G4 "D" KIT Type 90 SERVICE MANUAL

1 INSTALLATION

1.1 PARTS CHECKLIST

- 1. Installation Guide
- 2. PWA, CVG4 (P/N: 28424-001)
- 3. MBU System ROM IC 3 FAX5600L
- 4. MBU System ROM IC 4 FAX5600L
- 5. Grounding Plate FAX5600L (P/N: 28423-001)
- 6. PWA Mounting Bracket
- 7. Modified Rear Cover
- 8. Screws, M3 x 6 Philips with Flat Washer (3)
- 9. Screws, M3 x 8 Tapping with Flat Washer (3)
- 10. V.35 Data Cable (P/N: 28378-001)
- 11. RS366 Dial Cable (P/N: 28379-001)
- 12. Wire Routing Guide
- 13. Model Label, G4 Digital FAX5600L
- Optional: V.24 (V.28) Data Cable (P/N: 28382-001) Back to Back Cable (P/N: 28433-001)

1.2 INSTALLATION CHECKLIST

CAUTION: The installation of this product will erase all system and document memory. The machine will return to default settings when power is restored.

Before installing this product check the character display and make sure that 100% is displayed. Print all lists and messages, and note all settings to aid in reprogramming the machine.

Fur	nction
Print lists and messages:	FAX5600
Memory File Polling File Quick Dial Speed Dial Group Dial User Function File Program Print Auto Document	51 52 31, 43 32, 44 33, 45 35, 47 42 46 53
Confidential File Message* Memory Lock Message*	55 56
For Function 60 and higher enter password 2 2 2	2
Personal Code Authorized Reception Forwarding List* Specified Cassette** User Parameter List	71 72 75 76 91
For Service Level functions enter Function 6 0 1 9 9	1 Yes
System Parameter List (G3)	02
Note the settings: System Setup (TTI, RTI, CSI, etc.) Economy Transmission Number for Multi-Sort Reception* On/Off Switches	61 74 77 81

- * Machines with memory options
- ** Machines with extra paper feed unit

1.3 INSTALLATION PROCEDURE

This product is to be used with the Ricoh FAX5600L. Users of this instruction document should be either service trained or certified by successfully completing a Ricoh Technical Training Program in English.

Tools Required

• Metric Philips screw driver set • PROM puller

Use the antistatic wrist strap as an antistatic safety measure during the installation of this product.

NOTE: Before installing this option read the Operator Safety, Laser Safety, and other notes, warnings and cautions at the beginning of this machine's Service Manual.

Procedure

- 1. Turn off the fax machine power, and disconnect the machine.
- 2. Unfasten the rear cover, disconnect the speaker and remove the back cover. Figure 1 [A].
- 3. Raise the front cover and scanner cover [release buttons front and side].
- 4. Remove the left cover. Figure 1 [B].
- 5. Remove the MBU holder. Figure 2 [D]. The MBU holder will not be reused.

MBU System ROM Replacement

- 6. Move the MBU battery jumper, TB1, to OFF.
- 7. Remove MBU System ROMs from their sockets: FAX5600L IC 3 and IC 4
- 8. Replace with the G4 Digital Option ROMs: FAX5600L IC 3 and IC 4
- 9. Move the battery jumper back to ON.

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Grounding Plate and Bracket

- 10. Remove the NCU to attach the grounding plate. Figure 1 [C].
- 11. Attach the grounding plate using one tapping screw, and one threaded screw. Figure 3 [F, F₁, F₂].

NOTE: The threaded screw connects to ground.

12. Attach the mounting bracket using two tapping screws. Figure 3 $[G, G_1, G_2]$.

CVG4

- 13. Plug the CVG4 PWA connector, CN 1, into the FCU, and secure it to the mounting bracket using two threaded screws. Figure 3 $[H_1, H_2]$.
- 14. Replace the NCU and the left cover. Figure 1 [B, C].

Modified Rear Cover

- 15. From the original rear cover, remove the speaker and, if installed, the hard disk option cover and the memory card. Using the same fasteners attach them to the new G4 cover.
- 16. Attach the new G4 cover to the machine.

