SERVICE MANUAL
PC-FAX EXPANDER TYPE 450

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1. OVERALL INFORMATION

1.1 SPECIFICATIONS

Item	Description
PC Fax Interface	EIA/TIA Class 2 (Class 1 is not supported)
Host Interface Connector	EIA/TIA RS232C DB25 female connector
Scanner	TWAIN interface Maximum resolution: 200 x 200 dpi

1.2 FEATURES

- Class 2 fax transmission directly from a host PC
  (PC fax application required)
- Class 2 fax transmission through SAF memory
  (PC fax application required)
- Class 2 fax reception directly to a host PC
  (PC fax application required)
- Class 2 fax reception through SAF memory
  (PC fax application required)
- Local printing from a PC fax application
  (PC fax application required)
- Local scanning from the machine's scanner using TWAIN API
  (CFM Twain driver required)

2.　DETAILED DESCRIPTIONS

2.1　AT COMMANDS AND RESPONSES

2.1.1　CLASS 0 COMMANDS

| Command	Function	Remarks
ATA	Answer	
ATD	Dial	
ATE	Command echo	
ATH	Switch-hook control	
ATI	Identification	
ATL	Speaker volume	
ATM	Speaker control	
ATP	Set pulse dial as default	The machine returns OK, but the function is not supported.
ATQ	Result code display	
ATS	S register	
ATT	Set tone dial as default	
ATV	Result code form	
ATX	Extended result codes	The machine returns OK, but the function is not supported.
ATZ	Reset	
AT&C	DCD option	The machine returns OK, but the function is not supported.
AT&D	DTR option	
AT&F	Restore factory configuration	

2.1.2　CLASS 2 COMMANDS

Command	Function	Remarks
AT+FCLASS?	Service class	The machine responds "0" or "2".
AT+FMFR?	Identify manufacturer	The machine responds "RICOH(NAD)".
AT+FLID	Local ID string	
AT+FBOR	Phase C data bit order	
AT+FCR	Capability to receive	The machine returns OK, but the function is not supported.
AT+FDCC	DCE capability parameters	
AT+FDIS	Current session parameters	
AT+FDT	Data transmission	
AT+FET	Transmit page punctuation	
AT+FDR	Phase C receive data	
AT+FMDL?	Identify model	The machine responds "PC-FAX EXPANDER (NAD)".

Command	Function	Remarks
AT+FREV?	Identify revision	The machine responds with FCU ROM version and release date.
AT+FAA	Adaptive answer	The machine returns OK, but the function is not supported.
AT+FPHCTO	Phase C timeout	
AT+FECM	ECM parameter	
AT+FBUG	Session manager reporting parameter	
AT+FPTS	Page transfer status	
AT+FAXERR	Fax error value	The machine returns OK, but the function is not supported.
AT+FDCS	Current session results	
AT+FCQ	Copy quality capability parameter	The machine returns OK, but the function is not supported.
AT+FK	Session termination	
+FHNG	Call termination with status	
+FCON	Facsimile connection response	
+FCSI	Report the CSI	
+FTSI	Report the TSI	
+FCFR	Indicate CFR	

