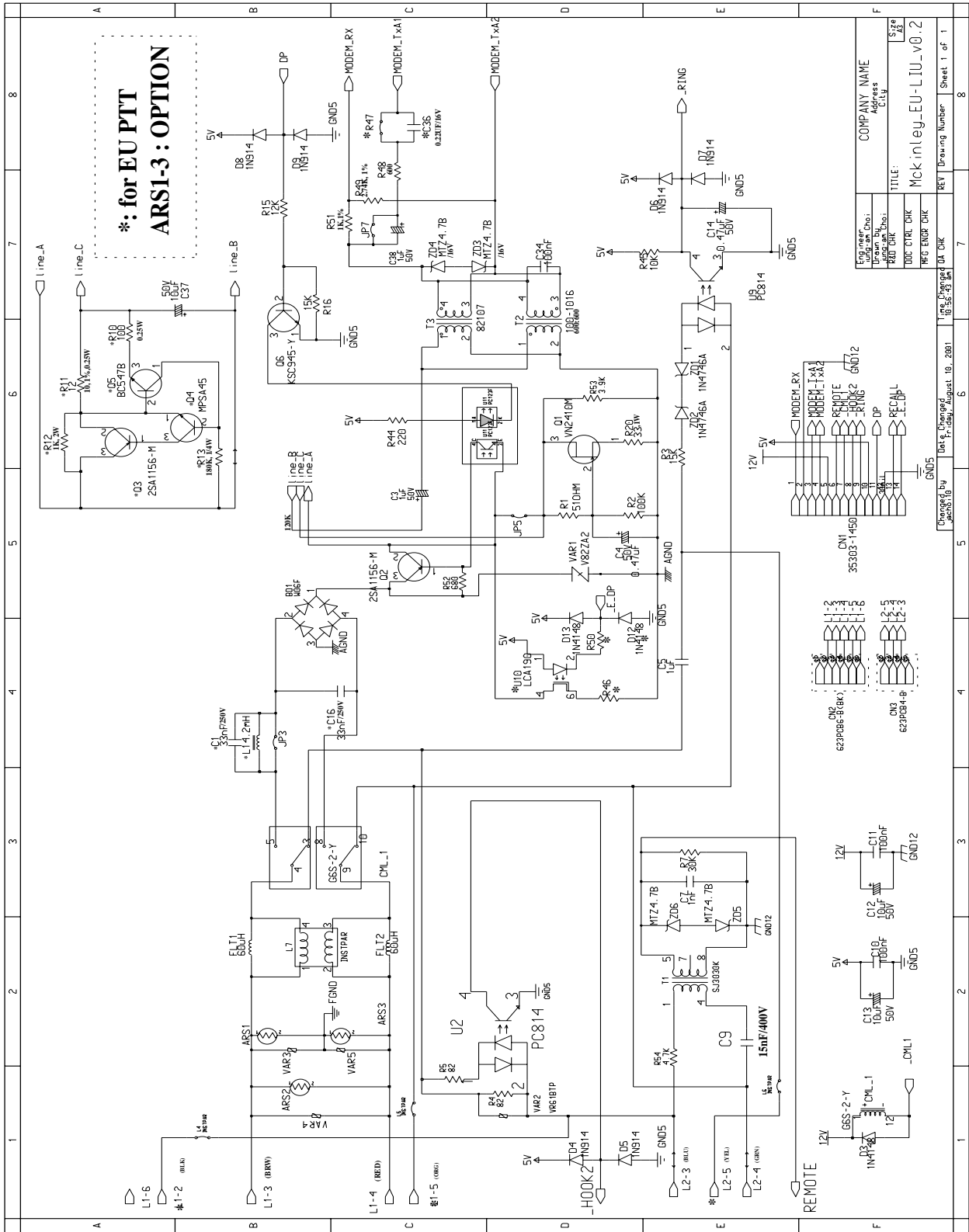








# 11-44 LIU Circuit Diagram (FaxCentre F12)

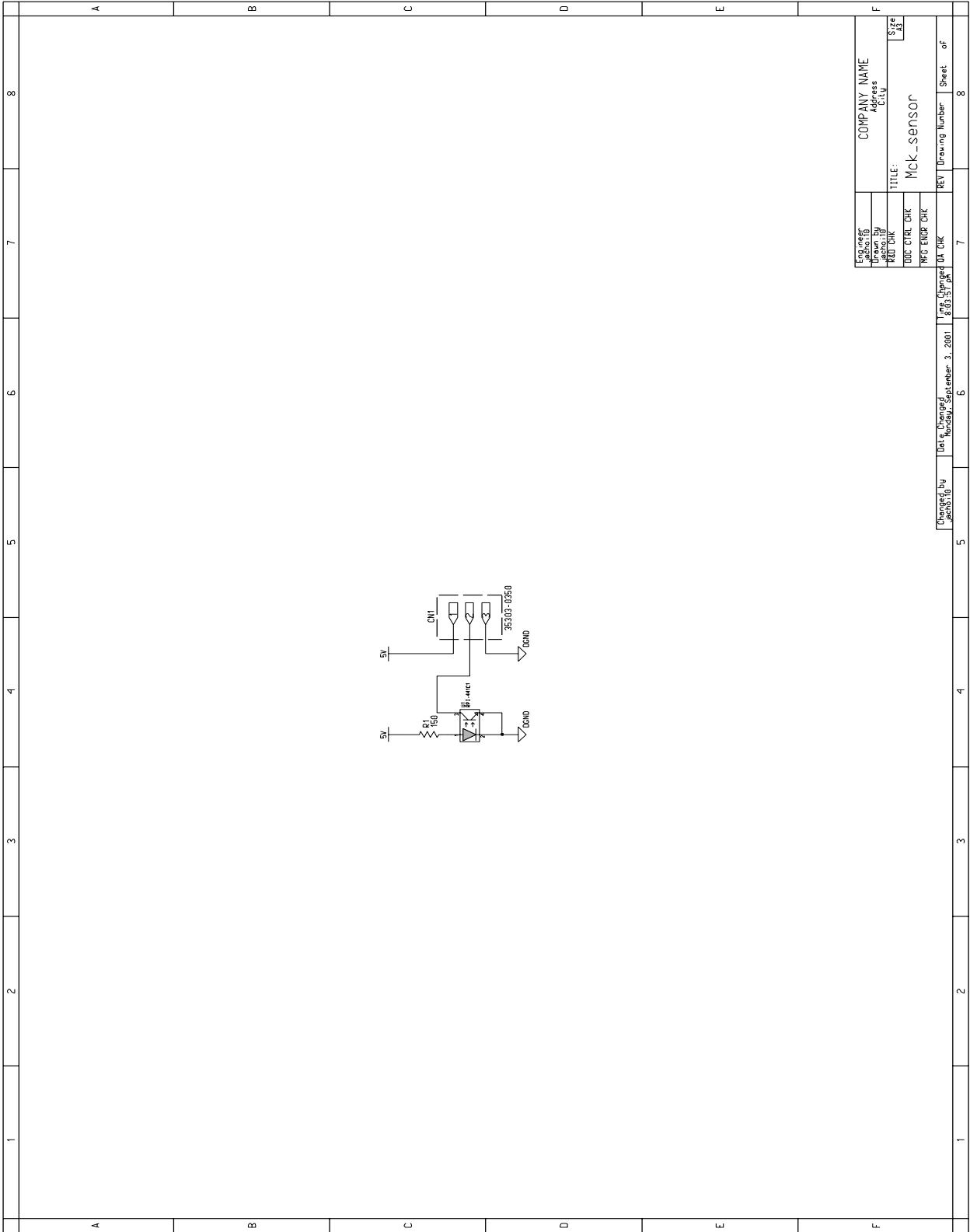




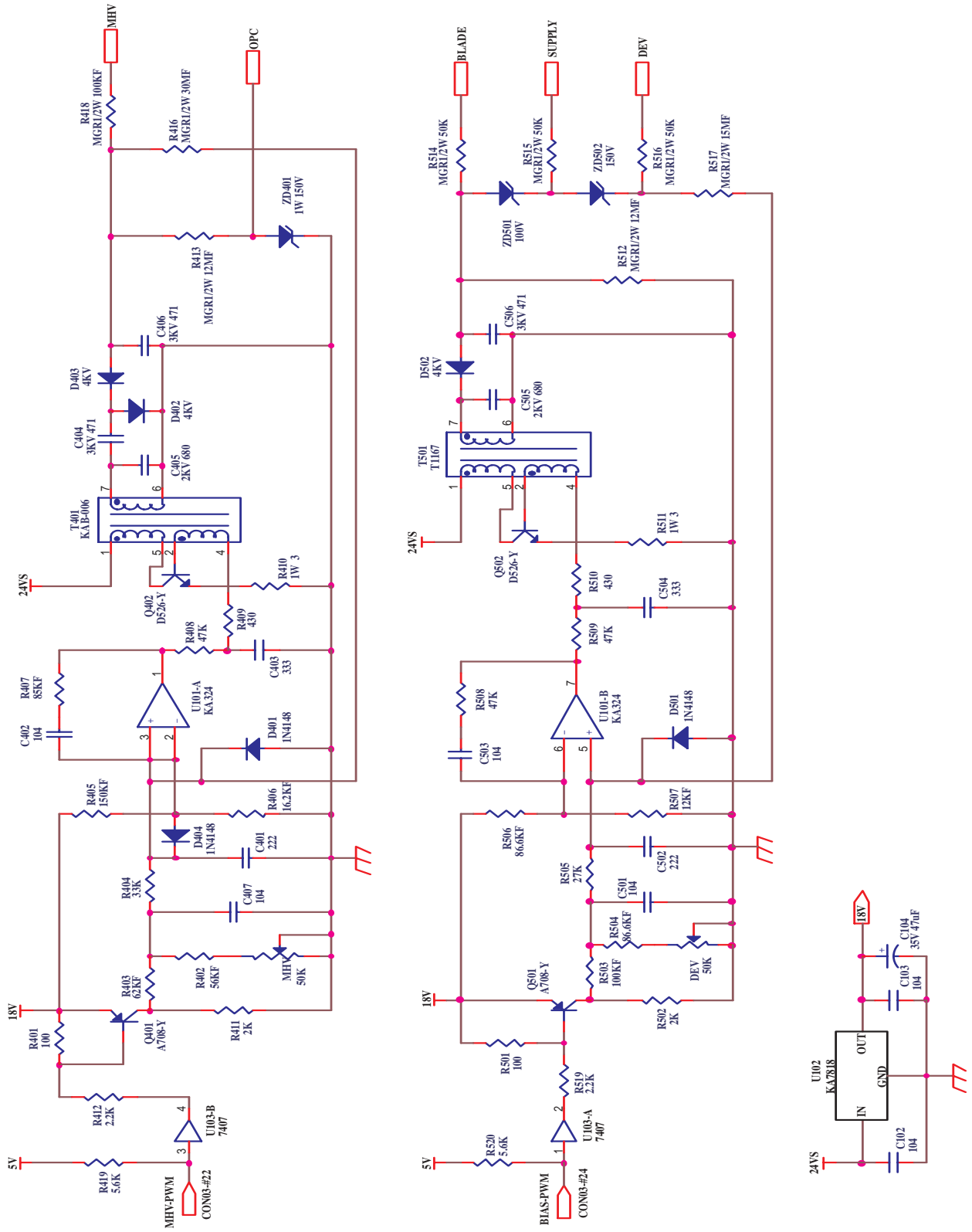




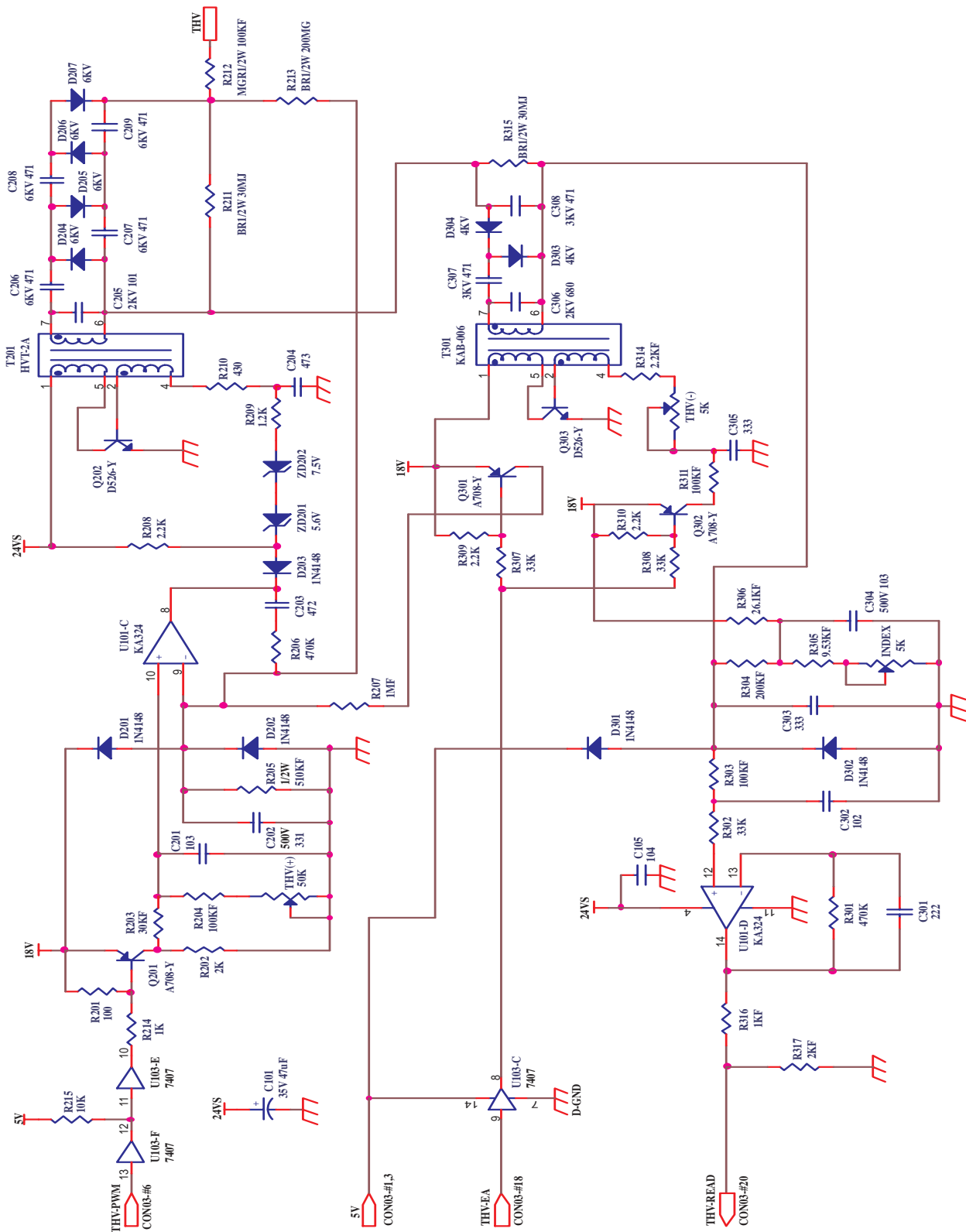
# 11-47 Sensor Circuit Diagram (FaxCentre F12)



