ISDN Option Type 140

SERVICE MANUAL

October 1st, 1995

Subject to change

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1. INSTALLATION

1.1. INSTALLATION PROCEDURE *

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

1.1.1. User Level Programming

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

Item	ISDN		PSTN	Remarks
	G4	G3	G3	
Own analog number			✔	Used for transfer operations in PSTN G3 communication
Own ISDN-G4 number	✔			Used for transfer operations in ISDN G4 communication.
Own ISDN-G3 number		✔		Used for transfer operations in ISDN G3 communicaiton.
Polling ID	✔	✔	4	Used for secured polling, transfer operations, and closed network.
Confidential ID	✔	4	4	Used for confidential reception. Optional SAF memory required.
Memory lock ID	✔	4	4	Used for memory lock. Optional SAF memory required.
Remote ID		4	4	Used for fax on demand operations or transfer request using DTMF tones. Optional SAF memory or Fax On Demand kit required.
RTI		✔	4	Used to identify the terminal in G3 NSF/NSS communications.
TTI		✔	4	Printed on each transmitted page in G3 communicaitons.
G4_TID (Terminal ID)	✔			Used to identify the terminal in G4 communications.
CSI			4	Used to identify the terminal in G3 DIS/DCS communications over PSTN.
IG3_CSI (ISDN G3 CSI)		✔		Used to identify the terminal in G3 communications over an ISDN.

1.1.2. Service Level Programming

Item	Function No.	Remarks
System Switches	01 - 0	**System Switch 0A** - Network used for G3 transmission - Network used for G4-to-G3 fallback
Communication Switches	01 - 4	**Communication Switch 07** - G4-to-G3 fallback On/Off
G4 internal switches	17 - 01	Change the country code, and reset the machine first. Then change any of the locally required settings and/or the following. **Internal Switches 17, 18, 1A, 1B and 1C** - G4 to G3 automatic fallback parameters **Parameter Switch 01, bits 4 to 6** - Codec attenuation level
G4 parameter switches	17 - 02	
ISDN international prefix	17 - 03	Program the international access code.
G4 subscriber number - 1	17 - 04	**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	17 - 05	
ISDN G3 subscriber number - 1	17 - 06	**When not using MSN* service:** Program the ISDN subscriber number here. If an another termial 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	17 - 07	
G4 subaddress	17 - 08	Program a subaddress to identify the terminal, if two or more terminals answer the call to the subscriber number for G4 fax.
ISDN G3 subaddress	17 - 09	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; This is also referred to as “Direct Dialing In” in some countries

After changing any setting, make sure to turn off the machine, wait for 5 or more seconds, then turn it back on, so that the new settings take effect.

1.2. SWITCH SETTINGS

The following tables show the default settings of the Internal Switches and the Parameter Switches for each country setting.

1.2.1. Internal Switches

Switch No.	USA	Europe	Asia	Germany (1TR6)	France (CNET)
00 Country code	**11(H)**	**European country code setting**	**Asian country code setting**	**01(H)**	**00(H)**
01	00(H)	00(H)	00(H)	00(H)	00(H)
02	00(H)	00(H)	00(H)	00(H)	00(H)
03	00(H)	00(H)	00(H)	00(H)	00(H)
04	00(H)	00(H)	00(H)	**20(H)**	00(H)
05	00(H)	00(H)	00(H)	00(H)	00(H)
06	00(H)	00(H)	00(H)	00(H)	00(H)
07	00(H)	00(H)	00(H)	00(H)	00(H)
08	00(H)	00(H)	00(H)	00(H)	00(H)
09	00(H)	00(H)	00(H)	**02(H)**	00(H)
0A	00(H)	00(H)	00(H)	00(H)	00(H)
0B	00(H)	00(H)	00(H)	00(H)	00(H)
0C	00(H)	00(H)	00(H)	00(H)	00(H)
0D	00(H)	00(H)	00(H)	00(H)	00(H)
0E	00(H)	00(H)	00(H)	00(H)	00(H)
0F	00(H)	00(H)	00(H)	00(H)	00(H)
10	10(H)	10(H)	10(H)	10(H)	**??(H)**
11	00(H)	00(H)	00(H)	**01(H)**	00(H)
12	00(H)	00(H)	00(H)	00(H)	**??(H)**
13	00(H)	00(H)	00(H)	00(H)	00(H)
14	**01(H)**	00(H)	00(H)	00(H)	00(H)
15	00(H)	00(H)	00(H)	00(H)	00(H)
16	00(H)	00(H)	00(H)	**01(H)**	**02(H)**
17	00(H)	00(H)	00(H)	00(H)	00(H)
18	00(H)	00(H)	00(H)	00(H)	00(H)
19	**01(H)**	00(H)	00(H)	00(H)	00(H)
1A	00(H)	00(H)	00(H)	00(H)	00(H)
1B	00(H)	00(H)	00(H)	00(H)	00(H)
1C	00(H)	00(H)	00(H)	00(H)	00(H)
1D	00(H)	00(H)	00(H)	00(H)	00(H)
1E	00(H)	00(H)	00(H)	00(H)	00(H)
1F	00(H)	00(H)	00(H)	00(H)	00(H)

1.2.2. Parameter Switches

Switch No.	USA	Europe	Asia	Germany (1TR6)	France (CNET)
00	00(H)	00(H)	00(H)	00(H)	00(H)
01	30(H)	21(H)	21(H)	30(H)	30(H)
02	01(H)	00(H)	00(H)	00(H)	00(H)
03	00(H)	00(H)	00(H)	00(H)	00(H)
04	07(H)	07(H)	07(H)	07(H)	07(H)
05	02(H)	02(H)	02(H)	06(H)	02(H)
06	00(H)	00(H)	00(H)	01(H)	00(H)
07	0B(H)	0B(H)	0B(H)	0B(H)	0B(H)
08	07(H)	07(H)	07(H)	07(H)	07(H)
09	00(H)	00(H)	00(H)	00(H)	00(H)
0A	01(H)	01(H)	01(H)	01(H)	01(H)
0B	0B(H)	0B(H)	0B(H)	07(H)	0B(H)
0C	01(H)	01(H)	01(H)	01(H)	01(H)
0D	00(H)	00(H)	00(H)	00(H)	00(H)
0E	B2(H)	B2(H)	B2(H)	B2(H)	B2(H)
0F	00(H)	00(H)	00(H)	00(H)	00(H)

2. SERVICE TABLES AND PROCEDURES

2.1. SERVICE LEVEL FUNCTIONS

To enter G4 service mode, press the following sequence of keys:
Function 6 0 1 9 9 5 then immediately Yes .

```
SERVICE SET      NO: _ OR NO
01BIT SW.         02PARA.LIST
03ERROR CODE      04SVC MONITOR ↓
```

Then press 1 7 .

```
G4               NO: _ OR NO
01G4_ISW          02G4_PSW
03ISDN_IP         04G4_SN1      ↓
```

After completing a G4 service mode operation, you must reset the machine by switching it off, waiting for more a few minutes, then switching back on. There is no need to do this for any of the G3 service modes.

2.1.1. G4 Internal Switch Programming (Function 01)

1. After entering G4 service mode, press 0 1 .

```
G4_ISW
 DEFAULT : 00000000          ↑
 SWITCH00: 00000000          ↓
```

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

```
G4_ISW
 DEFAULT : 00000000          ↑
 SWITCH03: 00000000          ↓
```

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

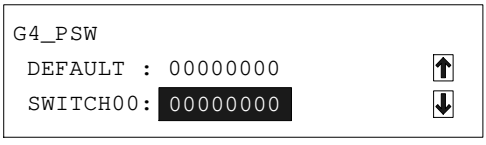
```
G4_ISW
 DEFAULT : 00000000          ↑
 SWITCH03: 10000000          ↓
```

4. Either:

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

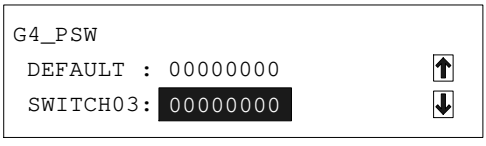
2.1.2. G4 Parameter Switch Programming (Function 02)

1. After entering G4 service mode, press [0] [2] .

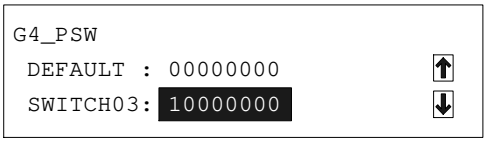


   Bit 7 is displayed at the left, and bit 0 at the right. The default settings are shown on the top line, and the current settings on the bottom.