Communication Cables

- 17. Orient the wire routing guide so that the cables will feed *down* through the routing loop. Affix the guide above and to the right of the rear screw on the left panel. Figure 1 [J].
- 18. Connect the V.35 data cable and the V.24-200 auto-dial cable to the G4 networking equipment.
- 19. Feed the cables down through the routing loop. Twist the loop ends together to secure the cables.

NOTE: The test switches located beneath the auto-dial connector on the rear panel should all be OFF. These switches are used in back-to-back testing only.

Final Steps

- 20. Affix the new model label over the old model name on the operator panel.
- 21. Connect the G4 cables to the G4 networking equipment.
- 22. Use the FAX5600L Installation Checklist, *section 1.2 above*, to complete the initialization procedure on *page 3-13 in the Service Manual.*

NOTE: Do not attempt to restore power until all connections have been made.

Additional Equipment

Back-to-Back Cable Part Number 28433-001

A back-to-back cable capable of testing V.35 and V.24 signals is used for the following V.35/V.24 tests.

- 1. The input port data. See Internal Switch 0F (ISW0F).
- 2. Back-to-back CSDN layer 1 and PSDN layer 2 network simulations. *See section 4 below.*

X.21 is not supported in this product at this time, and the back-to-back cable is not available.

2 SERVICE TABLES AND PROCEDURES

2.1 SERVICE LEVEL FUNCTIONS

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	DN_IP : Not used in the United States. Do not modify.
04	ISDN_IP : Integrated Services Data 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	G4_SN2 : Not used in the United States. Do not modify.
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, and used when communicating through a terminal adapter to ISDN networks. 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 PROGRAMMING

1. To enter the G4 service mode, press

Function	6	0	1	9	9	1	Yes

The Service Function menu appears:

SERVICE FUNCTION	ON	NO.\$\$
O1BIT SW.	02PARA LIST	
03ERROR CODE	04SVC MONITOR	Ļ

2. Press 1 8

The G4 service function menu appears:

G4		NO.\$\$
01.G4_ISW	02.G4_PSW	
03.DN_IP	04.ISDN_IP	Ļ

● keys	To review the menu pages, press the scroll	
•	Use the ten key pad to enter numbers.	
•	To return to the Service Function menu, press Yes or N	10
•	To exit the service modes and return to standby, press Fu	nction

SYSTEM RESET NOTE: The machine must be reset after completing G4 service mode operations: Turn off the main power to the machine; wait a few seconds; then turn it back on.

2.2.1 ISW Internal Switch (Function 01)

1. Enter the G4 service mode.

0 1		
G4_ISW		
DF:	00010001	1
SW:00	00010001	ţ
	0 1 G4_ISW DF: SW:00	0 1 G4_ISW DF: 00010001 SW:00 00010001

Bits are numbered from 0 to 7. 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.	To display another switch, press	↓	or ↑
Exam	ple: To display bit switch 3, press	Ļ	3 times

G4_ISW		
DF:	0000000	Î
SW:03	0000000	Ļ

3. Press a bit 's number on the ten-key pad to toggle its setting between 0 and 1.

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

G4_ISW		
DF:	0000000	1
SW:03	00001000	↓

- 4. To continue adjusting bit switches, go to steps 2 and 3.
- To return to the G4 service function menu, press Yes
- To exit the service modes and return to standby, Function press

and perform system reset.

2.2.2 PSW Parameter Switch (Function 02)

1. Enter the G4 service mode.

Press	0 2		
	G4_PSW		
	DF:	01000000	1
	SW:00	01000000	Ļ

Bits are numbered from 0 to 7. 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. To display another switch, press \bigcup or \uparrow

Example: To	display bit switch 0E, press	s ↑	2 times

G4_PSW		
DF:	10110010	1
SW:0E	10110010	\downarrow
SW:UE	10110010	¥

3. Press a bit 's number on the ten-key pad to toggle its setting between 0 and 1.

Example: To change bit 0 from its current setting, press 0 once.

G4_PSW		
DF:	10110010	1
SW:0E	10110011	\downarrow

- 4. To continue adjusting bit switches, go to steps 2 and 3.
- To return to the G4 service function menu, press Yes
- To exit the service modes and return to standby, press Function and perform system reset.