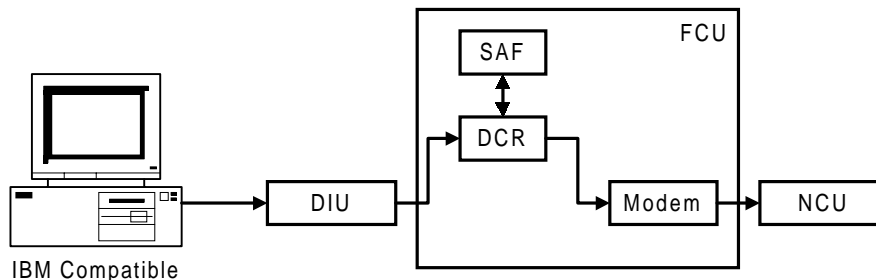## 2.2 CLASS 2 FAX COMMUNICATION

2.2.1 DIRECT TRANSMISSION
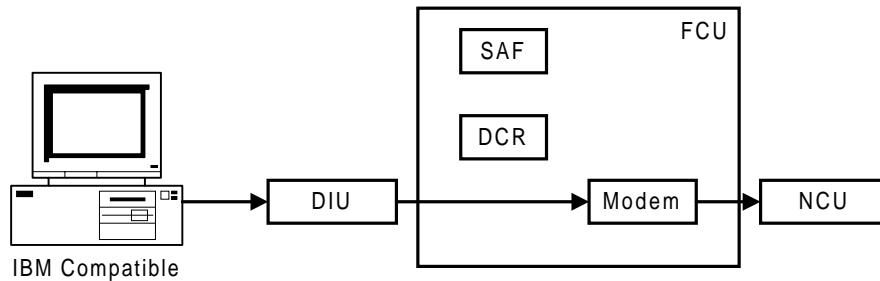
A824D001.WMF

The host computer sends commands and image data to the machine through the DIU during transmission.

NOTE: 1) Group dials programmed in the machine cannot be used.
2) ISDN G4 numbers programmed in quick or speed dials cannot be used.
3) If ISDN is selected for G3 communication (system switch 0A, bit 6), the G3 numbers must have been programmed in quick or speed dial.
4) T.30 optional protocols (e.g., BFT) are not supported by class 2 fax communication.

2.2.2 MEMORY TRANSMISSION

A824D002.WMF

The host computer sends destination number(s) and image data to the machine through the DIU during transmission. The machine stores the image in the SAF memory, then makes a fax transmission.

NOTE: 1) If the memory overflows while storing the first page into SAF memory, the machine does not start the transmission.
2) If the memory overflows while storing the second or subsequent page into SAF memory, the machine transmits all the successfully stored pages.
3) When fax numbers programmed in the machine's quick or speed dials are specified using the PC fax application, all the specified numbers must have been programmed in the fax machine.
4) T.30 optional protocols (e.g., BFT) are not supported by class 2 fax communication.

2.2.3 DIRECT RECEPTION
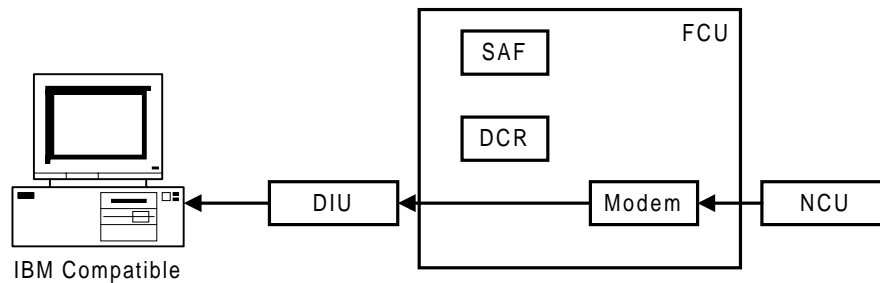
A824D003.WMF

The machine transfers received image data directly to the host PC without storing it into SAF memory.

NOTE: 1) If the host PC is not ready to receive a fax message, the machine receives the message into SAF memory.
2) Even if the SAF memory is full, the machine starts fax reception. However, the machine will not continue reception if the host computer is not ready to receive a message.
3) The "Number of rings to answer" parameter in the PC fax application must not exceed 4.

2.2.4 MEMORY RECEPTION
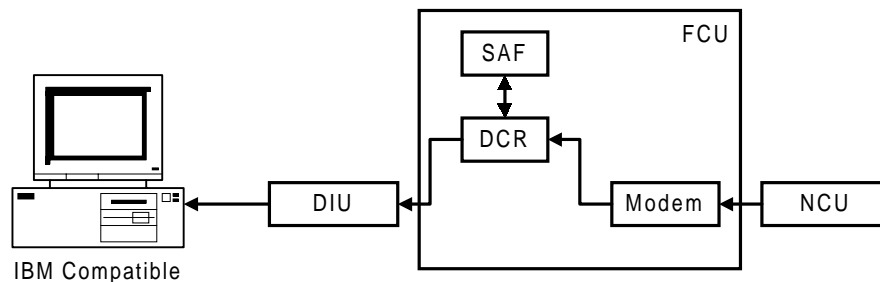
A824D004.WMF

The machine receives a fax message in the SAF memory, then transfers data to the host computer after the reception has finished. The machine prints the received message after transferring data to the host if user parameter 20 – bit 4 is set to "1: Print".