2. Increment bit switch: ↓
   Decrement bit switch: ↑
   Example:
   Display bit switch 3: ↓ x 3



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



4. Either:

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

2.1.3. Storing the ISDN International Access Code (Function 03)

1. After entering G4 service mode, press [0] [3] .

2. Input the ISDN International Prefix (ISDN-IP).
   Example: [1] [2] [3] [4] [Yes]

2.1.4. Storing the First G4 Subscriber Number (Function 04)

Program the Second Subscriber Number when you have two units connected to the same line. Program the number of the other unit as the Second Subscriber Number. When a call comes in, if the other unit is busy, your machine will answer the call. Also, note the following:

- When calling, the first subscriber number will be added to the Setup signal as the Calling ID.
- When receiving, the Called ID will be compared with the first and second subscriber numbers.

1. After entering G4 service mode, press [0] [4] .

2. Input the number in the following format.
   Area Code Pause (-) Local Subscriber Number
   Then press [Yes] .

2.1.5. Storing the Second G4 Subscriber Number (Function 05)

1. After entering G4 service mode, press [0] [5] .

2. Input the number as explained in the previous section.
   Then press [Yes] .

2.1.6. Storing the First ISDN G3 Subscriber Number (Function 06)

The function of this is similar to the G4 Subscriber Number, except that it operates for G3 communications on the IDSN.

1. After entering G4 service mode, press [0] [6] .

2. Input the number in the following format.
   Area Code Pause (-) Local Subscriber Number
   Then press [Yes] .

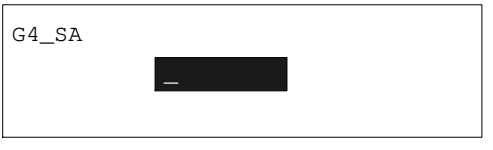
2.1.7. Storing the Second ISDN G3 Subscriber Number (Function 07)

1. After entering G4 service mode, press [0] [7] .

2. Input the number as explained in the previous section. Then press [Yes] .

2.1.8. Storing the G4 Subaddress (Function 08)

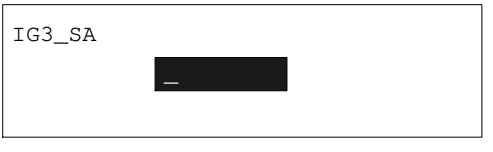
1. After entering G4 service mode, press [0] [8] .



2. Input the subaddress. Then press [Yes] .

2.1.9. Storing the ISDN G3 Subaddress (Function 09)

1. After entering G4 service mode, press [0] [9] .

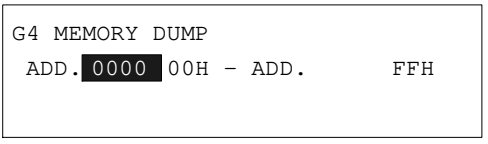


2. Input the subaddress. Then press [Yes] .

2.1.10. Printing a G4 Memory Dump (Function 10)

Use this function to print the D-ch. Layer 1 dump list. Refer to the Appendix A for more details.

1. After entering G4 service mode, press [1] [0] .



2. Input the range of addresses that you wish to print.
   Example: Addresses 03B000 to 03B1FF:
   Input [0] [3] [B] [0] [0] [3] [B] [1] [◇] .

2.1.11. Printing a G4 Protocol Dump List (Function 11)

1. After entering G4 service mode, set parameter switch E bit 1 to 1 (use G4 function 02). Then make a test communication.

2. From the G4 service mode menu, press [1] [1] .

3. Either:
   - Print a protocol dump list for the B and D channels: [0] [◇]
   - Print a protocol dump list for the D channel: [1] [◇]
   - Print a protocol dump list for the B channel link layer: [2] [◇]
   - Print a protocol dump list for the D channel link layer: [3] [◇]

4. Reset parameter switch E bit 0 to 0 after you have finished.

2.1.12. Printing the G4 System Parameter List (Function 12)

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

```
G4 SYSTEM PARAMETER LIST
        PRESS START
```

2.

2.1.13. Modem/DTMF Tone Tests (Function 13)

This is only for use during PTT approval tests.

2.2. 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. Such bits are for use only in other areas, such as Japan.

Note: After changing any of the switches below, turn off the machine, wait for 5 seconds or more, and turn it back on, so that the new settings take effect.

2.2.1. G4 Internal Switches

Bit Switch 00

	FUNCTION	COMMENTS
0 to 7	Country code Bit 4 3 2 1 0 Country 0 0 0 0 0 France 0 0 0 0 1 Germany (1TR6 mode) 0 0 0 1 0 UK 0 0 0 1 1 Italy 0 0 1 0 0 Austria 0 0 1 0 1 Belgium 0 0 1 1 0 Denmark 0 0 1 1 1 Finland 0 1 0 0 0 Ireland 0 1 0 0 1 Norway 0 1 0 1 0 Sweden 0 1 0 1 1 Switzerland 0 1 1 0 0 Portugal 0 1 1 0 1 Netherlands 0 1 1 1 0 Spain 0 1 1 1 1 Israel 1 0 0 0 1 USA 1 0 0 1 0 Asia 1 0 0 1 1 Japan 1 0 1 0 0 Hong Kong 1 0 1 0 1 South Africa 1 0 1 1 0 Australia 1 0 1 1 1 New Zealand 1 1 0 0 0 Singapore 1 1 0 0 1 Malaysia **Note:** In Germany, use the UK setting for the EuroISDN lines.	

Bit switches 01 and 02 are not used.

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 #2 (D + Bch1).
1 to 7	Not used	Do not change the factory settings.

Bit Switch 04		
	FUNCTION	**COMMENTS**
0 to 4	Not used	Do not change the factory settings.
5	RCBCTR **0:** Not valid **1:** Valid	This bit is used in Germany; set it to 1 for German PTT approval tests. **1:** RCBCTR counts consecutive R:RNR signals. If the counter reaches the value of N2, the link is disconnected.
6	Not used	Do not change the factory settings.
7		

Bit Switch 05		
	FUNCTION	**COMMENTS**
0	Not used	Do not change the factory setting.
1	Logical channel number (LCN) **0:** Not controlled **1:** Fixed at 01	This bit is normally 0. However, some networks may require a fixed LCN. In such cases, this bit should be 1, and you may have to set a different value for the LCN using G4 Parameter Switch A.
2	Protocol ID check **0:** Yes **1:** No	The Protocol ID is in the CR packet.
3 to 7	Not used	Do not change the factory settings.

Bit Switch 06		
	FUNCTION	**COMMENTS**
0	Inclusion of the DTE address in the S:CR packet **0:** No **1:** Yes	When the CR packet format matches ISO8208 protocol, some networks may require this bit to be set at 1. This bit is only effective if bit 0 of G4 Parameter switch 6 is at 0.
1	Calling and called DTE addresses **0:** Not used **1:** Used	This is only for packet networks. The CR packet should contain the rx side's DTE address, but does not have to include the tx side's; it can include it as an option.
2 to 7	Not used	Do not change the factory setting.

Bit switch 07 and 08 are not used.