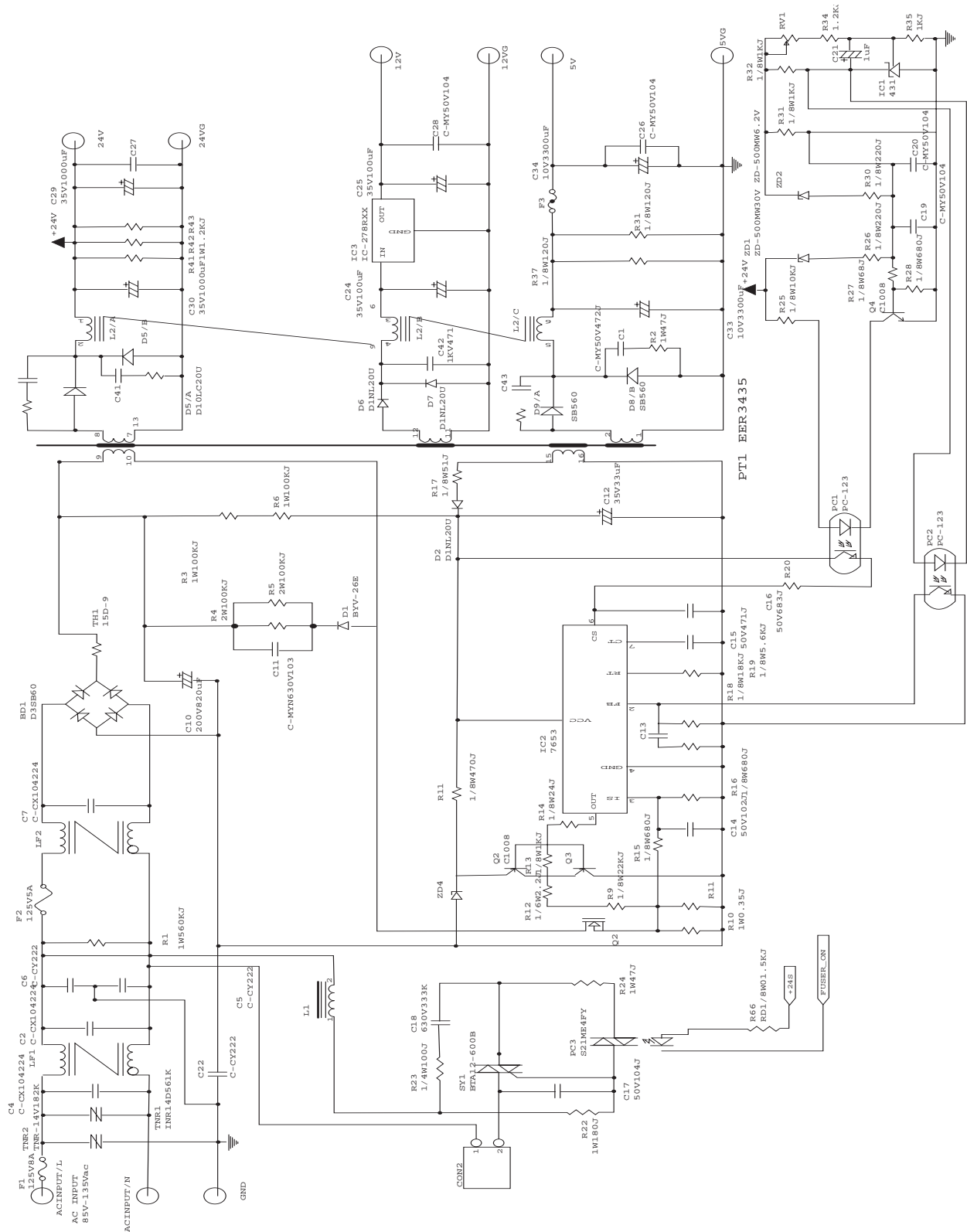
# 11-48 HVPS Circuit Diagram (1 of 2, FaxCentre F12)



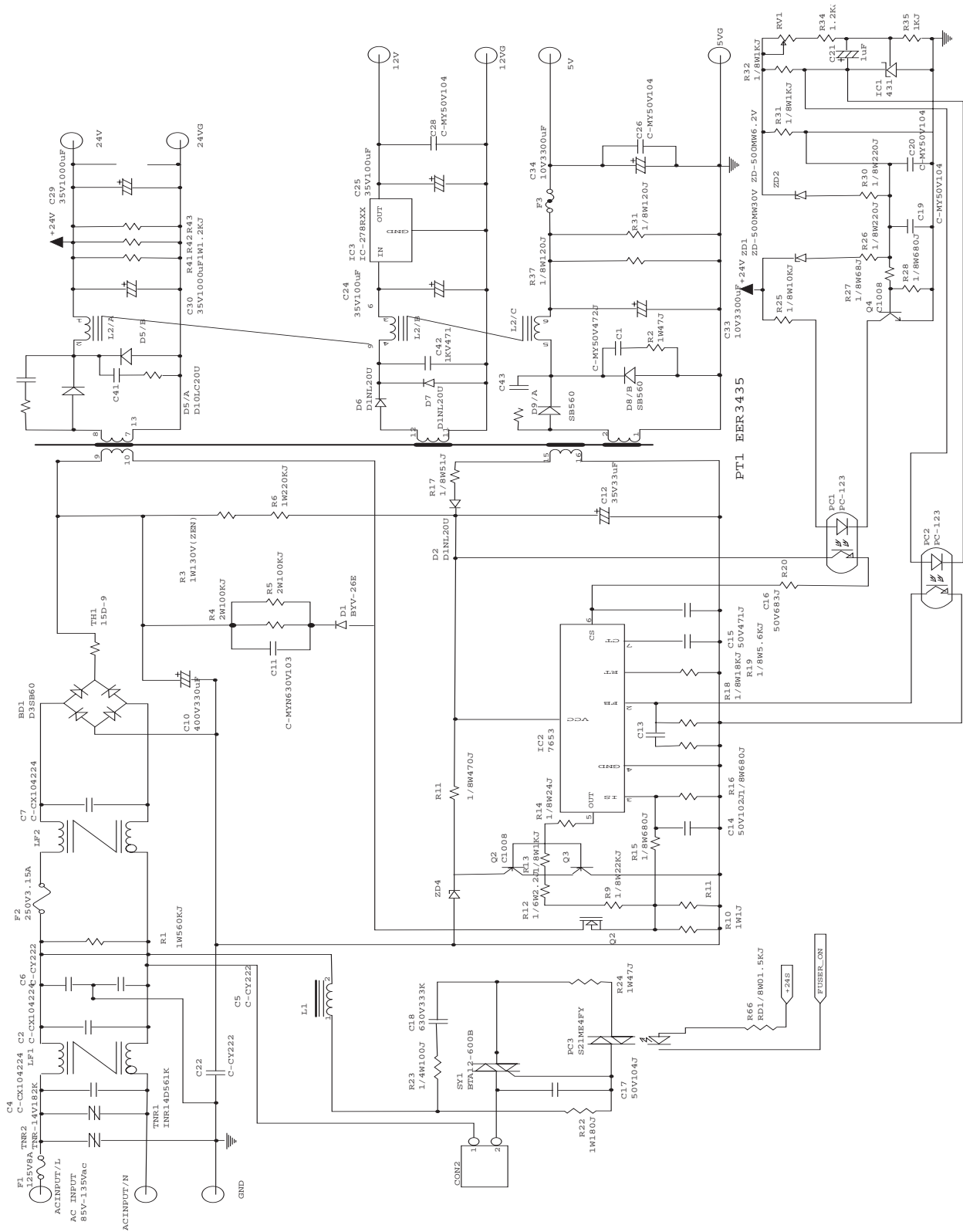
# 11-49 HVPS Circuit Diagram (2 of 2, FaxCentre F12)



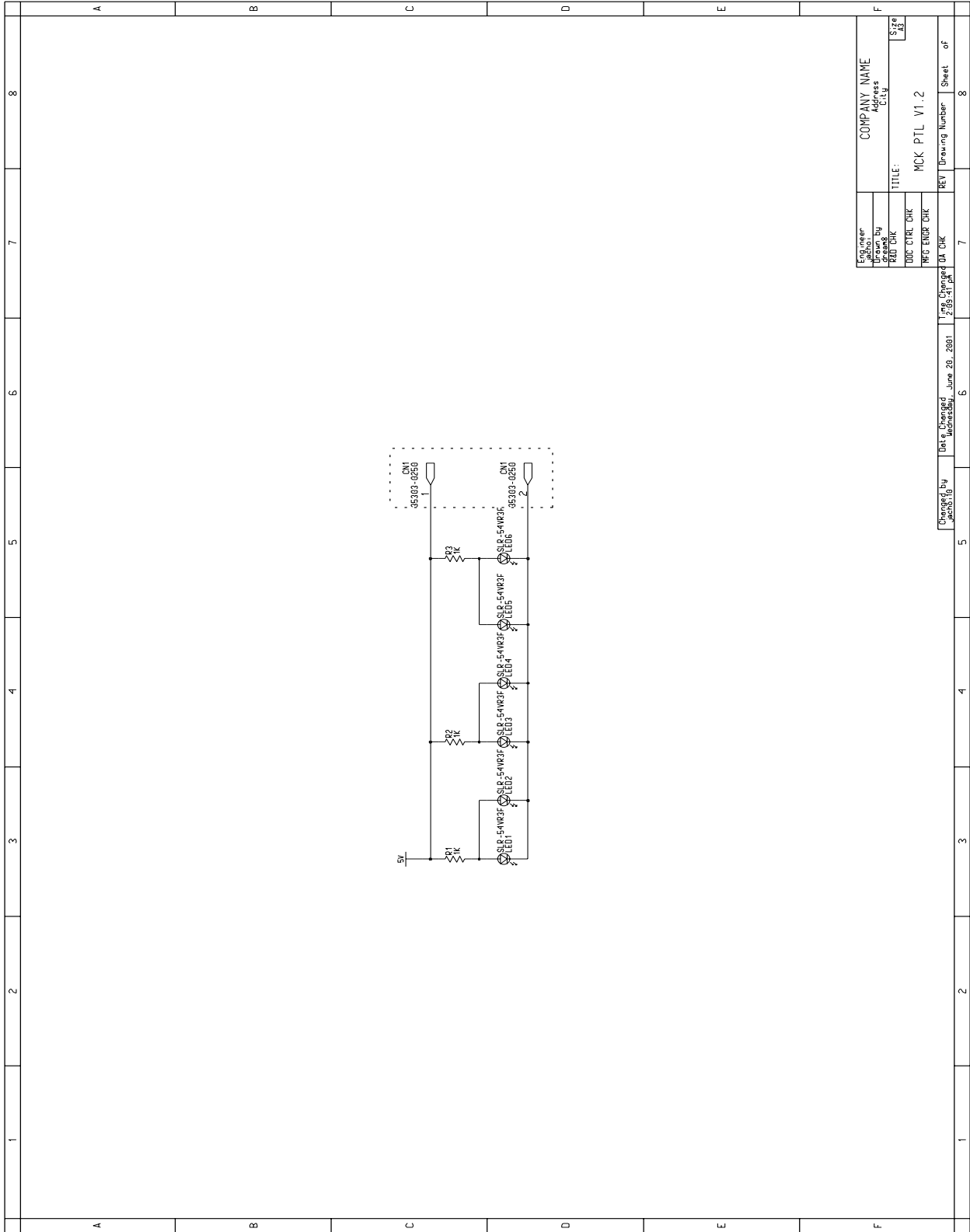
# 11-50 SMPS Circuit Diagram (110V, FaxCentre F12)