2.2.3 ISDN International Prefix (Function 04)

1. Enter the G4 service mode.

Press	04		
	ISDN_IP	\$\$\$\$	
• To cha	nge an entry, press	Clear or No]
2. Enter t Example: Pre	he code provided by ess 1 2 3 4	the network.	
	G4 01.G4_ISW 03.DN_IP	02.G4_PSW 04.ISDN_IP	NO.\$\$ ↓

• To exit the service modes and return to standby, press Function and perform system reset.

2.2.4 Subscriber Number 1 (Function 05)

1. Enter the G4 service mode.

	Press	0 5			
		G4_SN1			
		\$\$\$\$\$\$\$\$\$\$	\$\$\$\$\$		
•	To cha	nge an entry, press	Clear or N	0	
2.	Enter t pause	he the subscriber nu (–).	umber (up to 20 c	digits), inclu	uding
Exam	ple: Pre	ess Pause 1 2	2 3 4 5	6 7 Y	′es
		G4 01.G4_ISW 03.DN_IP	02.G4_PSW 04.ISDN_IP	NO.\$\$ ↓	

• To exit the service modes and return to standby, press Function and perform system reset.

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2.2.5 DNIC Network Identification (Function 12)

1. Enter the G4 service mode.

Press	1 2		
	DNIC	\$\$\$\$	
• To cha	inge an entry, press	Clear or No]
2. Enter t Example: Pre	he code provided by ess 1 2 3 4	the network. Yes	
	G4 01 G4 ISW	02 G4 PSW	NO.\$\$
	03.DN_IP	04.ISDN_IP	Ļ

• To exit the service modes and return to standby, press Function and perform system reset.

2.2.6 TID Terminal Identification (Function 13)

1. Enter the G4 service mode.

Press	1 3
	G4_TID
	 \$\$\$\$
• To cha	inge an entry, press Clear or No
2. Enter t	he country code of the terminal. The US county code is 011
Example: Pre	ess 0 1 1 Yes
	G4_TID 011-= -\$\$\$\$\$\$\$\$\$
3. Enter t Example: Pre	he terminal's fax number. ess 4 0 8 4 7 1 9 8 1 1 Yes
	G4_TID 011-4084719811= =\$\$\$\$\$\$\$ ABC

- 4. Enter the terminal's identification provided by the customer.
- Use the Quick Dial (QD) keys to enter letters, spaces (QD key 30) and symbols (QD key 31).

Examp	le: Pre	ss L 8 0 +	DG	ì4	СС	; U			
		G4_TID	YES	OR	CLR	• NC	С		
		011-408471	.9811=I	.80+DG	4CCU				
		-L80+DG4CCU \$\$							
-									
5.	Press	Yes to program	the entr	y and I	return	to G4	i serv	ice m	lode.

2.2.7 Memory List Printing (Function 15)

This function disgorges the machine memory for engineering development purposes; it is impractical to use in the technical service environment. See Function 16 which prints a hex code listing of the protocol exchange for a more useful tool.

1. Enter the G4 service mode.

••		
	Press	1 5
		G4 MEMORY DUMP ADD.\$\$\$\$ 00H - ADD. FFH
•	Use the To eras	e Quick Dial keys to enter letters. se an entry, press No
2. Exam	Enter ti ple: Pre	he starting address of the range to be printed. ss 2 2 A A
		G4 MEMORY DUMP ADD.22AA00H — ADD. \$\$\$\$ FFH
3 Exam	Enter ti ple: Pre	he final address of the range to be printed. ss 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.



2.2.8 Protocol List Printing (Function 16)

1. Enter the G4 service mode.

Press	1 6
	G4_DMP2 0 protocol press "start"
Pross	Start to print

2. Press Start to print.



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

G4_DMP2	
	0 PROTOCOL PRESS "START"

- To return to the Service Function menu, press Yes or No
- To exit the service modes and return to standby, press Function

2.2.9 System Parameter List Printing (Function 17)

1. Enter the G4 service mode.

Press	1	7	
	G4	SYSTEM	PARAMETER LIST PRESS "START"

2. Press Start to print.

G4 SYSTEM PARAMETER LIST PRINTING

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

G4		NO.\$\$
01.G4_ISW	02.G4_PSW	
03.DN_IP	04.ISDN_IP	Ļ

- To return to the Service Function menu, press Yes or No
- To exit the service modes and return to standby, press Function

2.3 BIT SWITCHES

2.3.1 Internal Switches (ISW)

CAUTION

Do not adjust a bit switch that is described as "not used", as this may cause the machine to malfunction, or to operate in a manner that is not accepted by local regulations. Such bits are for use only in other areas, such as Japan.