Bit Switch 09		
	FUNCTION	**COMMENTS**
0	Not used	Do not change the factory setting.
1	New session within the same call **0:** Not accepted **1:** Accepted	**0:** If a new R:CSS is received, the machine sends back S:RSSN. **1:** If a new R:CSS is received, the machine sends back S:RSSP. Set this bit to 1 for German PTT approval tests.
2 to 7	Not used	Do not change the factory settings.

Bit switches 0A to 0F are not used.

Bit Switch 10 (Dch. Layer 1)		
	FUNCTION	**COMMENTS**
0	Connection detector **0:** Disabled **1:** Enabled	In most countries (including Europe), this should be disabled.
1 **2**	Layer 1 T3 timer **Bit 2 1 Time** 0 0 5 s 0 1 29 s 1 0 10 s 1 1 Not used	This should be kept at 5 s (both bits at 0) for normal operation. However, you may have to change this during PTT approval tests.
3	Layer 1 T4 timer **0:** Not used **1:** Used	Set this bit to 1 for French PTT approval tests.
4 **5**	Not used	Do not change the factory 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".

Bit Switch 10 (Dch. Layer 1)		
	FUNCTION	**COMMENTS**
7	Loop back 4 mode **0:** Disabled **1:** Enabled	This is normally kept at 0. However, set it to 1 for British PTT approval tests.

Bit Switch 11 (Dch. Layer 2)		
	FUNCTION	**COMMENTS**
0	Not used	Do not change the factory setting.
1	Type of TEI used **0:** Dynamic TEI **1:** Static TEI	This is normally fixed at 0. However, some networks such as the Northern Telecom ISDN 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	This is used in the USA with the DMS100 (Northern Telecom ISDN) exchanger. 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 any of the factory settings.

Bit Switch 13: D channel layer 3 (Attachment IE in S: SETUP)		
	FUNCTION	**COMMENTS**
0	Not used	Do not change the factory settings.
1		
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 or not. 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 to 7	Not used	Do not change the factory settings.

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. Refer to Appendix C for more details. Set this bit to 1 if the ISDN does not support 3.1 kHz audio. This bit is only used in the USA and the UK.
1	Not used	Do not change the factory settings.
2		
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. Refer to Appendix C for more details.
1 to 4	Not used	Do not change the factory 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 France and Germany (1TR6), also in countries where the global call reference is used.

Bit Switch 15: D channel layer 3 (Judgement R: MSG)		
	FUNCTION	**COMMENTS**
6	Not used	Do not change the factory settings.
7		

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 (CNET) 1 1 Not used	In Germany (1TR6) and France (CNET), 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 (UK), 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 factory 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 **7**	Not used	Do not change the factory settings.

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: UK (EuroISDN mode) - #3, #18, #57, #58, # 63, # 65, #79, #88, and #127 Germany (1TR6 mode) - #3, #31, #53, #58, #62, #89, and #90 France - #3, #65, #88, and #113 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 UK CPS code set (#3, #18, #57, #58, # 63, # 65, #79, #88, and #127) even if another counry code is programmed.	

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 to 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 factory settings.

2.2.2. 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 to 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 Japan, Taiwan, and the 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 **3**	Not used	Do not change the default settings.
4 5 6	Signal attenuation level for G3 fax signals received from ISDN line. If an analog signal comes over an digital line, the signal level after decoding by the TE is theorically 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, adjust the decoded signal's attenuation level using these switches. The values in the "Codec" column below show the attenuation level at the G4 interface board. The values in the "Modem" column show the actual attenuation level at the modem, because the signal is attenuated again on the MFCE by -6dB. Bit 6 5 4 Codec Modem (Actual attenuation level) 0 0 0 -4.5dB -10.5dB 0 0 1 -2.5dB -8.5dB 0 1 0 -0.5dB -6.5dB 0 1 1 +1.5dB -4.5dB (default setting) 1 0 0 +3.5dB -2.5dB 1 0 1 +5.5dB -0.5dB 1 1 0 +7.5dB +1.5dB 1 1 1 +9.5dB +3.5dB	
7	Not used	Do not change the default settings.

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 **3**	Not used	Do not change the default settings.
4 **5**	Transmission mode Bit 5 4 Mode 0 0 CS	Other settings: Not used
6 **7**	Not used	Do not change the default settings.

Parameter Switch 03		
	FUNCTION	**COMMENTS**
0	Link modulus **0:** 8 **1:** 128	This setting determines whether protocol frame numbering is done using 3 bits (0 to 7 then start again at 0) or 7 bits (0 to 127 then start again at 0). Set this bit switch to match the network's specifications.
1 to 7	Not used	Do not change the default settings.

Parameter Switch 04 is not used. Do not change any of the default settings.

Parameter Switch 05		
	FUNCTION	**COMMENTS**
0 **1** **2** **3**	Link timer (D-channel layer 2 T1 timer) Bit 3 2 1 0 Value 0 0 0 0 0 s 0 0 0 1 1 s 0 0 1 0 2 s and so on until 1 0 1 0 10 s	The link timer is the maximum allowable time between sending a protocol frame and receiving a response frame from the remote terminal.
4 to 7	Not used	Do not change the default 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 **2** **3**	Not used	Do not change the default settings.
4	Packet modulus **0:** 8 **1:** 128	Do not change the default setting, unless the machine is experiencing compatibility problems.
5 **6** **7**	Not used	Do not change the default 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 B, bits 0 to 3). Normally, do not change the default setting.
4 to 7	Not used	Do not change the default 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. This should be kept at 7 normally. If the packet modulus (G4 Parameter Switch 6, bit 4) is 8, the packet window size cannot be more than 7. However, if the packet modulus is 128, the window size can be up to 15. Also, if the layer 3 protocol setting (G4 Parameter Switch 6, bit 0) is at IS8208, the packet window size cannot be more than 7.
4 to 7	Not used	Do not change the default settings.

Parameter Switch 09		
	FUNCTION	**COMMENTS**
0 **1** **2** **3**	LCGN Bit 3 2 1 0 Value 0 0 0 0 0 0 0 0 1 1 0 0 1 0 2 and so on until 1 1 1 1 15	Keep the value of the LCGN at 0.
4 to 7	Not used	Do not change the default settings.

Parameter Switch 0A		
	FUNCTION	**COMMENTS**
0 **1** **2** **3** **4** **5** **6** **7**	LCN Bit 7 6 5 4 3 2 1 0 Value 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 1 0 2 0 0 0 0 0 0 1 1 3 and so on until 1 1 1 1 1 1 1 1 255	Keep at the value of the LCN at 1.

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 to 7	Not used	Do not change the default settings.

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

Parameter Switch 0D		
	FUNCTION	**COMMENTS**
0 **1**	Back-to-back test mode Bit 1 0 Setting 0 0 Off 0 1 Not used 1 0 ISDN L2 test mode (TE mode) 1 1 ISDN L2 test mode (NT mode)	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. After the test, return both bits to 0. See "Back-to-back Testing" in the Troubleshooting section for full details.
2 to 7	Not used	Do not change the default settings.

Parameter Switch E		
	FUNCTION	**COMMENTS**
0	Troubleshooing mode - real time status codes display **0:** Off **1:** On	If this is switched on, the status codes will be displayed in the lower two lines of the LCD. These codes are explained in the Troubleshooting section (G4CCU Status Codes). Change this bit back to 0 after testing.
1	Saving frames to the protocol dump list **0:** Off **1:** On	Keep this bit at 1 normally.
2 to 7	Not used	Do not change the default settings.

2.3. 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. Switch 08 is not used.