# 11-51 SMPS Circuit Diagram (220V, FaxCentre F12)

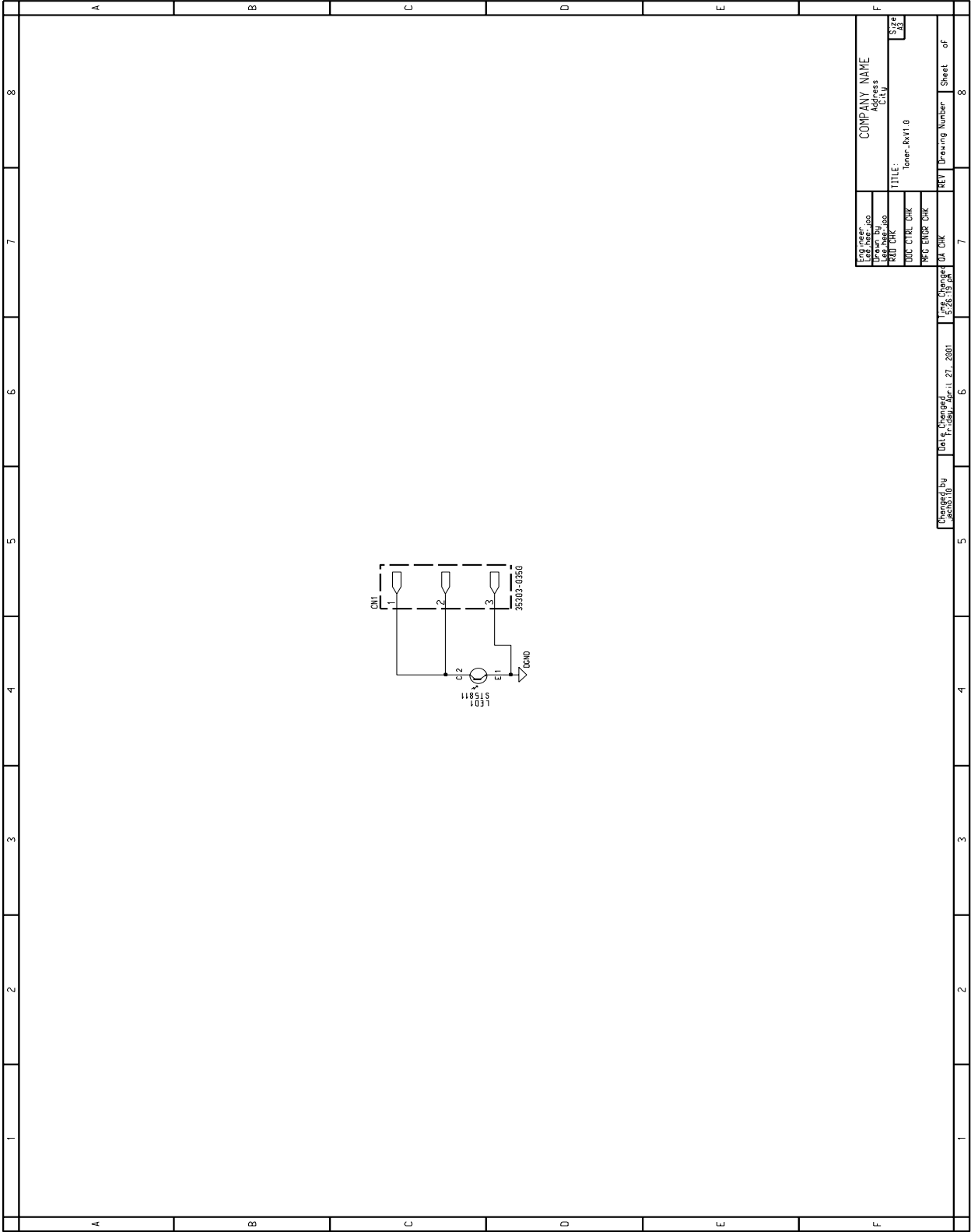


# 11-52 PTL Circuit Diagram (FaxCentre F12)

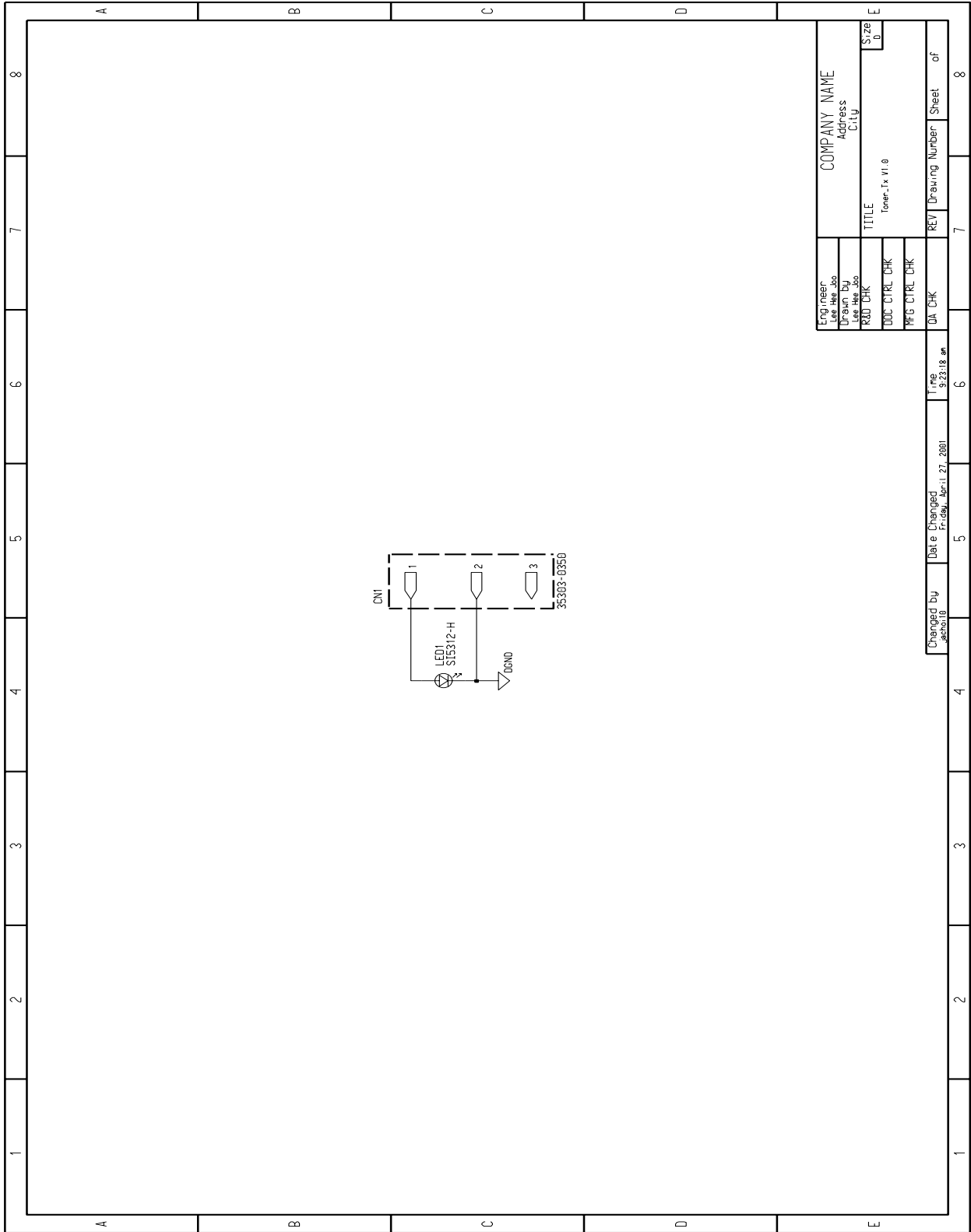




# 11-53 Toner-RX Circuit Diagram (FaxCentre F12)



# 11-54 Toner-TX Circuit Diagram (FaxCentre F12)



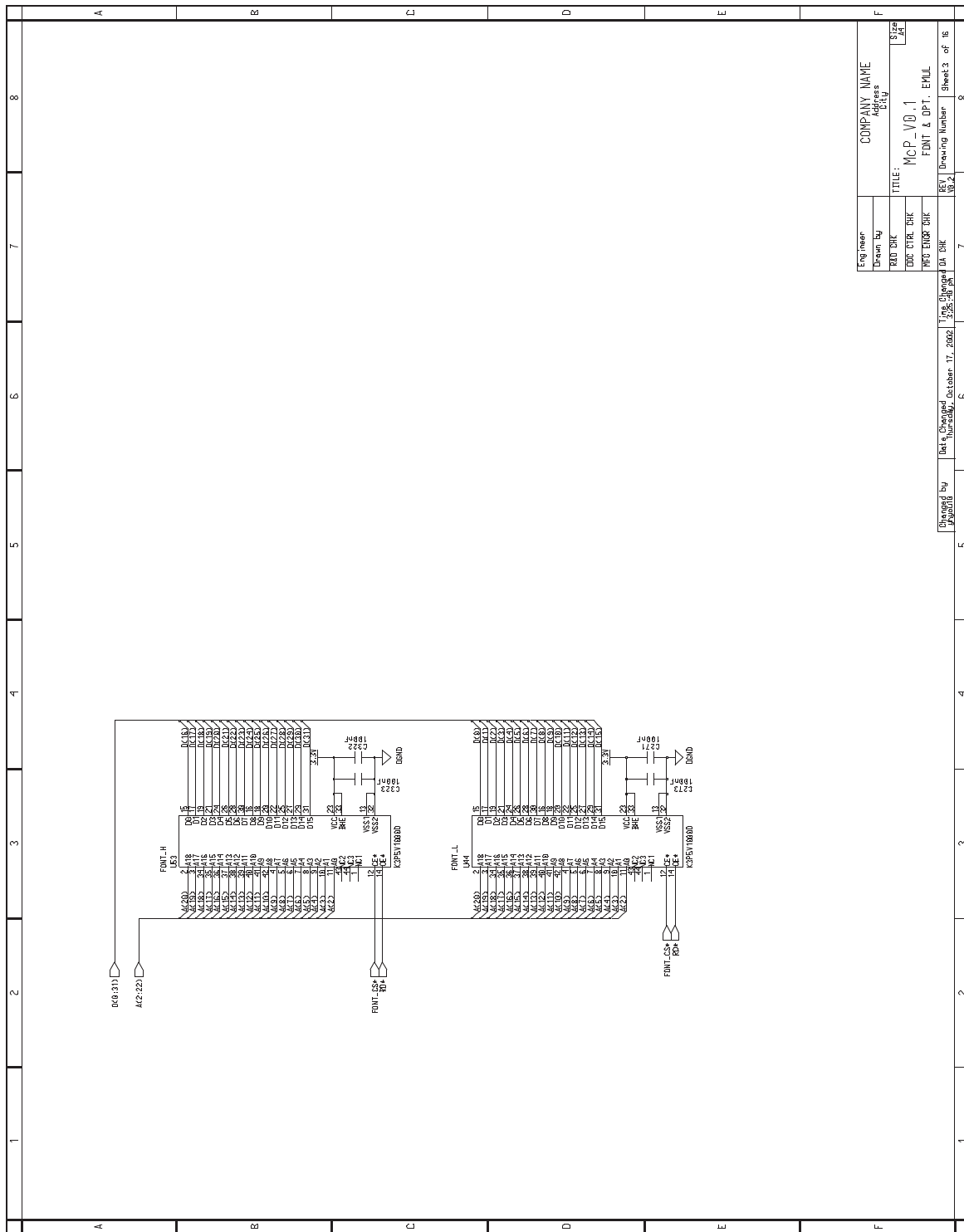
Engineer Lee.Hae.Boo	COMPANY NAME	Size D
Drawn By Lee.Hae.Boo	Address	
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DOC CTRL CHK	TITLE Toner.Tx v1.0	
MFG CTRL CHK	REV	Sheet of
QA CHK	Drawing Number	8

Changed By achho.08	Date Changed Friday, April 27, 2001	Time 9:23:18 am
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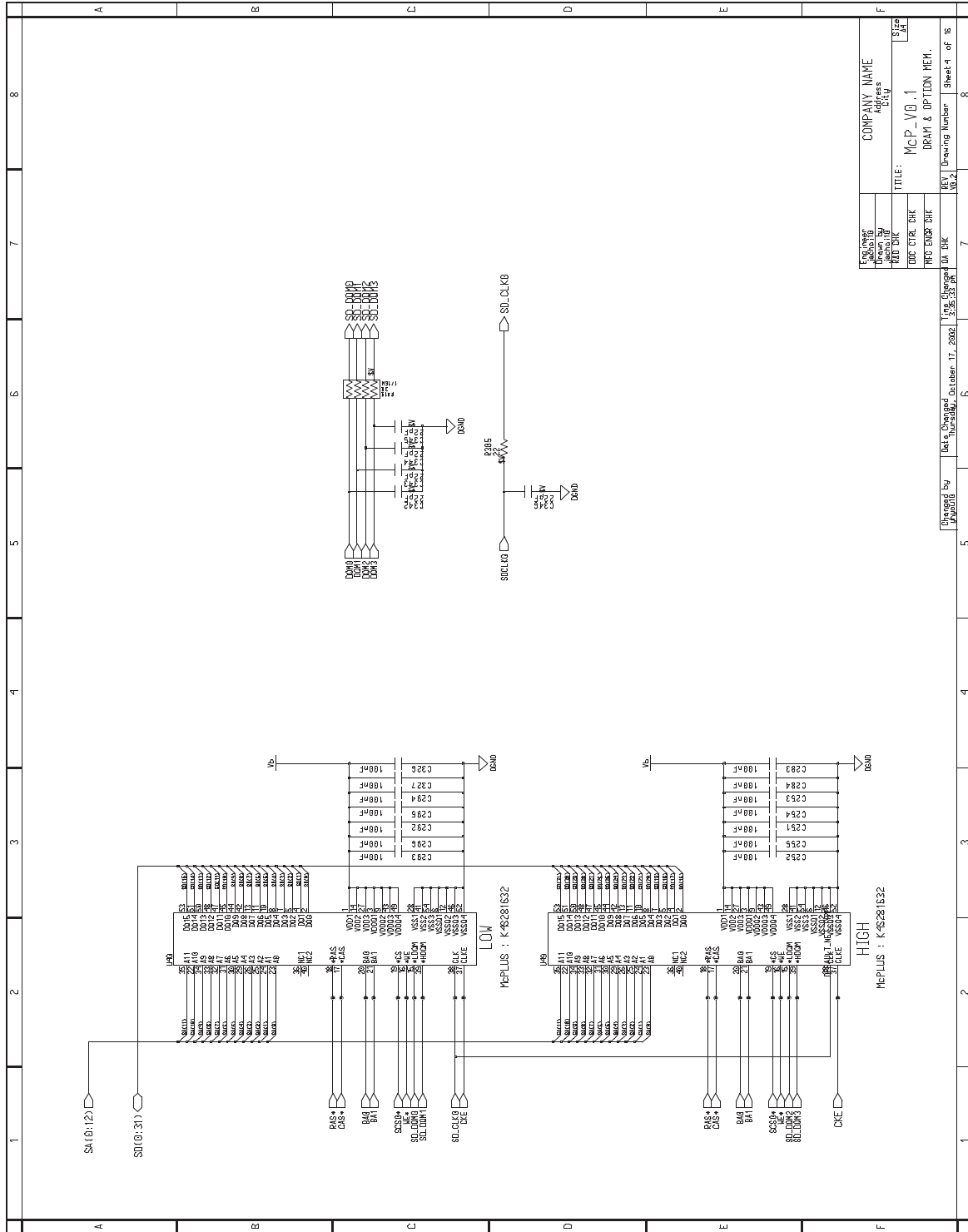