NOTE: Internal bit switches are changed using procedures described in section 2.2.1.

Bit S	Bit Switch ISW00														
Bit							Fun	nction							Default
	Cou	intry	Co	de.	Set	5 bit	switches:								
	Bit	4	3	2	1	0	Country	Bit	4	3	2	1	0	Country	
0 1 2 3 4		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 1 1	0 0 1 1 1 0 0	0 0 1 1 0 0 1 1 0 0	0 1 0 1 0 1 0 1 0	France Germany UK Italy Austria Belgium Denmark Finland Ireland Norway		0 0 0 0 1 1	1 1 1 1 0 0	0 0 1 1 1 0 0	1 0 1 1 1	0 1 0 1 1 1 0	Sweden Switzerland Portugal Holland Spain Israel USA Asia Japan	1 0 0 1
5	Not	use	d. D	o n	ot ch	nang	e factory set	tting.							0
6	Not used. Do not change factory setting.					0									
7	Not	use	d. D	o n	ot ch	nang	e factory set	tting.							0

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

Bit \$	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.

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Bit S	Bit Switch ISW04 (Data Link Task – Layer 2)				
Bit	Function	Default			
0	T3 time.The time in seconds (s) available to receive an acknowledging frame sent in response to a command frame. When this time is exceeded, the link channel is considered to be non-operational and will be reset to continue normal link operations. 0: Ricoh mode T = 10 s. 1: CCITT T.90 (X.75) mode T = 30 s.	0			
1	Shift-up Mode. Modulo 8 to modulo 128 0: Immediate (negotiation available) 1: Indirect (call disconnect/reconnect)	0			
2	Fallback Mode. Modulo 128 to modulo 8 0: Immediate (negotiation available) 1: Indirect (call disconnect/reconnect)	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	PSDN Back-To-Back Testing (Set one machine to 1) Reset after testing. 0: DTE 1: DCE	0			

Bit Switch ISW04 Comments:

Bit 0: 0: T = 10 s. Sufficient time to ensure continuous link operations for most circumstances.

1: T = 30 s. This setting is used for satellite communication paths, high traffic congested networks, and when CCITT compliance is required for overseas acceptance tests.

- Bit 1: 0: Immediate. The DCE can respond to the modulo 8 SABM command frame with DM, and will not disconnect the call. In turn, the modulo 8 machine shifts up and sends the modulo 128 SABME link set up command frame.
 1: Indirect. When SABM is received from the modulo 8 machine, the DCE disconnects and does not send the DM frame. When the call is reconnected, the modulo 8 machine shifts up and sends SABME to establish the data link.
- Bit 2: 0: Immediate. The DCE can respond to the modulo 128 SABME command frame with DM; the call is not disconnected. The modulo 128 machine will fallback by sending SABM, the link setup command for modulo 8 machines.
 1: Indirect. When SABME is received from a modulo 128 machine, the DCE will disconnect the call. SABM is sent when the call is 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 \$	Bit Switch ISW05 (Network Task – Layer 3)				
Bit	Function	Default			
0	Calling-up Packet0: CR Packet (S:CR)Call Request1: 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: Fixed1: 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. NOTE: 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 \$	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 \$	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 (see 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: (see packet, PSW07-0, 1, 2, 3 and 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.

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

Bit S	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 S	it 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 Timing Signal Check in PSDN Back-to-Back Test 0: Disabled 1: Enabled	0			
	Call Detection Mode. Set 2 bits: Bit: 4 3 Mode				
3 4	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			
	CVG4 I/O Port Check Mode. Set 2 bits:				
	Bit: 6 5 Mode				
5 6	 0 Normal operation 1 0 Output "H" data on IO ouput port 0 1 Output "L" data on IO output port 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.

NOTE: When all testing is done, restore the dip switches to OFF, the bit switches for normal operation, and reset the machines: See System Reset Note, page 8.

Output "H" data on IO output port (all output pins high – ISW0F = 01000000):

Disconnect the machine from the DCE. Set *the CVG4 dip switches below the dial connector 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 12 seconds. The output pins of the machine will all read high on a multimeter.

