4500L G4 "D" KIT SERVICE MANUAL

This product is to be used with the FAX4500L.
Users of this instruction document should be certified,
by successfully completing the
Ricoh FAX4500L Training Program.

1. Installation Instructions

1.1. Parts Check List

1. Installation Instructions

2. PWA CVG4 Digital (P/N: 28424-001)

3. PWA Mounting Bracket (P/N: 28423-001)

4. Grounding Plate

5. MBU PROM (IC 2) (P/N: 28425-001)

6. Modified Rear Cover

7. V.35 Data Cable (P/N: 28378-001)

8. RS366 Dial Cable (P/N: 28379-001)

9. Screws M3 x 6

10. Screws M3 x 8

11. Model Label

12. Wire Routing Fastener

Optional Items available to be ordered:

13. V.24 Data Cable (P/N: 28382-001)
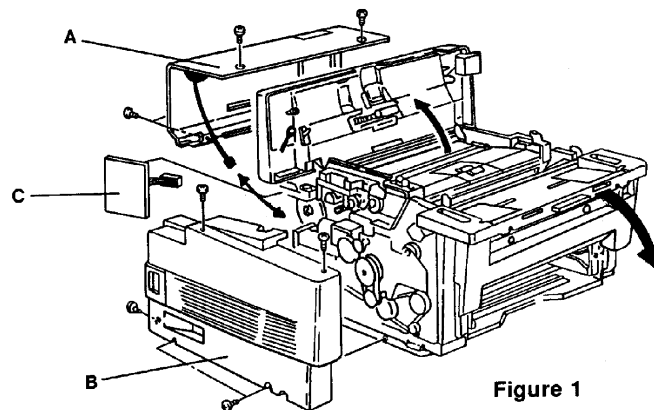
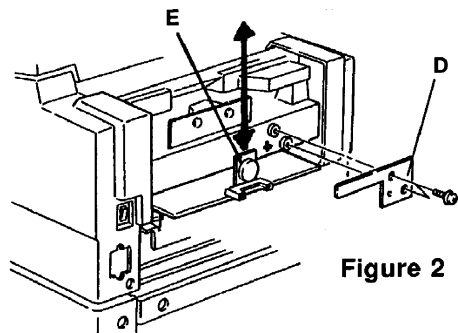14. Back-to-Back Cable (P/N: 28433-001)
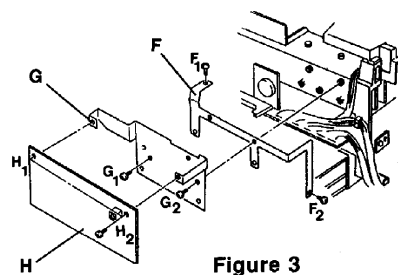
Figure 1

Figure 2

Figure 3

1.2. Installing the Fax4500D G4 Digital Option

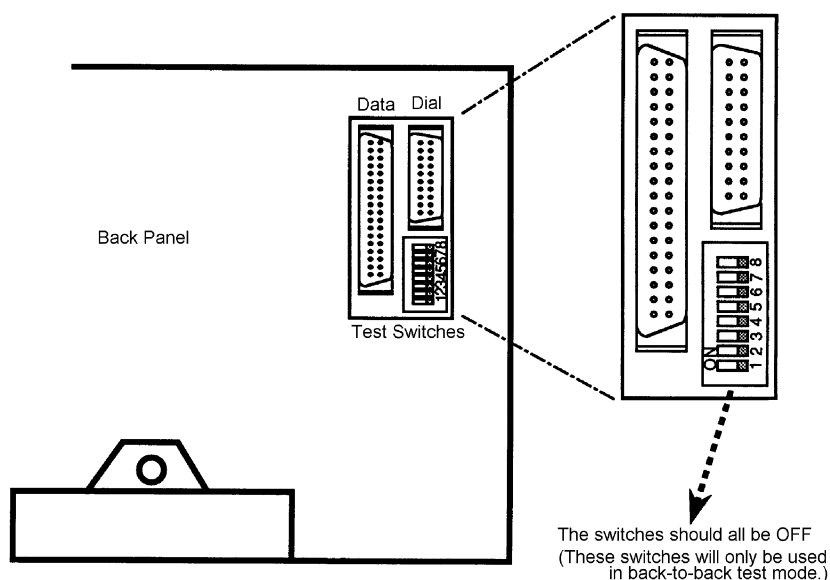Ensure that the power is turned off and the machine is unplugged.

1. Unfasten the rear cover [A: 4 screws], disconnect the speaker, and remove the cover.

2. Press the front cover release button and open the front cover. Press the scanner release button and lift the scanner cover. Remove the left cover [B: 6 screws], and the NCU [C: 1 screw]. Figure 1.

3. Remove the MBU holder [D: 2 screws]. Figure 2. (The MBU holder will not be reused.)

4. Move the battery jumper on the MBU [E] at location TB1 to off. Figure 2.

5. Remove the MBU from the FCU. Figure 2.

6. Remove the MBU PROM from the socket at location IC 2, and replace it with the G4 Digital Option PROM.

7. Replace the MBU on the FCU, and move the MBU battery jumper to on.

8. Install the grounding plate [F] using one self-tapping screw [F_1] and one threaded screw [F_2] as shown in Figure 3. **NOTE: The threaded screw connects to ground.**

9. Install the mounting bracket [G] using two self-tapping screws [G_1, G_2]. Figure 3.

10. Plug the CVG4 Digital board [H] into the FCU and attach it to the bracket [G] using two threaded screws [H_1, H_2]. Figure 3.

11. Install the NCU [C] and the left cover [B].

12. Remove the hard disk option cover [2 screws], the speaker [1 screw], and the memory card cover [1 screw], if used, from the old rear cover, and install them on the modified rear cover, using the same fasteners.

13.   Install the modified G4 rear cover from the kit.

14.   With the long side of its base oriented horizontally, affix the
        wire routing fastener above and to the right of the rear screw
        on the left panel. (The communication cables will be fed
        down through the routing loop of the fastener away from the
        paper cassette.)

15.   Connect V.35 and RS366 (V.24-200) cables as needed.
        Figure 4. Thread the cables **down** through the routing loop.
        Twist the loop ends together to secure the cables.

***Caution: Do not plug in or switch on until everything is
connected.***

16.   Affix the new model label over the old model name on the
        operation panel.

17.   Follow instructions in FAX4500L Field Service Manual for
        connecting, initializing, and programming the FAX4500L
        machine. See section 2 to adjust the group 4 internal
        switches, and parameter switches.

Connectors and Switches Layout

FAX4500L G4 Digital Cable Connections

< V.35 DSU Connection >

V.35 Special Cable

RS366
(V.24-200)
Special Cable

Standard
V.35

to
DSU DATA

to
DSU DIAL

Standard
V.24-200
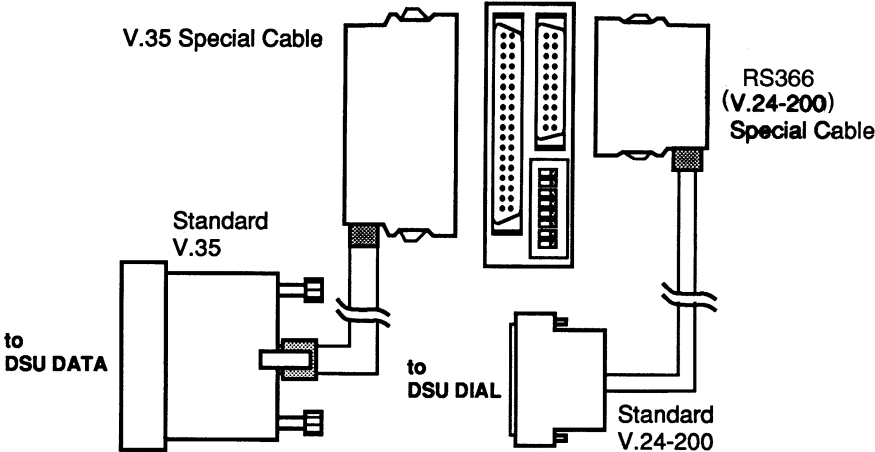
< V.24 DSU Connection > - Option -

V.24 Special Cable

RS366
(V.24-200)
Special Cable

Standard
V.24

to
DSU DATA

to
DSU DIAL

Standard
V.24-200
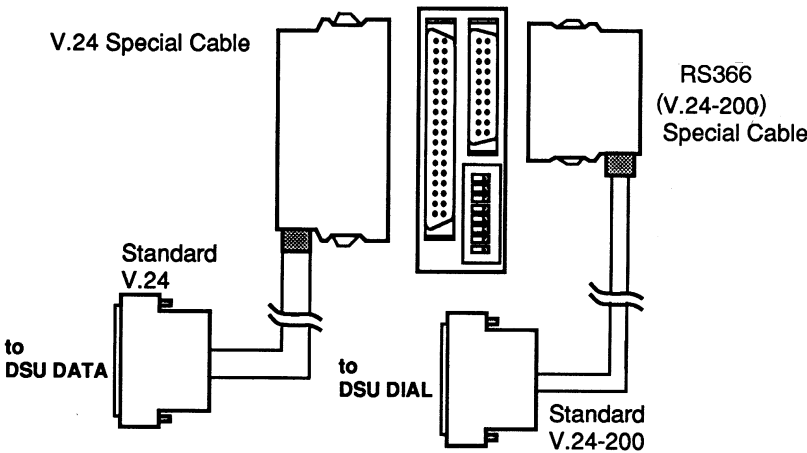
2. Service Tables and Procedures

2.1. Service Level Functions

Note: A description of the procedure for entering Service Mode begins on the next page.