NOTE: 1) If an error occurs due to cable disconnection, the PC fax application must be restarted to receive the message.
2) Memory reception is not possible when forwarding is enabled.
3) Manual reception from the PC fax application is not supported.
4) The "Number of rings to answer" parameter in the PC fax application must not exceed 4.

2.3 SCANNING AND PRINTING
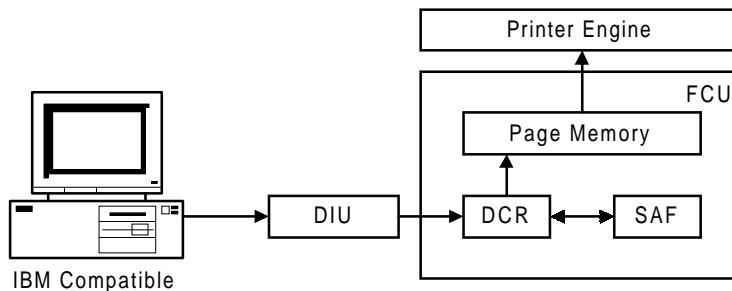
2.3.1 SCANNING
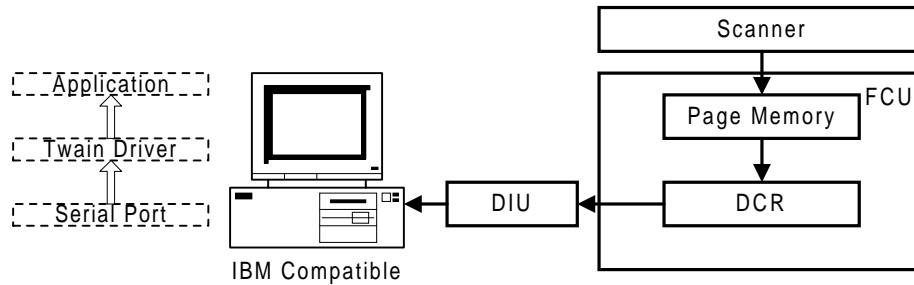
A824D005.WMF

The machine scans an original into page memory, then transfers the data to the host PC. The data is sent to the application through the CFM Twain driver.

NOTE: 1) The maximum resolution is 200 x 200 dpi.

2.3.2 PRINTING

A824D006.WMF

The machine receives print data into SAF memory as fax image data, then prints it after all the data has been transferred from the host PC.
The destination number "0000" informed from the host PC identifies a print job.

NOTE: 1) If SAF memory runs out while receiving print data, the machine prints up to the successfully received data.
  2) The machine cannot receive print data while printing a message from the SAF memory. The data will be received after printing.
  3) If a fax destination is specified together with the print destination "0000", the destinations specified after "0000" will be delayed until the machine prints all pages in the message.

3. INSTALLATION

THIS OPTION MUST BE INSTALLED BY A CUSTOMER SERVICE REPRESENTATIVE WHO HAS COMPLETED THE TRAINING COURSES FOR THE BASE COPIER AND THIS OPTION.

NOTE: 1) Never install telephone wiring during a lightning storm.
2) Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3) Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4) Use caution when installing or modifying telephone lines.
5) Avoid using a telephone (other than a cordless type) during an electric storm. There may be a remote risk of electric shock from lightning.
6) Do not use an telephone to report a gas leak in the vicinity of the leak.

⚠**CAUTION**
Before installing this option, turn off the main switch, and disconnect the power cord.

