ISDN Unit

(Machine Code: H143-20/21)

SERVICE MANUAL

June 4, 1999
Subject to change

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1. INSTALLATION

1.1 HARDWARE INSTALLATION

Install the hardware as described in Chapter 3 of the host fax machine's service manual. Then program the following items.

NOTE: 1) Hardware installation is not required for the I-Schmidt 3 (H548 model).
2) When installing the ISDN G4 unit to the Schmidt 3 (H547 model), make sure to set communication bit switch 16 bit 2 to “1.” Then turn the machine off and on to enable the ISDN unit.

1.2 PROGRAMMING ITEMS

1.2.1 USER LEVEL PROGRAMMING

The following items can be programmed with user function 61 and 64. Make sure that the items are programmed correctly.

Item	Function No.	Remarks
Own G3 number	User 61	Used for transfer operations in ISDN G3 communication.
Own G4 number	User 61	Used for transfer operations in ISDN G4 communication.
Polling ID	User 61	Used for secured polling, transfer operations, and closed network.
Confidential ID	User 61	Used for confidential reception.
Memory lock ID	User 61	Used for memory lock.
RTI	User 61	Used to identify the terminal in G3 NSF/NSS communications.
TTI	User 61	Printed on each transmitted page in G3 communications.
G4_TID (Terminal ID)	User 61	Used to identify the terminal in G4 communications.
CSI (Used for G3 communication only.)	User 61	Used to identify the terminal in G3 DIS/DCS communications over PSTN (cannot program in the I-Schmidt 3).
IG3_CSI (ISDN G3 CSI)	User 61	Used to identify the terminal in G3 communications over an ISDN.
PSTN access code	User 61	Used for G3 communication only (cannot program in the I-Schmidt 3).

G4 subscriber number - 1	User 64	Input a "-" (pause) after the area code. **When not using MSN* service:** Program the ISDN subscriber number here. If an another terminal is on the same bus from the DSU, identify the terminals using a sub-address. **When using MSN* service:** Program the dedicated ISDN number for the terminal as the 1st ISDN subscriber number. If the customer wishes the machine to answer the calls to a different number, program it as the 2nd subscriber number.
G4 subscriber number - 2	User 64	
G4 SPID number	User 64	**This item is displayed only in the USA models.** Program the G4 SPID Number given when connected under the US National ISDN.
G4 subaddress	User 64	Program a subaddress to identify the terminal, if two or more terminals answer the call to the subscriber number for G4 fax.
ISDN G3 subscriber number - 1	User 64	Input a "-" (pause) after the area code. **When not using MSN* service:** Program the ISDN subscriber number here. If an another terminal is on the same bus from the DSU, identify the terminals using a sub-address. **When using MSN* service:** Program the dedicated ISDN number for the terminal as the 1st ISDN subscriber number. If the customer wishes the machine to answer the calls to a different number, program it as the 2nd subscriber number.
ISDN G3 subscriber number - 2	User 64	
ISDN G3 SPID number	User 64	**This item is displayed only in the USA models.** Program the ISDN G3 SPID Number given when connected under the US National ISDN.
ISDN G3 subaddress	User 64	Program a subaddress to identify the terminal, if two or more terminals answer the call to the subscriber number for G3 fax.

* MSN: Multiple Subscriber Number. In this service, more than one number is allocated to one line (one line can have up to 8 units connected to it).

NOTE: 1) Subscriber numbers are indicated as "SN" on the display in Europe and Asia models, whereas they are indicated as "DN" (directory number) in the USA models.

2) SPID (Service Profile Indication Number: G4 and I-G3) menu items are displayed only in the USA models (default). However, they can be turned off with user parameter switch 06 bit 6. Subscriber number-2 program menus (G4 and I-G3) are displayed instead.

1.2.2 SERVICE LEVEL PROGRAMMING

Item	Function No.	Remarks
System Switches	01 - 0	**System Switch 0A** - Default communication mode (bit 1) - Network used for G3 transmission (bit 6) (not required for the I-Schmidt 3) - Network used for G4-to-G3 fallback (bit 7) (not required for the I-Schmidt 3)
Communication Switches	01 - 4	**Communication Switch 07** - G4 to G3 fallback On/Off (bit 0) - Fallback from G4 to G3 reflected in Quick/Speed dials (bit 3)
G4 Internal Switches	16 - 01	Change the country code and reset the machine first if necessary. Then change any of the locally required settings and/or the following. **Internal Switch 13** - Condition for fallback from G4 to G3 **Internal Switches 17, 18, 1A, 1B and 1C** - G4 to G3 automatic fallback parameters

NOTE: Settings become effective when you exit the service mode.

1.2.3 REMARKS AT INSTALLATION

Programming the Subscriber Numbers

When programming the subscriber numbers, input a "-" (pause) after the area code. When the machine receives a call, it compares the digits after the last "-" (pause) with the called number attached to the SETUP signal. The machine responds to the call only when the numbers match.
For example:
If the subscriber number is programmed as, 123-456789,
the machine responds to the call only if the last 6 digits of the called number are 456789.
If the subscriber number is programmed as, 123-456-789,
the machine responds to the call only if the last 3 digits of the called number are 789.

NOTE: Even if more than one "-" are programmed, the machine compares the digits after the last "-."