FUNCTION	DESCRIPTION
01	G4_ISW : G4 Internal Switches, one of two sets of G4 software switches.
02	G4_PSW : G4 Parameter Switches, the second of two sets of G4 software switches.
03	NOT USED IN USA. DO NOT CHANGE THE SETTINGS OF THIS FUNCTION.
4	ISDN_IP : Integrated Services Digital Network International Prefix. A network access code, similar to the international dial access code, and used to receive transfer result reports when communicating through a terminal adapter to an ISDN network machine.
05	G4_SN1 : G4 Subscriber Number 1, one of two G4 subscriber numbers.
06	NOT USED IN USA. DO NOT CHANGE THE SETTINGS OF THIS FUNCTION.
07 ~ 11	Not used.
12	DNIC : Data Network Identification Code. A four-digit code which identifies the network the terminal is on, and used when communicating with a machine on another CSDN or PSDN network.
13	G4_TID : G4 Terminal Identification Code. A three-part code consisting of the network's country code, the terminal's network number, and the terminal name. It is similar to a TTI.
14	Not used.
15	G4_DMP1 : G4 Memory Dump List. Prints the commands sent between the FCU and the CVG4 as the contents of a specified range of memory locations
16	G4_DMP2 : G4 Protocol Dump. Prints a list of protocol signals exchanged during the last communication. See also bit switches ISW12-0 and PSW0E-1.
17	G4_LIST : G4 System Parameter List. Prints a list showing the current G4 ISW and PSW bitswitch settings, and other parameters programmed with G4 functions
18	Not used.

2.2. Service Level Procedures

1. Press **Function.**
    Type **6 0 1 9 9 1**.
    Press **Yes**.
    The Service Function menu appears:

```
SERVICE FUNCTION              NO.$$

01BITSW.             02PARA LIST

03ERROR CODE        04SVC MONITOR  9
```

Press the Scroll Key arrows, 9 and 8, indicated in the
character display to review menu pages. Use the ten-keypad
to enter numbers.

2. Type **1 8**.
    The G4 menu of service functions appears:

```
G4                            NO.$$

01.G4_ISW           02.G4_PSW

03.DN_IP            04.ISDN_IP     9
```

3. Type the function number at the keypad. Use scroll keys to
    review menu pages.

4. Press **Yes** or **No** to return to Service Function menu.
    Press **Function** to exit service modes and return to
    standby.

**Note: The machine must be reset after completing G4
        service mode programming operations:**

Method 1:   Hold down Stop key for about 10 seconds.

**Method 2:   Turn the machine off,
             wait a few minutes,
             turn it back on.**

2.2.1. Internal Switch Programming G4_ISW (Function 01)

1.   Enter the G4 service mode (see page 7) and type **0 1**:

```
G4_ISW

  DF:           00010001              8

  SW:00         00010001              9
```

      Bit 7 is displayed at the left, and bit 0 at the right. The default settings (DF) are shown above the current settings (SW).

2.   Press the scroll key arrow 9 to advance to the next switch. Press the scroll key arrow 8 to go back to the previous switch.

Example: To display bitswitch 03, press 9 3 times:

```
G4_ISW

  DF:           00000000              8

  SW:03         00000000              9
```

3.   Press a number on the ten-key pad corresponding to the bit number to toggle its value between 0 and 1.

Example: To change bit 3 from its current setting, press key **3** once.

```
G4_ISW

  DF:           00000000              8

  SW:03         00001000              9
```

4.   Go to step 2 to continue adjusting bitswitches. Press **Yes** when finished to return to G4 service function menu:

```
G4                            NO.$$

01.G4_ISW           02.G4_PSW

03.DN_IP            04.ISDN_IP    9
```

5.   Press **Function** to exit service modes and return to standby. Perform system reset. See page 7.

2.2.2. Parameter Switch Programming G4_PSW (Function 02)

1.   Enter the G4 service mode (see page 7) and type **0 2**:

```
G4_PSW

  DF:      0100000                    8

  SW:00    0100000                    9
```

      Bit 7 is displayed at the left, and bit 0 at the right. The default settings (DF) are shown above the current switch settings (SW).

2.   Press the scroll key arrow 9 to go to the next switch.
      Press the scroll key arrow 8 to go back to the previous switch.

Example: To display bitswitch 0E, press 9 or 8 until switch 0E appears:

```
G4_PSW

  DF:      10110010                    8

  SW:0E    10110010                    9
```

3.   Press a number on the ten-key pad corresponding to the bit number to toggle its value between 0 and 1.

Example: To change bits 4, 5, 6, and 7 from their current settings, press each key, **4**, **5**, **6**, and **7**, once.

```
G4_PSW

  DF:      10110010                    8

  SW:0E    01000010                    9
```

4.   Go to step 2 to continue adjusting bitswitches.
      Press **Yes** when finished to return to G4 service function menu:

```
G4                            NO.$$

01.G4_ISW            02.G4_PSW

03.DN_IP             04.ISDN_IP   9
```

5.   Press **Function** to exit service modes and return to standby. Perform system reset. See page 7.

2.2.3. CSDN/PSDN International Prefix Programming DN_IP (Function 03)

THIS FUNCTION NOT USED IN USA.

DO NOT CHANGE THE SETTINGS OF THIS FUNCTION.

2.2.4. ISDN International Prefix Programming ISDN_IP (Function 04)

1. Enter the G4 service mode (see page 7) and type **0 4**. The Integrated Services Data Network International Prefix display appears:

```
ISDN_IP

               $$$$

```

2. Type the code provided by the network.
Example: 5 6 7 8:

```
ISDN_IP

               5678

```

3. To make a change, press **Clear** to erase the number over the cursor, using the scroll arrows to move the cursor. Press **No** to erase the complete entry.
    Press **Yes** to program the what is in the display and return to the G4 service function menu.

```
G4                              NO.$$

01.G4_ISW          02.G4_PSW

03.DN_IP           04.ISDN_IP      9
```

4. Press **Function** to exit service modes and return to standby.
    (Press **Yes** or **No** to return to Service Menu.)

2.2.5. Subscriber Number 1 Programming G4_SN1 (Function 05)

1. Enter the G4 service mode (see page 7) and type **0 5**. The CSDN/PSDN G4 Subscriber Number 1 display appears:

```
G4_SN1


   $$$$$$$$$$$$$$$$$$$$
```

2. Type the subscriber number (up to 20 numbers).
    Include a pause (–): press **Pause**.
Example: – 4 0 8 2 5 7 2 0 2 4:

```
G4_SN1


   –4082572024$$$$$$$$$
```

3. To make a change, press **Clear** to erase the number over the cursor, using the scroll arrows to move the cursor. Press **No** to erase the complete entry.
    Press **Yes** to program the what is in the display and return to the G4 service function menu.

```
G4                          NO.$$

01.G4_ISW          02.G4_PSW

03.DN_IP           04.ISDN_IP      9
```

4. Press **Function** to exit service modes and return to standby.
    (Press **Yes** or **No** to return to Service Menu.)

2.2.6. Subscriber Number 2 Programming G4_SN2 (Function 06)

THIS FUNCTION NOT USED IN USA.

DO NOT CHANGE THE SETTINGS OF THIS FUNCTION.

2.2.7. Network Identification DNIC Programming (Function 12)

1.   Enter the G4 service mode (see page 7) and type **1 2**. The Data Network Identification Code display appears:

```
DNIC

                 $$$$
```

2.   Type the code provided by the network.
Example: 4 3 2 1:

```
DNIC

                4321
```

3.   To make a change, press **Clear** to erase the number over the cursor, using the scroll arrows to move the cursor. Press **No** to erase the complete entry.
Press **Yes** to program the what is in the display and return to the G4 service function menu.

```
G4                          NO.$$

01.G4_ISW        02.G4_PSW

03.DN_IP         04.ISDN_IP       9
```

4.   Press **Function** to exit service modes and return to standby.
(Press **Yes** or **No** to return to Service Menu.)

2.2.8. Terminal Identification Programming G4_TID (Function 13)

1.   Enter the G4 service mode (see page 7) and type **1 3**. The Terminal Identification display appears:

```
G4_TID

   -=
  $$$$
```

2.   Type the country code provided by the network.
Example: 1:

```
G4_TID

   -=
  1$$$
```

3.   To make a change, press **Clear** to erase the number over the cursor, using the scroll arrows to move the cursor. Press **No** to erase the complete entry.
Press **Yes** to bring up the machine telephone number display:

```
G4_TID

  1-=
 -$$$$$$$$$$$
```

4.   Type the machine telephone number provided by the network (up to 11 numbers). See step 3 to make a change.
Example: 4 0 8 2 5 7 2 0 2 4:

```
G4_TID

  1-=
 -4082572024$
```

5.   Press **Yes** to bring up the terminal name display:

```
G4_TID

  1-4082572023=      YES OR CLR =NO
 =$$$$$$$$$$$                   ABC
```

6. Type the name provided by the customer using the ten-key pad for numbers and the Quick Dial keys (indicated by ABC in the display) for letters and space. To make a change, see step 3.

Example: C 2 0 D   S W 5 6 2 W:

```
G4_TID

    1-4082572023=       YES OR CLR =NO
   =C20D SW562W                     ABC
```

7. Press **Yes** to program the what has been put in the display and return to the G4 service function menu.

```
G4                            NO.$$

01.G4_ISW          02.G4_PSW

03.DN_IP           04.ISDN_IP        9
```

8. Press **Function** to exit service modes and return to standby. (Press **Yes** or **No** to return to Service Menu.)

2.2.9. Memory List Printing G4_DMP1 (Function 15)

Note: This function disgorges the machine memory for engineering
development purposes, and it is impractical to use in the
technical service environment. See Function 16, page 19,
which prints a hex code listing of the protocol exhange for a
more useful tool.

1.   Enter the G4 service mode (see page 7) and type **1 5**. The
address range display appears:

```
G4 MEMORY DUMP

      ADD.$$$$ 00H – ADD.     FFH
```

2.   Type the initial address of the range to be printed. Use the
ten-key pad for numbers and the Quick Dial keys for letters.
To make a change, press **Clear** to erase the number over
the cursor, using the scroll arrows to move the cursor. Press
No to erase the complete entry.
Example: 2 2 A A:

```
G4 MEMORY DUMP

      ADD.22AA00H – ADD.$$$$ FFH
```

3.   Type the last address of the range to be printed. Follow the
procedures in step 2.
Example: 2 2 B B:

```
G4 MEMORY DUMP

      ADD.22AA00H – ADD.22BBFFH
           PRESS "START"
```

4.   Press **Start** to print the contents of the range:

```
G4 MEMORY DUMP
        PRINTING
```

5.   When the list is printed, the display of step 1 reappears:

```
G4 MEMORY DUMP

      ADD.$$$$ 00H – ADD.    FFH
```

6.   Continue, or press **Yes** or **No** to return to G4 service
      function menu. Press **Function** to exit service modes, and
      return to standby.