Switch 05	
	FUNCTION
0 **1** **2** **3**	Data rate Bit 3 2 1 0 Setting 0 0 0 0 64 kbps 0 0 0 1 56 kbps 1 1 1 1 As in Parameter Switch 2, bits 0 and 1 Other settings: Not used
4	Not used
5	
6	
7	

Switch 06	
	FUNCTION
0 **1** **2** **3**	Link modulus Bit 3 2 1 0 Setting 0 0 0 0 Modulo 8 0 0 0 1 Modulo 128 1 1 1 1 As in Parameter Switch 3, bit 0 Other settings: Not used
4	Not used
5	
6	
7	

Switch 07	
	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 **5** **6** **7**	Packet modulus Bit 7 6 5 4 Setting 0 0 0 0 Modulo 8 0 0 0 1 Modulo 128 1 1 1 1 As in Parameter Switch 6, bit 4 Other settings: Not used

3. TROUBLESHOOTING

3.1. 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 signalling 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.

3.1.1. 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

3.1.2. 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

3.1.3. 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

3.1.4. 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

3.1.5. 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

3.1.6. 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

3.1.7. 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
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

Code	Probable Cause	Action
8-27	Timeout during state 1.1	8
8-28	Timeout during state 0.3	8

3.1.8. 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

3.1.9. 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

Code	Probable Cause	Action
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

3.1.10. 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

3.2. G4CCU STATUS CODES *

The display of G4CCU status codes is affected by the Real Time Display On/off setting (G4 Parameter Switch E, bit 0).

- If Real Time Display is off (the bit is 0; this is the default setting), there is no indication on the operation panel.
- If Real Time Display is on (the bit is 1), the codes are fully displayed on the operation panel.

The codes are defined in the following pages.

3.2.1. Layer 1 (Physical Layer)

Code (H)	Status	Code (H)	Status
10	Ready	E0	R: [DISC]
01	S: [SETUP]	E1	S: [REL]
02	R: [CALL_PROC]	E3	R: [REL_COMP]
03	R: [CONN]	E4	R: [STAT]
04	S: [CONN_ACK]	E5	R: [STAT_ENQ]
05	R: [SETUP ACK]	F0	S: [DISC]
06	R: [ALERT]	F1	R: [REL]
11	R: [SETUP]	F2	S: [REL_COMP]
12	S: [CALL_PROC]	F3	S: [STAT]
13	S: [CONN]		
14	R: [CONN_ACK]		

3.2.2. Layer 2 (Link Layer)

Code (H)	Status	Code (H)	Status
20	S: SABM, or R: SABM	D0	S: DISC, or R: DISC
21	S: UA, or R: UA	D1	S: DM, or R: DM
22	S: FRMR, or R: FRMR		
28	S: SABME, or R: SABME		

3.2.3. Network Layer (Layer 3)

Code (H)	Status	Code (H)	Status
30	S: CR	C2	S: SQ
31	R: CC	C3	R: SF
38	R: CN	CA	R: SI
39	S: CA	CB	S: SF
32	S: GF	C4	S: RQ
3A	R: GQ	C5	R: RF
3B	R: GF	CC	R: RI
C0	S: CQ	CD	S: RF
C1	R: CF	C6	R: IT
C8	R: CI	C7	R: IF
C9	S: CF	CE	R: DIAG

3.2.4. Transport Layer (Layer 4)

Code (H)	Status	Code (H)	Status
40	S: TCR, or R: TCR	42	S: TBR, or R: TBR
41	S: TCA, or R: TCA	43	S: TCC or R: TCC

3.2.5. Session Layer, Session Control Layer (Layer 5)

Code (H)	Status	Code (H)	Status
50	S: CSS, or R: CSS	56	S: RSUI, or R: RSUI
51	S: RSSP, or R: RSSP	A0	S: CSA, or R: CSA
52	S: RSSN, or R: RSSN	A1	S: RSAP, or R: RSAP
53	S: CSCC, or R: CSCC	A2	S: CSE, or R: CSE
54	S: RSCCP, or R: RSCCP	A3	S: RSEP, or R: RSEP

3.2.6. Session Layer, Document Control Layer (Layer 5)

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

3.3. LEDs *

There are six LEDs on the G4 Interface board, as shown below.

		LED 5	LED 6
LED 1	LED 2	LED 3	LED 4

These LEDs give the following information about the status of the machine.

O = ON, -- = OFF

	LED 1	LED 2	LED 3	LED 4
Initial Settings				
Power-up/Reset			O	O
	--	--	--	--
Initial setting request from FCU			--	O
	--	--	--	--
Initial setting confirmation to FCU			--	--
	--	--	--	--
Communication				
Layer 1 activated			--	--
	O	--	--	--
Layer 2 set			--	--
	O	O	--	--
B channel connected (ISDN G4)			--	--
	O	O	O	--
B channel connected (ISDN G3)			--	--
	O	O	--	O
B channel released			--	--
	O	O	--	--
Layer 2 released			--	--
	O	--	--	--
Layer 1 deactivated			--	--
	--	--	--	--
The following will be displayed if bit 1 of G4 parameter switch E is at 1.				
B channel: send I frame (A blinks at this time if bit 1 of G4 parameter switch E is at 1)			--	A
	O	O	O	--
B channel: receive I frame (B blinks at this time if bit 1 of G4 parameter switch E is at 1)			B	--
	O	O	O	--

Note: At the start and end of communication, both A and B will blink.

3.4. BACK-TO-BACK TEST *

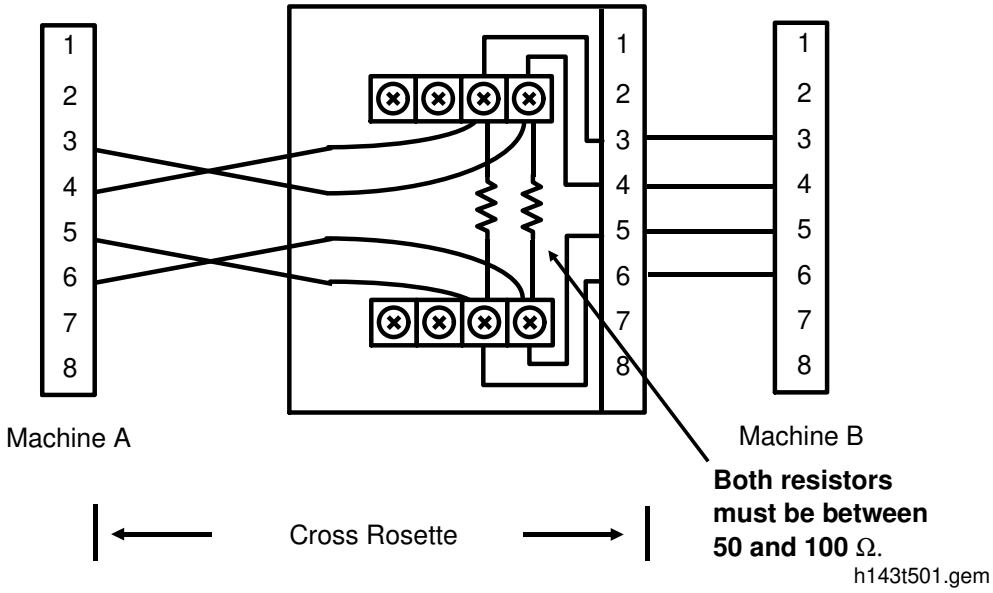
To make a back-to-back test, you need:

- Two machines (both of them must have CiG4 board)
- 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.



3. Make the following bit switch adjustments:
   - In the machine acting in NT mode, set bits 0 and 1 of G4 parameter switch 0D to 1.
   - In the machine acting in TE mode, set bit 0 of G4 parameter switch 0D to 0 and bit 1 to 1.

4. Reset the machine by switching it 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

A. D-Channel Layer 1 Dump List

A.1. How to Print the Dump List

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

1. After entering G4 service mode,
   press [1] [0] .
2. Input the addresses 03B000 to 03B1FF:
   Input [0] [3] [B] [0] [0] [3] [B] [1] [◇] .