G4 to G3 Fallback

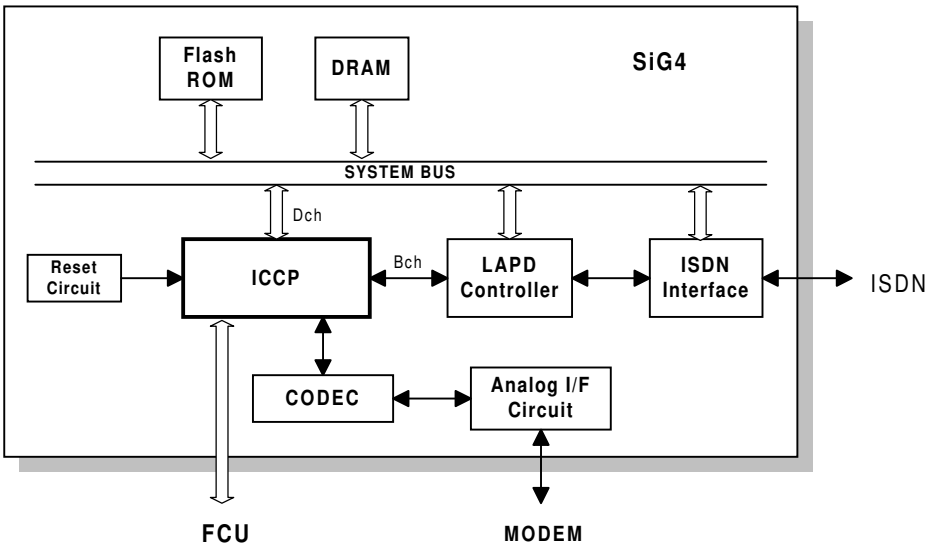
To ensure G4 to G3 fallback occurs for almost all cases, the following switches should be programmed at installation.

G4 internal switch 13 bit 7: Condition for fallback from G4 to G3
1: Fallback in response to any CPS code (G4 internal switches 17, 18, 1A, 1B, and 1C do not have to be programmed.)

Communication switch 07 bit 3: Fallback from G4 to G3 reflected in programmed Quick/Speed Dials
1: Always start to transmit with G4

2. OVERALL SYSTEM CONTROL

2.1 BLOCK DIAGRAM



H548D500.WMF

The SiG4 (Standard ISDN G4) board contains ICCP (ISDN Communication Control Processor), Flash ROM, DRAM, LAPD controller, CODEC, ISDN interface and analog interface. The ICCP controls the entire board.

ICCP

- 16 bit CPU which controls the entire board
- HDLC control
- Channel select for B channel interface control

CODEC

- A/D, D/A converter for ISDN G3 communication

LAPD Controller

- ISDN layer 1 and LAPD control

ROM

- 512 kB (4 Mbit) Flash ROM for system software storage

DRAM

- 2MB (16 Mbit) DRAM used

The Flash ROM program can be updated using a flash memory card and the flash memory copy tool.

3. SERVICE TABLES AND PROCEDURES

3.1 SERVICE LEVEL FUNCTIONS

To enter G4 service mode, press the following sequence of keys:
Function 6 1 9 9 8 then immediately Yes .

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

Press 1 6 then Yes.

```
0-G4_ISW   1-G4_PSW
2-G4_DMP1  3-G4_DMP2
```

NOTE: Settings become effective when you exit the service mode.

3.1.1 G4 INTERNAL SWITCH PROGRAMMING (FUNCTION 0)

1. After entering G4 service mode, press 0.

```
ISW DF      0001 0001
BITSW 00:   0001 0001
```

   Bit 7 is displayed at the left, and bit 0 at the right. The default settings are shown on the top line, and the current settings on the bottom.

2. Increment bit switch: ▶
   Decrement bit switch: ◀
   Example:
   Display bit switch 3: ▶ x 3

```
ISW DF      0000 0000
BITSW 03:   0000 0000
```

3. Adjust the bit switch.
   Example: To change the value of bit 7, press 7 .

```
ISW DF      0000 0000
BITSW 03:   1000 0000
```

4. Either:
   - Adjust more bit switches - go to step 2.
   - Finish - Yes

3.1.2 G4 PARAMETER SWITCH PROGRAMMING (FUNCTION 1)

1. After entering G4 service mode, press [1] .

```
PSW DF      0000 0000
BITSW 00:   0000 0000
```

   Bit 7 is displayed at the left, and bit 0 at the right. The default settings are shown on the top line, and the current settings on the bottom.

2. Increment bit switch: [▶]
   Decrement bit switch: [◀]
   Example:
   Display bit switch 3: [▶] x 3

```
PSW DF      0000 0000
BITSW 03:   0000 0000
```

3. Adjust the bit switch.
   Example: To change the value of bit 7, press [7] .

```
PSW DF      0000 0000
BITSW 03:   1000 0000
```

4. Either:
   - Adjust more bit switches - go to step 2.
   - Finish - [Yes]

3.1.3 PRINTING A G4 MEMORY DUMP (FUNCTION 2)

Use this function to print the D-ch. Layer 1 dump list.

1. After entering G4 service mode, press [2] .

```
G4_DMP1        START/N
ADD.000000 - 0000FF
```

2. Input the range of addresses that you wish to print.
   Example: Addresses 07EB00 to 07ECFF:
   Input [0] [7] [E] [B] [0] [7] [E] [C] [◇].

3.1.4 PRINTING A G4 PROTOCOL DUMP LIST (FUNCTION 3)

1. From the G4 service mode menu, press 3 .

```
G4_DMP2          Y/<>
CODE0     D+BCH1
```

2. Either:
   - Print a protocol dump list for the D channel and B channel 1:
   - Print a protocol dump list for the D channel and B channel 2:
     D+BCH1/D+BCH2:
     Up to 2 kbytes data is stored. When the data exceeds this limit, it is overwritten (The oldest data is overwritten first, also see G4 internal switch 03 bit 0.)
     D+BCH2 data is logged only when there is dual communication.
   - Print a protocol dump list for the D channel: x 2
     Up to 2 kbytes data is stored.
   - Print a protocol dump list for the B channel 1 link layer: x 3
   - Print a protocol dump list for the B channel 2 link layer: x 4
   - Print a protocol dump list for the D channel link layer: x 5
3. Reset parameter switch E bit 0 to 0 after you have finished.