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 *ISW0F-5 and 6* to 1 and 0 respectively.

Input Port Data on LCD (Machine Input Test Mode) – Test 1:

Connect two machines with the V.35/V.24(V.28) back-to-back cable. *CVG4 dip switches can be on or off.*

On the machine to be tested, set *ISW0F-5 and 6* 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 12 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) *

LCD Display

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 output codes are as follows:

	V.35	V.24(V.28)	V.24-200	X.2I*
HIGH	7F0F	7F0F	7F8F	7FFF
LOW	FFFF	FFFF	FFFF	FEFF

Input Port Data on LCD (Machine Input Test Mode) – Test 2:

Disconnect the machine from the DCE. Then set *ISW0F-5 and 6* to 1 (01100000). Hold down the Stop button for about 12 seconds. If the test is correct, the display in the bottom right corner of the LCD should be as follows:

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

NOTE: Internal switches ISW10 and ISW11 are not used in the United States. Do not change the factory settings.

Bit S	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).

Use G4 function 16 to print a G4 protocol dump list, and see section 2.3.2 for bitswitch PSW0E-1.

NOTE: Internal switches ISW13 through 19, and ISW1A through 1F are not used in the United States. Do not change the factory settings.

2.3.2 Parameter Switches (PSW)

CAUTION

Do not adjust a bit switch that is described as "not used", as this may cause the machine to malfunction, or to operate in a manner that is not accepted by local regulations. Such bits are for use only in other areas, such as Japan.

NOTE: Parameter bit switches are changed using procedures described in section 2.2.2.

Bit S	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			
	DCE I/F Data. Set 2 bits.				
	Bit: 6 5 I/F				
5 6	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.

NOTE: Parameter switches PSW01 and PSW02 are not used in the United States. Do not change the factory settings.

Bit S	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 S	Switch	n PS	SW04	4										
Bit							Fund	tion						Default
	Link	Link K Value. 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 ι	usec	l. Do	o not	cha	inge fact	ory setti	ng.						0
5	Not ι	Not used. Do not change factory setting.										0		
6	Not ι	usec	l. Do	o not	cha	inge fact	ory setti	ng.						0
7	Not ι	usec	d. Do	o not	cha	inge fact	ory setti	ng.						0

Bit Switch PSW04 Comments:

Bits: 0, 1, 2, and 3: These bits are set, along with the link modulus *PSW03-0* bit switch, 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 1 2 3		0 0 0 0 0	0 0 0 1 1	0 1 1 0	0 1 0 1 0	0 1 2 3 4 5		0 0 1 1	1 1 0 0	1 1 0 1	0 1 1 1 0	6 7 8 9 10		0 1 0 0
4	Not ι	usec	I. Do	o not	cha	nge facto	ory setti	ng.						0
5	Not used. Do not change factory setting.									0				
6	Not ι	Not used. Do not change factory setting.										0		
7	Not ι	usec	l. Do	o not	cha	nge facto	ory setti	ng.						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 S	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: PSDN or CSDN T.90 connection 1: CSDN
- Bit 4: This bit function is similar to the link modulus, *PSW03-0*; it determines the packet numbering method for PSDN connections. Normally, modulo 8 is used. Modulo 128 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					
	Packet Size. Set 4 bits.											
	Bit:	3	2	1	0	Value						
0 1 2 3		0 1 1 1	1 0 0 0	1 0 1 1	1 0 1 0 1	128 256 512 1024 2048	1 1 0 1					
4	Not ι	usec	l. Do	o not	cha	nge factory setting.	0					
5	Not ι	usec	l. Do	o not	cha	nge factory setting.	0					
6	Not used. Do not change factory setting.											
7	Not ι	usec	l. Do	o not	cha	nge 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 S	Switch	ו PS	SW0	8										
Bit							Fund	ction						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		0
1		0	0	1	1	3		1	0	1	1	11		1
2		0	1	0	0	4		1	1	0	0	12		0
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 ι	usec	l. Do	o not	cha	nge fact	tory sett	ing.						0
5	Not used. Do not change factory setting.										0			
6	Not ι	Not used. Do not change factory setting.											0	
7	Not ι	usec	d. Do	o not	cha	nge fact	tory sett	ing.						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*. 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*, the maximum value is 7.