List Sample

```
    * * * G4 CCU MEMORY DUMP LIST (SEP. 25.1995  4.05PM) * * *
            0  1  2  3   4  5  6  7   8  9  A  B   C  D  E  F
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 03B000    00 00 00 F2  10 1E 00 F3  01 1C 64 F4  10 12 00 F5
 03B010    11 22 00 F6  10 36 00 F7  02 00 08 F7  20 A6 08 F7
 03B020    03 81 00 F7  07 34 60 F7  10 32 00 F7  02 00 03 F7
 03B030    20 29 03 F7  02 00 18 F7  20 A9 04 F7  20 AB 0B F7
 03B040    02 00 04 F7  20 AB 0C F7  02 00 04 F7  02 00 08 F7
 03B050    20 A9 04 F7  20 AB 0E F7  02 00 04 F7  02 00 08 F7
 03B060    20 A9 04 F7  20 00 03 F7  20 29 03 F7  10 02 7C F3
 03B070    10 3E 40 F3  10 1E 00 F3  FF FF FF FF  00 00 FF FF
 03B080    FF FF 00 00  00 00 FF FF  FF FF 00 00  00 00 FF FF
 03B090    FF FF 00 00  00 00 FF FF----------------------------
    :
    :
```

H143X501.wmf

Refer to “How to Read the Dump List” later in this chapter.

A.2. How to Read the Dump List

A.2.1. Data Format

The machine logs the details of layer 1 communication whenever a event has taken place. The event can be either a request from the machine, a request from the DSU, a transmission of a signal, or a reception of a signal.

Each log consists of 4 bytes. The first byte indicates the type of event, the second and the third bytes for optional data, which depends on the type of event, and the fourth byte indicates the layer 1 status. The following table explains all types of data formats.

1st byte	2nd byte	3rd byte	4th byte
00(H): TE mode initialization request	**00(H)**	**00(H)**	Layer 1 status TE mode **F1(H)**: F1 status **F2(H)**: F2 status **F3(H)**: F3 status **F4(H)**: F4 status **F5(H)**: F5 status **F6(H)**: F6 status **F7(H)**: F7 status **F8(H)**: F8 status NT mode **C1(H)**: G1 status **C2(H)**: G2 status **C3(H)**: G3 status **C4(H)**: G4 status Refer to the “Layer 1 Activation/ Deactivation Procedure” later in this chaper.
01(H): Layer 1 activation request	See note 1	See note 2	
10(H): Layer 1 status has changed			
02(H): Frame transmission request	**00(H)**	Number of transmitted data bytes (Max. 255 bytes)	
20(H): Frame reception indication	See note 3	Number of received data bytes (Max. 255 bytes)	
03(H): TEI assignment request	Assigned TEI value	00(H)	
04(H): Layer 1 de-activation request	See note 4	See note 2	
05(H): Loop back mode request	**00(H)**	**00(H)**	
06(H): NT mode initialization request	**00(H)**	**00(H)**	
EE(H): Communication error	See note 5	**00(H)**	

The data “FF FF FF FF” indicates the end of the data.

Notes

1. Status Register Value

Data (Hex)	Description
1E or 1C	Deactivated or standby
02 or 00	INFO0 signal received
0E or 0C	Not connected
1A or 18	Error status
12 or 10	Non-synchronized signal received
22 or 20	INFO2 signal received
32 or 30	Priority high
36 or 34	Priority low
3E or 3C	Terminated

2. Command Register Value

Data (Hex)	Description
00	No command requested
40	Standby request
44	Reset request
60	Priority change requset (High priority)
64	Priority change request (Low priority)
7C	Termination request

3. Received Frame Status Register

Bit 7 - Not used
Bit 6 - 0: Normal, 1: Received data overflow
Bit 5 - 0: Normal, 1: CRC error
Bit 4 - 0: Normal, 1: Received frame aborted
Bits 3 to 0: Not used

4. Interrupt Status Register

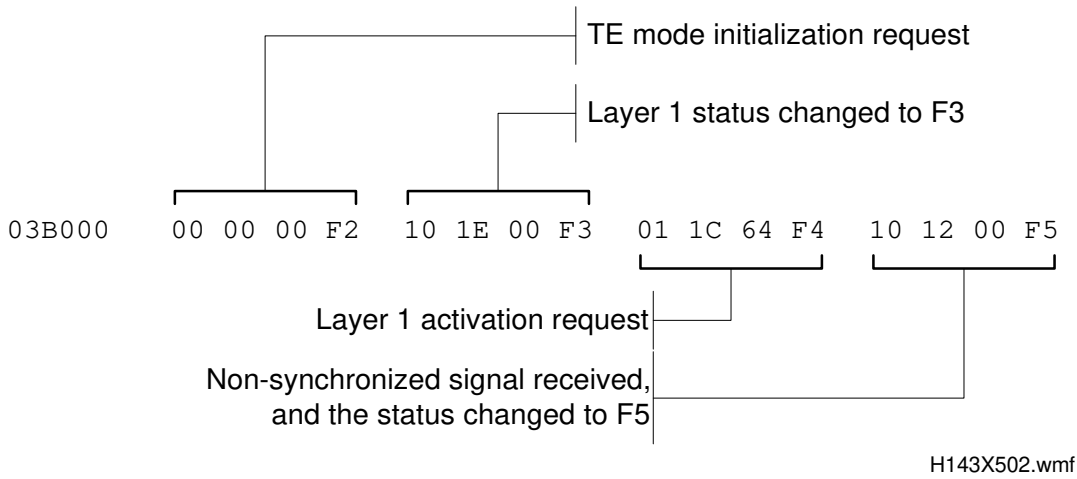
Bit 7 - 0: Normal, 1: Frame received
Bit 6 - 0: Normal, 1: Receive buffer full
Bit 5 - Not used
Bit 4 - 0: Normal, 1: Transmission buffer full
Bit 3 - Not used
Bit 2 - 0: Normal, 1: Layer 1 status has changed
Bit 1 - Not used
Bit 0 - 0: Normal, 1: Communication error

5. Communication Error Status Register

Bit 7 - 0: Normal, 1: Frame resend
Bit 6 - 0: Normal, 1: Transmission underrun
Bit 5 - Not used
Bit 4 - 0: Normal, 1: Transmission pool overflow
Bits 3 to 0 - Not used

A.2.2. Reading the Sample Dump List

Line #1



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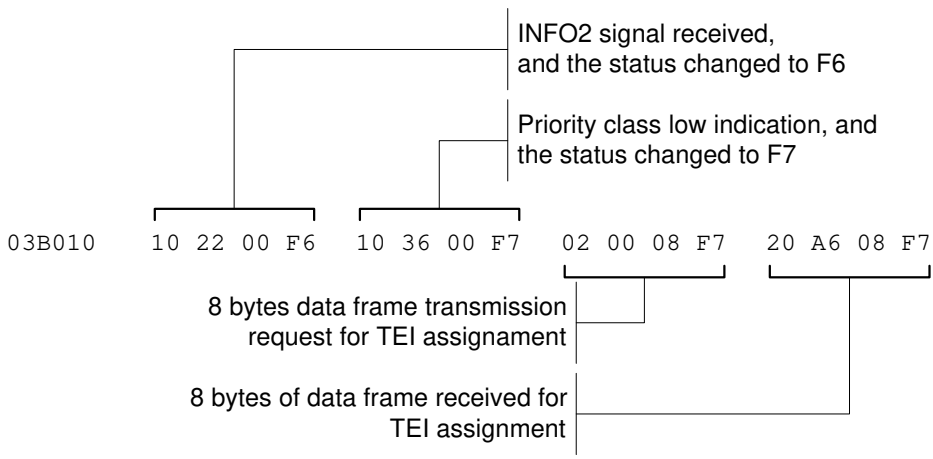
Line #2