3.1.5 MODEM/DTMF TONE TESTS (FUNCTION 4)

This is only for use during PTT approval tests.

3.1.6 G4 SOFTWARE DOWNLOAD

The G4 software program can be updated using a flash memory card and the flash memory copy tool. Refer to section 4.1.27 of the mainframe service manual.

3.1.7 BIT SWITCHES

⚠WARNING

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.

NOTE: Settings become effective when you exit the service mode.

3.1.8 G4 INTERNAL SWITCHES

Bit Switch 00		
	FUNCTION	**COMMENTS**
0 to 7	Country code Bit 4 3 2 1 0 Country 0 0 0 0 1 Germany (1TR6 mode) 0 0 0 1 0 Universal (Europe Euro ISDN) 1 0 0 0 1 USA **Note:** In Germany, use the Universal setting for the Euro ISDN lines.	

Bit switches 01 and 02 are not used. Do not change the settings.

Bit Switch 03		
	FUNCTION	**COMMENTS**
0	Amount of protocol dump data in one protocol dump list **0:** Last communication only **1:** Up to the limit of the memory area for protocol dumping	Change this bit to 0 if you want to have a protocol dump list of the last communication only. This bit is only effective for the dump list D + Bch1.
1-7	Not used	Do not change the settings.

Bit Switch 04		
	FUNCTION	**COMMENTS**
0-2	Not used	Do not change the settings.
3	Auto data rate change for transmission (64 kbps to 56 kbps) **0:** On **1:** Off	**0:** The machine automatically changes the transmission data rate from 64 kbps to 56 kbps after 3 s if the other end did not accept the call. This is to cope with 56 kbps networks in the USA. Normally, keep this bit at 0.
4	Auto data rate change for reception (64 kbps to 56 kbps) **0:** Off **1:** On	**1:** The machine automatically changes the reception data after 6 s. Change this bit to 1 only when there is a communication error where the other terminal informs 64 kbps in the SETUP signal although it is actually 56 kbps.
5-7	Not used	Do not change the settings.

Bit Switch 05		
	FUNCTION	**COMMENTS**
0-1	Not used	Do not change the settings.
2	Protocol ID check **0:** Yes **1:** No	The Protocol ID is in the CR packet.
3-7	Not used	Do not change the settings.

Bit switches 06 to 0F are not used. Do not change the settings.

Bit Switch 10 (Dch. Layer 1)		
	FUNCTION	**COMMENTS**
0-5	Not used	Do not change the settings.
6	INFO1 signal resend 0: Resend 1: No resend	0: Some DSUs may not reply to the INFO1 signal with INFO2, if there is noise in the INFO1 signal accidentally. Try changing this bit to 0, to resend INFO1 before the machine displays "CHECK INTERFACE".
7	Not used	Do not change the settings.

Bit Switch 11 (Dch. Layer 2)		
	FUNCTION	**COMMENTS**
0	Not used	Do not change the settings.
1	Type of TEI used **0:** Dynamic TEI **1:** Static TEI	This is normally fixed at 0. However, some networks may require this bit to be set at 1 (see below). In this case, you may have to change the values of bits 2 to 7.
2 to 7	Static TEI value	Store the lowest bit of the TEI at bit 7 and the highest bit of the TEI at bit 2. **Example:** If the static TEI is 011000, set bits 3 and 4 to 1 and bits 2, 5, 6, and 7 to 0.

Bit switch 12 is not used. Do not change the settings.

Bit Switch 13: D channel layer 3 (Attachment IE in S: SETUP)		
	FUNCTION	**COMMENTS**
0-1	Not used	Do not change the settings.
2	Attachment of calling ID **0:** No **1:** Yes	Normally, this bit should be at 0, because most networks add the calling ID to the SETUP signal to the receiver. However, some networks may require the machine to add this ID. Only in this case should this bit be at 1.
3	Attachment of the Lower Layer Capabilities **0:** No **1:** Yes	This bit determines whether Lower Layer Capabilities are informed in the [SETUP] signal. Keep this bit at 0 in most cases.
4	Attachment of the Higher Layer Capabilities **0:** Yes **1:** No	This bit determines whether Higher Layer Capabilities are informed in the [SETUP] signal or not. Keep this bit at 0 in most cases.
5	Attachment of the channel information element (CONN) **0:** No **1:** Yes	Keep this bit at 0 in most cases.
6	Attachment of the Higher Layer Capabilities for ISDN G3 transmission **0:** Same as the bit 4 setting **1:** Not attached	This bit determines whether Higher Layer Capabilities are informed in the [SETUP] signal for ISDN G3 transmission. This switch is effective in coping with communication problems with some types of T/A and PBX which do not respond to Higher Layer Capability “G3.” When this bit is set to 0, the setting depends on the setting of bit 4.
7	Condition for fallback from G4 to G3 **0:** Refer to the CPS code setting **1:** Fallback in response to any CPS code	**0:** Fallback occurs when a CPS code is the same as the CPS code settings specified by G4 internal switches 17, 18, 1A, 1B, and 1C. If you wish to enable fallback when any CPS code is detected, set this bit to “1.” This switch is effective in coping with fallback problems where the CPS code does not match those specified in the ITU-T recommendation Q.931.