INSTALLATION PROCEDURE
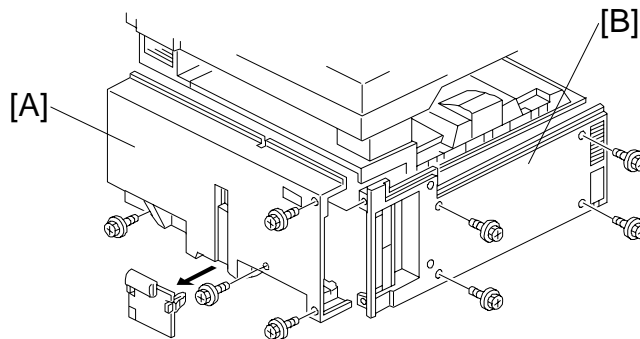
A815I500.WMF
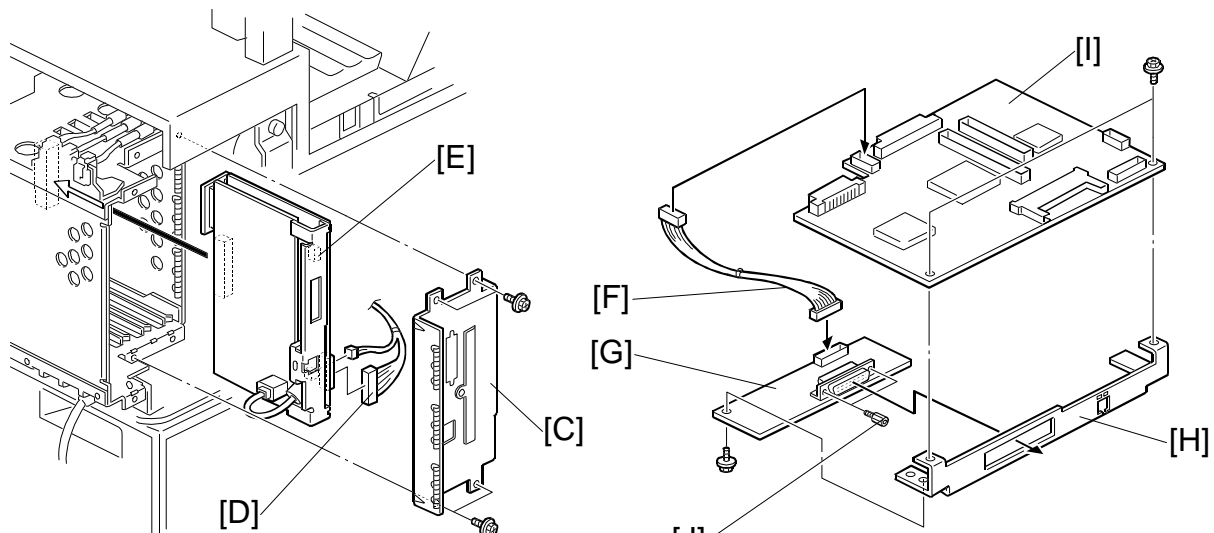
A815I501.WMF

A815I502.WMF

1. Remove the rear cover [A] (4 screws) and the left-side cover [B] (4 screws).

2. Remove the bracket [C] (2 screws) and disconnect the harness [D], then remove the FCU [E] from the expansion box.
    NOTE: If the ISDN unit was already installed, go to "with the ISDN unit" section on the next page.

