*FIREBERD 6000*
# Quick Cards

*These Quick Cards have been assembled to help users easily perform basic test functions. The Quick Cards are also effective tools to familiarize new users with the FIREBERD 6000 test set.*

*To use the Quick Cards:*
   *1. Select the desired application from the Table of Contents.*
   *2. Refer to the appropriate setup card to configure the FIREBERD 6000.*
   *3. If additional information is needed, refer to the FIREBERD 6000 User's Guide.*

## Table of Contents

*These Quick Cards were created with reference to Rev. M or greater software.*

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*FIREBERD 6000 Setup*
# Full T1 In-Service Monitoring

*The following procedure outlines how to connect the FIREBERD 6000 with a 41440A interface to the network in order to perform a Full T1 In-Service Monitoring test. Please read the entire procedure BEFORE starting.*

- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *▲ (up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:*

## Part 1 – Interface Setup

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | T1/FT1 | Access the T1/FT1 interface. | |
| 2 | CONFIG | Access the **CONFIGURATION** menu. | |
| 2a | FRAME | Scroll through the list until you reach the appropriate framing of your circuit (e.g., D4, ESF, SLC®-96, or OFF). | |
| 2b | CODE | Scroll through the list until you reach the appropriate coding of your circuit (e.g., B8ZS or AMI). | |
| 2c | INPUT | Scroll through the list and set to **DSXMON** (assuming DSX access). | |
| 2d | MORE | See additional selections. | |
| 2e | RESULT | Scroll through the list and set to **LIV**. | |
| 2f | REFT1 | Scroll through the list and set to **BRDG**. | |
| 2g | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the T1/FT1 main menu. | |
| 3 | MODE | Access the **MODE** menu. | |
| 3a | FULLT1 | To monitor the FULL T1 bandwidth. | |
| 4 | ENTER | Press **ENTER** on the keypad to return to the main menu. | |
| 5 | ANALYSIS MODE | Select **CONTINUOUS**. | |

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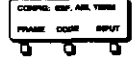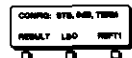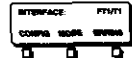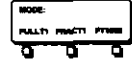WWW Address: http://www.ttc.com

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# Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|

1    Press **RESTART** to clear alarms and begin the test. Verify that:
    A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating a signal is present).
    B. FIREBERD 6000's **FRM SYNC** LED is illuminated (if **FRM SYNC** is not illuminated, go back to **Step 2a** and select the appropriate frame format).

*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

# Table 1 – Analysis Results

| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| T-CARRIER | BPVs | Bipolar Violations |
| | FRA ERR | Frame Errors |
| | CRC ERR | CRC Errors (ESF framing only) |
| | FRA LOSS | Frame Loss |
| | BIT SLIP | Bit Slips (applicable only with a REFT1) |
| SIGNAL | +LVL dB | Positive Receive Signal Level |
| | -LVL dB | Negative Receive Signal Level |
| | PP LVL V | Peak-to-Peak Receive Signal Level (volts) |
| | RCV FREQ | Receive Frequency |

*Table 2 is a list of INTERFACE STATUS LEDs. When illuminated each of the status LEDs mean the following:*

# Table 2 – Interface Status LEDs

| Illuminated Status LED | Description |
|------------------------|-------------|
| CODE | Illuminates when B8ZS coding is being received. |
| ALM 1 | Illuminates when a Yellow Alarm is detected. |
| ALM 2 | Illuminates when an Excess Zeros Alarm is detected. |

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*FIREBERD 6000 Setup*
# T1/FT1 Out-of-Service BERT

*The following procedure outlines how to connect the FIREBERD 6000 with a 41440A interface to the network in order to perform a T1/FT1 Out-of-Service BERT. Please read the entire procedure BEFORE starting.*

- **WARNING** – *Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- ▲ *(up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:*

## Part 1 – Interface Setup

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | T1/FT1 | Access the T1/FT1 interface. | |
| 2 | CONFIG | Access the **CONFIGURATION** menu. | |
| 2a | FRAME | Scroll through the list until you reach the appropriate framing of your circuit (e.g., D4, ESF, SLC®-96, or OFF). | |
| 2b | CODE | Scroll through the list until you reach the appropriate coding of your circuit (e.g., B8ZS or AMI). | |
| 2c | INPUT | Scroll through the list and set to **TERM**. | |
| 2d | MORE | See additional selections. | |
| 2e | RESULT | Scroll through the list and set to **STD**. | |
| 2f | LBO | Scroll through the list and set the Line Build Out to **0 dB**. | |
| 2g | REFT1 | Scroll through the list and set to **BRDG**. | |
| 2h | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the previous menu. | |
| 3 | ERRINS | Set to **OFF**. | |
| 3a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the previous menu. | |
| 4 | MODE | Access the **MODE** menu. | |