# 11-57 Main Circuit Diagram (3 of 16, WorkCentre M15/M15i)



# 11-58 Main Circuit Diagram (4 of 16, WorkCentre M15/M15i)



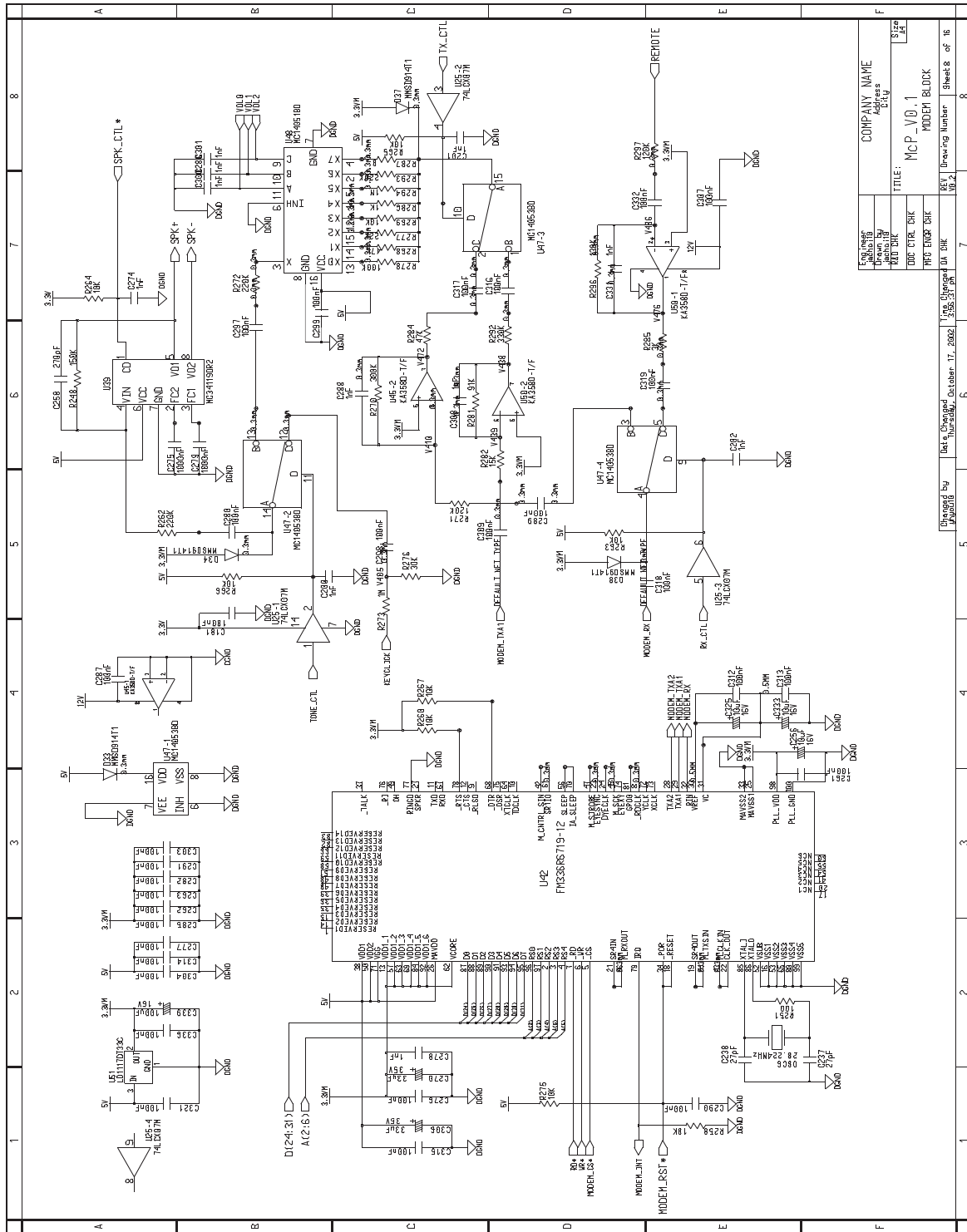






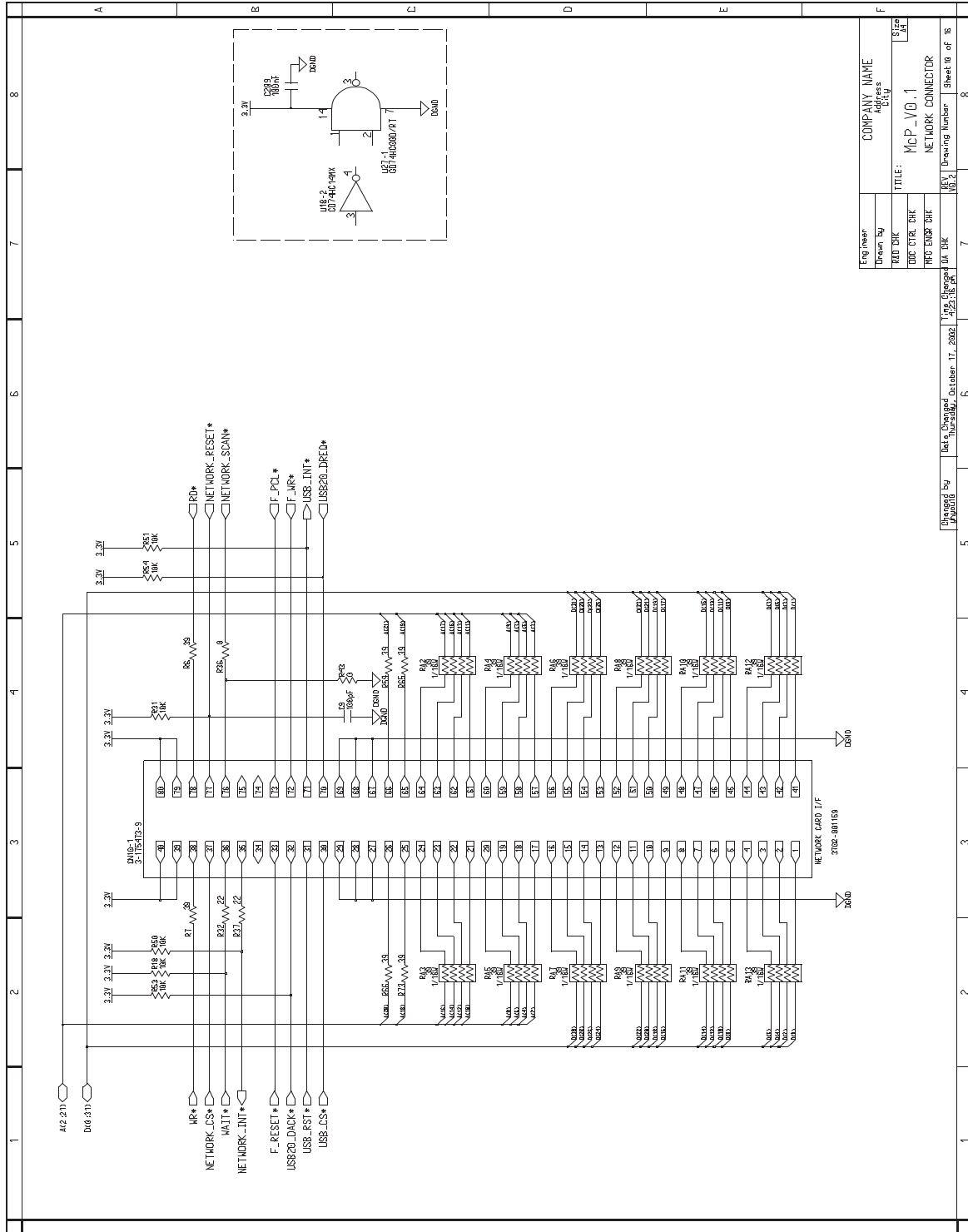


# 11-62 Main Circuit Diagram (8 of 16, WorkCentre M15/M15i)





# 11-64 Main Circuit Diagram (10 of 16, WorkCentre M15/M15i)

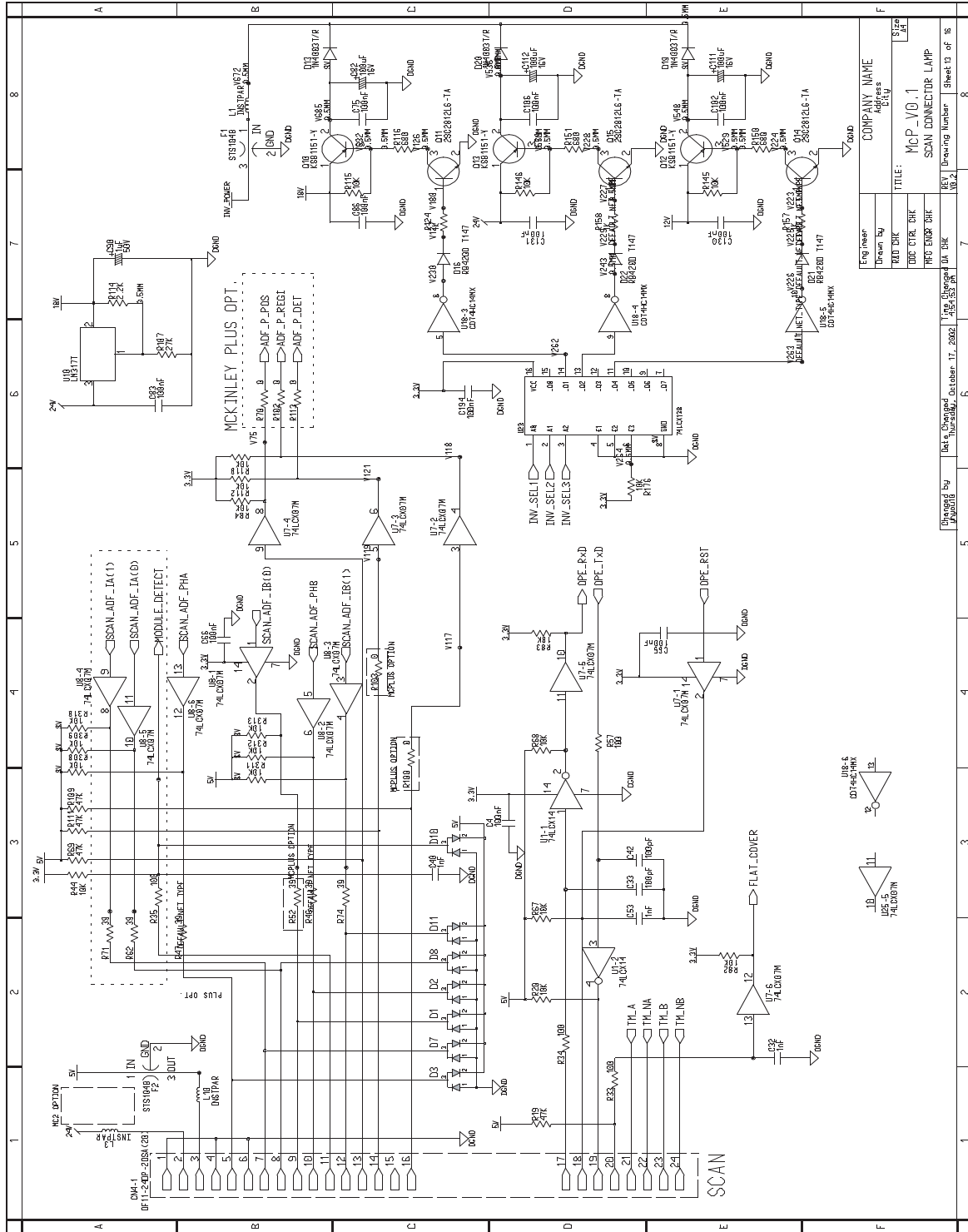


Engineer	COMPANY NAME
Drawn by	Address
DATE CHK	DATE
DATE CHK	TITLE: MCP_V0.1
DATE CHK	NETWORK CONNECTOR
DATE CHK	DATE
DATE CHK	Drawing Number
DATE CHK	Sheet 10 of 16