- **Without the ISDN unit**

3. Connect the harness [F] to the DIU [G]. (RS232C interface)

4. Attach the bracket [H] enclosed in the PC-Fax Expander to the DIU [G]. (2 screws)

5. Attach the FCU [I] to the bracket [H] (2 screws).

6. Connect the harness [F] to the CN326 on the FCU [I] as shown.

7. Remove 2 hexagonal screws [J] from the DIU [G].
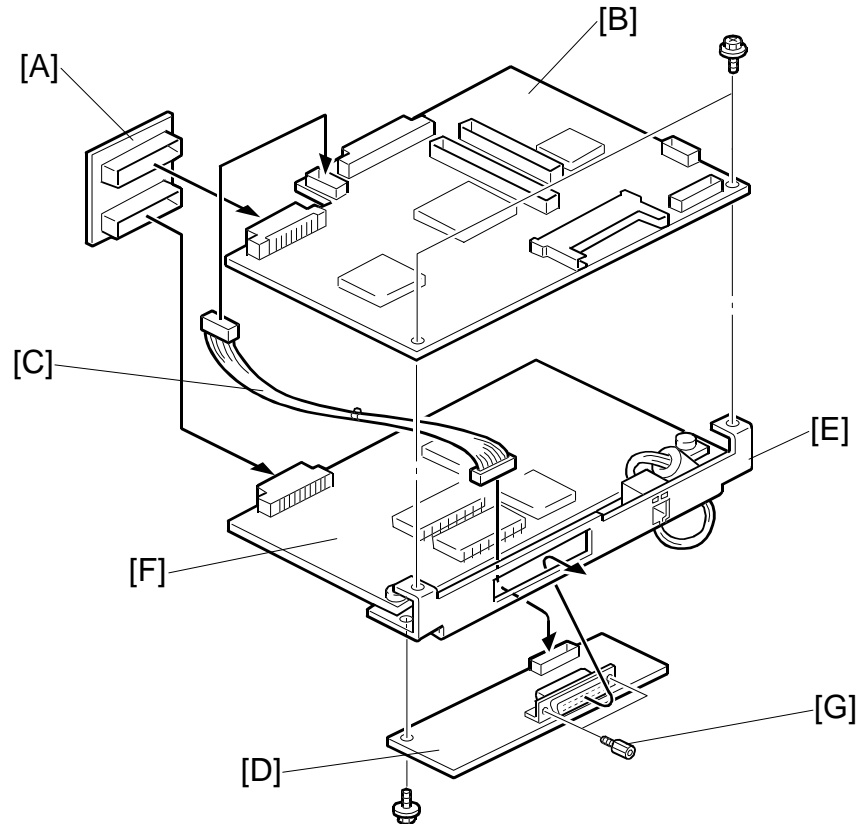
A815I503.WMF

- **With the ISDN unit**
  NOTE: The bracket which is enclosed in the PC-Fax Expander is not used.

3. Disconnect the interface board [A], then remove the FCU [B] from the assembly as shown.

4. Connect the harness [C] to the DIU [D], then attach the DIU [D] to the bracket [E] as shown

5. Make sure that the harness [C] is between the ISDN board [F] and the FCU [B], then replace the FCU [B] as shown.

6. Connect the harness [C] to the CN326 on the FCU [B], then replace the interface board [A] as shown.
   NOTE: Make sure not to pinch the harness [C] between the FCU [B] and the interface board [A] when connecting it.

7. Remove the 2 hexagonal screws [G] from the DIU [D].
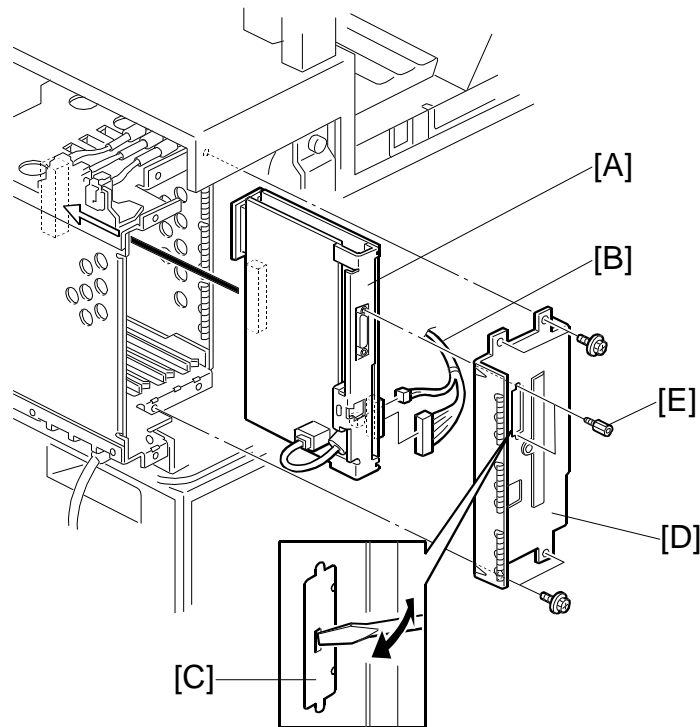
A815I504.WMF

8. Insert the FCU and DIU assembly [A] into the expansion box; connect the harness [B] and slide the assembly into bottom of the box.