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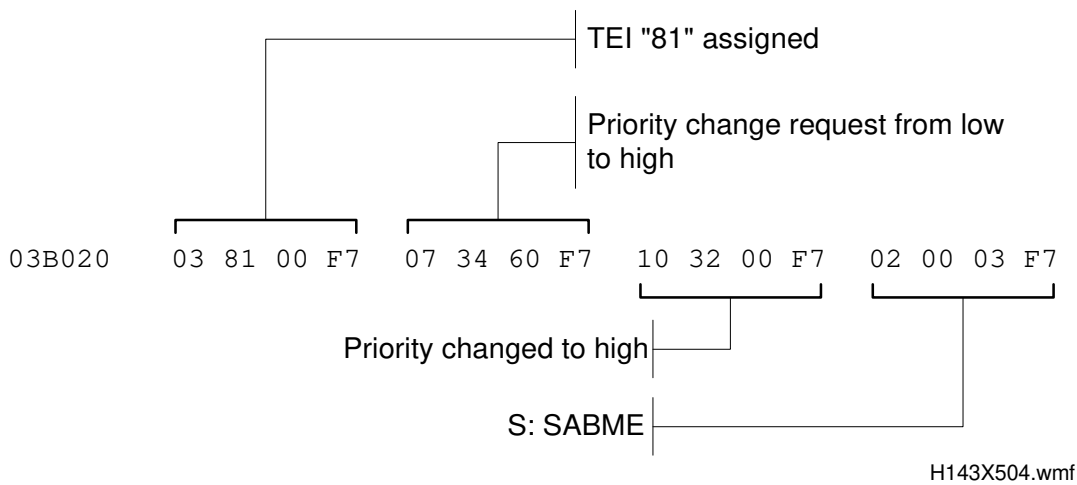
Line #3



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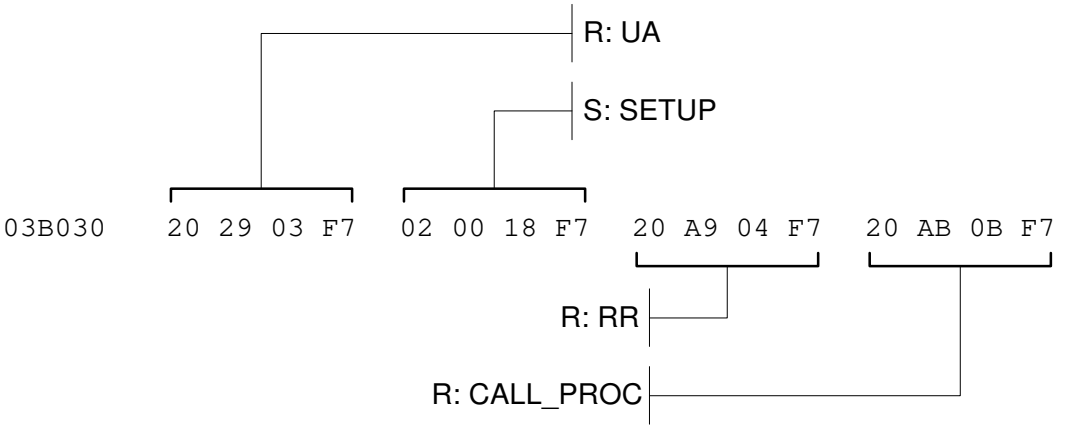
Line #4



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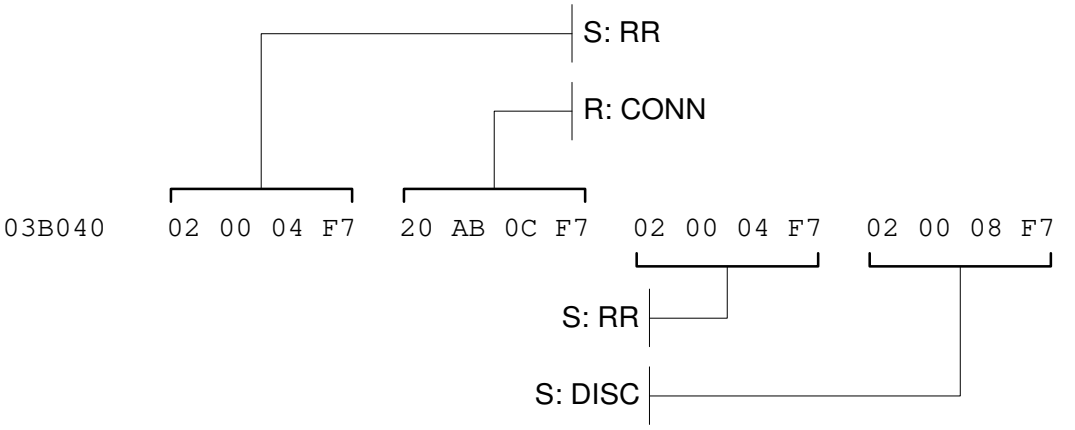
Line #5



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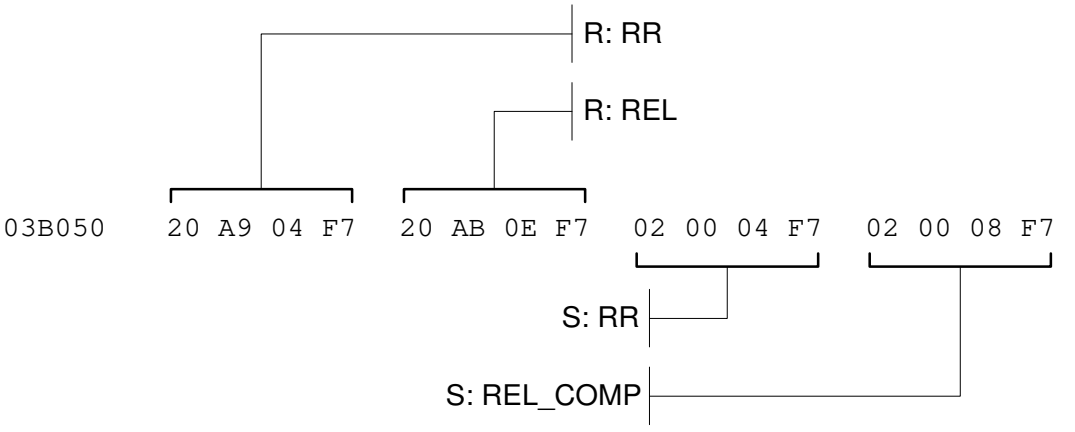
Line #6



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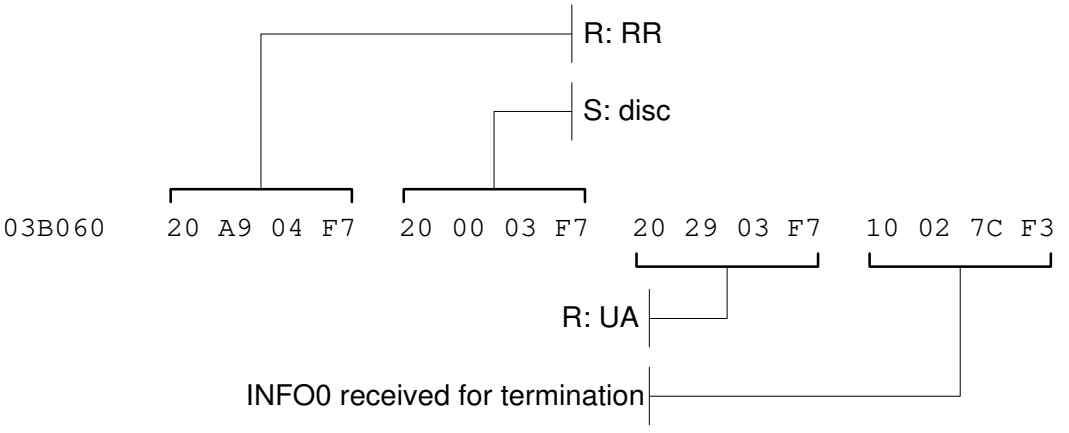
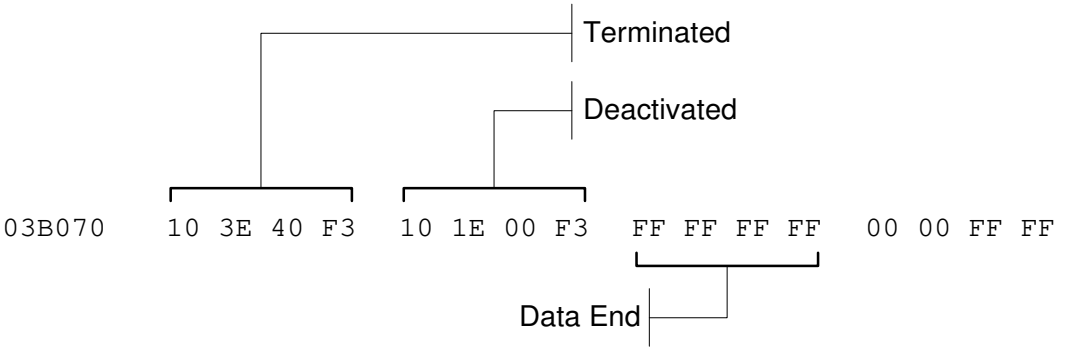
Line #7