### *For Full T1 testing, Steps 4a-4b7 should be substituted with the following instruction:*

| | | | |
|------|---------|----------------|---------------|
| 4a | FULLT1 | Allows you to select and BERT the FULL T1 bandwidth. | |

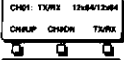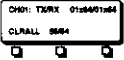*SLC is a registered trademark of AT&T Technologies, Inc.*
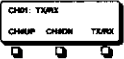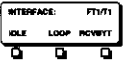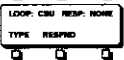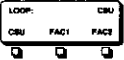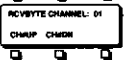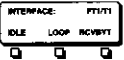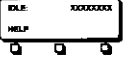
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# Part 1 – Interface Setup *(cont.)*

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 4a | FRACT1 | Select and monitor any selection of time slots. Traffic on unselected channels will be replaced with the idle code entered in **Step 7**. (Repeat **Steps 4b5** and **4b6** for each channel you wish to test.) | |
| 4b1 | MORE | See additional selections. | |
| 4b2 | CLRALL | Clear all channel setup parameters from a previous test. | |
| 4b3 | 56/64 | Choose between 56K and 64K bandwidth. | |
| 4b4 | MORE | See additional selections. | |
| 4b5 | CH# UP CH# DN | Select the channels you wish to drop. | |
| 4b6 | TX/RX | Set the selected channel to **TX/RX**. | |
| 4b7 | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the T1/FT1 main menu. | |
| 4b8 | MORE | See additional selections. | |
| 5 | LOOP | Access the **LOOP** menu. | |
| 5a | TYPE | Select which piece of equipment you want to loop back. Press **MORE** for additional selections if needed. | |
| 5b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the **LOOP** menu. | |
| 5c | RESPND | Set the FIREBERD 6000 to **AUTO** (automatically responds to a received loop code) or **NONE**. | |
| 5d | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the T1/FT1 main menu. | |
| 6 | RCVBYT | Select a channel 1-24 to be displayed in the RCV BYTE result. | |
| 6a | CH# UP CH# DN | Select the channel you wish to monitor. | |
| 6b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the T1/FT1 main menu. | |
| 7 | IDLE | Select an 8-bit binary idle code pattern to be inserted in the inactive channels. | |
| 8 | ENTER | Press to set these idle code bits. | |
| 9 | ENTER | Press **ENTER** on the keypad to return to the main menu. | |

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# T1/FT1 Out-of-Service BERT *(cont.)*

## Part 1 – Interface Setup *(cont.)*

| Step | Softkey | Action/Purpose |
|------|---------|----------------|
| 10 | DATA | Scroll through the list and select a data pattern. QRSS is the recommended data pattern for T1 testing. Additional stress patterns (including 3 in 24 and 1:7) are located in **AUX 41**. (Press the **MORE** key as necessary in **AUX 41** to see the additional patterns.) Refer to the FIREBERD 6000 manual for a detailed description of each available test pattern. |
| 11 | GEN CLK | Scroll through the list and set to **SYNTH** to generate internal timing or **INTF** to recover timing from the network. |
| 12 | ANALYSIS MODE | Select **CONTINUOUS**. |

## Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|
| 1 | Press **RESTART** to clear alarms and begin the test. Verify that:<br>A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating a signal is present).<br>B. FIREBERD 6000's **FRM SYNC** LED is illuminated (if **FRM SYNC** is not illuminated, go back to **Step 2a** and select the appropriate frame format). |

*NOTE: To perform a loopback test, press the **LOOP UP** key on the INTERFACE STATUS and CONTROL section of the FIREBERD 6000.*

*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

## Table 1 – Analysis Results

| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| **ERROR** | BIT ERRS | Bit Errors |
| | BER | Bit Error Rate |
| | PAT SLIP | Pattern Slips |
| **T-CARRIER** | BPVs | Bipolar Violations |
| | FRA ERR | Frame Errors |
| | CRC ERR | CRC Errors (ESF framing only) |
| | FRA LOSS | Frame Loss |
| | BIT SLIP | Bit Slips (applicable only with a REFT1) |