Bit Switch 14: D channel layer 3 (Selection IE in S: SETUP)		
	FUNCTION	**COMMENTS**
0	ISDN G3 information transfer capability **0:** 3.1 kHz audio **1:** Speech	In tx mode, this determines the information transfer capability informed in the [SETUP] message. In rx mode, this determines the information transfer capability that the machine can use to receive a call. Set this bit to 1 if the ISDN does not support 3.1 kHz audio.
1-2	Not used	Do not change the settings.
3 **4**	Channel selection in [SETUP] in tx mode Bit 4 3 Setting 0 0 Any channel 0 1 B1 channel 1 0 B2 channel 1 1 Not used	**Any channel:** When this is informed to the exchanger, the exchanger will select either B1 or B2.
5	Called ID mapping **0:** Called party number **1:** Keypad facility	**0:** Called ID is mapped to the called party number. **1:** Called ID is mapped to the keypad facility. On the 5ESS network (USA), set it to 1.
6	Numbering plan for the called party number **0:** Unknown **1:** E.164	**E.164:** This may be used in Sweden if an AXE10 exchanger is fitted with old software, and in Australia. **Unknown:** This is the normal setting.
7	Subaddress coding type **0:** IA5 (NSAP) **1:** BCD (ISO8348)	This is normally kept at 0. However, some networks require this bit to be at 1.

Bit Switch 15: D channel layer 3 (Judgement R: MSG)		
	FUNCTION	**COMMENTS**
0	Action when receiving [SETUP] signal containing no called subaddress, if the subaddress was programmed in the dialed number **0:** A reply is sent **1:** No reply is sent	This bit depends on user requirements. If it is at 1, communication will be halted if the other terminal has not input the subaddress.
1-4	Not used	Do not change the settings
5	Global call reference **0:** Ignored **1:** Global call number is used	Global call reference means 'call reference value = 0'. This bit determines how to deal with such an incoming call if received from the network. Keep this bit at 1 in Germany 1TR6.
6-7	Not used	Do not change the settings.

Bit Switch 16: D channel layer 3 (Approval)		
	FUNCTION	**COMMENTS**
0 **1**	Answer delay time Bit 1 0 Setting 0 0 No delay 0 1 1.0 s delayed (1TR6) 1 0 0.5 s delayed 1 1 Not used	In Germany 1TR6, a time delay to answer a call is required. In other countries, use this switch as follows: If the machine is connected to the same bus from the DSU as a model K200 is connected, the machine receives most of the calls because the response time to a call is faster than the K200. If the customer wants the K200 to receive most of the calls, adjust the response time using these bits. If the customer does not want one machine to receive most of the calls, use subaddresses to identify each terminal.
2	Action when receiving [SETUP] signal containing user-specific callrd party subaddress **0:** Ignores the call **1:** Receives the call	Normally, the 3rd octet of called party subaddress information in the [SETUP] signal is set to NSAP. However, some networks may add “user-specific” subaddress to the [SETUP] signal, and the result of this is that the machine won't answer the call if a subaddress is specified. So, change this bit to 1 to let the machine receive the call if the machine is connected to such a network.
3-4	Not used	Do not change the settings.
5	Indicated bearer capabilities **0:** 56 kbps **1:** 64 kbps	**1:** 64 kbps calling is indicated in the Bearer Capabilities, but communication is at 56 k. Use this bit if the machine is connected to a network which does not accept a 56 kbps data transfer rate as a bearer capability.
6	Not used	Do not change the settings.
7	Transfer capabilities (SI) informed in 1TR6 ISDN G3 transmission **0:** G3 Fax **1:** Analog	This bit determines whether transfer capabilities informed in the Service Indicator for 1TR6 ISDN G3 transmission. This switch is effective in coping with communication problems with some types of T/A and PBXs.

Bit Switch 17: CPS Code Used for G4 to G3 Fallback - 1		
	FUNCTION	**COMMENTS**
0 to 6	Condition for fallback from G4 to G3 Bits 0 to 6 of bit switch 17 contain a CPS code, and bits 0 to 6 of bit switch 18 contain another CPS code. If a CPS code is received which is the same as either of these, communication will fall back from ISDN G4 mode to ISDN G3 mode. The CPS codes must be the same as those specified in table 4-13 of CCITT recommendation Q.931. Examples: Bit 6 5 4 3 2 1 0 1 0 0 0 0 0 1 CPS code 65 1 0 1 1 0 0 0 CPS code 88 For the codes in bits 0 to 6 of bit switches 17 and 18 to be recognized, bit 7 of bit switch 17 must be 1. Also, bit 0 of the Communication Switch 07 must be at 0, or Fallback from G4 to G3 will be disabled.	
7	This bit determines whether fallback from G4 to G3 occurs on receipt of one of the CPS codes programmed in bit switch 17 or 18, or on receipt of a certain standard code. **0:** Fallback occurs on receipt of any of the following CPS codes: Universal (Euro ISDN) - #3, #18, #57, #58, # 63, # 65, #79, #88, and #127 Germany 1TR6 mode - #3, #53, #58, and #90 Others - #3, #65, and #88 **1:** Fallback from G4 to G3 occurs on receipt any of above CPS codes or one of the CPS codes programmed in bit switch 17, 18, 1A, 1B, or 1C	

Bit Switch 18: CPS Code Used for G4 to G3 Fallback - 2		
	FUNCTION	**COMMENTS**
0 to 6	Condition for fallback from G4 to G3 See the explanation for bits 0 to 6 of bit switch 17	
7	This bit helps to choose the CPS code set for G4 to G3 fallback. **0:** Fallback occurs on receipt of the CPS code set which is specified by the country code setting. **1:** Fallback occurs on receipt of the Universal CPS code set (#3, #18, #57, #58, # 63, # 65, #79, #88, and #127) even if another country code is programmed. If bit switch 17 bit 7 is “1”, fallback occurs on receipt of the Universal CPS code set or one of the CPS codes programmed in bit switches 17, 18, 1A, 1B, or 1C.	

G4 to G3 fallback

Bit 0 of Communication Switch 07 must be at 0, or fallback from G4 to G3 will be disabled.