H143X508.wmf

Line #8



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A.2.3. Layer 1 Status

The ITU-T I.430 recommendation (the basic user-network interface - Layer 1 specification) specifies layer 1 activation/deactivation procedures.

Before understanding the procedures, the status and INFO signals should be noted.

TE (Terminal Equipment) Status

Status	Description
F1	TE is turned off.
F2	TE is turned on, but no signal is exchanged.
F3	TE is stopped. No signal is exchanged between TE and NT.
F4	TE is waiting for the response to INFO1 signal from NT.
F5	TE is checking if the signal from the NT is INFO2 or INFO4.
F6	TE is waiting for signals from NT after receiving INFO2 signal.
F7	TE and NT are in synchronized condition.
F8	TE has failed to synchronize to NT, and waiting for the stop request from NT

NT (Network Termination) Status

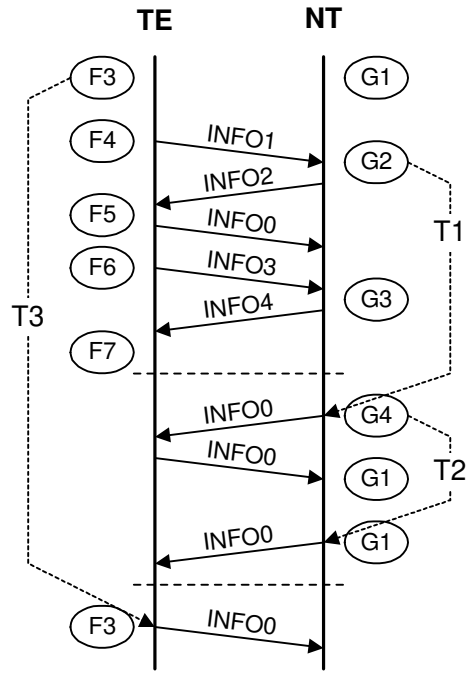
Status	Description
G1	NT is stopped.
G2	NT is sending INFO2 signal.
G3	TE and NT are in synchronized condition.
G4	NT is terminating itself.

INFO Signals

NT to TE Direction		TE to NT direction	
INFO0	No signal (11111111...)	INFO0	No signal (11111111...)
INFO2	Activation signal in synchronized condition (B=0, D=0, E=0, A=0)	INFO1	Activation signal in non-synchronized condition (+0-0111111+0-0)
INFO4	Synchronized frame	INFO3	Synchronized frame

1. Activation Procedure from the TE

In idle “F3” status, the TE send the INFO1 signal to the NT and changes to “F4” status. The NT then changes to “G2” status and sends INFO2 signal to the TE.
The TE changes to “F5” status and stops sending signals to synchronize itself to the signal from the NT.
After the TE has synchronized to the signal, it sends INFO3 signal to the NT and changes to the “F6” status.
The NT then changes to “G3” status and sends INFO4 signal back to the TE to inform that a physical link has been established.
The timers T1, T2 and T3 are used to reset the TE or NT if a correct response has not received before the timers expire.



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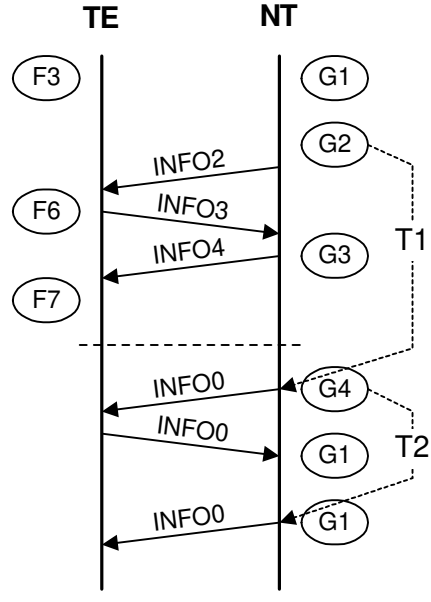
2. Activation Procesure from the NT

The procedure starts from the NT by sending INFO2 signal to the TE.

After the TE has synchronized to the signal, it sends INFO3 signal to the NT and changes to the “F6” status.
The NT then changes to “G3” status and sends INFO4 signal back to the TE to inform that a physical link has been established.
The timers T1 and T2 are used to reset the NT if a correct response has not received before the timers expire.



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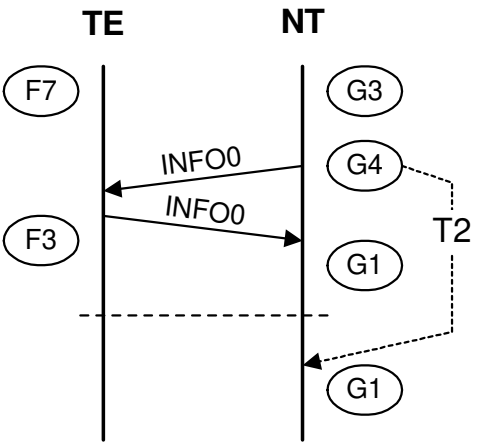
3. Termination Procedure from the NT

The termination procedure starts from synchronized status (“F7”status for the TE and “G3” status for the NT).

To terminate the physical connection, the NT just stops sending signals and changes to “G1” status. (The INFO0 signal means no signal is sent from the NT.) Then, the TE also stops sending signals and changes to “F3” status.



H143X512.wmf

B. G4 Parameter Locations

B.1. Initial Programming Items Comparison List

Note: The model ”CGO” is only for the US and Taiwan markets.