2.2.10. Protocol List Printing G4_DMP2 (Function 16)

1.   Enter the G4 service mode (see page 7) and type **1 6**.
The G4 protocol print display appears:

```
G4_DMP2

        0   PROTOCOL
        PRESS "START"
```

2.   Press **Start**:

```
G4 PROTOCOL DUMP LIST
        PRINTING
```

3.   When the list is printed, the display of step 1 reappears.

```
G4_DMP2

        0   PROTOCOL
        PRESS "START"
```

4.   Continue, or press **Yes** or **No** to return to G4 service
function menu. Press **Function** to exit service modes,
and return to standby.

NOTE: See sections 4.2 through 4.6. pages 53 through 57, of this
manual for Hex. code meanings. Also, consult the Ricoh G4
Training Manual for more information concerning the G4 level
protocols.

2.2.11. System Parameter List Printing G4_LIST (Function 17)

1.   Enter the G4 service mode (see page 7) and type **1 7**. The G4 system protocol print display appears:

```
G4 SYSTEM PARAMETER LIST

          PRESS "START"

```

2.   Press **Start**:

```
    G4 SYSTEM PARAMETER LIST
            PRINTING
```

3.   When the list is printed, the G4 service function menu returns:

```
G4                          NO.$$

01.G4_ISW        02.G4_PSW

03.DN_IP         04.ISDN_IP      9
```
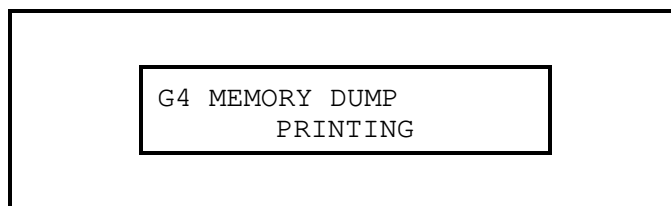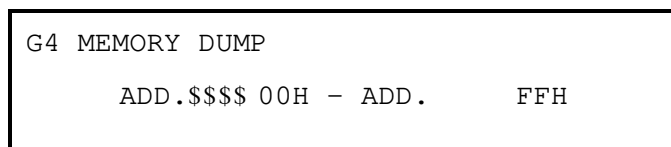
4.   Press **Function** to exit service modes and return to standby.
(Press **Yes** or **No** to return to Service Menu.)

2.3. Bit Switches

2.3.1. G4 Internal Switches (G4 - ISW)

Group 4 bit switches are changed using procedures described on pages 7, 8, and 9.

Bit Switch ISW00														
Bit	Function													Default
	Country Code. Set 5 bit switches:													
	Bit:	4	3	2	1	0	Country	Bit:	4	3	2	1	0 Country	
0		0	0	0	0	0	France		0	1	0	1	0 Sweden	1
1		0	0	0	0	1	Germany		0	1	0	1	1 Switzerland	0
2		0	0	0	1	0	UK		0	1	1	0	0 Portugal	0
3		0	0	0	1	1	Italy		0	1	1	0	1 Holland	0
4		0	0	1	0	0	Austria		0	1	1	1	0 Spain	1
		0	0	1	0	1	Belgium		0	1	1	1	1 Israel	
		0	0	1	1	0	Denmark		1	0	0	0	1 USA	
		0	0	1	1	1	Finland		1	0	0	1	0 Asia	
		0	1	0	0	0	Ireland		1	0	0	1	1 Japan	
		0	1	0	0	1	Norway							
5	Not used. Do not change factory setting.													0
6	Not used. Do not change factory setting.													0
7	Not used. Do not change factory setting.													0

Bit switches ISW01 and ISW02 are not used. Do not change the factory settings.

NOTE: Bit switches ISW01 and ISW02 are not used in the United States. Do not change the factory settings.

Bit Switch ISW03 (Application Task)		
Bit	Function	Default
0	Frame Save Area Clear Mode (troubleshooting tool) 0: Clear with each communication 1: Not cleared	0
1	Debugging tool. Do not change factory setting.	0
2	Debugging tool. Do not change factory setting.	0
3	Debugging tool. Do not change factory setting.	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch ISW03 Comments:

Bit 0:   Provides a save area of 2K bytes for communication protocols.

0: The area is cleared after each communication.

1: Saves communication exchanges until memory is used up. Exchanges are printed with *Function 16*, G4 Protocol Dump.

Bit	Function	Default
Bit Switch ISW04 (Data Link Task – Layer 2)		
0	N2 and T3 0: Ricoh mode (N2 = 8 times, T3 = 10 s) 1: CCITT T.90 mode (N2 = 60/T1, T3 = 30 s. T1 between 1 and 10 s. Default = 2 s)	0
1	Shift-up Mode 0: Immediate (negotiable) 1: Indirect	0
2	Fallback Mode 0: Immediate (negotiable) 1: Indirect	0
3	Not Used. Do not change factory setting.	0
4	Not Used. Do not change factory setting.	0
5	Not Used. Do not change factory setting.	0
6	Not Used. Do not adjust.	0
7	PSDN Back-To-Back Testing (Set one machine to 1) Reset after testing. 0: DTE 1: DCE	0

Bit Switch ISW04 Comments:

Bit 0: N2 is the number of times SABM can be repeated if no response is received. T3 = TL1 + TL2. TL1 is the time between receiving the flag response from the other end and sending the first SABM. TL2 is the time between each SABM sending attempt

Bit 1: 0: Immediate – When link layer modulo 8 mode is established, negotiation between terminals is available concerning the link layer modulo. Shift up to modulo 128 mode is done using R:SABME.
1: Indirect – When link layer modulo 8 is established, S:DM is sent after R:SABME

Bit 2: 0: Immediate – When link layer modulo 128 is established, S:SABME is sent. Then if R:DM is received, fallback is done by sending S:SABM.
1: Indirect – If R:DM is received, the call is disconnected and then reconnected.

Bit 7: When doing a PSDN back-to-back test, one of the fax machines must appear to be a DCE. This is done by setting this bit to 1 in one of the machines before doing the test.

Bit Switch ISW05 (Network Task – Layer 3)		
Bit	Function	Default
0	Calling-up Packet 0: CR Packet (S:CR) Call Request 1: SQ Packet (S:SQ) Reset Request	0
1	Not used. Do not change factory setting.	0
2	Protocol ID Check 0: Yes (TYMNET) 1: No	0
3	Not used. Do not change factory setting	0
4	Not used. Do not change factory setting.	0
5	Received Charge (Collect Call) 0: Refuse 1: Accept	0
6	Ricoh Mode (57 second) Timer 0: Disabled 1: Enabled	0
7	Packet Size (P) and Window Size (W) T.90 CSDN (ISO8208) 0: Fixed 1: Variable	0

Bit Switch ISW05 Comments:

Bit 0: This is used for packet networks and packet-type ISDNs. Between communications, Call Request (CR) is used normally, but Reset Request (SQ) can be used instead if this bit is at 1. If the network sends SQ, and if any packets are stuck in the network (such as due to communication faults) between the two terminals, they are cleared before communication. The setting of this bit depends on the network; in general, if the network is not complete, set this bit to 1.
 6 Try setting this bit to 1 if layer 3 cannot be established.

Bit 2: The protocol ID is contained in the CR packet. This bit is set to 0 if the machine is connected to TYMNET.

Bit 5: Collect calls known in the CCITT recommendations as "received charge". This is only used for PSDNs and packet-type ISDNs. The CR packet informs whether or not the call is a collect call.
0: Refuse collect call
1: Accept collect call

Bit 6: Ricoh 57-second timer. This is only for PSDN networks. Normally, if Call Connected (CC) is not received in reply to CR within 180 seconds, the communication is terminated. This time can be reduced to 57 seconds by setting this bit to 1.
0: Disabled (normal time = 180 seconds)
1: Enabled

Bit 7: This bit can be set to 0 if the machine is connected to an ISDN through a Terminal Adapter, or if it is connected to a CSDN that uses ISO8208 (T.90).
0: Fixed – Packet size (P) = 2048 Window size (W) = 7
1: Variable – As programmed in PSW07-0, 1, 2, 3, and PSW08-0,1,2,3

Bit Switch ISW06 (Network Task – Layer 3)		
Bit	Function	Default
0	S:CR Packet with Calling DTE Address 0: Disabled 1: Enabled	0
1	S:CR Packet with Calling and Receiving DTE Address 0: Disabled 1: Enabled	0
2	S:CR Packet with DNIC 0: Disabled 1: Enabled (FEDEX)	0
3	Not used. Do not change factory setting.	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch ISW06 Comments:

Bit 0: Inclusion of the sending DTE address in the Call Request packet (S:CR) – This bit is only for packet networks. The CR packet should contain the receiving side's DTE address; the transmitting side's may be included as an option.)

Bit 1: Inclusion of the transmitted/received DTE address in the S:CR packet – This bit is only valid if the machine is connected to an ISDN through a Terminal Adapter, or a T.90 CSDN; the CR packet is sent to match the IS8208 (T.90) layer 3 protocol. If the bit is 1, the other end's identifier can be seen in the display panel a few seconds earlier than normal.

Bit 2: Inclusion of DNIC (DN)/CC (ISDN) in the S:CR packet – If the machine is connected to the Federal Express network, this bit should be 1.

Bit Switch ISW07 (Network Task)		
Bit	Function	Default
0	Multi-channel (LCN Variability) 0: Contracted 1: Not contracted	0
1	International Prefix 0: Disabled 1: Enabled	0
2	Facility (Packet and Packet Window Size) Limitation 0: Disabled 1: Enabled	0
3	Not used. Do not change factory setting.	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch ISW07 Comments:

Bit 0: 0: Contracted – If the logical channel number (LCN) is set to a different number (PSW0A) from the actual value, communication is still possible.
1: Not contracted – Communication is not possible under the above conditions. It may be necessary to set this bit to 1 to carry out certain PTT approval tests.