The CPS codes for which fallback occurs are decided as follows.

- G4 bit switch 17, bit 7 - If set to “0”, fallback occurs on receipt of a code from a set that depends on the country code. If set to ”1”, fallback occurs for the 5 CPS codes programmed in bits 0 to 6 of G4 bit switches 17, 18, 1A, 1B, and 1C, in addition to the country code set.
  Note that if G4 bit switch 18, bit 7 is set to “1”, the CPS code set that is used is always the Universal set, regardless of the country code setting.

Bit Switch 19		
	FUNCTION	**COMMENTS**
0	Permanence of the link **0:** Set/released each LAPD call **1:** Permanent	Keep this at 1 in the USA. In other areas, this bit is normally 0, depending on network requirements.
1	Channel used in ISDN L2 (64k) mode **0:** B1 **1:** B2	When making an IDSN L2 back-to-back test, you can select either the B1 or B2 channel with this bit switch.
2-7	Not used	Do not change the factory settings.

Bit Switch 1A: CPS Code Used for G4 to G3 Fallback - 3		
	FUNCTION	**COMMENTS**
0 to 6	Condition for fallback from G4 to G3 See the explanation for bits 0 to 6 of bit switch 17.	
7	Not used	Do not change the setting.

Bit Switch 1B: CPS Code Used for G4 to G3 Fallback - 4		
	FUNCTION	**COMMENTS**
0 to 6	Condition for fallback from G4 to G3 See the explanation for bits 0 to 6 of bit switch 17	
7	Not used.	Do not change the setting.

Bit Switch 1C: CPS Code Used for G4 to G3 Fallback - 5		
	FUNCTION	**COMMENTS**
0 to 6	Condition for fallback from G4 to G3 See the explanation for bits 0 to 6 of bit switch 17	
7	Not used.	Do not change the setting.

Bit switches 1D to 1F are not used. Do not change any of the settings.

3.1.9 G4 PARAMETER SWITCHES

Parameter Switch 00		
	FUNCTION	**COMMENTS**
0 **1** **2**	Network type Bit 2 1 0 Type x 0 0 Circuit switched ISDN Other settings: Not used	Do not change the default setting.
3-7	Not used	Do not change the default settings.

Parameter Switch 01		
	FUNCTION	**COMMENTS**
0	Voice coding **0:** μ law **1:** A law	**0:** This setting is used in USA. **1:** This setting is used in Europe and Asia.
1	Action when [SETUP] signal without HLC is received **0:** Respond to the call **1:** Not respond to the call	If there are several TEs on the same bus and the machine responds to calls for another TE, the call may be without HLC information. Identify the type of calling terminal and change this bit to 1 if the caller is not a fax machine.
2-6	Not used	Do not change the settings.
7	Signal attenuation for G3 fax signals received from ISDN line (-6dB) **0:** Off **1:** On	**0:** If an analog signal comes over digital line, the signal level after decoding by the TE is theoretically the same as the level at the entrance to the digital line. However, this sometimes causes the received signal level to be too high at the received end. In this case, set this bit to 1 to adjust the attenuation level.

Parameter Switch 02		
	FUNCTION	**COMMENTS**
0 **1**	Data rate (kbps) Bit 1 0 Setting 0 0 64 kbps 0 1 56 kbps	Other settings: Not used
2-7	Not used	Do not change the settings.

Parameter Switch 03 and 04 are not used. Do not change any of the settings.

Parameter Switch 05		
	FUNCTION	**COMMENTS**
0-3	Not used	Do not change the settings.
4	B-channel T3 timer **0:** 30s **1:** 57s	**1:** This switch is useful when used in combination with the Communication Bit SW 07 bit 4. This is to cope with communication problems where G4 communication fails on the ISDN B-channel.
5-7	Not used	Do not change the settings.

Parameter Switch 06		
	FUNCTION	**COMMENTS**
0	Layer 3 protocol **0:** ISO8208 **1:** T.70NULL	Set this bit to match the type of layer 3 signalling used by the ISDN. The dedicated parameters have the same setting for specific destinations.
1-7	Not used	Do not change the settings.

Parameter Switch 07		
	FUNCTION	**COMMENTS**
0 **1** **2** **3**	Packet size 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	This value is sent in the CR packet. This value must match the value stored in the other terminal, or communication will stop (CI will be returned). If the other end returns CI, check the value of the packet window size with the other party. Note that this value must be the same as the value programmed for the transport block size (G4 Parameter Switch 0B, bits 0 to 3). Normally, do not change the default setting.
4-7	Not used	Do not change the settings.

Parameter Switch 08		
	FUNCTION	**COMMENTS**
0 **1** **2** **3**	Packet window size Bit 3 2 1 0 Value 0 0 0 1 1 0 0 1 0 2 and so on until 1 1 1 1 15	This is the maximum number of unacknowledged packets that the machine can send out before having to pause and wait for an acknowledgement from the other end. Normally this should be kept at 7.
4-7	Not used	Do not change the settings.

Parameter Switch 09 and 0A are not used. Do not change any of the settings.

Parameter Switch 0B		
	FUNCTION	**COMMENTS**
0 **1** **2** **3**	Transport block size 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	This value must match the value set in the other terminal. Note that this value must be the same as the value programmed for the packet size (G4 Parameter Switch 7, bits 0 to 3). Also, the transport block size is limited by the amount of memory in the remote terminal.
4-7	Not used	Do not change the settings.

Parameter Switch 0C is not used. Do not change any of the settings.