Bit S	Switch	ו PS	SW0	9										
Bit							Func	tion						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		0
1		0	0	1	1	3		1	0	1	1	11		0
2		0	1	0	0	4		1	1	0	0	12		0
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 ι	usec	d. Do	o not	cha	inge fact	ory setti	ng.						0
5	Not used. Do not change factory setting.										0			
6	Not ι	Not used. Do not change factory setting.											0	
7	Not ι	usec	d. Do	o not	cha	inge fact	ory setti	ng.						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								Fur	nctic	n		Default
Bit E 0 1 2 3 4 5 6 7	_CN. Bit:	Se ⁷ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	t 8 b 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	its. 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 1 1 1 1 1 0 0 0 0 0 0 1 1 1 1 1 1 0	Fur 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 0 1 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	Value 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 • 253 254	3	Default 1 0 0 0 0 0 0

Bit Switch PSW0A Comments:

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

Bit Switch PSW0B											
Bit						Function	Default				
	Transport Block Size. Set 4 bits.										
	Bit:	3	2	1	0	Value					
0 1 2 3		0 1 1 1	1 0 0 0	1 0 1 1	1 0 1 0 1	128 256 512 1024 2048	1 1 0 1				
4	Not ι	usec	l. Do	o not	cha	nge factory setting.	0				
5	Not ι	usec	l. Do	o not	cha	nge factory setting.	0				
6	Not used. Do not change factory setting.										
7	Not ι	usec	l. Do	o not	cha	nge 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*. Set these bits according to the network specifications.

Bit Switch PSW0C								
Bit	Function	Default						
	Session Window Size. Set 2 bits:							
	Bit: 1 0 Value							
0 1	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								
	Back-to-Back Test Mode. Set 4 bits.									
	Bit: 2 1 0 Test									
0 1 2	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.									
6	Not used. Do not change factory setting.									
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	Bit Switch PSW0E											
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											
2	Not used. Do not change factory setting.											
3	Not used. Do not change factory setting.	0										
	Test Clock Rate. Set 4 bits. Bit: 7 6 5 4 Rate (kbps) Bit: 7 6 5 4 Rate (kbps)											
4 5 7	0 0 1 2.4 0 1 1 1 16.0 0 0 1 0 4.8 1 0 0 19.2 0 0 1 1 7.2 1 0 0 19.2 0 1 0 9.6 1 0 1 48.0 0 1 0 1 10 1 48.0 0 1 0 1 10 56.0 0 1 0 14.4 1 0 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 to1, Layer 2 command/response protocols will be included when the G4 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 G4 SERVICE RAM ADDRESSES

Additional service switch bits have been assigned for G4 network selection and G4 transfer result report DNIC number.

Access the RAM addresses with G3 Service Level Function 06 (Service Manual, sections 4.1 and 4.1.6.)

FAX5600L 08005A (Service Switch 1A): Bit 7: DNIC number for transfer result report

0: Enabled, 1: Disabled

08005B (Service Switch 1B):

Bit 5: Network selection for broadcasting numbering feature

0: DDX, 1: ISDN

Default Settings

FAX5600L

SW1A	0	0	0	0	0	0	0	0	Hex: 00
SW1B	0	0	0	0	0	0	1	0	Hex: 02

4 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 System Reset Notes, page 8.

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. incompatibillity 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.

- 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.

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
ISW04 (DCE)	1000000	00000000
PSW0D (Test Mode)		
CSDN Layer 1	0000001	00000001
CSDN Layer 2	0000010	00000010
PSDN Packet	00000100	00000100
PSW00 (Cable I/F)		
V.35	01000000	01000000
V.24	00100000	00100000
ISW04 (DCE PSDN phly)	10000000	0000000
ISW04 (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.