9. Open the RS232C connector window [C] on the bracket [D], then install the bracket [D] onto the expansion box.

10. Tighten the 2 hexagonal screws [E] as shown.

11. Replace the left-side and rear covers. (4 screws each).

12. Plug in the machine and turn on the main switch.

13. Enter the service mode, and set bit 3 of system switch 1C to "1", then turn off and on the main switch.

14. Print the system parameter list. If "TR29" appears in the "option" section of the system parameter list, go head. Otherwise, check the cable connection.

15. Follow the instructions in the Operator's manual to connect the machine to a host computer and how to set up the machine and the computer, if required.
    NOTE: 1) A "Straight – through" shielded serial cable is required, but it is not enclosed.
              2) One end of the serial cable must have DB25 male connection to connect to the DIU.

4.   SERVICE TABLES AND PROCEDURES

4.1   SERVICE MODE FUNCTIONS

4.1.1 PC PROTOCOL DUMP LIST

Use this function to check the AT commands and responses that are exchanged between a host computer and the machine.
Refer to section 2.1 for details of the supported AT commands.

1.   Enter service mode, and select 05 "Protocol Dump".

2.   Select 3 "PC Protocol List", then press Start.

4.2   BIT SWICTHES

System Switch 1C		
No	**FUNCTION**	**COMMENTS**
0	PC-DIU communication record on the Journal **0:** Disabled **1:** Enabled	**1:** Communications between the DIU and a host PC are logged on the Journal. Also, the Data-in LED turns on while data is coming in and going out to the PC. Be sure to reset this bit to "0" after a test.
1 to 2	Not used	Do not change the settings.
3	PC-Fax Expander option **0:** Not installed **1:** Installed	Change this bit to 1 when installing the PC-Fax Expander. (Europe model only)
4 to 7	Not used	Do not change the settings.

4.3   USER PARAMETERS

User Switch 20		
No	**FUNCTION**	**COMMENTS**
0	Class 2 transmission **0:** Direct tx **1:** Memory tx	**0:** Image data is sent directly from a host during communication. **1:** Image data is sent to the fax machine's SAF memory before starting a fax communication, then it is sent by the fax machine.
1	Addition of fax TTI in class 2 memory transmission **0:** Disabled **1:** Enabled	**1:** The machine adds its TTI to all the messages sent through SAF memory. This setting is effective only when bit 0 is set to "1".

User Switch 20		
No	**FUNCTION**	**COMMENTS**
2	Message received to: **0:** Fax **1:** PC	**0:** Received messages are printed at the machine. **1:** Received messages are transferred to the host PC.
3	Class 2 reception **0:** Direct rx **1:** Memory rx	**0:** Received messages are transferred to the host PC directly during fax communication. **1:** Received messages are stored in the SAF memory during reception. Then they are transferred to the host PC after reception has been completed.
4	Message printout in class 2 memory rx **0:** Disabled **1:** Enabled	**1:** A message received into memory is printed after it has been transferred to the host PC.
5	Checkered mark on printouts from a PC **0:** Disabled **1:** Enabled	**1:** The machine prints a checkered mark on a document printed through the DIU.
6 to 7	Not used	Do not change the settings.

User Switch 21		
No	**FUNCTION**	**COMMENTS**
0 to 3	Scan density for the "Light" setting in scanner mode. **Bit3 Bit2 Bit1 Bit0 Setting** 0 0 0 1 Level1 0 0 1 0 Level2	All the other settings are the same as Level1.
4 to 7	Scan density for the "Dark" setting in scanner mode. **Bit7 Bit6 Bit5 Bit4 Setting** 0 0 0 1 Level5 0 0 1 0 Level6	All the other settings are the same as Level5.

5. PARTS LIST

Index	Part Number	Name	Q'ty/Unit
1	A2335195	PCB - DIU	1
2	A2335282	Harness – FCU-DIU	1
3	A8165801	Bracket	1
4	04513006B	Screw – M3 x 6	4