Parameter Switch 0D		
	FUNCTION	**COMMENTS**
0 **1**	Back-to-back test mode Bit 1 0 Setting 0 0 Off 1 0 ISDN L2 test mode (TE mode) Other settings - Not used	When doing a back-to-back test or doing a demonstration without a line simulator, use these bits to set up one of the machines in TE mode, and the other in NT mode Please note that this machine can only be set to TE mode. After the test, return both bits to 0. See "Back-to-back Testing" in the Troubleshooting section for full details.
2-7	Not used	Do not change the settings.

Parameter Switch 0E and 0F are not used. Do not change any of the settings.

3.2 DEDICATED TRANSMISSION PARAMETERS*

The following G4 communication parameter bytes have been added for each Quick Dial and Speed Dial. For how to program Dedicated Transmission Parameters, refer to the Service Manual for the base machine.

Switches 01 to 04 are for use with Group 3 communication and are explained in the Service Manual for the base machine.
Switches 05 to 08 are not used. Do not change the settings.

Switch 09	
	FUNCTION
0 **1** **2** **3**	Layer 3 protocol Bit 3 2 1 0 Setting 0 0 0 0 IS.8208 0 0 0 1 T.70 NULL 1 1 1 1 As in Parameter Switch 6, bit 0 Other settings: Not used
4-7	Not used

Switch 10 (Optional ISDN G4 unit required)		
	FUNCTION	**COMMENTS**
0	Attachment of the Higher Layer Capabilities **0:** Yes **1:** No	This bit determines whether Higher Layer Capabilities are informed in the [SETUP] signal.
1	Not used	Do not change the settings.
2	ISDN G3 information transfer capability for transmission **0:** 3.1 kHz audio **1:** Speech	This determines the information transfer capability informed in the [SETUP] message. Set this bit to 1 if the ISDN does not support 3.1 kHz audio.
3-7	Not used	Do not change the settings.

4. TROUBLESHOOTING

4.1 ERROR CODES

The tables on the following pages show the error codes that will be printed on the Service Monitor Report. See the Service Manual for the base machine for instructions on how to print this report.

The meaning of the numbers in the Action column is as follows.

1. Check Layer 1 signaling with a protocol analyzer to determine the cause of the problem. This may require assistance from a G4 specialist.
2. Repeat the communication. If the problem does not repeat itself, the problem was a temporary one caused by the user connecting the machine to another interface. However, if the problem remains, there is a network problem.
3. There is a network problem.
4. There is a network problem. Do the following:
   - Check the error bit rate of the network. If it is high, contact the network and ask them to improve the line.
   - Check the network speed (is it 56 or 64 kbps), and make sure that the bit switch setting is correct. You may also use the dedicated transmission parameters if this problem only occurs when dialling certain numbers.
   - Check that the user dialled the correct number.
5. There is a network problem, or a problem in the machine at the other end.
6. There is a problem in the machine at the other end; ask a technician to check it.
7. The machine at the other end is not a Group 4 fax terminal.
8. The machine is not compatible with the machine at the other end. A compatibility test is needed.

Error codes related with the errors detected by the FCU are listed in the Service Manual of the main body.

4.1.1 D-CHANNEL LAYER MANAGEMENT

Code	Probable Cause	Action
7-00	Link reset	2
7-01	Link set-up failed because of time-out.	2
7-02	Link release failed because of time-out.	2
7-03	Link set-up parameter error	2

4.1.2 D-CHANNEL, LAYER 1

Code	Probable Cause	Action
7-10	T3 timeout (layer 1 activation error)	1
7-11	No connection on the S0 interface	1
7-12	Deactivated	1

4.1.3 D-CHANNEL LINK LAYER

Code	Probable Cause	Action
7-20	At the start of link set-up, the machine received an unsolicited S (F=1).	2
7-21	At the start of link set-up, the machine received an unsolicited DM (F=1).	2
7-22	At TEI release, the machine received an unsolicited UA (F=1).	2
7-23	At the start of link set-up, the machine received an unsolicited DM (F=0).	2
7-24	At TEI release, the machine received an unsolicited UA (F=0).	2
7-25	SABME received at the start of network link set-up	No error
7-26	N200 retransmission error for SABME	2
7-27	N200 retransmission error for DISC	2
7-28	N200 retransmission error for situation enquiry (RR)	2
7-29	N(R) sequence number error	3
7-30	N(S) sequence number error	3
7-31	FRMR received	3
7-32	Non-standard frame received	3
7-33	Abnormal frame length	3
7-34	N201 error; information field N in the I frame exceeded N201	3
7-35	T201 timeout; timeout while waiting for checking	3
7-36	T202 timeout; timeout while waiting for ID assignment	3

4.1.4 D-CHANNEL NETWORK LAYER

Code	Probable Cause	Action
7-40	Insufficient mandatory information elements	3
7-41	Abnormal LI for a mandatory information element	3
7-42	T301 timeout; timeout while waiting for R:CONN	3
7-43	T303 timeout; timeout while waiting for R:CALL-PROC etc.	3
7-44	T304 timeout; timeout while waiting for R:CALL-PROC etc.	3
7-45	T305 timeout; timeout while waiting for R:REL	3
7-46	T308 timeout; timeout while waiting for R:REL-COMP	3
7-47	T310 timeout; timeout while waiting for R:ALERT etc.	3
7-48	T313 timeout; timeout while waiting for R:CONN-ACK	3
7-49	Internal error	3
7-51	Release call reference during communication	3

4.1.5 B-CHANNEL LINK LAYER

Code	Probable Cause	Action
7-60	T3 timeout; timeout while waiting for flag	4
7-61	T3 timeout; timeout while waiting for SABM during an incoming call	4
7-62	T1 timeout x N2; timeout while waiting for UA after sending SABM	5
7-63	T1 timeout x N2; timeout while waiting for a response to a transmitted S frame (P=1)	5
7-64	T1 timeout x N2; timeout while waiting for SABM or DISC after sending FRMR	5
7-65	T1 timeout x N2; timeout while waiting for a response to DISC	5
7-66	RNR x N2 (other end busy, RCB counter error)	5
7-67	Invalid (Ad) frame received	5
7-68	Invalid short frame received	5
7-69	Link reset error	5
7-70	FRMR received	5
7-71	Non-standard (Cn) frame received	5
7-72	An S or U frame having an information field was received	5
7-73	A frame longer than the maximum N1 length was received	5
7-74	An S or I frame having an N(R) error was received	5
7-75	CRC error	3