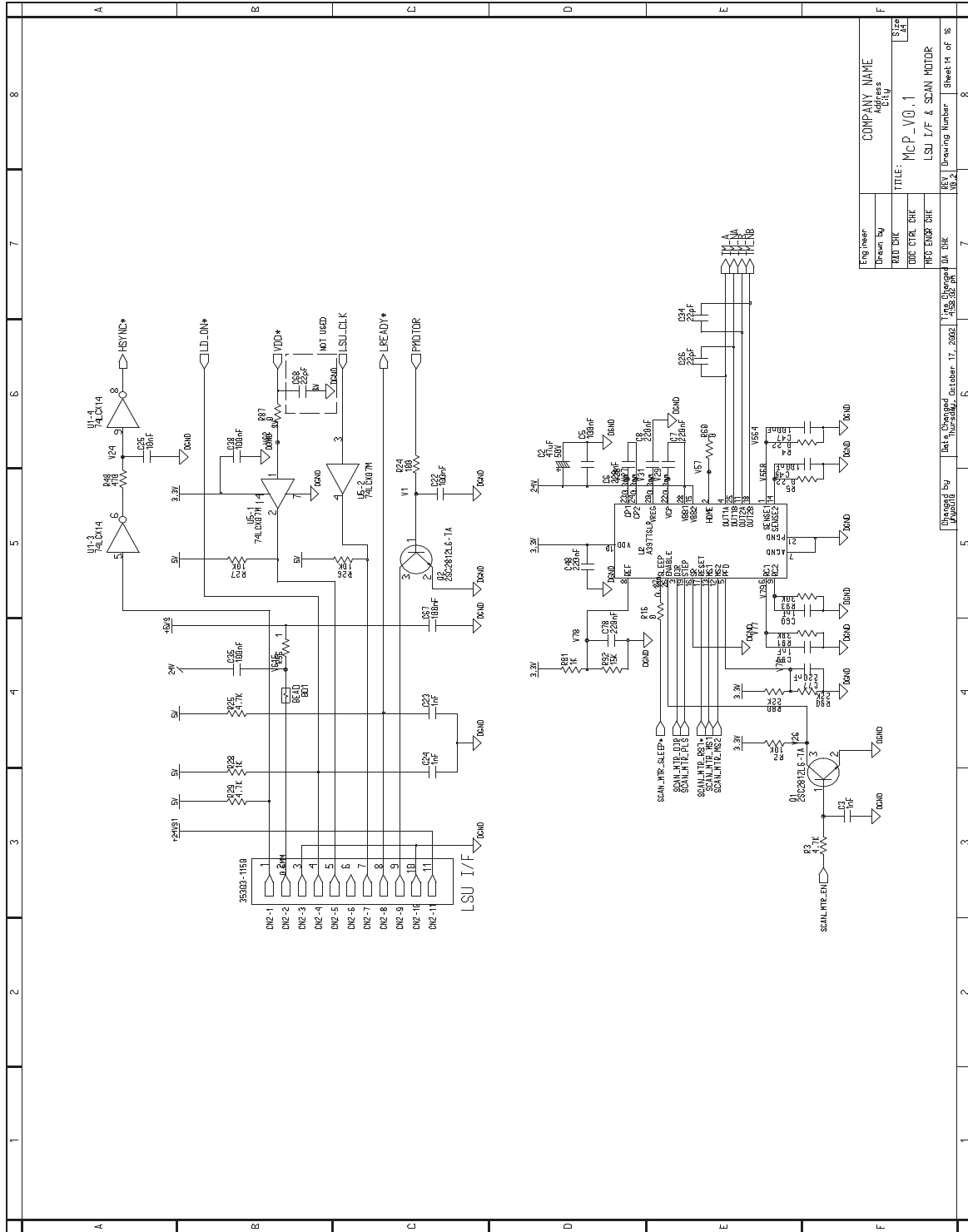


# 11-67 Main Circuit Diagram (13 of 16, WorkCentre M15/M15i)



Eng. near	COMPANY NAME
Drawn by	Address
Check by	City
DATE	STATE
DATE	TITLE: MCKINLEY PLUS OPT.
DATE	SCAN CONNECTOR LAMP
DATE	REV. Drawing Number
DATE	Sheet 13 of 16

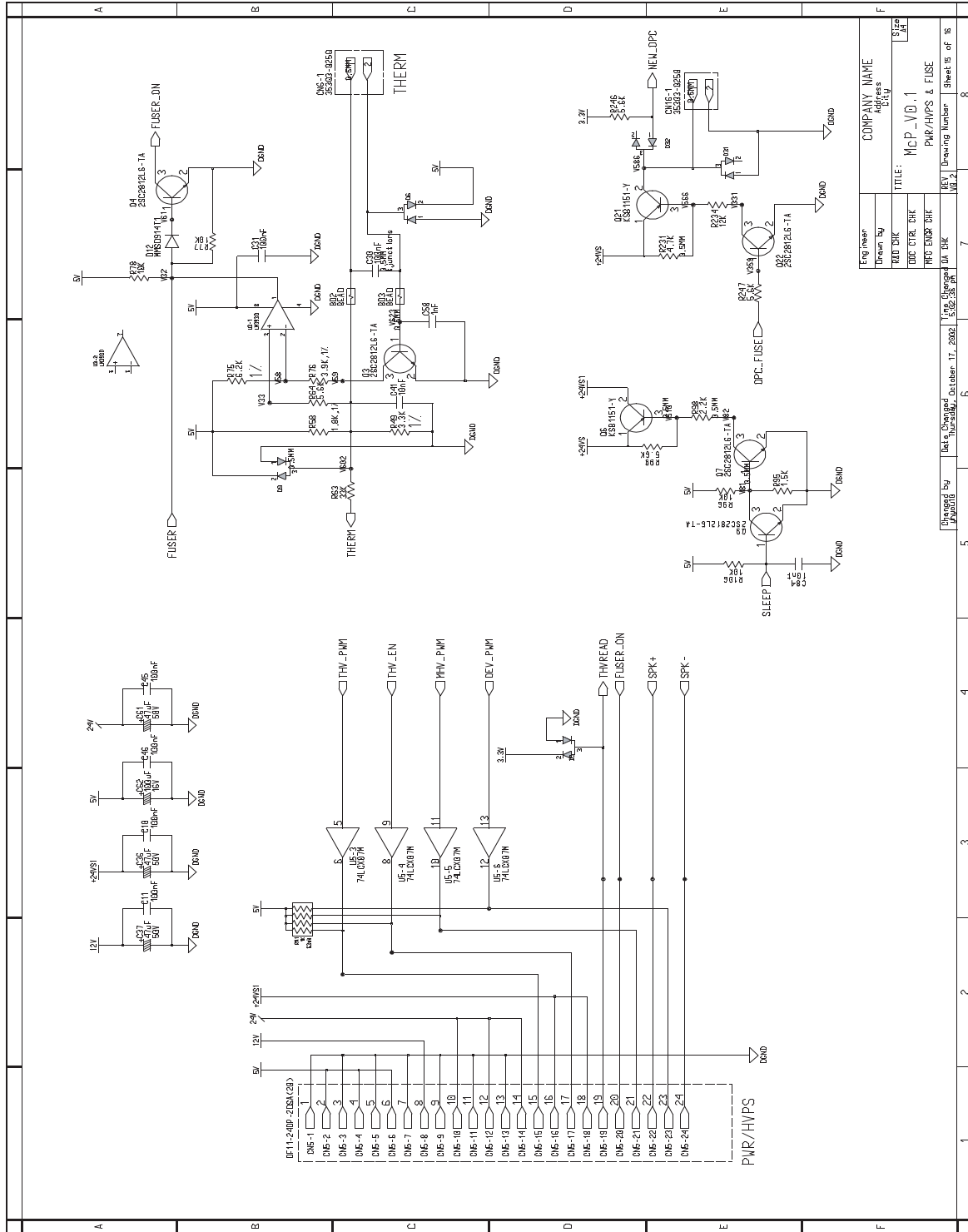
# 11-68 Main Circuit Diagram (14 of 16, WorkCentre M15/M15i)



Eng. near	COMPANY NAME
Drawn by	Address
Rev. 001	City
Rev. 002	State
Rev. 003	Zip
Rev. 004	Country
Rev. 005	Telephone
Rev. 006	Fax
Rev. 007	E-mail
Rev. 008	Web
Rev. 009	URL
Rev. 010	Other
Rev. 011	Other
Rev. 012	Other
Rev. 013	Other
Rev. 014	Other
Rev. 015	Other
Rev. 016	Other
Rev. 017	Other
Rev. 018	Other
Rev. 019	Other
Rev. 020	Other



# 11-69 Main Circuit Diagram (15 of 16, WorkCentre M15/M15i)



Eng. Name	COMPANY NAME
Drawn By	Address
Part No.	Model
Rev. No.	Rev. No.
Issue No.	Issue No.
Sheet No.	Sheet No.

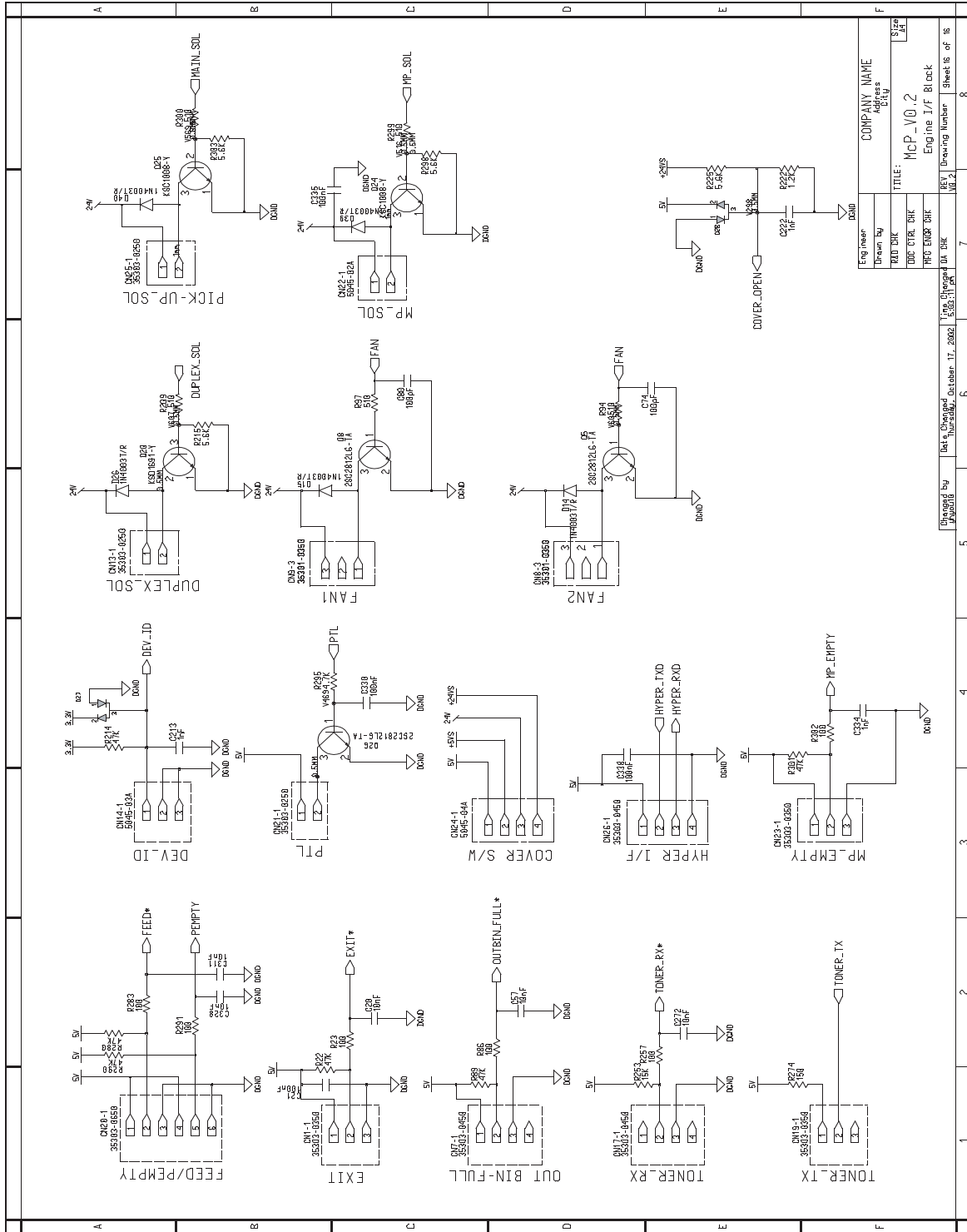
Drawn By	DATE	Revised By	DATE
Checked By	DATE	Approved By	DATE
Released By	DATE	Released By	DATE
Released By	DATE	Released By	DATE
Released By	DATE	Released By	DATE

Drawn By	DATE	Revised By	DATE
Checked By	DATE	Approved By	DATE
Released By	DATE	Released By	DATE
Released By	DATE	Released By	DATE
Released By	DATE	Released By	DATE

Drawn By	DATE	Revised By	DATE
Checked By	DATE	Approved By	DATE
Released By	DATE	Released By	DATE
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Released By	DATE	Released By	DATE