5 SESSION LAYER SIGNAL IDENTIFIERS

5.1 LAYER 1 — PHYSICAL LAYER

5.1.1 V.35 Cable (X.21bis)

DB36	Signal	V.35	DCE	
1	RTA	V	From	Rx Signal Element Timing
2	RTB	Х	From	Rx Signal Element Timing
3	ST2A	Y	From	Tx Signal Element Timing
4	ST2B	AA	From	Tx Signal Element Timing
5 ~ 18				Not Connected
19	FG	А		Frame Ground
20	SG	В		Signal Ground
21	RS	С	То	Request to Send (RTS)
22	CS	D	From	Clear to Send (CTS)
23	DR	Е	From	Data Set Ready (DSR)
24	CD	F	From	Data Carrier Detect
25	ER	Н	То	Data Terminal Ready (DTR)
26	CI	J	From	Call (Ring) Indication (RI)
27	TI	NN	From	DCE Self Test Indicator
28	SDA	Р	То	Send Data
29	SDB	S	То	Send Data
30	RDA	R	From	Receive Data
31	RDB	Т	From	Receive Data
32 ~ 36				Not Connected

5.1.2 V.24 Cable (X.21bis)

DB36	Signal	V.24	DCE	
1 ~ 6				Not Connected
7	SD	2	То	Send Data
8	RD	3	From	Receive Data
9	RT	17	From	Rx Signal Element Timing
10	ST2	15	From	Tx Signal Element Timing
11 ~ 18				Not Connected
19	FG	1		Frame Ground
20	SG	7		Signal Ground
21	RS	4	То	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	ER	20	То	Data Terminal Ready (DTR)
25	CI	22	From	Call (Ring) Indication (RI)
27	TI	25	From	DCE Self Test Indicator
28 ~ 36				Not Connected

5.1.3 V.24-200 Cable (CSDN, CSDN/ISDN)

DB20	Signal	V.24-200	DCE	
1	DS1	14	То	Digit Signal (2°)
2	DS2	15	То	Digit Signal (21)
3	DS4	16	То	Digit Signal (2 ²)
4	DS8	17	То	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	То	Digit Present
13	ACL	3	From	Abandoned Call
14	CRQ	4	То	Call Request
15	PND	5	From	Present Next Digit
16				Not Connected
17	SG	7		Signal Ground
18 ~ 20				Not Connected

5.1.4 V.24-200 Dialing Signals in Binary Code

Charactera		Ou	tput S	ignals	6
Characters	DS8	DS4	DS2	DS1	Hex
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	С
- (SEP)	1	1	0	1	D

EON: End of Number SEP: Separation (Pause)

5.1.5 Back-to-Back Cable

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

5.2 LAYER 2 — DATA LINK (X.25 LAPB/X.75)

Identifier	Command	Response	Hex
I	Information (numbered frame)		хх
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 Asynchronous Balanced Mode Extended (modulo 128)		x F
DISC	Disconnected		хF
DM		Disconnected Mode	x 3
UA		Unnumbered Acknowledgment	x 3
CMDR		Command Reject	x 7
FRMR		Frame Reject	x 7

5.3 LAYER 3 — NETWORK

From DTE	From DCE	Hex		
Call Setup	and Clearing			
CR: Call Request	Incoming Call	0B		
CA: Call Accepted	CN: Call Connected	0F		
CQ: Clear Request	CI: Clear Indication	13		
CF: DTE Clear Confirmation	CF: DCE Clear Confirmation	17		
Data and Interrupt				
DT: DTE Data	DT: DCE Data			
IT: DTE Interrupt	IT: DCE Interrupt	23		
IF: DTE Interrupt Confirmation	IF: DCE Interrupt Confirmation	27		
Flow Cont	rol 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		
REJ: Reject (modulo 8)		x9		
REJ: Reject (modulo 128)		09		
DTE Reset Confirmation	DCE Reset Confirmation	1B		
Re	estart			
Restart Request	Restart Indication	FB		
DTE Restart Confirmation	DCE Restart Confirmation	FF		
Diaç	inostic			
	DIAG: Diagnostic	F1		

5.4 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	80
TDT	Transport Data		F 0
TBR		Transport Block Reject	70

5.5 LAYER 5 — SESSION CONTROL (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		09
RSEP		Response Session End Positive	0 A
CSA	Command Session Abort		19
RSAP		Response Session Abort Positive	1 A
CSUI	Command Session User Information		01
RSUI		Response Session User Information	02
CSCC	Command Session Change Control		15
RSCCP		Response Session Change Control Positive	16

5.6 LAYER 6 — DOCUMENT PRESENTATION (T.73)

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		29
RDEP		Response Document End Positive	2 A
CDD	Command Document Discard		39
RDDP		Response Document Discard Positive	3 A
CDR	Command Document Resynchronize		19
RDRP		Response Document Resynchronize Positive	1 A
CDUI	Command Document User Information		01
RDGR		Response Document General Reject	0 0
CDPB	Command Document Page Boundary		3 1
RDPBP		Response Document Page Boundary Positive	32
RDPBN		Response Document Page Boundary Negative	3 0

6 TROUBLESHOOTING

6.1 CVG4 STATUS CODES

When the real time display bit switch, 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 the switch is off (0).