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## Table 1 – Analysis Results *(cont.)*

| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| SIGNAL | +LVL dB | Positive Receive Signal Level |
| | -LVL dB | Negative Receive Signal Level |
| | PP LVL V | Peak-to-Peak Receive Signal Level (volts) |
| | RCV FREQ | Receive Frequency |
| | RCV BYTE | Receive Byte |

*Table 2 is a list of INTERFACE STATUS LEDs. When illuminated each of the status LEDs mean the following:*

## Table 2 – Interface Status LEDs

| Illuminated Status LED | Description |
|------------------------|-------------|
| CODE | Illuminates when B8ZS coding is being received. |
| ALM 1 | Illuminates when a Yellow Alarm is detected. |
| ALM 2 | Illuminates when an Excess Zeros Alarm is detected. |

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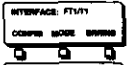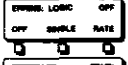
*FIREBERD 6000 Setup*

# T1/FT1 – Voice and Signaling

*The following procedure outlines how to connect the FIREBERD 6000 with a 41440A interface to the network in order to perform an end-to-end T1/FT1 Out-of-Service Voice and Signaling test. Please read the entire procedure BEFORE starting.*

- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *▲ (up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:*

## Part 1 – Interface Setup

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | T1/FT1 | Access the T1/FT1 interface. | |
| 2 | CONFIG | Access the **CONFIGURATION** menu. | |
| 2a | FRAME | Scroll through the list until you reach the appropriate framing of your circuit (e.g., D4, ESF, SLC®-96, or OFF). | |
| 2b | CODE | Scroll through the list until you reach the appropriate coding of your circuit (e.g., B8ZS or AMI). | |
| 2c | INPUT | Scroll through the list and set to **TERM**. | |
| 2d | MORE | See additional selections. | |
| 2e | RESULT | Scroll through the list and set to **STD**. | |
| 2f | LBO | Scroll through the list and set the Line Build Out to **0 dB**. | |
| 2g | REFT1 | Scroll through the list and set to **BRDG**. | |
| 2h | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the T1/FT1 main menu. | |
| 3 | ERRINS | Set to **OFF**. | |
| 3a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the T1/FT1 main menu. | |
| 4 | MODE | Access the **MODE** menu. | |
| 4a | MORE | See additional selections. | |
| 4b | VOICE | Places the FIREBERD 6000 into **VOICE** mode. | |
| 4b1 | SEL< | Press to choose between setting your TX channel or your RX channel (toggle between **RX:_<TX:_<**, and **TX:_<RX:_<**.) | |

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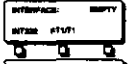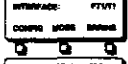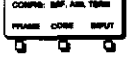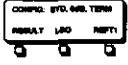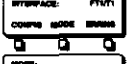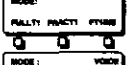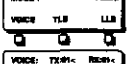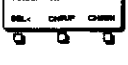Tel. (800) 638-2049 • (301) 353-1550 (MD) • FAX. (301) 353-0234
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# Part 1 – Interface Setup *(cont.)*

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| **4b2** | CH# UP<br>CH# DN | Select your **TX** and **RX** channels. | |
| **4b3** | MORE | See additional voice selections. | |
| **4c** | SIG | Set to **ON**. (Use the front panel keypad to set the ABCD signaling bits for ESF framing or AB bits for D4 framing in binary format.) | |
| **4c1** | ENTER | Press to enter the values selected. | |
| **5** | ENTER | Press **ENTER** on the keypad to return to the main menu. | |
| **6** | GEN CLK | Scroll through the list and set to **SYNTH** to generate internal timing or **INTF** to recover timing from the network. | |
| **7** | ANALYSIS MODE | Select **CONTINUOUS**. | |

# Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|

*Insert the handset into the RJ-8 handset jack, which is located on the T1/FT1 Interface Module (voice transmission/reception can now be verified on an individual channel).*

**1** Press **RESTART** to clear alarms and begin the test. Verify that:
  A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating a signal is present).
  B. FIREBERD 6000's **FRM SYNC** LED is illuminated (if **FRM SYNC** is not illuminated, go back to **Step 2a** and select the appropriate frame format).