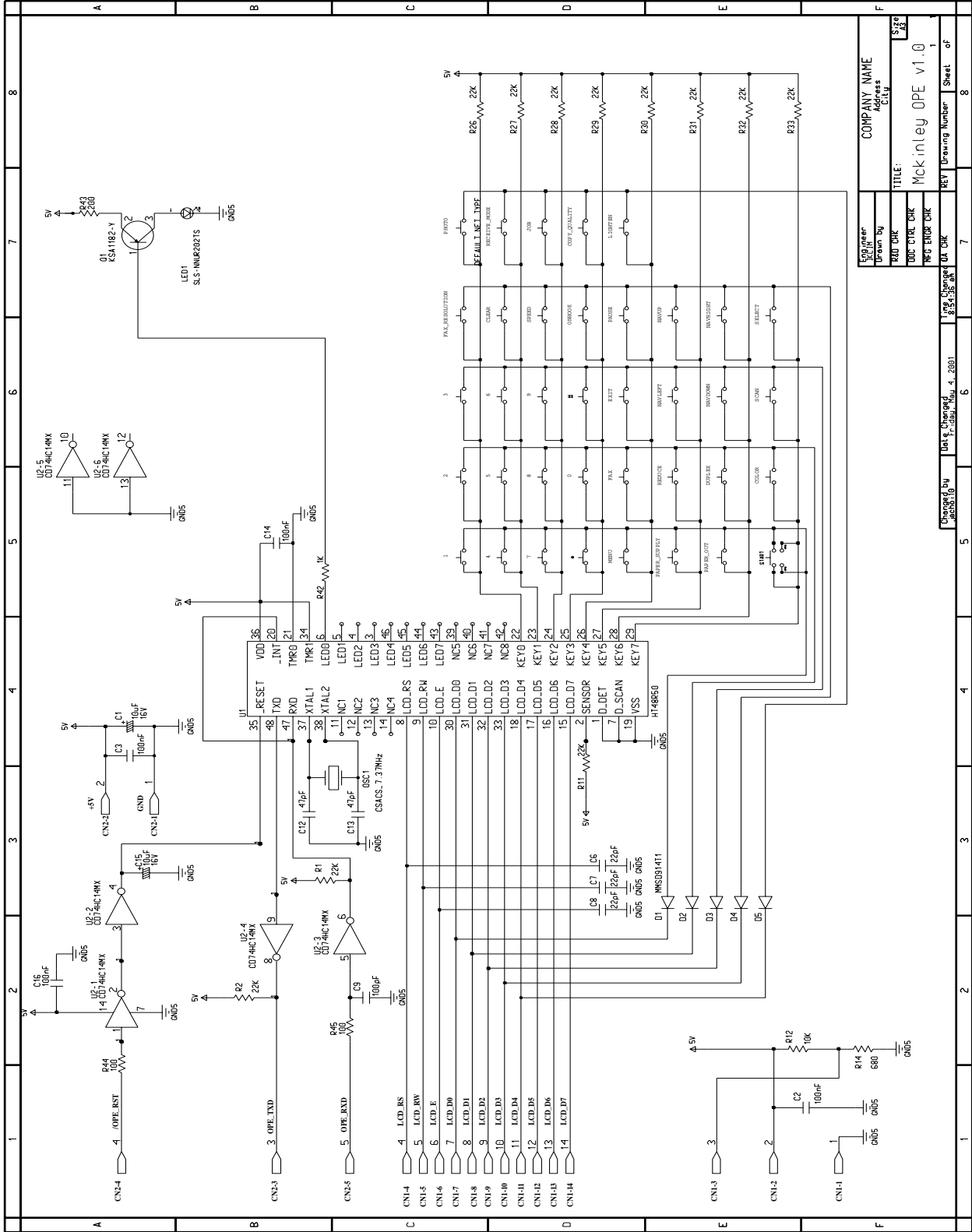
Drawn By	DATE	Revised By	DATE
Checked By	DATE	Approved By	DATE
Released By	DATE	Released By	DATE
Released By	DATE	Released By	DATE
Released By	DATE	Released By	DATE