Bit 1: The setting of this bit depends on the network specifications.

Bit 2: 0: Packet and packet window sizes are as programmed: (packet: PSW07-0, 1, 2, 3; packet window: PSW08-0, 1, 2, 3)
1: The packet window size (W) is fixed according to the packet size (P) as follows: if P = 128, W = 5; if P = 256, W = 4; if P = 512, W = 2;
if P = 1024, W = 2. These match the Japanese DDX-P network specifications.

Bit Switches ISW08, ISW09 ISW0A, ISW0B, ISW0C and ISW0D are not used by the FAX4500D.   Do not change the factory settings.

> **NOTE: Bit Switches ISW08, ISW09, and ISW0A through D are not used in the United States. Do not change the factory settings.**

Bit Switch ISW0E		
Bit	Function	Default
0	Physical Mode 0: CCITT (V.24-200, X.21 dialing) 1: NTT DDX (Japan)	0
1	X.21 Dialing Mode* 0: Normal X.21 dialing mode 1: Enabled	0
2	V.25 (V.24-200) Auto Dial 0: Disabled 1: Enabled (SEP code)	0
3	Rough Timer Mode 0: Off 1: On	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch ISW0E Comments:

Bit 0:   0: CCITT:
a) At the end of dialing on the V.24-200 parallel autodial interface, EON is used.
b) For X.21, there is no CPS (Call Progress Signal) start code.
1: DDX:
a) At the end of dialing on the V.24-200 interface, + is used.
b) For X.21, CPS start code, SI, is checked.

Bit 1:   0: Normal X.21 dialing is used
1: A prefix of "5/16-" is added at the start of the number. This is used on the DATEX-L network in Germany.

Bit 2:   If the user wishes to connect the machine to the PSTN with a V.25 interface (V.24-200 parallel autodial), setting this bit to 1 will cause the machine to automatically insert the "SEP" code at the start of the telephone number.

Bit 3:   For machines with a V.24-200 autodial, the rough timer provides a timing adjustment to overcome problems that some DCEs exhibit when working through this interface.

* Not applicable at this time

Bit Switch ISW0F		
Bit	Function	Default
0	Not used. Do not change factory setting.	0
1	Not used. Do not change factory setting.	0
2	L1 Signal Check in L2 CSDN and PSDN Tests 0: Disabled 1: Enabled	0

3
4
	Call Detection Mode. Set 2 bits:
	
	Bit 4 3 Mode
	:
	
	   0 0 CI: On only
	   1 0 CI or CD: On (DTR: On)
	   0 1 CI or CD: On (RTS: On)
	   1 1 Reserved
		0
		0

5
6
	CVG4 I/O Port Check Mode. Set 2 bits:
	
	Bit 6 5 Mode
	:
	
	   0 0 Normal operation
	   1 0 Output "H" data on IO ouput port
	   0 1 Output "L" data on IO output port
	   1 1 Indicate input port data on LCD
		0
		0

7	Not used. Do not change factory setting.	0

Bit Switch ISW0F Comments:

Bit 2: Enable this bit to check the Layer 1 timing signals (TX: ST2 and RX: RT) during Layer 2 back-to-back testing in order to study compatibility with the network DSU.

If the back-to-back test is successful when this bit is enabled, but the network communication is not, the data transfer timing signals may not be compatible with those of the DSU. *(REF: PK Type 1 test, FAX7000D Service Manual, pages 3-6 and 6-22)*

Reset this bit to 0 after testing. *See section 4 and PSW0D, for test procedures.*

Bits 3 and 4: Method of entering receive mode in V series communication. The setting of these bits depends on the type of DSU or DCE.

Bits 5 and 6: Terminal board test – This can test the operation of each signal on the V.24(V.28), V.35, or X.21***** jack. The procedures follow.

* **Not applicable at this time**
Test Procedure for bits 5 and 6
Output "H" data on IO output port (all output pins high – ISW0F = 01000000):
Disconnect the machine from the DCE. Set the CVG4 dip switches beneath the dial connector on the back panel to ON. Then, set bits 5 and 6 of switch ISW0F to 0 and 1 respectively. Reset the machine: hold down the Stop key for about 10 seconds. The output pins of the machine will all read high on a multimeter. After the multimeter test, reset the dip switches: hold down Stop for about 10 seconds.

Output "L" data on IO output port (All output pins low – ISW0F = 00100000):
The test procedure for output low is the same as for output high. In this case, set bits 5 and 6 of ISW0F to 1 and 0 respectively.

Input Port Data on LCD (Machine Input Test Mode) – Test 1:
Connect two machines with the back-to-back cable, 28433-001. Dip switches can be On OR OFF. On the machine to be tested, set bits 5 and 6 of switch ISW0F to 1 (01100000). On the other machine, set bits 5 and 6 for either "output high" (01000000) or "output low" (00100000). Then reset both machines: hold down the Stop key for about 10 seconds. The output pins on the other machine will go high if "ouput high" was selected (or low, if "output low" was selected), causing the input pins on the tested machine to go high (or low). On the tested machine, the following pins should go high (or low):

> V.35: D(CS), E(DR), F(CD), J(CI), R(RDA), T(RDB)
> V.24 (V.28): 3(RD), 5(CS), 6(DR), 8(CD), 22(CI)
> V.24-200 (Auto Dial): 3(ACL), 5(PND), 13(DSC), 22(DLO)
> X.21: 4(RA), 5 (IA), 11(RB), 12(IB)

The display in the bottom right of the LCD shows the status of the input pins as a four-figure (two-byte) hexadecimal code. (This code is displayed one byte at a time; the high byte is displayed for 2 seconds, and the low byte is displayed for 1 second, and this is repeated indefinitely). the make-up of this code depends on the status of the input pins as shown in the following table:

Bit	Meaning	Bit	Meaning
0	1:V.24-200 PND Low	8	1:X.21 IA and IB High
1	1:V.24-200 ACL Low	9	Not used
2	1:V.24-200 DSC Low	10	Not used
3	1:V.24-200 DLO Low	11	Not used
4	1:V.24, V.35 CD Low	12	Not used
5	1:V.24, V.35 CI Low	13	Not used
6	1:V.24, V.35 CS Low	14	Not used
7	1:V.24, V.35 DR Low	15	1: Rx data Low

Correct codes are as follows:
Output high: V.35 – 7F0F, V.24(V.28) – 7F0F, V.24-200 – 7F8F, X.21 – 7FFF
Output low: V.35 – FFFF, V.24(V.28) – FFFF, V.24-200 – FFFF, X.21 – FEFF

After testing, reset the bit switches, and hold down Stop for about 10 seconds to reset the machine.

Input Port Data on LCD (Machine Input Test Mode) – Test 2:
Disconnect the machine from the DCE. Then set bits 5 and 6 of ISW0F to 1 (01100000). Hold down the Stop key for about 10 seconds. If the test is correct, the display in the bottom right corner of the LCD should be as follows:

X.35 or X.21: 7FFF   V.24(V.28): FFFF

When all testing is done, restore the dip switches to OFF, reset the bit switches for normal operation, and reset the machines: hold down Stop for about 10 seconds.

Bit switches ISW10 and ISW11 are not used. Do not change the factory settings.

Bit Switch ISW12		
Bit	Function	Default
0	Frame Save Conditions for G4 Protocol Dump List 0: Excludes layer 2 signals when C/R save mode (PSW0E) is on 1: Includes layer 2 signals when C/R save mode (PSW0E) is off	0
1	Not used. Do not change factory setting.	0
2	Not used. Do not change factory setting.	0
3	Not used. Do not change factory setting.	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch ISW12 Comments:

Bit 0:   0: When ISW12-0 is 0, and PSW0E-1 is 1, the G4 protocol dump list will not include data link layer command/response (C/R) protocols.
1: When ISW12-0 is 1, and PSW0E-1 is 0, the G4 protocol dump list will include data link layer command/response protocols, such as Receive Ready (RR) or Set Asychronous Balanced Mode (SABM).
See page 6 for G4 protocol dump list, function 16, and page 45 for bitswitch PSW0E-1.

2.3.2. Parameter Switches (PSW)

Group 4 bit switches are changed using procedures described on pages 7, 8, and 9.

Bit Switch PSW00		
Bit	Function	Default
0	Not used. Do not change factory setting.	0
1	Not used. Do not change factory setting.	0
2	Network 0: CSDN (Circuit Switched) 1: PSDN (Packet Switched)	0
3	Not used. Do not change factory setting.	0
4	DCE I/F Dial 0: Auto Dial 1: Manual	0
5 6	DCE I/F Data. Set 2 bits. Bit: 6 5 I/F 0 0 X.21 0 1 V.24 (V.28) 1 0 V.35 (V.10, V.11)	0 1
7	Not used. Do not change factory setting	0

Bit Switch PSW00 Comments:

Bit 2:   Set this bit at installation to match the network connection.

Bit 4:   Set this bit at installation to match the type of dialing connection between the machine and the DCE.

Bits 5 and 6:   Set these two bits at installation to match the type of data connection between the machine and the DCE.

Parameter switches PSW01 and PSW02 are not used. Do not change the factory settings.

Bit Switch PSW03		
Bit	Function	Default
0	Link Modulus 0: Modulo 8 1: Modulo 128	0
1	Not used. Do not change factory setting.	0
2	Not used. Do not change factory setting.	0
3	Not used. Do not change factory setting.	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch PSW03 Comments:

Bit 0:   The link modulus determines the protocol frame numbering method. Modulo 8 uses 3 bits, numbering from 0 to 7 and starting again at 0. Modulo 128 uses 7 bits, numbering from 0 to 127 and starting again at 0.
0: Modulo 8 is the normal CSDN and PSDN setting.
1: Modulo 128 can be used when large amounts of data are to be transmitted over error-free lines.

Check with the network company for the appropriate setting.