4.1.6 B-CHANNEL NETWORK LAYER

Code	Probable Cause	Action
7-80	A packet having an abnormal GFI was received	6
7-81	A packet was received that had a logical channel number different from the logical channel being used for the communication	6
7-82	A packet containing a format error was received	6
7-83	A packet containing an LI error was received	7
7-84	A CN packet was received that had a PID different from 02	7
7-85	Unsupported packet type received	7
7-86	Abnormal or unsupported facility received	7
7-87	P(s) sequence number error	6
7-88	P(r) sequence number error	6
7-89	A reset using S:RQ or R:RI occurred	6
7-90	A restart using S:RQ or R:SI occurred	6
7-91	Call set-up error; in reply to S:CR, R:CI was received to indicate rejection of the call	7
7-92	T20 timeout; timeout while waiting for an SF packet	6
7-93	T21 timeout; timeout while waiting for a CC packet	6
7-94	T22 timeout; timeout while waiting for an RF packet	6
7-95	T23 timeout; timeout while waiting for a CF packet	6
7-96	T10 timeout; timeout while waiting for the first frame	6

4.1.7 TRANSPORT LAYER

Code	Probable Cause	Action
8-00	Invalid block received	8
8-01	TCC block received	8
8-02	TBR block received	8
8-05	TCR block; block format error	8
8-06	TCR block; block size parameter LI error	8
8-07	TCR block; extended addressing LI error	8
8-08	TCR block; block size length error	8
8-10	TCA block; block format error	8
8-11	TCA block; Tx origin reference data in TCR disagreed with the address reference data in TCA	8
8-12	TCA block; octet 7 did not equal 0	8
8-13	TCA block; extended addressing LI error	8
8-14	TCA block; block size exceeded that set by TCR	8
8-15	TCA block; block size parameter LI error	8
8-20	TDT block; block format error	8
8-21	TDT block; octet 3 did not equal either 00 or 80(H)	8
8-22	TDT block; the end indicator was “Continue” even though there was no field data	8

Code	Probable Cause	Action
8-23	TDT block; an end block with no field data was received after an end indicator of “End”	8
8-26	Timeout during state 0.2	8
8-27	Timeout during state 1.1	8
8-28	Timeout during state 0.3	8

4.1.8 SESSION LAYER

Code	Probable Cause	Action
8-30	Invalid frame received	8
8-31	RSSN received	8
8-32	CSA received	8
8-34	Calling terminal identification error in CSS	8
8-35	Date and time error in CSS	8
8-36	Window size error in CSS	8
8-37	Service identification error in CSS	8
8-38	Session user data error in CSS	8
8-39	CSS rejected (new session rejected)	8
8-40	Called terminal identification error in RSSP	8
8-41	Date and time error in RSSP	8
8-42	Date and time in RSSP was not the same as that in CSS	8
8-43	Window size error in RSSP	8
8-44	Service identification error in RSSP	8
8-45	Session user data error in RSSP	8
8-47	Message synchronization error inside the CCU	8
8-48	Document task busy	8
8-50	Ti timeout; non-communication surveillance timer (T.62)	8
8-51	T2 timeout; timeout while waiting for a response (T.62)	8
8-52	T3 timeout; CSA timer timeout (T.62)	8
8-53	G4 board load timer timeout; calling side waited too long for a new session	8
8-54	G4 board load timer timeout; calling side waited too long for transport probability	8
8-55	G4 board load timer timeout; called side waited too long for S:RSSP	8
8-56	G4 board load timer timeout; document transmission surveillance timer timeout	8
8-57	G4 board load timer timeout; timeout while waiting for a user abort request after a provider fail	8

4.1.9 DOCUMENT LAYER

Code	Probable Cause	Action
8-60	T.62 coding format error (LI error)	8
8-61	A mandatory PI was absent, or the LI for a mandatory PI was 0	8
8-62	Calling/called terminal identification LI was different from that specified by F.184 (LI = 24)	8
8-63	The LI for session user data exceeded the maximum value (512)	8
8-64	The LI for CDUI was not 0	8
8-65	Checkpoint and document reference numbers LI error, or they were not in T.61 (ASCII) coding	8
8-66	The checkpoint reference number differed from the expected value	8
8-70	RDGR received	8
8-71	A non-standard PDU was received while in calling mode	8
8-72	A non-standard PDU was received while in called mode	8
8-73	Abnormal PDU received while in calling state ds1	8
8-74	15 consecutive CDCL signals received	8
8-75	Session window size control error (size not equal to 0)	8
8-76	Internal error	8

4.1.10 PRESENTATION LAYER

Code	Probable Cause	Action
8-80	X.209 coding error in session user data (LI error)	8
8-81	PV error in session user data	8
8-82	PI error in session user data	8
8-83	The capabilities in the session user data of CDS/CDC were not the same as those in RDCLP	8
8-84	X.209 coding error in the DP (LI error)	8
8-85	X.209 coding error in the SLD (document descriptor/page descriptor) (LI error)	8
8-86	SLD object type absent	8
8-87	PI error in the SLD (document descriptor/page descriptor)	8
8-88	The capabilities in the SLD (document descriptor/page descriptor) are duplicated or are not the same as those in RDCLP	8
8-89	No document descriptor at the start of the document	8
8-90	No page descriptor at the start of the page	8
8-91	Page descriptor PV error	8
8-92	X.209 coding error in the TU (LI error)	8
8-93	The TU was absent	8
8-94	PV error in the TU	8
8-95	TI error	8
8-96	X.209 coding nest level >> 8, or an LI form error	8
8-97	CDPB/CDE received while TU/TI not yet completed, or an unexpected PDU was received while analyzing an SLD	8

4.2 LEDS

There are four LEDs on the G4 board. These LEDs describe the status of the machine.