# 11-70 Main Circuit Diagram (16 of 16, WorkCentre M15/M15i)

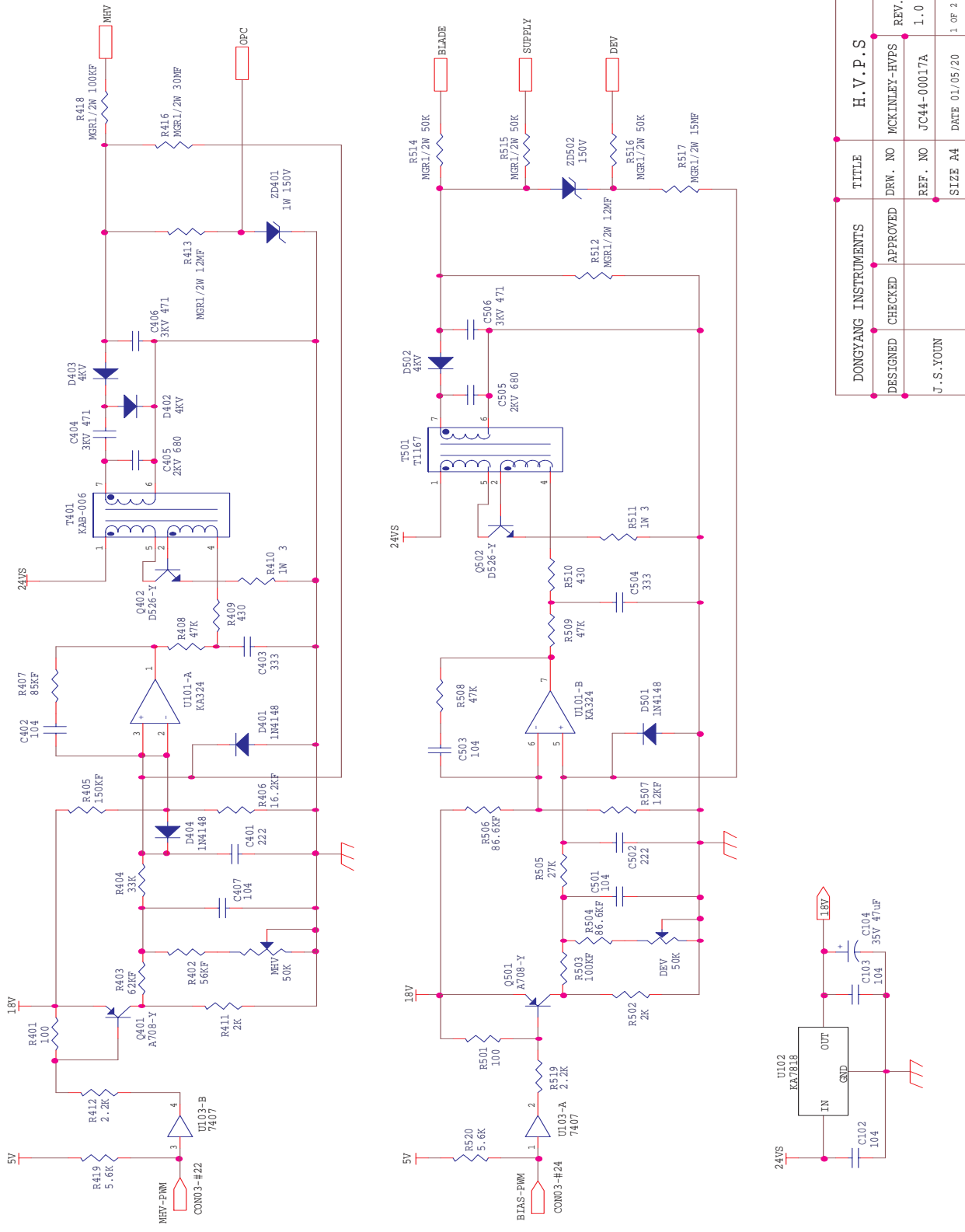




# 11-72 OPE Circuit Diagram (WorkCentre M15/M15i)

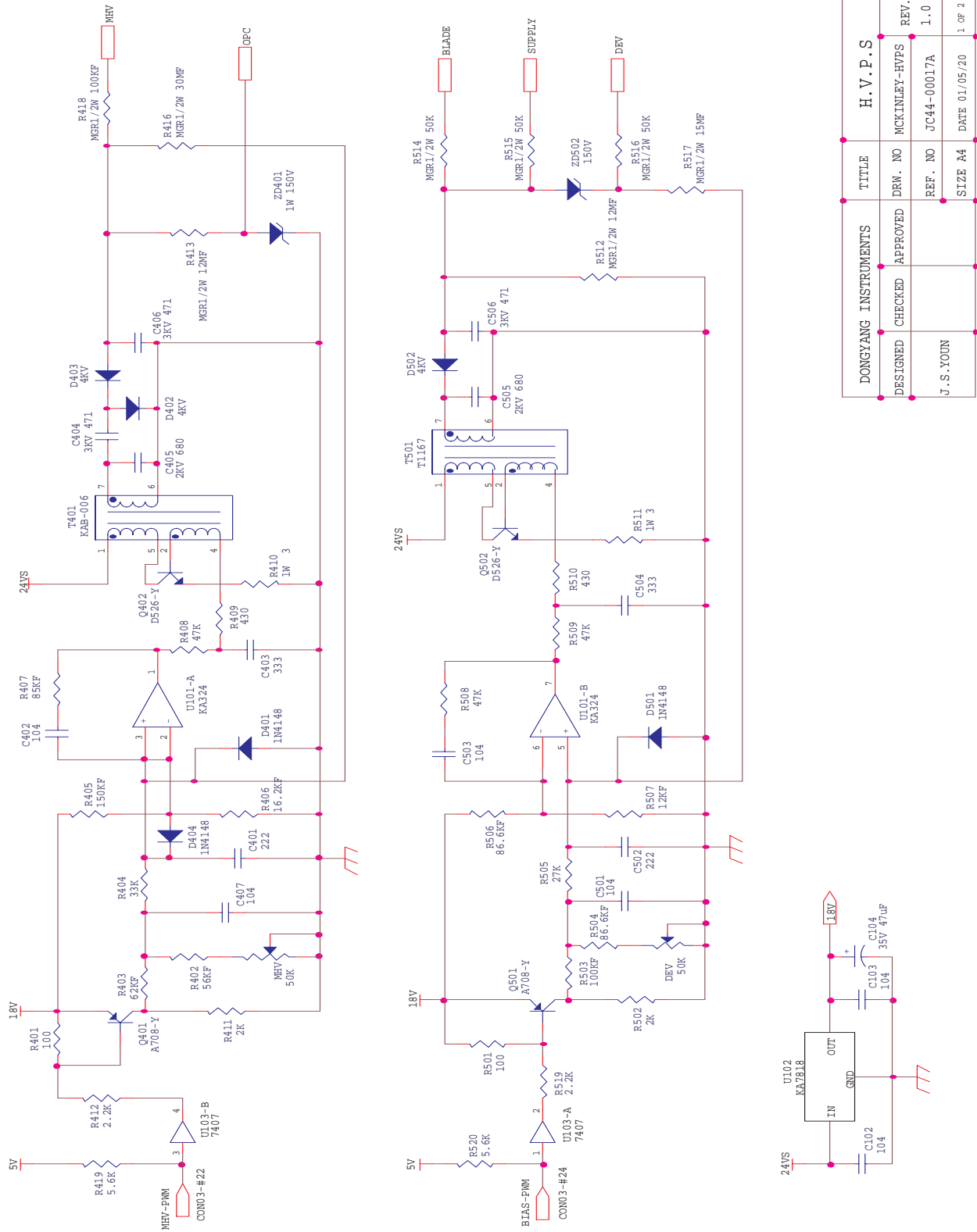


# 11-73 HVPS Circuit Diagram (1 of 2, WorkCentre M15/M15i)



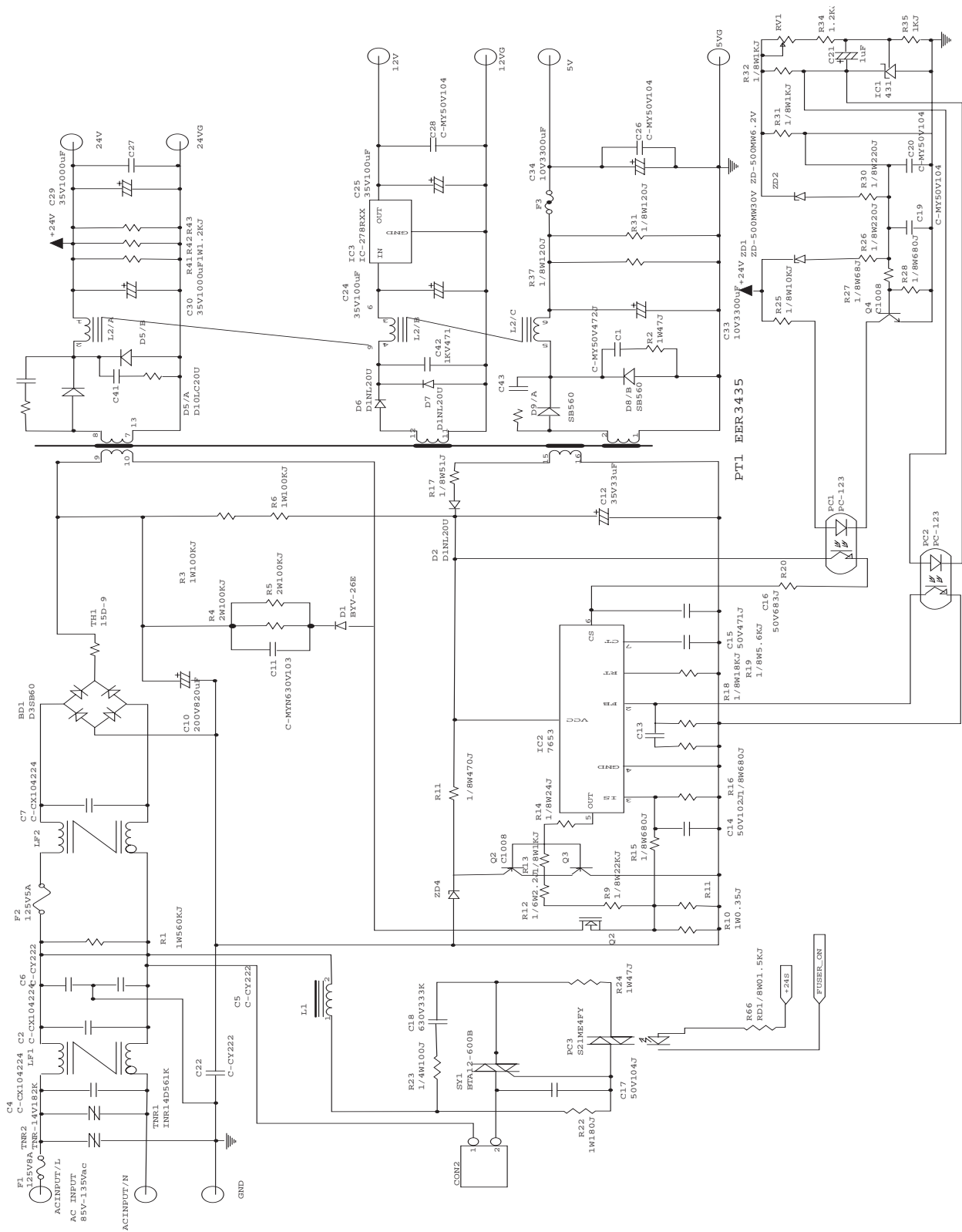
DONGYANG INSTRUMENTS		H. V. P. S	
DESIGNED	CHECKED	APPROVED	REV.
J. S. YOUN		MCKINLEY - HVPS	1.0
		REF. NO	UC44-00017A
		DATE	01/05/20
		SIZE	A4
			1 OF 2

# 11-74 HVPS Circuit Diagram (2 of 2, WorkCentre M15/M15i)



DONGYANG INSTRUMENTS	TITLE	H.V.P.S
DESIGNED	APPROVED	DRW. NO MCKINLEY-HVPS
J.S.YOON	CHECKED	REV. 1.0
		REF. NO UC44-00017A
		DATE 01/05/20
		SIZE A4
		1 OF 2

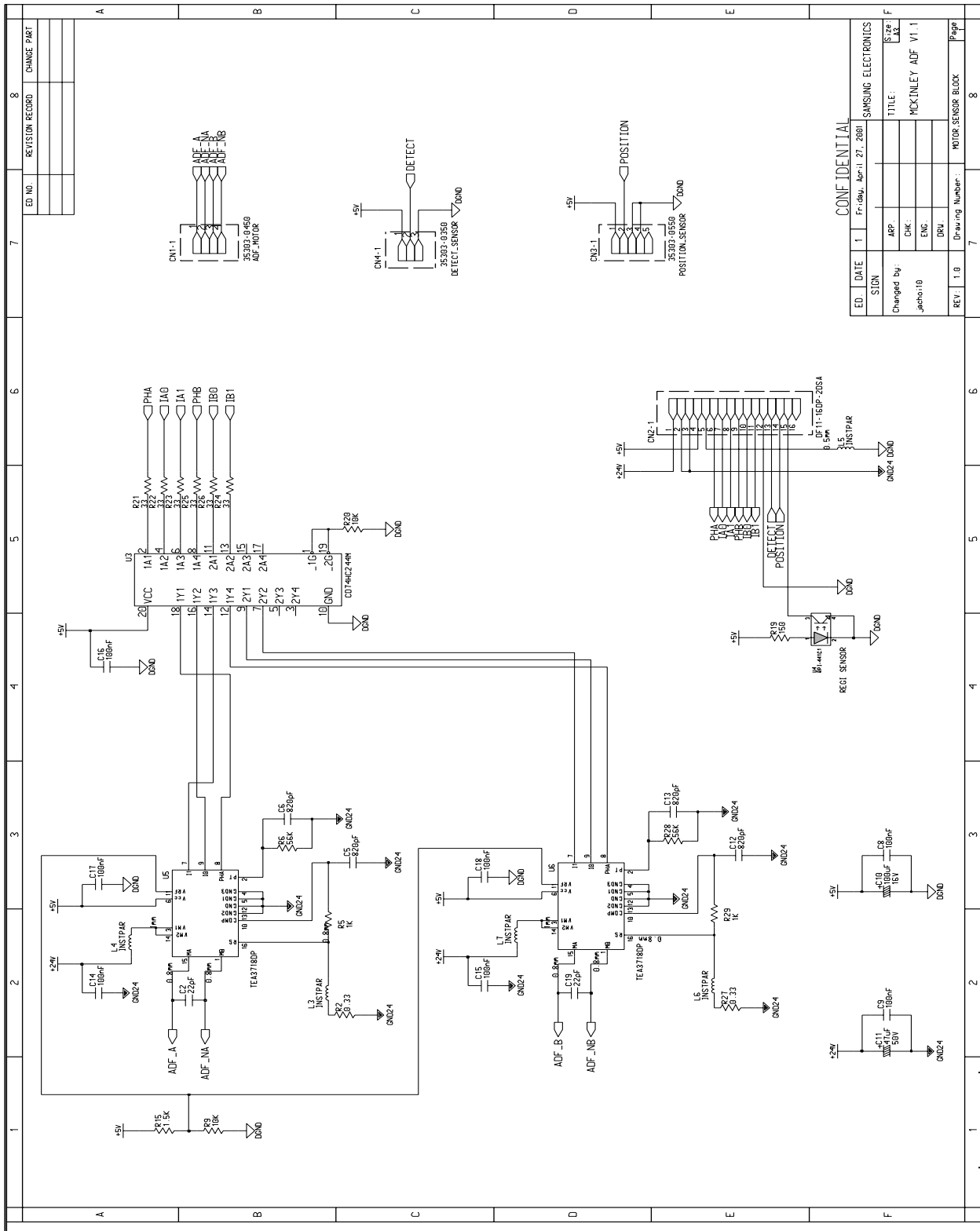
# 11-75 SMPS Circuit Diagram (110V) (WorkCentre M15/M15i)







# 11-77 ADF Circuit Diagram (WorkCentre M15/M15i)

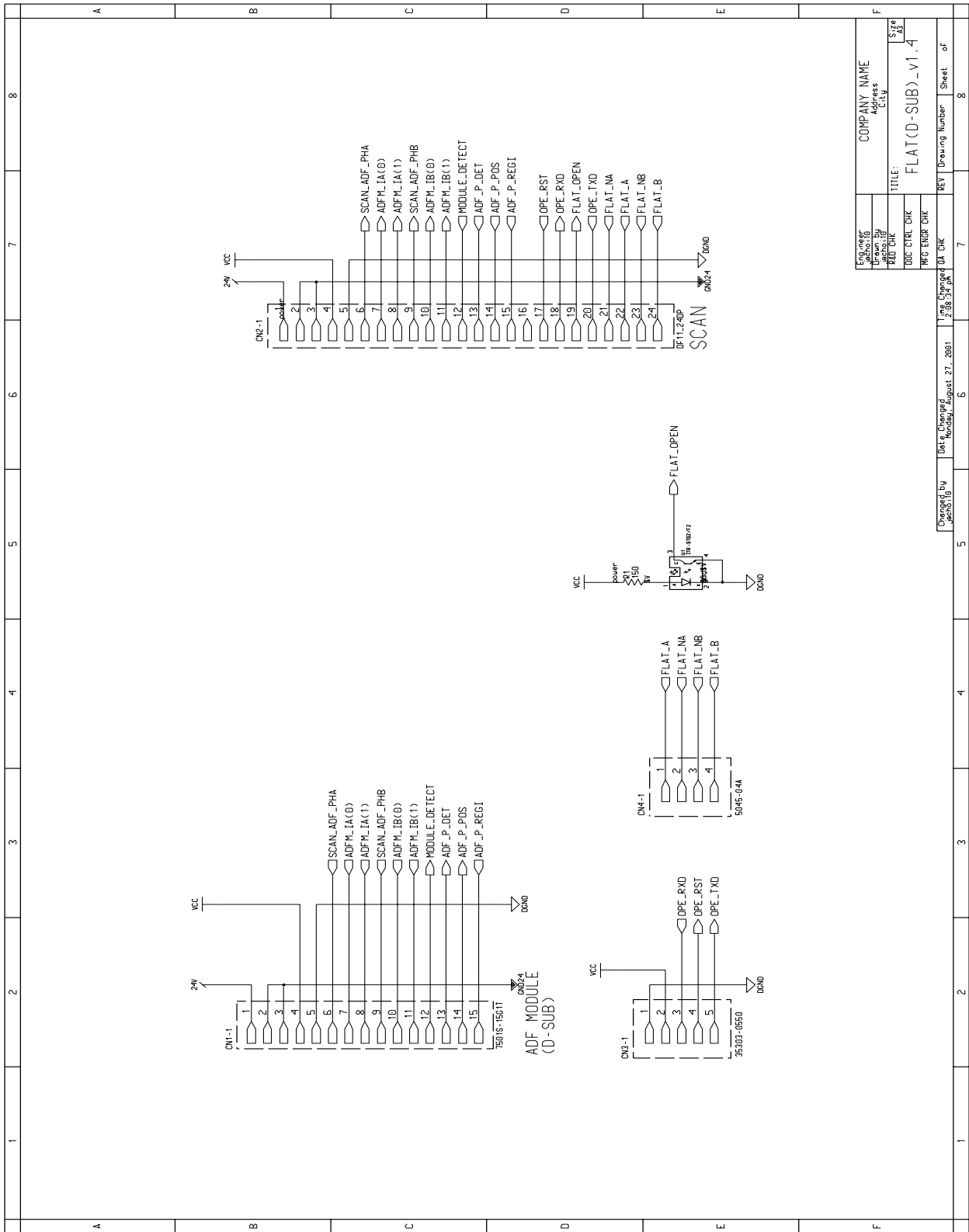


ED		DATE		SIGN		SAMSUNG ELECTRONICS	
1	1	1	1	1	1	1	1
REV: 1.0		Drawing Number:		MOTOR SENSOR BLOCK		Page	
APP: Jackho10		CHK: ENC		DRU: V1.1		TITLE: MCKINLEY ADF V1.1	
Fr:day, Apr-11 27: 2801		SAMSUNG ELECTRONICS		Size: 82		Page: 8	

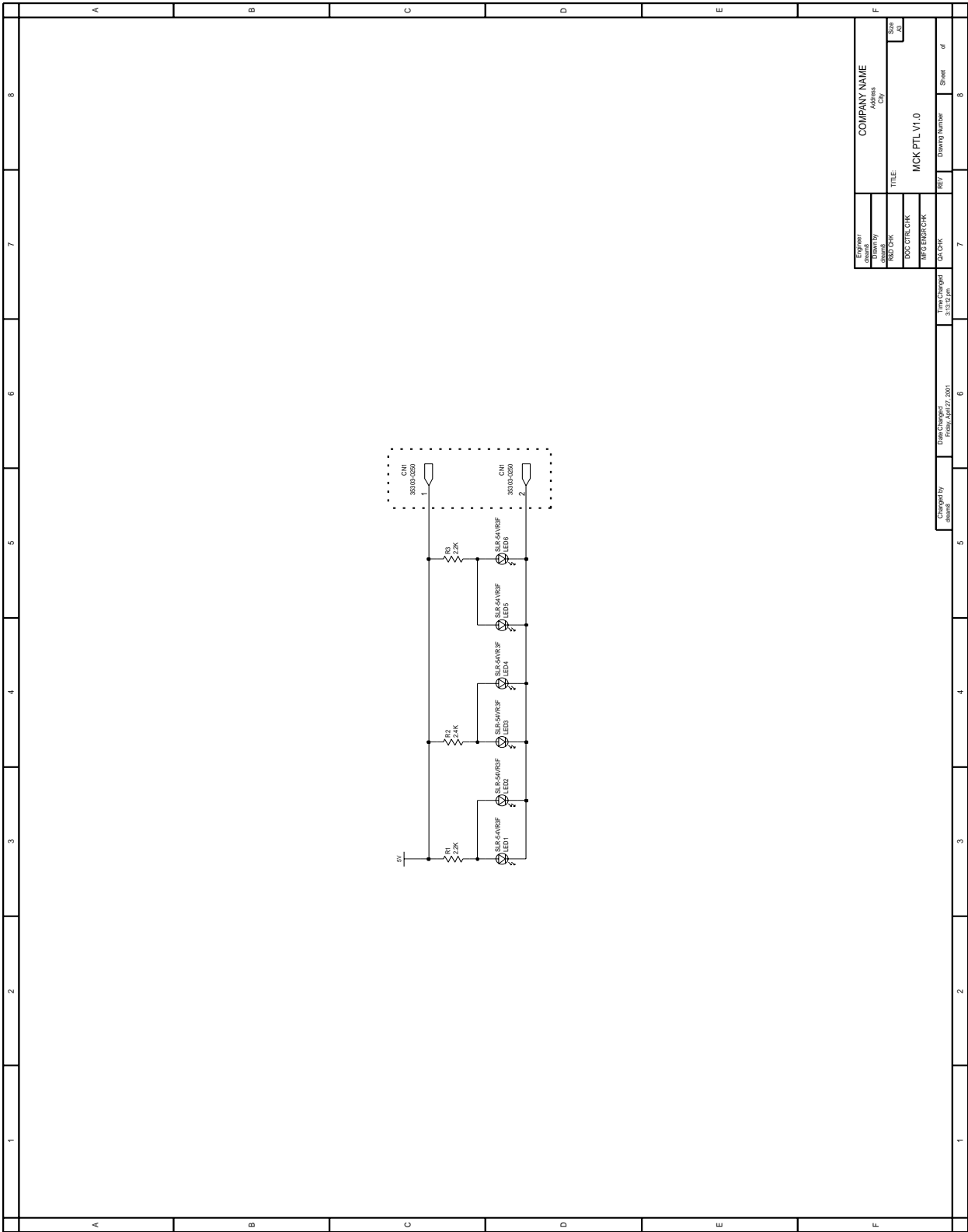
CONFIDENTIAL

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# 11-78 Flat Circuit Diagram (WorkCentre M15/M15i)