*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

# Table 1 – Analysis Results

| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| **T-CARRIER** | RX ABCD | Receive ABCD bits |

*Table 2 is a list of INTERFACE STATUS LEDs. When illuminated each of the status LEDs mean the following:*

# Table 2 – Interface Status LEDs

| Illuminated Status LED | Description |
|------------------------|-------------|
| **CODE** | Illuminates when B8ZS coding is being received. |
| **ALM 1** | Illuminates when a Yellow Alarm is detected. |
| **ALM 2** | Illuminates when an Excess Zeros Alarm is detected. |

*NOTE: Using this mode, you may check the integrity of the circuit by inserting and monitoring voice traffic, and monitoring and transmitting signaling bits on individual channels within the T1/FT1 bit stream. Using this mode gives a quick check of the integrity of the circuit and verifies proper signaling sequences. For example, you may set the signaling bits for on-hook and then verify that proper off-hook bits are being returned.*

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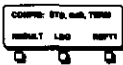
*FIREBERD 6000 Setup*

# ANSI T1.403 PRMs with the 41440A Interface

*The following procedure outlines how to connect the FIREBERD 6000 with a 41440A interface to the network in order to perform a T1/FT1 In-Service ANSI T1.403 PRM test. Please read the entire procedure BEFORE starting.*

* **WARNING** – Set up the FIREBERD 6000 **BEFORE** connecting to the network.
* By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.
* ▲ (up-arrow key) is used to return to the previous menu selection.
* Use the **MENU** softkey to scroll through the options until you reach **INTF SETUP** (LED beside it is illuminated). Then follow the steps below:

*NOTE: The ANSI T1.403 PRM Option must be installed in the FIREBERD 6000 to perform this test.*

## Part 1 – Interface Setup

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | T1/FT1 | Access the T1/FT1 interface. | |
| 2 | CONFIG | Access the **CONFIGURATION** menu. | |
| 2a | FRAME | Scroll through the list and set to **ESF** framing. | |
| 2b | CODE | Scroll through the list until you reach the appropriate coding of your circuit (e.g., B8ZS or AMI). | |
| 2c | INPUT | Scroll through the list and set to **DSXMON** (assuming DSX access). | |
| 2d | MORE | See additional selections. | |
| 2e | RESULT | Scroll through the list and set to **LIV**. | |
| 2f | REFT1 | Scroll through the list and set to **BRDG**. | |
| 2g | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the T1/FT1 main menu. | |
| 3 | MODE | Access the **MODE** menu. | |
| 3a | MORE | Press *twice* to access additional selections. | |
| 3b | T1.403 | Receive/generate PRMs. | |
| 4 | ENTER | Press **ENTER** on the keypad to return to the main menu. | |
| 5 | ANALYSIS MODE | Select **CONTINUOUS**. | |

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# Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|

1    Press **RESTART** to clear alarms and begin the test. Verify that:
    A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating a signal is present).
    B. FIREBERD 6000's **FRM SYNC** LED is illuminated (if **FRM SYNC** is not illuminated, go back to **Step 2a** and select the appropriate frame format).

*Table 1 lists 14 ANSI T1.403 ANALYSIS RESULTS which are provided by the FIREBERD 6000.*

# Table 1 – Analysis Results

| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| T-CARRIER | F FR ES | Far-End Frame Error Seconds |
| | F F SES | Far-End Severely Errored Framing Seconds |
| | F BPV S | Far-End BPV Seconds |
| | F SLP S | Far-End Controlled Slip Seconds |
| | F CRC E | Far-End CRC Error Events |
| | F SI CRC | Far-End CRC 1 Bin |
| | F LO CRC | Far-End CRC 2 to 5 Bin |
| | F MD CRC | Far-End CRC 6 to 10 Bin |
| | F MH CRC | Far-End CRC 11 to 100 Bin |
| | F HI CRC | Far-End CRC 101 to 319 Bin |
| | F SV CRC | Far-End CRC 320 to 333 Bin |
| | F HS CRC | Far-End Severely High CRC Bin |
| | PRM TIM | Far-End Performance Report Seconds |
| | PAY SRC | Far-End Payload Source/Loopback |

*Table 2 is a list of INTERFACE STATUS LEDs. When illuminated each of the status LEDs mean the following:*

# Table 2 – Interface Status LEDs

| Illuminated Status LED | Description |
|------------------------|-------------|
| **CODE** | Illuminates when B8ZS coding is being received. |
| **ALM 1** | Illuminates when a Yellow Alarm is detected. |
| **ALM 2** | Illuminates when an Excess Zeros Alarm is detected. |