Bit Switch PSW04													
Bit	Function												Default
	Link K Value. Set 4 bits.												
0 1 2 3	Bit: 3 2 1 0 Value 0 0 0 0 0 0 0 0 1 1 0 0 1 0 2 0 0 1 1 3 0 1 0 0 4 0 1 0 1 5 0 1 1 0 6 0 1 1 1 7					Bit: 3 2 1 0 Value 1 0 0 0 8 1 0 0 1 9 1 0 1 0 10 1 0 1 1 11 1 1 0 0 12 1 1 0 1 13 1 1 1 0 14 1 1 1 1 15							1 1 1 0
4	Not used. Do not change factory setting.												0
5	Not used. Do not change factory setting.												0
6	Not used. Do not change factory setting.												0
7	Not used. Do not change factory setting.												0

Bit Switch PSW04 Comments:

Bits: 0, 1, 2, and 3:   These bits are set, along with the link modulus PSW03-0 bitswitch (page 34), according to network specifications. The link K value is the maximum number of unacknowledged frames that the machine can send out before having to pause and wait for an acknowledgement from the other end.

If the link modulus (PSW03-0) is set to modulo 8, the K value cannot be more than 7. If the link modulus is set to modulo 128, the K value can be up to 15.

Bit Switch PSW05												
Bit	Function											Default
	Link Timer Value. Set 4 bits.											
	Bit:	3	2	1	0	Value	Bit:	3	2	1	0 Value	
0		0	0	0	0	0						0
1		0	0	0	1	1	0	1	1	0	6	1
2		0	0	1	0	2	0	1	1	1	7	0
3		0	0	1	1	3	1	0	0	1	8	0
		0	1	0	0	4	1	0	0	1	9	
		0	1	0	1	5	1	0	1	0	10	
4	Not used. Do not change factory setting.											0
5	Not used. Do not change factory setting.											0
6	Not used. Do not change factory setting.											0
7	Not used. Do not change factory setting.											0

Bit Switch PSW05 Comments:

Bits: 0, 1, 2, and 3:   The link timer value is the maximum allowable time between sending a protocol frame and receiving a response frame from the DSU. Normally, a setting of 2 is enough. A higher value may be necessary for a network using satellites.

Bit Switch PSW06		
Bit	Function	Default
0	Layer 3 Protocol 0: IS8208 1: T.70 Null	0
1	Not used. Do not change factory setting.	0
2	Not used. Do not change factory setting.	0
3	Not used. Do not change factory setting.	0
4	Packet Modulus 0: Modulo 8 1: Modulo 128	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch PSW06 Comments:

Bit 0: 0: For ISDN connection, either directly or through a terminal
adapter (TA)
1: For CSDN or PSDN connections

Bit 4: This bit function is similar to the link modulus, PSW03-0, page 34; it
determines the packet numbering method for PSDN connections.
Normally, modulo 8 is used. Modulo 8 is useful when large amounts
of data are to be transmitted over error-free lines. Check with the
network company for the appropriate setting.

Bit Switch PSW07		
Bit	Function	Default

0
1
2
3
	Packet Size. Set 4 bits.
	
	Bit: 3 2 1 0 Value
	
	    0 1 1 1 128
	    1 0 0 0 256
	    1 0 0 1 512
	    1 0 1 0 1024
	    1 0 1 1 2048
		1
		1
		0
		1

4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch PSW07 Comments:

Bits: 0, 1, 2, and 3:   The packet size depends on the memory size of the packet handling equipment in the network. Set these bits according to the network specifications.

Bit Switch PSW08																	Default
Bit	Function																Default
	Packet Window Size. Set 4 bits.																
	Bit:	3	2	1	0	Value		Bit:	3	2	1	0	Value				
		0	0	0	0	0			1	0	0	0	8				
		0	0	0	1	1			1	0	0	1	9				
0		0	0	1	0	2			1	0	1	0	10				1
1		0	0	1	1	3			1	0	1	1	11				1
2		0	1	0	0	4			1	1	0	0	12				1
3		0	1	0	1	5			1	1	0	1	13				0
		0	1	1	0	6			1	1	1	0	14				
		0	1	1	1	7			1	1	1	1	15				
4	Not used. Do not change factory setting.																0
5	Not used. Do not change factory setting.																0
6	Not used. Do not change factory setting.																0
7	Not used. Do not change factory setting.																0

Bit Switch PSW08 Comments:

Bits: 0, 1, 2, and 3:   A setting for PSDN, which is similar to the Link K parameter set by PSW04-0, 1, 2, and 3 (page 35). It is used for the maximum number of packets the machine can send without receiving a response from the other end. If IS8208 layer 3 protocol was selected by PSW06-0 (page 37), the maximum value is 7.

Bit Switch PSW09												
Bit	Function											Default

LCGN. Set 4 bits.

Bit:	3	2	1	0	Value	Bit:	3	2	1	0	Value
	0	0	0	0	0		1	0	0	0	8
	0	0	0	1	1		1	0	0	1	9
0	0	0	1	0	2		1	0	1	0	10
1	0	0	1	1	3		1	0	1	1	11
2	0	1	0	0	4		1	1	0	0	12
3	0	1	0	1	5		1	1	0	1	13
	0	1	1	0	6		1	1	1	0	14
	0	1	1	1	7		1	1	1	1	15

Default for Bit 0: 0, Bit 1: 0, Bit 2: 0, Bit 3: 0

Bit	Function	Default
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch PSW09 Comments:

Bits: 0, 1, 2, and 3:   The Logical Channel Group Number (LCGN) provides packet routing information over a switched data path within the packet network. It indicates the Packet Assembler/Disassembler (PAD) connection. It is used for PSDNs and ISDNs when there is more than one channel to the network. The value is determined by contract between user and network. If there is no contract, the factory setting can be used.

Bit Switch PSW0A										
Bit	Function									Default

LCN. Set 8 bits.

Bit	7	6	5	4	3	2	1	0	Value	Default
0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	1	1	
	0	0	0	0	0	0	1	0	2	
	0	0	0	0	0	0	1	1	3	
	0	0	0	0	0	1	0	0	4	
	0	0	0	0	0	1	0	1	5	
0	0	0	0	0	0	1	1	0	6	
1	0	0	0	0	0	1	1	1	7	1
2	0	0	0	0	1	0	0	0	8	0
3	0	0	0	0	1	0	0	1	9	0
	0	0	0	0	1	0	1	0	10	0
4	0	0	0	0	1	0	1	1	11	
5	0	0	0	0	1	1	0	0	12	0
6	0	0	0	0	1	1	0	1	13	0
7	0	0	0	0	1	1	1	0	14	0
	0	0	0	0	1	1	1	1	15	0
	0	0	0	1	0	0	0	0	16	
	●	●	●	●	●	●	●	●	●	
	●	●	●	●	●	●	●	●	●	
	●	●	●	●	●	●	●	●	●	
	1	1	1	1	1	1	0	1	253	
	1	1	1	1	1	1	1	0	254	
	1	1	1	1	1	1	1	1	255	

Bit Switch PSW0A Comments:

The Logical Channel Number (LCN) is part of the packet routing
information similar to the LCGN (PSW09).

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Bit Switch PSW0B		
Bit	Function	Default

0
1
2
3
	Transport Block Size. Set 4 bits.
	
	Bit: 3 2 1 0 Value
	
	     0 1 1 1 128
	     1 0 0 0 256
	     1 0 0 1 512
	     1 0 1 0 1024
	     1 0 1 1 2048
		1
		1
		0
		1

4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch PSW0B Comments:

Bits: 0, 1, 2, and 3:   The transport block size depends on the memory size of the packet handling equipment in the network. It must not be greater than the packet size value set by PSW07-0, 1, 2, and 3 (page 38). Set these bits according to the network specifications.

Bit Switch PSW0C		
Bit	Function	Default

0
1
	Session Window Size.
	
	Bit: 1 0 Value
	
	      0 1 1
	      1 0 2
	      1 1 3
		1
		0

2	Not used. Do not change factory setting.	0
3	Not used. Do not change factory setting.	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch PSW0C Comments:

Bits 0 and 1:   This is the number of session layer commands that the machine can send without receiving acknowledgment from the other end. CCITT recommendations allow for a value up to 3, but keep the setting at 1 in this machine.

Bit Switch PSW0D		
Bit	Function	Default

0
1
2
	Back-to-Back Test Mode. Set 4 bits.
	
	Bit: 2 1 0 Test
	
	       0 0 0 Off for normal operation
	       1 0 0 Packet Back-to-Back (PSDN)
	       1 0 1 Layer 1 Test (CSDN)
	       0 1 0 Layer 2 test (CSDN)
		0
		0
		0

3	Not used. Do not change factory setting.	0
4	Not used. Do not change factory setting.	0
5	Not used. Do not change factory setting.	0
6	Not used. Do not change factory setting.	0
7	Not used. Do not change factory setting.	0

Bit Switch PSW0D Comments:
See section 4 for back-to-back test procedures.

Bits 0, 1, and 2:   000: Normal Operation. Always reset the bits to 0000 after testing.

001: CSDN Layer 1 (Physical Link). This test checks data transmission (ST2) and reception (RT) signal element timing for the V.24 and V.35 physical connections. Signalling proceeds from layer 1 when Start is pressed. The clock must be enabled in one of the machines by setting dip switches as indicated in the section 4.

010: CSDN Layer 2 Back-to-Back Test (Data Link). This test doesn't check layer 1 signal element timing. The clock must be enabled in one of the machines by setting its dip switches. See section 4. Layer 1 is established, and signalling begins from layer 2 when Start is pressed. This setup is also used for high speed operation without a network, using DSUs on a leased or dedicated line (no manual dialing).

010: CSDN Layer 2 Network Test (Data Link). Each machine is connected to a network through a DSU. Connection between the DSUs must be established before beginning the test-dialing is manual only. Layer 1 is not checked. Clock signal is provided by the network: all the dip switches are set to OFF.

100: PSDN Packet Back-to-Back Test. One machine must be set as DCE (ISW04-7). Signal element timing (layer 1) is not checked. Clock is enabled by setting the dip switches in one of the machines. See section 4. Layer 2 is established when the machine is turned on, and SQ/SF (Reset Request/Reset Confirm) packets are exchanged. Communication begins from the CR (Call Request) packet, when Start is pressed.