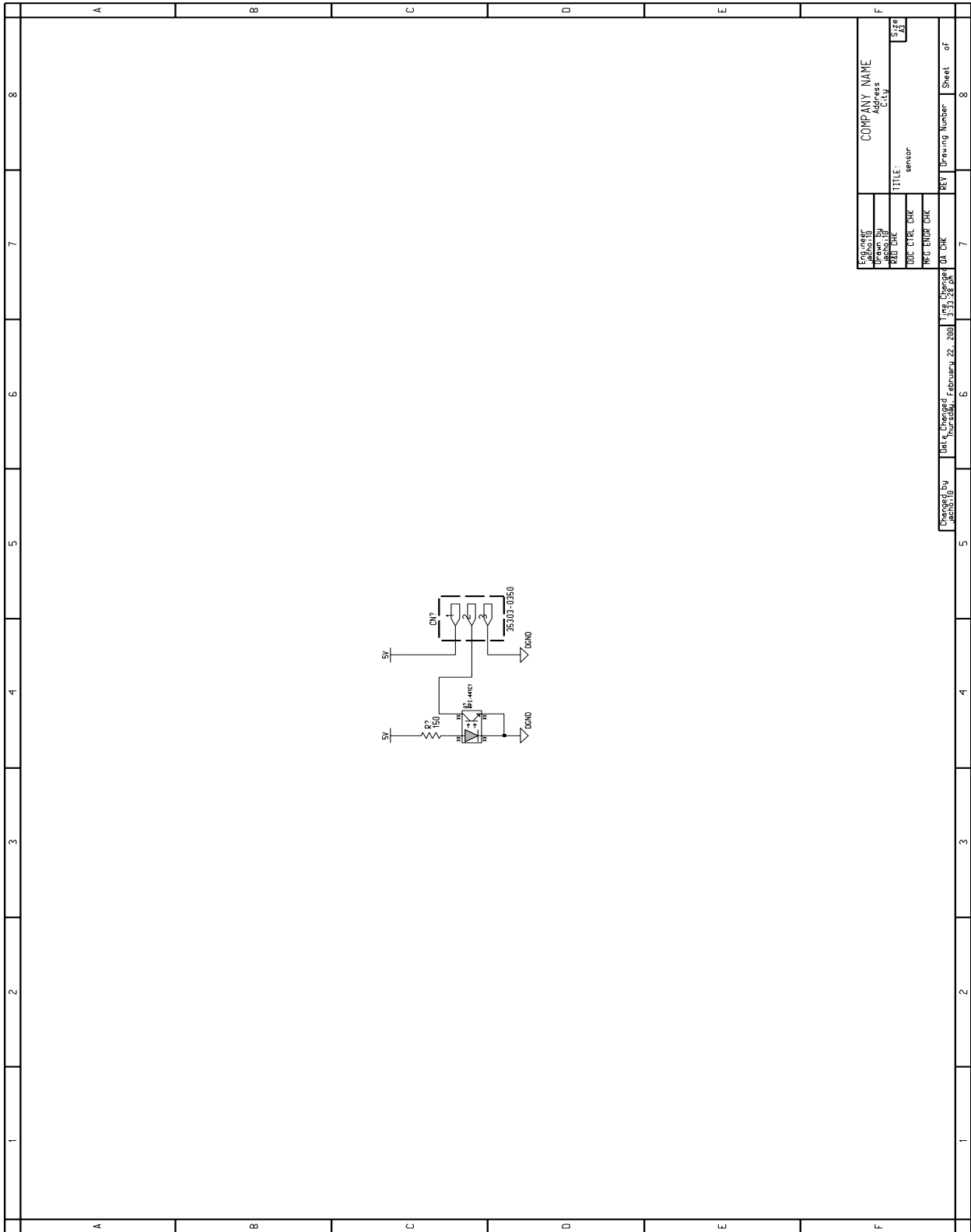
# 11-79 PTL Circuit Diagram (WorkCentre M15/M15i)



Customer Account	Company Name
Drawn by RGO/CHK	Address
DOC CTRL/CHK	City
MFG ENGR/CHK	State
QA/CHK	Country
REV	Revision Number
	Sheet
	of

Changed by dwm3	Date Changed Friday, April 17, 2003
Time Changed 3:13:12 pm	

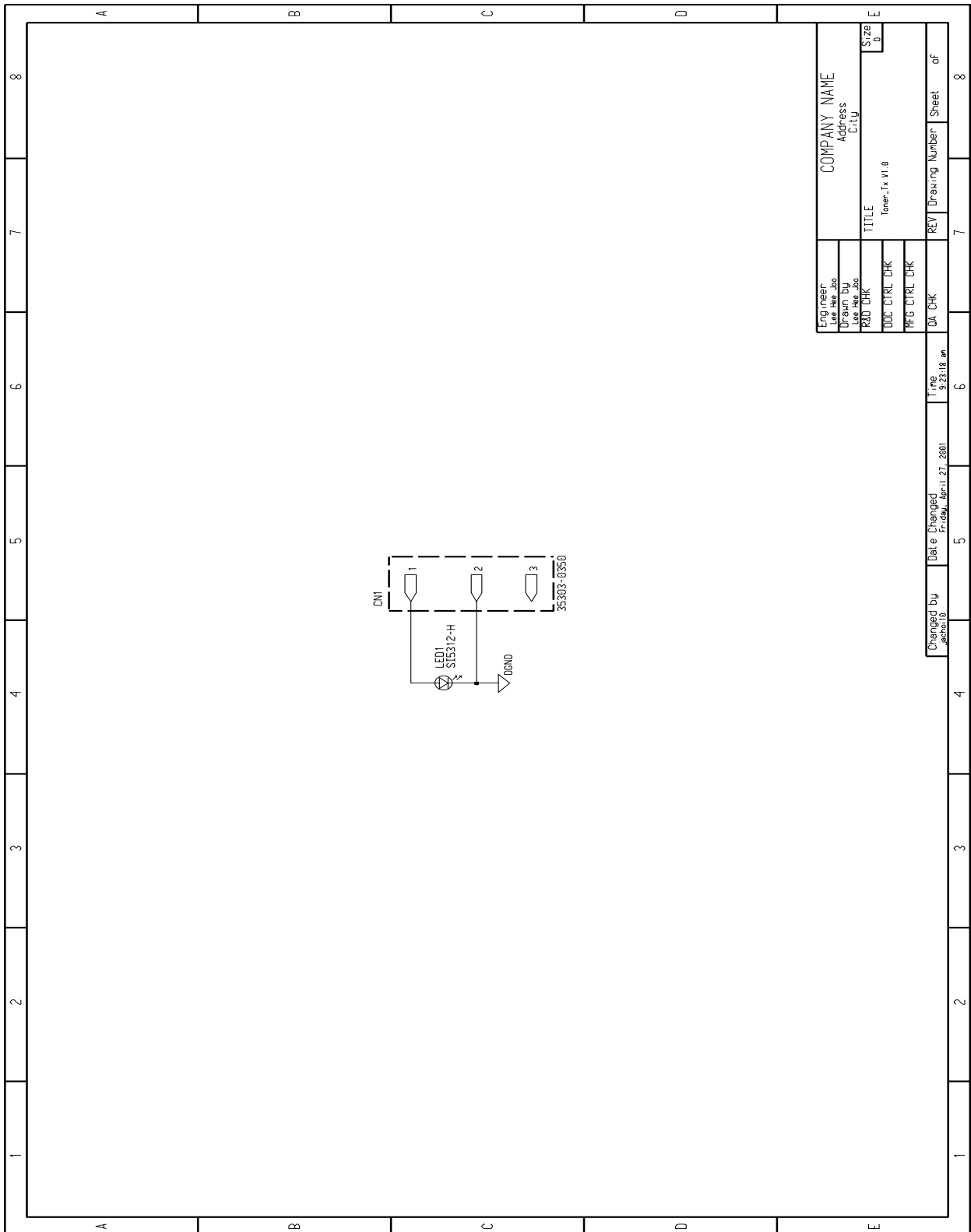
# 11-80 Sensor Circuit Diagram (WorkCentre M15/M15i)



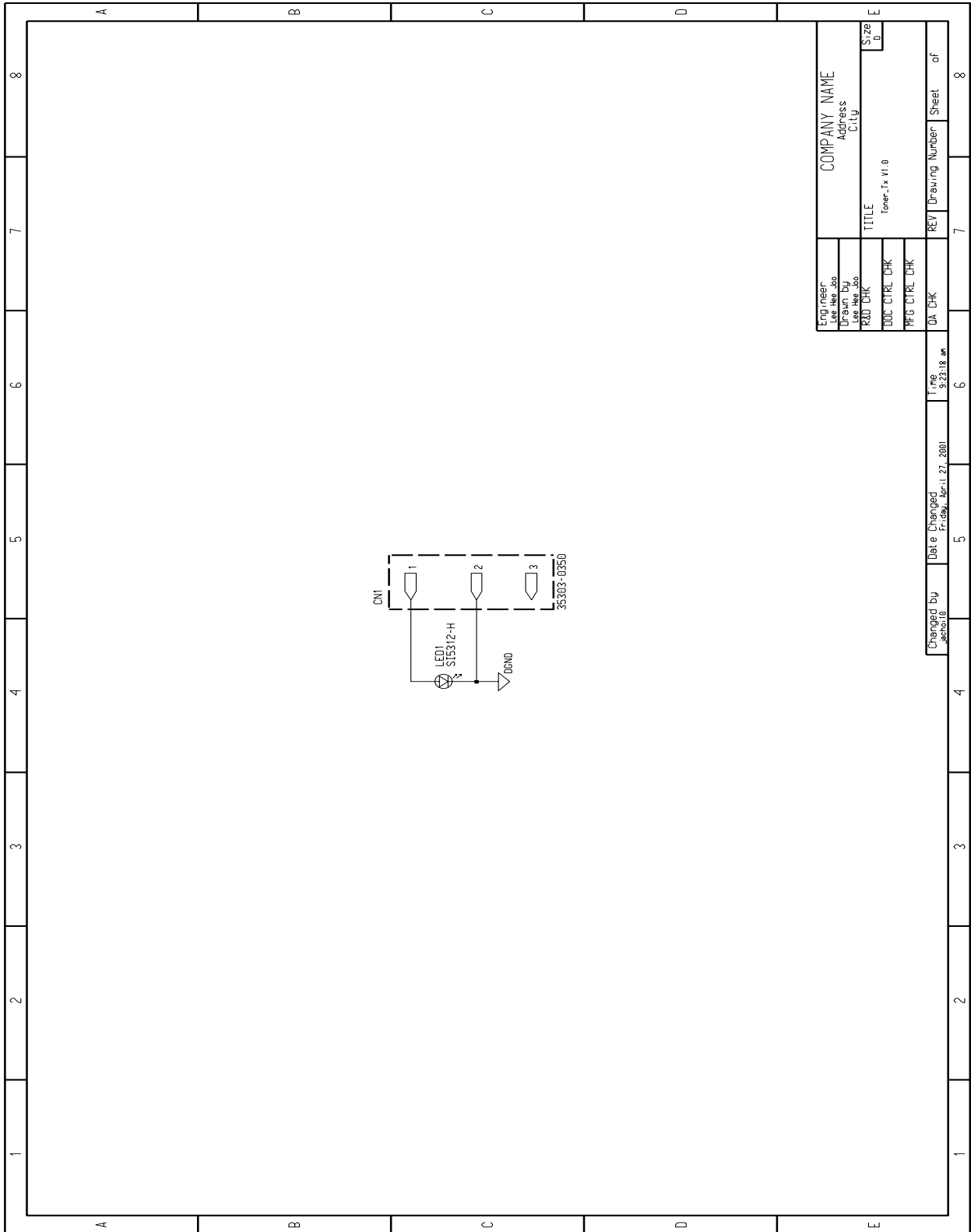
Engineering	COMPANY NAME
Drawn By	Address
APP CHK	City
IDOC CTRL CHK	TITLE: sensor
PHI CTRL CHK	REV Drawing Number
QA CHK	Sheet of

Changed By: jeh518  
 Date Changed: Thursday, February 22, 2001 3:33:28 PM

# 11-81 Toner\_Rx Circuit Diagram (WorkCentre M15/M15i)



# 11-82 Toner\_Tx Circuit Diagram (WorkCentre M15/M15i)



Engineer Lee.Hae.Lo	Drawn By Lee.Hae.Lo	R&D CHK	DOC CTRL CHK	MFG CTRL CHK	QA CHK	REV	Drawing Number	Sheet	of
COMPANY NAME									
Address									
City									
TITLE									
Toner Tx v1.0									
Size									
D									
E									

Changed by achao.l.b	Date Changed Friday, April 27, 2001	Time 9:23:18 am
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