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*FIREBERD 6000 Setup*
# 2M In-Service Monitoring

*The following procedure outlines how to connect the FIREBERD 6000 with a 41800 interface to the network in order to perform a 2.048M In-Service Monitoring test. Please read the entire procedure BEFORE starting.*

- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *▲ (up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:*

## Part 1 – Interface Setup

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | 2M/Nx64 | Access the 2M/Nx64 interface. | |
| 2 | CONFIG | Access the CONFIGURATION menu. | |
| 2a | FRAME | Scroll through the list until you reach the appropriate framing of your circuit (e.g., framed, unframed, CRC4, or TS16). | |
| 2b | MORE | See additional selections. | |
| 2c | RESULT | Scroll through the list and set to LIVE. | |
| 2d | INPUT | Scroll through the list and set to MON. | |
| 2e | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 2M/Nx64 main menu. | |
| 3 | MODE | Access the MODE menu. | |
| 3a | FULL2M | Monitor the entire 2M bandwidth. | |
| 4 | ENTER | Press ENTER on the keypad to return to the main menu. | |
| 5 | ANALYSIS MODE | Select CONTINUOUS. | |

## Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|
| 1 | Press RESTART to clear alarms and begin the test. Verify that:<br>A. FIREBERD 6000's PATTERN SYNC LED is illuminated (indicating a signal is present).<br>B. FIREBERD 6000's FRM SYNC LED is illuminated (if FRM SYNC is not illuminated, go back to Step 2a and select the appropriate frame format). |

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FB6000-2M.In-Service/Card1.1/3.97

*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

# Table 1 – Analysis Results

| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| **T-CARRIER** | FAS ERR | FAS Errors |
| | MFAS ERR | MFAS Errors (if TS16 is active) |
| | REBE ERR | REBE Errors |
| | BIT SLIP | Bit Slips (used with REFT1) |
| | CODE ERR | Code Errors (per CCITT 0.161) |
| **SIGNAL** | +LVL dB | Positive Receive Signal Level |
| | -LVL dB | Negative Receive Signal Level |
| | RCV FREQ | Receive Frequency |

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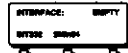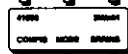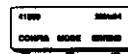
*FIREBERD 6000 Setup*
# 2M/Nx64 Out-of-Service BERT

*The following procedure outlines how to connect the FIREBERD 6000 with a 41800 interface to the network in order to perform an end-to-end 2.048M Out-of-Service test. Please read the entire procedure BEFORE starting.*

- **WARNING** – Set up the FIREBERD 6000 BEFORE connecting to the network.
- By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.
- ▲ (up-arrow key) is used to return to the previous menu selection.
- Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:
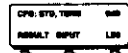
## Part 1 – Interface Setup

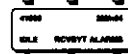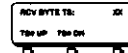| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | 2M/Nx64 | Access the 2M/Nx64 interface. | |
| 2 | CONFIG | Access the **CONFIGURATION** menu. | |
| 2a | FRAME | Scroll through the list until you reach the appropriate framing of your circuit (e.g., framed, unframed, CRC4, or TS16). | |
| 2b | MORE | See additional selections. | |
| 2c | RESULT | Scroll through the list and set to **STD**. | |
| 2d | INPUT | Scroll through the list and set to **TERM**. | |
| 2e | LBO | Scroll through the list and set the Line Build Out to **0 dB**. | |
| 2f | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 2M/Nx64 main menu. | |
| 3 | MODE | Access the **MODE** menu. | |
| 3a | FULL2M | Test the entire 2M bandwidth. | |
| 3b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 2M/Nx64 main menu. | |
| 4 | ERRINS | Access the **ERROR INSERTION** menu. Press **TYPE** and turn each error type **OFF**. | |
| 4a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 2M/Nx64 main menu. | |
| 5 | MORE | See additional selections. | |
| 5a | RCVBYT | Select the timeslot 0-31 to be displayed in the RX BYTE result (allows you to see the bytes on a specific timeslot). | |
| 5b | TS# UP<br>TS# DN | Select the timeslot you wish to monitor. | |

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## Part 1 – Interface Setup (cont.)