100: PSDN Packet Network Test. Each machine is connected to a network through a DSU. Connection between the DSUs must be established before beginning the test. DCE does not need to be set, and clock is provided by the network. SQ/SF packets are exchanged and communication begins with the CR packet when Start is pressed.

Bit Switch PSW0E		Default
Bit	Function	Default
0	Real Time Display (troubleshooting tool) 0: Off 1: On	0
1	Command/Response Frame Save (troubleshooting tool) 0: Off 1: On	1
2	Not used. Do not change factory setting.	0
3	Not used. Do not change factory setting.	0
4 5 6 7	Test Clock Rate. Set 4 bits. Bit: 7 6 5 4 Rate (kbps)　　Bit: 7 6 5 4 Rate (kbps) 0 0 0 1　2.4 0 0 1 0　4.8　　　0 1 1 1　16.0 0 0 1 1　7.2　　　1 0 0 0　19.2 0 1 0 0　9.6　　　1 0 0 1　48.0 0 1 0 1　12.0　　1 0 1 0　56.0 0 1 1 0　14.4　　1 0 1 1　64.0	1 1 0 1

Bit Switch PSW0E Comments:

Bit 0:　Set to 1 to display a status code in the bottom right of the character display. *See section 6.1. for status codes.*

Bit 1:　Command/Response frames are saved when set to 1. When bit switch *ISW12-0* is also set to 1, Layer 2 command/response protocols will be included when the G4 protocol dump list is printed.

> 0: Off. When ISW12-0 is also set to 0 (off), the layer 2 protocols will not be printed.

> 1: On When ISW12-0 is also set to 1 (on), the layer 2 protocols will be printed.

Bits 4, 5, 6, and 7:　This is used in back-to-back tests. (The default is 64.0 kbps.)

NOTE: Parameter switch PSW0F is not used. Do not change the factory settings.

3   BACK-TO-BACK TEST

NOTE: When testing is done, turn the dip switches to OFF, restore bit switches to normal operation, and reset the machines: hold down the STOP button for about 12 seconds. See SystemReset Notes, page 3-3.

These tests are useful for demonstrations, training coursed, and machine testing and troubleshooting. A cable rated for both V.35 and V .24 is used to connect the machines directly to each other, back-to-back. The layer 2 test can be used for compatibility problems: If the layer 2 test was successful but communication was not, the machine's data transfer timing signals may be incompatible with those of the DSU.

CSDN Layer 1 (Physical Link) Test - Direct

Two machines using CSDN protocol are directly connected to each other with the V.35/V.24 back-to-back cable. The bit switches for the CSDN layer 1 test mode and the cable rate are selected. The dip switches of ONE of the machines are set to enable the clock. After the document has been placed in the ADF, the call is initiated at the machine. Signalling begins when Start is pressed. The layer 1 data transfer signal element timing pins, ST and RT, for V.24 and V.35 connections are tested.

CSDN Layer 2 (Data Link) Test - Direct

Two machines using CSDN protocol are directly connected to each other with the V.56/V.24 back-to-back cable. The bit switches for the CSDN layer 2 test mode and the cable rate are selected. The dip switches of ONE of the machines are set to enable the clock. With the document in position in the ADF, the call is initiated at the machine. Signalling stars from layer 2 when the Star button is pressed. incompatibillty is ignored, and layer 1 is established. Data transfer signal element timing is NOT tested.

PSDN Packet test Direct

This test is a version the CSDN direct test above. Two machines using PSDN protocol are directly connected to each other with the V.35/V.24 back-to-back cable. The PSDN test mode and the cable rate are selected by bit switch. The dip switches are set to enable the clock. In addition, for the back-to-back PSDN test only, one of the machines is set as DCE. the physical link and the data link are established at power up. Network layer Reset Request (SQ) and Reset Confirmation (SF) packets are exchanged, and communicating begins with the Call Request (CR) packet when the Start button is pressed.

Back-to-back: CSDN Layer 1 &2/PSDN Packet Test-Direct

1. Turn off the AC power to both machines
2. Connect two fax machines through the data connectors with the V.35/V.24 back-to-back cable.
3. Locate dip switches 1 through 8 above the dial connector on the CVG4. On one of the machines, set the dip switches to enable the clock for V.35 or V.24 test mode:
   -V.35 set 5,6,7,8, on.
   -V.24 set 3,4, on.
   All other switches should be off.
4. Turn the power on. Set the test mode (PSW0D), the cable data rate (PSW00), and the PSDN DCE (ISW04) bit switches as required for the test. The layer 1 signal element timing check can be enabled for layer 2 tests by setting bit switch ISW0F-2 to 1.
   Enter the G4 service mode (section 2.2) and use G4 service mode functions 01 and) 02 to set the switches as follows:

SWITCH	MACHINE 1	MACHINE 2
PSW0D (Test Mode)		
CSDN Layer 1	00000001	00000001
CSDN Layer 2	00000010	00000010
PSDN Packet	00000100	00000100
PSW00 (Cable I/F)		
V.35	01000000	01000000
V.24	00100000	00100000
ISW04 (DCE PSDN only)	10000000	00000000
ISW0F (L1 Check in L2)*	00000100	00000100

  *Optional

NOTE: Test clock rates can be set from 2.4 kbps to 64 kbps by bit switch PSW0E. The default value is 64 kbps.

5. Enter G4 Service Mode.

6. Reset both machines by pressing the Stop button for 12 seconds.

7. Place a document in the ADF. Select G4 and dial by pressing any number on the keypad. Press the Start button.

8. After completing the tests, restore the bit switches to their original settings. Set the dip switches back to OFF.

9. Reset both machines by pressing the Stop button for 12 seconds.

10. Exit the service mode. (See section 2.2)

PSDN Packet Test-Network

This test is a version of the CSDN network test above. The machines are set for PSDN test mode. Two machines using PSDN protocol are connected to the network through DSUs. The clock is provided by the network, and the connection to the DSU is normal DTE to DCE connection. The dip switches are OFF. Power up establishes the data link layer. Network packets SQ and SF are exchanged, and communication begins with the CR packet when Start is pressed.

CSDN Layer 2 -Network

CSDN Layer 2 Test is similar to the direct test. The same CSDN layer 2 test mode setting is used. Signaling starts from layer 2 when Start is pressed. However; 1. The CSDN machines are connected through DSUs to a network. 2. Timing is provided by the network, and the dip switches are OFF. 3. The call is initiated manually at the DSU.

CSDN Layer 2/PSDN Packet Tests-Network

1.   Two machines both using the same protocol (CSDN or PSDN) are connected to the data network through DSUs. The dip switches are OFF. DCE for PSDN protocol is not enabled.

2.   Set the PSWOD test mode for CSDN Layer 2 or PSDN Packet and re-initialize the machines by pressing the Stop button for 12 seconds.

3.   Place a document in the ADF. Select G4. Initiate the call to the other terminal from the DSU, and press Start.

4.   After completing the tests, restore the bit switch, and re-initialize the machine. Exit the service mode.

4.   Layer Signal Identifiers

4.1.   Layer 1 (Physical Layer – The Cable Signals)

4.1.1.   V.35 Cable (28378-001)

DB36	Signal	V.35	DCE	
1	RTA	V	From	Rx Signal Element Timing
2	RTB	X	From	Rx Signal Element Timing
3	STA	Y	From	Tx Signal Element Timing
4	STB	AA	From	Tx Signal Element Timing
5 ~ 18				not connected
19	FG	A		Frame Ground
20	SG	B		Signal Ground
21	RS	C	To	Request to Send (RTS)
22	CS	D	From	Clear to Send (CTS)
23	DR	E	From	Data Set Ready (DSR)
24	CD	F	From	Data Carrier Detect (RLSD)
25	DTR	H	To	Data Terminal Ready
26	CI	J	From	Call (Ring) Indication (RI)
27	TI	NN	From	DCE Self Test Indicator
28	SDA	P	To	Send Data
29	SDB	S	To	Send Data
30	RDA	R	From	Receive Data
31	RDB	T	From	Receive Data
32 ~ 36				not connected

4.1.2. V.24 Cable (28382-001)

DB36	Signal	V.24	DCE	
1 ~ 6				not connected
7	SD	2	To	Send Data
8	RD	3	From	Receive Data
9	RT	17	From	Rx Signal Element Timing
10	ST	15	From	Tx Signal Element Timing
11 ~ 18				not connected
19	FG	1		Frame Ground
20	SG	7		Signal Ground
21	RS	4	To	Request to Send (RTS)
22	CS	5	From	Clear to Send (CTS)
23	DR	6	From	Data Set Ready (DSR)
24	CD	8	From	Data Carrier Detect
25	DTR	20	To	Data Terminal Ready
25	CI	22	From	Call (Ring) Indication (RI)
27	TI	25	From	DCE Self Test Indicator
28 ~ 36				not connected

4.1.3. V.24-200 Cable (28379-001)

DB20	Signal	V.24-200	DCE	
1	DS1	14	To	Digit Signal (2^0)
2	DS2	15	To	Digit Signal (2^1)
3	DS4	16	To	Digit Signal (2^2)
4	DS8	17	To	Digit Signal (2^3)
5 ~ 8				not connected
9	DLO	22	From	Data Line Occupied
10	DSC	13	From	Distant Station Connected
11	FG	1		Frame Ground
12	DPR	2	To	Digit Present
13	ACL	3	From	Abandoned Call
14	CRQ	4	To	Call Request
15	PND	5	From	Present Next Digit
16				not connected
17	SG	7		Signal Ground
18 ~ 20				not connected

V.24-200 Dialing Signals in Binary Code

Characters	Output Signals				
	DS8	DS4	DS2	DS1	HEX Value
0	0	0	0	0	0
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
'(EON)	1	1	0	0	C
-(SEP)	1	1	0	1	D

EON: End of Number
SEP: Separation (Pause)