Item	CFO	LHO/CGO	FX4
Country code	**U:** F-61	**U:** F-61	
Own analog number	**U:** F-61	**U:** F-61	**U:** F-61
Area code prefix	**U:** F-61	**U:** F-61	
Own ISDN-G4 number	**U:** F-61	**U:** F-61	**U:** F-61
Own ISDN-G3 number	**U:** F-61	**U:** F-61	**U:** F-61
Next transfer station	**U:** F-61	**U:** F-61	
G4 internal switches	**S:** F-18-01	**S:** F-18-01	**S:** F-17-01
G4 parameter switches	**S:** F-18-02	**S:** F-18-02	**S:** F-17-02
Data network international prefix	**S:** F-18-03	**S:** F-18-03	
ISDN international prefix	**S:** F-18-04	**S:** F-18-04	**S:** F-17-03
G4 subscriber number 1	**S:** F-18-05	**S:** F-18-05	**S:** F-17-04
G4 subscriber number 2	**S:** F-18-06	**S:** F-18-06	**S:** F-17-05
IG3 subscriber number 1	**S:** F-18-07	**S:** F-18-07	**S:** F-17-06
IG3 subscriber number 2	**S:** F-18-08	**S:** F-18-08	**S:** F-17-07
Internal Access Unit 1	**S:** F-18-09	**S:** F-18-09	
Internal Access Unit 2	**S:** F-18-10	**S:** F-18-10	
G4 subaddress	**S:** F-18-11	**S:** F-18-11	**S:** F-17-08
IG3 subaddress	**S:** F-18-12	**S:** F-18-12	**S:** F-17-09
G4 terminal ID	**S:** F-18-13	**S:** F-18-13	**U:** F-61
IG3 CSI	**S:** F-18-14	**S:** F-18-14	**U:** F-61
G4 dump 1 (RAM dump)	**S:** F-18-15	**S:** F-18-15	**S:** F-17-10
G4 dump 2 (Protocol dump)	**S:** F-18-16	**S:** F-18-16	**S:** F-17-11
G4 parameter list	**S:** F-18-17	**S:** F-18-17	**S:** F-17-12
Service level password	1991	1991	1995

U: User level function (Function - 60 - 2222)
S: Service level function (Function - 60 - 1991 or 1995)

B.2. Switch Locations Comparison List

Note: The model ”CGO” is only for the US and Taiwan markets.

1. Communication Parameter Display

Model	Switch Location	Setting
CFO	Bit switch 00, bit 7	0: Off, 1: On
LHO/CGO	Bit switch 00, bit 7	0: Off, 1: On
FX4	System switch 00, bit 5	0: Off, 1: On

2. Default Communication Mode

Model	Switch Location	Setting
CFO	000153(H), bit 2	0: G3, 1: G4
LHO/CGO	080053(H), bit 2	0: G3, 1: G4
FX4	System switch 0A, bit 0	0: G3, 1: G4

3. Network Used for G3 Transmission

Model	Switch Location	Setting
CFO	000153(H), bit 3	0: PSTN, 1: ISDN
LHO/CGO	080053(H), bit 3	0: PSTN, 1: ISDN
FX4	System switch 0A, bit 6	0: PSTN, 1: ISDN

4. Network Used for G3 transmission in G4-to-G3 Fallback

Model	Switch Location	Setting
CFO	000153(H), bit 3	0: PSTN, 1: ISDN
LHO/CGO	080053(H), bit 3	0: PSTN, 1: ISDN
FX4	System switch 0A, bit 7	0: PSTN, 1: ISDN

5. Automatic G4-to-G3 Fallback

Model	Switch Location	Setting
CFO	00015C(H), bit 0	0: Enabled, 1: Disabled
LHO/CGO	08005C(H), bit 0	0: Enabled, 1: Disabled
FX4	Communication switch 07, bit 0	0: Enabled, 1: Disabled

6. Specified Two Step Transfer

Model	Switch Location	Setting
CFO	00015C(H), bit 1	0: Disabled, 1: Enabled
LHO/CGO	08005C(H), bit 1	0: Disabled, 1: Enabled
FX4	Function not available	

7. Cable Equalizer for ISDN Transmission

Model	Switch Location	Setting		
CFO	Bit switch 08, bits 6 and 7	**Bit 7**	**Bit 6**	**Setting**
		0	0	None
LHO/CGO		0	1	Low
		1	0	Medium
		1	1	High
FX4	G3 switch 09, bits 0 and 1	**Bit 1**	**Bit 0**	**Setting**
		0	0	None
		0	1	Low
		1	0	Medium
		1	1	High

8. Cable Equalizer for ISDN Reception

Model	Switch Location	Setting		
CFO	Bit switch 0A, bits 6 and 7	**Bit 7**	**Bit 6**	**Setting**
		0	0	None
LHO/CGO		0	1	Low
		1	0	Medium
		1	1	High
FX4	G3 switch 09, bits 2 and 3	**Bit 3**	**Bit 2**	**Setting**
		0	0	None
		0	1	Low
		1	0	Medium
		1	1	High

C. Conditions for Receiving a Call

BC: Bearer Capability
HLC: Higher Layer Compatibility
SA: Subaddress

Tx Terminal	Setup			Response	Condition
	BC	HLC	Called No./ Called SA		
G4 Fax	Digital	G4	Not included	G4 reception	
	Digital	G4	Included	G4 reception	If called no. and called subaddress match the G4 subscriber no.
				No response	If called no. and called subaddress do not match the G4 subscriber no.
	Digital	N/A	Not included	G4 reception	If G4 Parameter Switch 01, bit 1 = 0.
				No response	If G4 Parameter Switch 01, bit 1 = 1.
	Digital	N/A	Included	G4 reception	If called no. and called subaddress match the G4 subscriber no.
				No response	If called no. and called subaddress do not match the G4 subscriber no.
G3 Fax	3.1k	G2/G3	Not included	G3 reception	
	3.1k	G2/G3	Included	G3 reception	If called no. and called subaddress match the IG3 subscriber no.
				No response	If called no. and called subaddress do not match the IG3 subscriber no.
	3.1k	N/A	Not included	G3 reception	If G4 Parameter Switch 01, bit 1 = 0.
				No response	If G4 Parameter Switch 01, bit 1 = 1.
	3.1k	N/A	Included	G3 reception	If called no. and called subaddress match the IG3 subscriber no.
				No response	If called no. and called subaddress do not match the IG3 subscriber no.

Tx Terminal	Setup			Response	Condition
	BC	HLC	Called No./ Called SA		
G3 Fax	Speech	G2/G3	Not included	G3 reception	
	Speech	G2/G3	Included	G3 reception	If called no. and called subaddress match the IG3 subscriber no.
				No response	If called no. and called subaddress do not match the IG3 subscriber no.
	Speech	N/A	Not included	No response	If G4 Internal Switch 14, bit 0 = 0, and G4 Parameter Switch 01, bit 1 = 0.
				G3 reception	If G4 Internal Switch 14, bit 0 = 1, and G4 Parameter Switch 01, bit 1 = 0
				No response	If G4 Internal Switch 14, bit 0 = 0, and G4 Parameter Switch 01, bit 1 = 1.
				No response	If G4 Internal Switch 14, bit 0 = 1, and G4 Parameter Switch 01, bit 1 = 1.
	Speech	N/A	Included	G3 reception	If called no. and called subaddress match the IG3 subscriber no.
				No response	If called no. and called subaddress do not match the IG3 subscriber no.
Tele-phone	Speech	TEL	Not included	No response	
	Speech	TEL	Included	No response	
	Speech	N/A	Not included	No response	If G4 Internal Switch 14, bit 0 = 0, and G4 Parameter Switch 01, bit 1 = 0.
				G3 reception	If G4 Internal Switch 14, bit 0 = 1, and G4 Parameter Switch 01, bit 1 = 0
				No response	If G4 Internal Switch 14, bit 0 = 0, and G4 Parameter Switch 01, bit 1 = 1.
				No response	If G4 Internal Switch 14, bit 0 = 1, and G4 Parameter Switch 01, bit 1 = 1.
	Speech	N/A	Included	G3 reception	If called no. and called subaddress match the IG3 subscriber no.
				No response	If called no. and called subaddress do not match the IG3 subscriber no.

Tx Terminal	Setup			Response	Condition
	BC	HLC	Called No./ Called SA		
Telephone	3.1k	TEL	Not included	No response	
	3.1k	TEL	Included	No response	
	3.1k	N/A	Not included	G3 reception	If G4 Parameter Switch 01, bit 1 = 0.
				No response	If G4 Parameter Switch 01, bit 1 = 1.
	3.1k	N/A	Included	G3 reception	If called no. and called subaddress match the IG3 subscriber no.
				No response	If called no. and called subaddress do not match the IG3 subscriber no.

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Conditions for Receiving a Call