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 5c | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 2M/Nx64 main menu. | |
| 6 | ALARMS | Access the **ALARMS** menu. Turn each type of error **OFF**. | |
| 6a | MORE | See additional selections. | |
| 6b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 2M/Nx64 main menu. | |
| 6c | MORE | See additional selections. | |
| 7 | FRWORD | Access the **FRAMING BIT** menu. | |
| 7a | NFAS | Edit the binary digits using the keypad. Press **ENTER** to set the digits (see the note below). | |
| 7b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the Frame Word menu. | |
| 7c | NFAS | Edit the binary digits using the keypad. Press **ENTER** to set the digits (see the note below). | |
| 8 | ENTER | Press **ENTER** on the keypad to return to the main menu. | |
| 9 | DATA | Scroll through the list and select a data pattern. $2^{15}$-1 is the recommended data pattern. Additional stress patterns are located on the front panel or in **AUX 41**. (Press the **MORE** key as necessary in **AUX 41** to see the additional patterns.) | |
| 10 | GEN CLK | Scroll through the list and set to **SYNTH** to generate internal timing or **INTF** to recover timing from the network. | |
| 11 | ANALYSIS MODE | Select **CONTINUOUS**. | |

*NOTE: Multiframe alignment signals allow receiving equipment to align the appropriate ABCD signaling bits with their corresponding voice channels. Setting the NFAS and MFAS bit will enable you to determine whether the correct signaling bits are being sent throughout the network.*

## Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|
| 1 | Press **RESTART** to clear alarms and begin the test. Verify that: <br> A. FIREBERD 6000's **PATTERN SYNC LED** is illuminated (indicating a signal is present). <br> B. FIREBERD 6000's **FRM SYNC LED** is illuminated (if **FRM SYNC** is not illuminated, go back to **Step 2a** and select the appropriate frame format). |

# 2M/Nx64 Out-of-Service BERT (cont.)

*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

## Table 1 – Analysis Results

| Category | Result Name | Result Description |
|---|---|---|
| ERROR | BIT ERRS | Bit Errors |
| | BER | Bit Error Rate |
| | PAT SLIP | Pattern Slips |
| T-CARRIER | CODE ERR | Code Errors |
| | FRA ERR | Frame Errors |
| | CRC ERR | CRC Errors |
| | FRA LOSS | Frame Loss |
| | BIT SLIP | Bit Slips (used with REFT1) |
| | RCV NFAS | Received NFAS Word |
| | RCV MFAS | Received MFAS Word (if TS16 is active) |
| | RCV BYTE | Received Timeslot Byte |
| SIGNAL | +LVL dB | Positive Receive Signal Level |
| | -LVL dB | Negative Receive Signal Level |
| | GEN FREQ | Generator Clock Frequency |
| | RCV FREQ | Receive Frequency |
| ALARM | AIS SEC | AIS Seconds |
| | FAS DIS S | FAS Distant Alarm Seconds |
| | MF DIS S | MFAS Distant Alarm Seconds |

*Table 2 is a list of INTERFACE STATUS LEDs. When illuminated each of the status LEDs mean the following:*

## Table 2 – Interface Status LEDs

| Illuminated Status LED | Description |
|---|---|
| CODE | Not in use on the 41800 interface. |
| ALM 1 | Illuminates when a FAS Distant Alarm is being received (the A-bit is set to 1). |
| ALM 2 | Illuminates when AIS is being received. |

*FIREBERD 6000 Setup*
# Out-of-Service V.35 Testing

*The following procedure outlines how to connect the FIREBERD 6000 with a V.35/449/X.21 interface (42522) to either the DSU/CSU or the (Nx)DSU-DP for out-of-service straight away and loopback BERT analysis. Please read the entire procedure BEFORE starting.*

- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *▲ (up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:*

## Part 1 – Interface Setup

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | 449V35 | Access the 449V.35 interface. | |
| 2 | TYPE | Access the **DATA TYPE** menu. Set to **V35** or **306** (see the note below for an explanation of the difference). | |
| 2a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 449/V35 main menu. | |
| 3 | EMULAT | Access the **EMULATION** menu. | |
| 3a | DTE | Select **DTE** emulation. | |
| 3b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the 449/V35 main menu. | |
| 4 | SIG | Set **LL** (local loop) or **RL** (remote loop) on, depending on the DCE you want to loopback. | |
| 5 | ENTER | Press **ENTER** on the keyboard to return to the main menu. | |
| 6 | DATA | Scroll through the list and select a data pattern. *NOTE: Either a 511 or 2047 pattern is recommended for data rates between 2.4 kb/s and 256 kb/s.* | |
| 7 | GEN CLK | Scroll through the list and set to **INTF** to receive clock from the DCE. | |
| 8 | TIMING MODE | Scroll through the list and set to **SYNC**. | |
| 9 | ANALYSIS MODE | Select **CONTINUOUS**. | |
| 10 | RTS/DTR | Press to illuminate both signal leads, setting them to **HIGH**. | |

*NOTE: The selection between V.35 or 306 is dependent upon the timing to the circuit under test. With a V.35 circuit, the serial clock transmit external (SCTE) timing lead is disabled, whereas with a 306 this lead is enabled. Similar procedures may be followed for RS-449 and X.21 datacom testing (your selection of TYPE in Step 2 will change).*

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# Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|

1    Press **RESTART** to clear alarms and begin the test. Verify that:
     A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating a signal is present).