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

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

6.1.1 Layer 1 Status Codes — Physical

Code (H)	Status			
1 B	Ready			
0 2	DLO:OFF (waiting for DCE ready)			
03	PND:ON (waiting for permission to dial)			
04	PND:OFF (waiting for dial signal rx status)			
05	DSC:ON (waiting for permission to communicate)			
06	CTS:ON (connection complete, waiting for data)			
07	Data phase (layer 2 and higher)			
08	DSR:OFF (waiting for machine ready)			
09	Waiting for R:MGACR (sequence checking)			
0 A	DSR:ON			
0 B	CI:OFF (waiting for machine ready)			

1. CSDN V-Series, Auto Dialing

2. CSDN V-Series, Manual Dialing

Code (H)	Status		
1 C	Ready		
0 2	DSR:ON (waiting for permission to dial)		
03	CTS:ON (connection complete, waiting for data)		
04	Data phase (layer 2 and higher)		
05	DSR:OFF (waiting for machine ready)		
06	Waiting for R:MGACR (sequence checking)		
07	DSR:ON (waiting for call rx availability)		
08	CI:OFF (waiting for machine ready)		

3. PSDN V-Series

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

4. Back-to-Back Test, V-Series

Code (H)	Status		
0 1	Ready		
0 2	/aiting for CTS:ON		
03	Data phase		
04	Waiting for R:MGACR (sequence checking)		
05	Waiting for CTS:OFF		

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

Code (H)	Status
01	Ready

6. L2 Back-to-Back Test

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

6.1.2 Layer 2 Status Codes — Link

Code (H)	Status		
2 0	S:SABM or R:SABM		
2 1	S:SAUA or R:SAUA		
2 2	S:FRMR or R:FRMR		
28	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		

Code (H)	Status
3 0	S:CR
3 1	R:CC
38	R:CN
39	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
СВ	S:SF
C 4	S:RQ
C 5	R:RF
СС	R:RI
CD	S:RF
C 6	R:IT
C 7	R:IF
CE	R:DIAG

6.1.3 Layer 3 Status Codes — Network

6.1.4 Layer 4 Status Codes — Transport

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	

6.1.5 Layer 5 Status Codes — Session Control

Code (H)	Status		
50	S:CSS or R:CSS		
5 1	S:RSSP or R:RSSP		
52	S:RSSN or R:RSSN		
53	S:CSCC or R:CSCC		
54	S:RSCCP or R:RSCCP		
5 5	S:CSUI or R:CSUI		
56	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		

6.1.6 Layer 6 Status Codes — Document Presentation

Code (H)	Status		
60	S:CDCL or R:CDCL		
6 1	S:RDCLP or R:RDCLP		
6 2	S:CDS or R:CDS		
63	S:CDC or R:CDC		
64	S:CDPB or R:CDPB		
65	S:RDPBP or R:RDPBP		
70	S:CDUI or R:CDUI (Data phase)		
90	S:CDE or R:CDE		
91	S:RDEP or R:RDEP		
92	S:CDD or R:CDD		
93	S:RDDP or R:RDDP		
94	S:CDR or R:CDR		
95	S:RDRP or R:RDRP		
96	S:RDGR or R:RDGR		
97	S:RDPBN or R:RDPBN		

6.2 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.

6.2.1 G4 Error Codes

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

6.2.2 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 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 occurred, 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 Control Layer

Error Code	Description	Action Code
5050	R:CSS, abnormal parameter or format	9
5051	R:RSSP, abnormal parameter or format	9
5052	R:RSSN, abnormal parameter or format	9
5053	R:CSCC, abnormal parameter or format	9
5054	R:RSCCP, abnormal parameter or format	9
5055	R:CSUI, abnormal parameter or format	9
5056	R:RSUI, abnormal parameter 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. Document 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