LED 1	LED 2	LED 3	LED 4

	O=ON, --=OFF			
Initial Settings				
Initial check (if the Flash ROM is updated)	O	O	O	O
Handshake with the FCU reay	O	O	--	--
Standby Mode				
Ready to communicate	--	--	--	--
Communication				
Layer 1 activated	--	--	--	O
Link setup	--	--	O	O
B channel 1 connected	--	O	O	O
B channel 2 connected	O	--	O	O

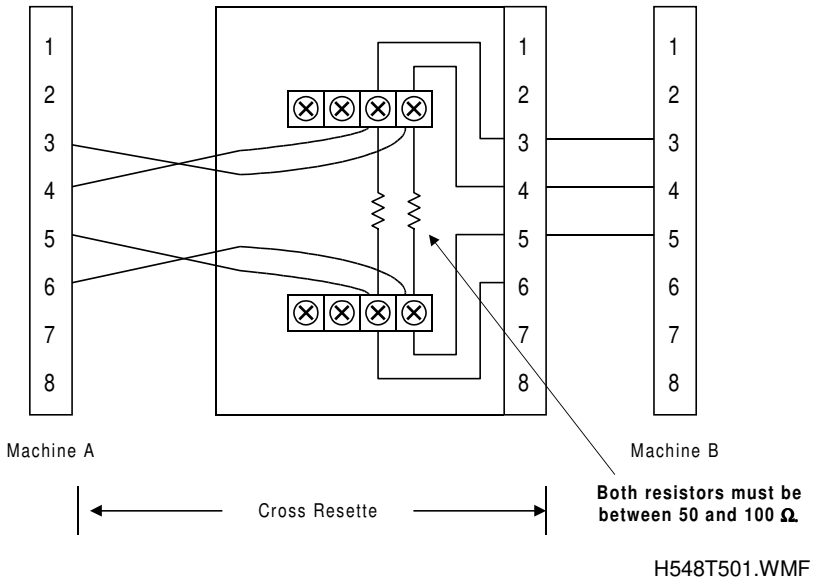
4.3 BACK-TO-BACK TEST

To make a back-to-back test, you need:

- Two machines, one with the CiG4 board (G4 board used in the FX4 and FR4) and the other with the SiG4 board (G4 board used with the Schmidt 3).
- Cross rosette

The procedure is as follows.

1. Switch off the machines
2. Connect two machines back-to-back using the cross rosette as follows.



H548T501.WMF

3. Make the following bit switch adjustments:
   - In the machine acting in NT mode (CiG4 board), set bits 0 and 1 of G4 parameter switch 0D to 1.
   - In the machine acting in TE mode (SiG4 board), set bit 0 of G4 parameter switch 0D to 0 and bit 1 to 1.
4. Reset the machines by switching them off, waiting a few seconds, then switching back on.
5. Place a document in one of the machines, dial a number, then press Start.
6. After you have finished the test, set bits 0 and 1 of G4 parameter switch 0D back to 0, then reset the machine.

NOTE: The following cannot be tested using this procedure:

- ISDN G3 communication
- P to M

APPENDIX

1.1 USEFUL SWITCHES

The following switches are useful for ISDN communication problems.
Please note that all switches except items 1, 2, and 8 are turned on as the default setting for the SiG4.

	Items	Purpose	SiG4	CiG4
1	**G4 internal switch 13 bit 7** Condition for fallback from G4 to G3 **1**: Fallback in response to any CPS code	Effective in coping with fallback problems where CPS codes do not match those specified in the ITU-T recommendation (Q.931).	✔	N/A
2	**Communication switch 07 bit 3** Fallback from G4 to G3 reflected in programmed Quick/Speed dials **1**: Always start Tx with G4	Effective when used with the above switch.	✔	N/A
3	**Communication switch 07 bit 4** Fallback from G4 to G3 when communication fails on the ISDN B-channel **1**: Fallback enabled	Effective with communication problems where the network connects G4 calls to the PSTN.	✔	✔
4	**G4 parameter switch 05 bit 4** B-channel T3 timer **1**: 57 s	Effective when used with the above switch.	✔	✔
5	**G4 internal switch 13 bit 6** Attachment of Higher Layer Capabilities for ISDN G3 transmission **1**: Do not attach	Effective with some types of T/As and PBXs which do not respond to HLC=G3.	✔	✔
6	**G4 internal switch 16 bit 7** Transfer capabilities informed (SI) in 1TR6 ISDN G3 transmission **1**: Analog (This switch is used only for the Germany 1TR6.)	Effective with some types of T/As and PBXs.	✔	✔
7	**User parameter switch 0D bit 6** Action when received Higher Layer Capabilities is Tel or Bearer Capabilities is Speech **1**: Respond to the call	Effective when the other terminal informs such transfer capabilities for ISDN G3 communication.	✔	✔
8	**Dedicated Tx Parameter 10 bit 2** ISDN G3 information transfer capabilities for transmission **1**: Speech	Effective with some types of T/As and PBXs.	✔	N/A

✔ : Available N/A: Not available

NOTE: 1) CiG4 board is an ISDN board for the previous models such as FX4 and FR4.
2) The ROM version of the CiG4 board must be later than “0B”, for above switches to be effective.