4.1.4. Back-to-Back Cable (28433-001)

DB36	Signal		DB36	
1	V.35	RTA] ST2A	3	Rx/Tx Signal Element Timing (A)
2	V.35	RTB] ST2B	4	Rx/Tx Signal Element Timing (B)
3	V.35	ST2A] RTA	1	Tx/Rx Signal Element Timing (A)
4	V.35	ST2B] RTB	2	Tx/Rx Signal Element Timing (B)
5~ 6			5~ 6	Not connected
7	V.24	SD] RD	8	Send Data/Receive Data
8	V.24	RD] SD	7	Receive Data/Send Data
9	V.24	RT] ST2	10	Rx/Tx Signal Element Timing
10	V.24	ST2] RT	9	Tx/Rx Signal Element timing
11~ 13			11~ 13	Not connected
14~ 18	X.21 (V.11)		14~ 18	Not used
19	FG		19	Frame Ground
20	SG		20	Signal Ground
21	V.35/V.24	RS] CS RS] CD RS] CI	22 24 26	Request To Send/Call To Send Request To Send/Carrier Detect Request To Send/Call Indication
22 24 26	V.35/V.24	CS] RS CD] RS CI] RS	21	Call To Send/Request to Send Carrier Detect/Request To Send Call Indication/Request To Send
23	V.35/V.24	DR] ER DR] TI	25 27	Data Set Ready/Data Terminal Ready Data Set Ready/Test Indicator
25 27	V.35/V.24	ER] DR TI] DR	23	Data Terminal Ready/Data Set Ready Test Indicator/Data Set Ready
28	V.35	SDA] RDA	30	Send Data/Receive Data (A)
29	V.35	SDB] RDB	31	Send Data/Receive Data (B)
30	V.35	RDA] SDA	28	Receive Data/Send Data (A)
31	V.35	RDB] SDB	29	Receive Data/Send Data (B)
32~ 36	X.21 (V.11)		32~ 36	Not used

4.2. Layer 2 (Data Link - X.25 LAPB)

Identifier	Command	Response	Hex
I	Information (numbered frame)		x x
RR	Receive Ready	Receive Ready	x 1
RNR	Receive Not Ready (busy)	Receive Not Ready (busy)	x 5
REJ	Reject	Reject	x 9
SABM	Set Asynchronous Balanced Mode (modulo 8)		x F
SABME	Set Asynchornous Balanced Mode Extended (modulo 128)		x F
DISC	Disconnected		x F
DM		Disconnected Mode	x 3
UA		Unnumbered Acknowledgment	x 3
CMDR		Command Reject	x 7
FRMR		Frame Reject	x 7

4.3. Layer 3 (Network)

from DTE to DCE	from DCE to DTE	Hex
Call set-up and clearing		
Call Request CR	Incoming Call	0B
Call Accepted CA	Call Connected CN	0F
Clear Request CQ	Clear Indication CI	13
DTE Clear Confirmation CF	DCE Clear Confirmation CF	17
Data and Interrupt		
DTE Data	DCE Data	
DTE Interrupt	DCE Interrupt	23
DTE Interrupt Confirmation	DCE Interrupt Confirmation	27
Flow Control and Reset		
DTE RR (modulo 8)	DCE RR (modulo 8)	x1
DTE RR (modulo 128)	DCE RR (modulo 128)	01
DTE RNR (modulo 8)	DCE RNR (modulo 8)	x5
DTE RNR (modulo 128)	DCE RNR (modulo 128)	05
DTE REJ (modulo 8)		x9
DTE REJ (modulo 128)		09
Reset Request	Reset Indication	1B
DTE Reset Confirmation	DCE Reset Confirmation	1F
Restart		
Restart Request	Restart Indication	FB
DTE Restart Confirmation	DCE Restart Confirmation	FF
Diagnostic		
	Diagnostic	F1

4.4. Layer 4 (Transport T.70)

Identifier	Command	Response	Hex
TCR	Transport Connection Request		E 0
TCA		Transport Connection Accept	D 0
TCC		Transport Connection Clear	8 0
TDT	Transport Data		F 0
TBR		Transport Block Reject	7 0

4.5. Layer 5 (Session T.62)

Identifier	Command	Response	Hex
CSS	Command Session Start		0 D
RSSP		Response Session Positive	0 E
RSSN		Response Session Negative	0 C
CSE	Command Session End		0 9
RSEP		Response Session End Positive	0 A
CSA	Command Session Abort		1 9
RSAP		Response Session Abort Positive	1 A
CSUI	Command Session User Information		0 1
RSUI		Response Session User Information	0 2
CSCC	Command Session Change Control		1 5
RSCCP		Response Session Change Control Positive	1 6

4.6. Layer 6 (Document Session – Presentation Layer)

Identifier	Command	Response	Hex
CDS	Command Document Start		2 D
CDC	Command Document Continue		1 D
CDCL	Command Document Capability List		3 D
RDCLP		Response Document Capability List Positive	3 E
CDE	Command Document End		2 9
RDEP		Response Document End Positive	2 A
CDD	Command Document Discard		3 9
RDDP		Response Document Discard Positive	3 A
CDR	Command Document Resynchronize		1 9
RDRP		Response Document Resynchronize Positive	1 A
CDUI	Command Document User Information		0 1
RDGR		Response Document General Reject	0 0
CDPB	Command Document Page Boundary		3 1
RDPBP		Response Document Page Boundary Positive	3 2
RDPBN		Response Document Page Boundary Negative	3 0

5. Troubleshooting

5.1. CVG4 Status Codes

When the real time display bitswitch, PSW0E-0, is turned on, CVG4 status codes will be displayed as hex codes in the operation panel character display during communication. The default position of that switch is off (0).

When PSW0E-0 is on, the status codes of all levels, 1 through 7, are also displayed as hex code in binary form in a row of LEDs on the CVG4 board. The LED representing bit 0 is closest to the G4 connector.

When the PSW0E-0 is off, the status codes will not appear in the operation panel character display, and only layer 1 and 2 codes will appear in the LEDs.

5.1.1 Layer 1 (Physical Layer) Status Codes

1. CSDN V-Series, Auto Dialing

Code (H)	Status
1 B	Ready
0 2	DLO:OFF (waiting for DCE ready)
0 3	PND:ON (waiting for permission to dial)
0 4	PND:OFF (waiting for dial signal rx status)
0 5	DSC:ON (waiting for permission to communicate)
0 6	CTS:ON (connection complete, waiting for data)
0 7	Data phase (layer 2 and higher)
0 8	DSR:OFF (waiting for machine ready)
0 9	Waiting for R:MGACR (sequence checking)
0 A	DSR:ON
0 B	CI:OFF (waiting for machine ready)

2.　　CSDN V-Series, Manual Dialing

Code (H)	Status
1 C	Ready
0 2	DSR:ON (waiting for permission to dial)
0 3	CTS:ON (connection complete, waiting for data)
0 4	Data phase (layer 2 and higher)
0 5	DSR:OFF (waiting for machine ready)
0 6	Waiting for R:MGACR (sequence checking)
0 7	DSR:ON (waiting for call rx availability)
0 8	CI:OFF (waiting for machine ready)

3.　　PSDN V-Series

Code (H)	Status
1 E	Ready
0 2	Waiting for CTS:ON
0 3	Data phase (layer 2 and higher)
0 4	Waiting for CTS:OFF

4.　　Back-to-Back Test, V-Series

Code (H)	Status
0 1	Ready
0 2	Waiting for CTS:ON
0 3	Data phase
0 4	Waiting for R:MGACR (sequence checking)
0 5	Waiting for CTS:OFF

5.   Back-to-Back Test Packet Mode, V-Series

Code (H)	Status
0 1	Ready

6.   L2 Back-to-Back Test

Code (H)	Status
0 1	Ready
0 2	Data phase

5.1.2. Layer 2 (Link Layer) Status Codes

Code (H)	Status
2 0	S:SABM or R:SABM
2 1	S:SAUA or R:SAUA
2 2	S:FRMR or R:FRMR
2 8	S:SABME or R:SABME
D 0	S:DISC or R:DISC
D 1	S:DSUA or R:DSUA
D 2	S:DM or R:DM

5.1.3 Layer 3 (Network Layer) Status Codes

Code (H)	Status
3 0	S:CR
3 1	R:CC
3 8	R:CN
3 9	S:CA
3 2	S:GF
3 A	R:SQ
3 B	R:GF
C 0	S:CQ
C 1	R:CF
C 8	R:CI
C 9	S:CF
C 2	S:SQ
C 3	R:SF
C A	R:SI
C B	S:SF
C 4	S:RQ
C 5	R:RF
C C	R:RI
C D	S:RF
C 6	R:IT
C 7	R:IF
C E	R:DIAG

5.1.4. Layer 4 (Transport Layer) Status Codes

Code (H)	Status
4 0	S:TCR or R:TCR
4 1	S:TCA or R:TCA
4 2	S:TBR or R:TBR
4 3	S:TCC or R:TCC

5.1.5. Layer 5 (Session Layer) Status Codes

Code (H)	Status
5 0	S:CSS or R:CSS
5 1	S:RSSP or R:RSSP
5 2	S:RSSN or R:RSSN
5 3	S:CSCC or R:CSCC
5 4	S:RSCCP or R:RSCCP
5 5	S:CSUI or R:CSUI
5 6	S:RSUI or R:RSUI
A 0	S:CSA or R:CSA
A 1	S:RSAP or C:RSAP
A 2	S:CSE or R:CSE
A 3	S:RSEP or R:RSEP

5.1.6 Layer 6 (Presentation Layer) Status Codes

Code (H)	Status
6 0	S:CDCL or R:CDCL
6 1	S:RDCLP or R:RDCLP
6 2	S:CDS or R:CDS
6 3	S:CDC or R:CDC
6 4	S:CDPB or R:CDPB
6 5	S:RDPBP or R:RDPBP
7 0	S:CDUI or R:CDUI (Data phase)
9 0	S:CDE or R:CDE
9 1	S:RDEP or R:RDEP
9 2	S:CDD or R:CDD
9 3	S:RDDP or R:RDDP
9 4	S:CDR or R:CDR
9 5	S:RDRP or R:RDRP
9 6	S:RDGR or R:RDGR
9 7	S:RDPBN or R:RDPBN

5.2 Error Codes – Service Monitor Report

The Service Monitor Report lists the communication errors occuring during communication. The errors appear as codes – some relating to G3 communication, and some relating to G4. (Note that not all the codes appearing in the report are true communication errors.

The service report is printed using G3 service function 04. See the FAX4500L Service Manual, pages 4-1 and 4-2, for guidance.

G3 error codes are found on pages 6-21 to 6-24 of the FAX4500L Service Manual.

5.2.1. FAX4500D G4 Error Codes

The following are error codes specific to the FAX4500D:

Code	Meaning	Action
3-00	No response from CVG4	1. Replace CVG4 2. Replace FCU 3. Check Network
3-11	G4 disconnect	Check with remote terminal; test by sending to another terminal
3-20	Command Session Abort (CSA) received; session stopped	Check with remote terminal; test by sending to another terminal
3-21	CSA sent; session stopped	Stop or other operation key was pressed; resend
3-30	Receive ability limit command for receiving	Check with remote terminal; test by sending to another terminal

5.2.2. G4 Communication Error Codes

Other G4 codes can appear on the Service Monitor Report and these are described on the following pages. Specific actions or remedies are recommended for these problems, and these appear in coded form along with the error code:

Action Code	Cause/Recommended Action
1	Cause: Interface problem (connector unplugged, DSU failure) Actions: Check DSU operation. Check connections: DSU cables, FCU, CVG4. Replace FCU or CVG4 if necessary.
2	Cause: FCU/CVG4 handshake error, or FCU is busy. Action: None. Machine resets itself automatically.
3	Cause: Interface problem (connector unplugged, DSU or network failure) Action: Check DSU and network operation. Check connections: DSU cables, FCU, CVG4. Replace FCU or CVG4 if necessary.
4	Cause: Interface problem in back-to-back test Actions: Same as 1.
5	End of communication error in back-to-back test Action: None. Error during communication in back-to-back test Action: Same as 4.
6	Cause: Abnormal signal received from remote or network Action: Check with remote
7	Cause: Network error Action: Check with network
8	Cause: CVG4 software failure Action: Replace CVG4 ROM
9	Cause: Remote terminal error in transport layer Action: Same as 6.
10	Cause: Remote terminal or local CVG4 software error in document layer (layer 6) Action: Same as 6, 8

1. Physical Layer

CSDN X-series (X.21)

Error Code	Description	Action Code
1001	T1 timeout (waiting for R:PLUS)	1
1002	T2 timeout (waiting for I:ON, dial-out permit)	1
1003	T3 timeout (waiting for DCE ready)	1
1004	T4 timeout (waiting for R:MGACR)	2
1005	T5 timeout (waiting for I:ON, dial-in approve)	1
1006	T6 timeout (waiting for R:1, ready to dial)	1
1007	T7 timeout (waiting for I:ON, CPS group 0	1
1008	T8 timeout (waiting for I:ON, CPS/DCE)	1
1009	R:0, disconnect (no error)	None

CSDN V.24-200 Auto Dial

Error Code	Description	Action Code
1001	TA1 timeout (waiting for DLO:OFF)	1
1002	TA2 timeout (waiting for PND:ON/OFF)	1
1003	TA3 timeout (waiting for DSC:ON)	1
1004	TA4 timeout (waiting for CTS:ON)	1
1005	TA5 timeout (waiting for DSR:OFF)	1
1006	TA6 timeout (waiting for R:MGACR)	2
1007	TA7 timeout (waiting for DSR:ON)	1
1008	TA8 timeout (waiting for CI:OFF)	1
100A	ACL:ON, disconnect (no error)	None
100B	DSR:OFF, disconnect (no error)	None
100C	CI:OFF, disconnect (no error)	None

CSDN V.24, V.35 Manual Dial

Error Code	Description	Action Code
1001	TM1 timeout (waiting for DSR:ON calling)	1
1002	TM2 timeout (waiting for CTS:ON)	1
1003	TM3 timeout (waiting for DSR:OFF)	1
1004	TM4 timeout (waiting for R:MGACR)	2
1005	TM5 timeout (waiting for DSR:ON called)	1
1006	TM6 timeout (waiting for CI:OFF)	1
100B	DSR:OFF, disconnect (no error)	None
100C	CI:OFF, disconnect (no error)	None

PSDN X-series (X.21)

Error Code	Description	Action Code
100D	I:OFF, disconnect	3

PSDN V.24, V.35

Error Code	Description	Action Code
1001	TP1 timeout (waiting for CTS:ON)	1
1002	TP2 timeout (waiting for CTS:OFF)	1
1003	CTS:OFF, disconnect	1

Back-to-Back Test X-, V-series

Error Code	Description	Action Code
100F	TT1 timeout	4

Packet Mode Back-to-Back Test X-series

Error Code	Description	Action Code
100D	I:OFF, disconnect	5

Packet Mode Back-to-Back Test V-series

Error Code	Description	Action Code
100E	CTS:OFF, disconnect	5

Layer 2 Back-to-Back Test

Error Code	Description	Action Code
100D	I:OFF, disconnect	5
100E	CTS:OFF, disconnect	5

2.   Data Link Layer

Error Code	Description	Action Code
2001	Frame size exceeded, S:FRMR (04)	6
2003	Undefined command received, S:FRMR (01)	6
2004	Undefined response received, S:FRMR (01)	6
2006	R:(i), N(R) error, S:FRMR (08)	6
2007	R:RRc (i) field present, S:FRMR (03)	6
2008	R:RRc N(R) error, S:FRMR (08)	6
2009	R:RNRc (i) field present, S:FRMR (03)	6
200A	R:RNRc N(R) error, S:FRMR (08)	6
200B	R:REJc (i) field present, S:FRMR (03)	6
200C	R:REJc N(R) error, S:FRMR (08)	6
200D	R:RRr (i) field present, S:FRMR (03)	6
200E	R:RRr N(R) error, S:FRMR (08)	6
200F	R:RNRr (i) field present, S:FRMR (03)	6
2010	R:RNRr N(R) error, S:FRMR (08)	6
2011	R:REJr (i) field present, S:FRMR (03)	6
2012	R:REJr N(R) error, S:FRMR (08)	6
2015	R:FRMR	6
2016	Link reset error	6
2021	TL2 timeout (flag detection)	6
2022	T1 timeout (R:SAUA)	6
2023	T1 timeout (R:DSUA)	6
2024	T2 timeout (R:SABM)	6
2025	N2 timeout waiting for S, (i) frame response	6
2026	Remote terminal busy, observation timeout	6

3. Network Layer

The third digit (x) of the error code gives the packet type in which the error code, as follows:

1: CN, 2: CC, 3: CI, 4: CF, 5: SI, 6: SF, 7: DT, 8: RR, 9: RNR, A: Other

Error Code	Description	Action Code
30x1	LI error	7
30x2	GFI error	7
30x3	LCGN/LCN error	7
30x4	PID (Protocol ID) error	9
30x5	D bit error	9
30x6	M bit error	9
30x7	P(s) sequence number error	7
30x8	P(r) sequence number error	7
30x9	Facility error	7
30xA	Other data error	7
30xB	Dial code error	7
30xC	TYMNET spec error	7, 9
30xD	State error	7, 9
30B1	T21 timeout (waiting for CC packet)	7
30B2	T23 timeout (waiting for CF packet)	7
30B3	T20 timeout (waiting for SF packet)	7
30B4	T22 timeout (waiting for RF packet)	7
30B5	T10F timeout (waiting for first frame)	7
30EE	Primitive error	8
30FF	Invalid packet received	7

4.　　Transport Layer

Error Code	Description	Action Code
4000	TCR, command error	9
4001	TCR, block LI error	9
4011	TCR, incorrect parameter	9
4012	TCR, parameter LI error	9
4013	TCR, parameter error	9
4020	TCA, block LI error	9
4021	TCA, reference number error	9
4022	TCA, incorrect parameter	9
4023	TCA, parameter LI error	9
4024	TCA, parameter error	9
4030	TCC, block LI error	9
4040	TBR, block LI error	9
4041	TBR, incorrect parameter	9
4050	TDT, block LI error	9
4051	TDT, end mark error	9
4052	TDT, other error	9

5.   Session Layer; Session Control Layer

Error Code	Description	Action Code
5050	R:CSS, abnormal parameter or format	9
5051	R:RSSP, abnormal paramer or format	9
5052	R:RSSN, abnormal paramer or format	9
5053	R:CSCC, abnormal paramer or format	9
5054	R:RSCCP, abnormal paramer or format	9
5055	R:CSUI, abnormal paramer or format	9
5056	R:RSUI, abnormal paramer or format	9
5057	UMA (User Memory Area) full	2, 8
5058	Timeout waiting for S: or R:CSS	9
5059	Timeout waiting for S: or R:RSSP	9
505A	Timeout waiting for S: or R:RSSN	9
505B	Timeout waiting for S: or R:CSCC	9
505C	Timeout waiting for S: or R:RSCCP	9
505D	Timeout waiting for S: or R:CSUI	9
505E	Timeout waiting for S: or R:RSUI	9
505F	Undefined command or response received, or layer transition error; connect error	9
5087	CVG4 internal processing error	8
508F	No reply from FCU within 4 s, or a frame was received after a transition error	2
50A0	Communication finished with R:CSA, or abnormal parameter or format in CSA	9
50A1	R:RSAP, abnormal parameter or format	9
50A2	R:CSE, abnormal parameter or format	9
50A3	R:RSEP, abnormal parameter or format	9
50A8	Timeout waiting for S: or R:CSA	9
50A9	Timeout waiting for S: or R:RSAP	9
50AA	Timeout waiting for S: or R:CSE	9
50AB	Timeout waiting for S: or R:RSEP	9
50AF	Undefined command or response received, or layer transitions error; disconnect error	9

6. Session Layer; Document Transfer Layer (Presentation Layer)

Error Code	Description	Action Code
6001	Command not sent due to lack of User Memory Area	2, 8
6002	T2 timeout (waiting for remote terminal response)	9
6003	T3 timeout (waiting for FCU action)	2
6004	Undefined command received, or LI error	9
6005	Undefined response received, or LI error	9
6006	RDGR received	10
6007	RDPBN received	10

7. Application Layer

Error Code	Description	Action Code
7001	FCU handshake timeout	2