*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

# Table 1 – Analysis Results

| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| **ERROR** | BIT ERRS | Change in Logical Value of Bit |
| | BER | Ratio of Number of Errored Bits to Receive Bits |
| | PAT SLIP | An Addition or Deletion of Bits |
| **PERFORMANCE** | GERR-SEC | Errored Seconds |
| **TIME** | EA SEC | Errored Analysis Seconds |
| **SIGNAL** | RCV FREQ | Receive Frequency |
| | GEN FREQ | Generate Frequency |
| **ALARM** | PAT LOSS | Count of Pattern Losses |
| | C-D CHA | Clock/Data Phase Changes |
| | DAT LOSS | Count of Data Losses |
| | CLK LOSS | Count of Clock Losses |

*NOTE: If you are receiving a large number of errors, your received clock may be faulty. If the received clock is missing or unusable (a large number of C-D CHA changes is also an indication), the FIREBERD 6000 Recovered Clock Option (Option 6004) enables the DTE to extract a clock from the received data. This will enable you to determine whether the transmission line or the clock is the source of errors. See the setup below for using the Recovered Clock Option:*

*1. Set TIMING MODE to RECOVD (this enables the FIREBERD 6000 to recover timing from transitions in the incoming data).*

*2. Press the MENU softkey and scroll through the list and set to SYNTH FREQ.*

*3. Using the keypad, enter the expected receive frequency. Press the ENTER key to select this frequency.*

*NOTE: The Recovered Clock Option only operates up to rates of 520 kb/s.*

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*FIREBERD 6000 Setup*
# DS0A Out-of-Service Testing

*The following procedure outlines how to connect the FIREBERD 6000 with a 30678A interface to the network in order to perform out-of-service BERT analysis on DS0A circuits from OCU-DP access jacks. Please read the entire procedure BEFORE starting.*

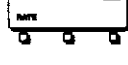- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *▲ (up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:*

## Part 1 – Interface Setup

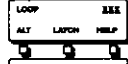| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | DS0A/B | Access the DS0A/B interface. | |
| 2 | MODE | Access the **DATA FORMAT** menu. | |
| 2a | DS0A | Select a **DS0A** format. | |
| 2b | RATE | Scroll through the list until you reach the appropriate data rate of your circuit (e.g., 2, 4, 4.8, 9.6, 19.2, or 56 kb/s). | |
| 2c | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the DS0A/B menu. | |
| 3 | INTFC | Select the **INTERFACE CODING** menu:<br>• Select **LNEAR** to test the local DSU/CSU (if access is at the OCU-DP).<br>• Select **LFAR** to test the distant DSU/CSU (if access is at the OCU-DP).<br>• Select **BIPOL** to provide signals on the tip and ring leads (if access is at the DS0-DP). | |
| 3a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the previous menu. | |
| 4 | LOOP | Access the **LOOP SELECTION** menu. | |
| 4a | LATCH | Select **LATCHING LOOP** codes. | |
| 4a1 | TYPE | Scroll through the list and set to **CHAN**. | |
| 4a2 | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the DS0A/B menu. | |
| 4a3 | MORE | See additional selections. | |

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# Part 1 – Interface Setup *(cont.)*

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 5 | AUX | Access the **AUXILIARY FUNCTIONS** menu. | |
| 5a | BYTE | Set to **OFF**. | |
| 5a1 | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the previous menu. | |
| 5b | MJU | Verify/select branches **OFF**. | |
| 5b1 | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the previous menu. | |
| 5c | THRU | Set to **OFF**. | |
| 5c1 | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the previous menu. | |
| 5c2 | MORE | See additional selections. | |
| 5d | ERRGEN | Set to **OFF**. | |
| 5d1 | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the previous menu. | |
| 5e | CHAN | Set to **PRI** (in order to test the primary channel). | |
| 6 | ENTER | Press **ENTER** on the keypad to return to the main menu. | |
| 7 | DATA | Recommended data patterns are 63, 511, 2047, and DDS 1-6 stress patterns (located in AUX 41). | |
| 8 | ANALYSIS MODE | Select **CONTINUOUS**. | |

# Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|

*Once the FIREBERD 6000 is properly configured and cabled, initiate a loop code sequence by pressing the LOOP UP softkey. At the conclusion of the test, press the LOOP DOWN softkey to restore the circuit to normal operation.*

1    Press **RESTART** to clear alarms and begin the test. Verify that:
   A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating a signal is present).
   B. FIREBERD 6000's **FRM SYNC** LED is illuminated (only if a 19.2 kb/s DS0A signal is present).

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# DS0A Out-of-Service Testing (cont.)

*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

## Table 1 – Analysis Results

| Category | Result Name | Result Description |
|---|---|---|
| **ERROR** | BIT ERRS | Change in Logical Value of Bit |
| | BER | Ratio of Number of Errored Bits to Received Bits |
| | PAT SLIP | An Addition or Deletion of Bits |
| **ALARM** | PAT LOSS | Count of Pattern Losses |
| | DAT LOSS | Count of Data Losses |
| | CLK LOSS | Count of Clock Losses |
| | PWR LOSS | Count of Power Losses |
| **SIGNAL** | REC FREQ | Receive Frequency |
| | GEN FREQ | Generate Frequency |
| | RCV CODE | Reportable DDS Code |
| | RCV BYTE | Current Byte |

*Table 2 is a list of INTERFACE STATUS LEDs. When illuminated each of the status LEDs mean the following:*

## Table 2 – Interface Status LEDs

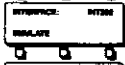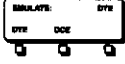| Illuminated Status LED | Description |
|---|---|
| **FRM SYNC** | Illuminates when the interface is configured to receive a DS0B signal at any rate or a DS0A at 19.2 kb/s and the interface has synchronized to the appropriate framing. |
| **CODE** | Illuminates when the interface has initiated an alternating loopback and is receiving the correct loop code bytes interleaved with the test data. |
| **ALM 1** | Illuminates when the **RX INPUT** jack is terminated and operating with bipolar signals. |

*FIREBERD 6000 Setup*
# Out-of-Service RS-232 Testing

*The following procedure outlines how to connect the FIREBERD 6000 with its internal RS-232 interface to either the modem, DSU/CSU, or (Nx)DSU-DP for out-of-service straight away and loopback BERT analysis. Please read the entire procedure BEFORE starting.*

- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps below:*

## Part 1 – Interface Setup

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 1 | INT232 | Access the RS-232 data interface. | |
| 2 | EMULAT | Access the **EMULATION** menu. | |
| 2a | DTE | Select **DTE** emulation. | |
| 3 | ENTER | Press **ENTER** on the keypad to return to the main menu. | |
| 4 | DATA | Scroll through the list and select a data pattern. *NOTE: Either 511 or 2047 pattern is recommended for data rates between 2.4 kb/s and 64 kb/s.* | |
| 5 | GEN CLK | Scroll though the list and set to **INTF** to receive clock from the DCE. | |
| 6 | TIMING MODE | Scroll through the list and set to **SYNC**. | |
| 7 | ANALYSIS MODE | Select **CONTINUOUS**. | |
| 8 | RTS/DTR | Press to illuminate both signal leads, setting them to **HIGH**. | |

## Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|
| 1 | Press **RESTART** to clear alarms and begin the test. Verify that: |
| | A. FIREBERD 6000's **PATTERN SYNC LED** is illuminated (indicating a signal is present). |

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*Table 1 lists important ANAYLSIS RESULTS that should be checked.*

## ▌ *Table 1 – Analysis Results*

| Category | Result Name | Result Description |
|---|---|---|
| **ERROR** | BIT ERRS | Change in Logical Value of Bit |
| | BER | Ratio of Number of Errored Bits to Receive Bits |
| | PAT SLIP | An Addition or Deletion of Bits |
| **PERFORMANCE** | GERR-SEC | Errored Seconds |
| **TIME** | EA SEC | Error Analysis Seconds |
| **SIGNAL** | RCV FREQ | Receive Frequency |
| | GEN FREQ | Generate Frequency |
| **ALARM** | PAT LOSS | Count of Pattern Losses |
| | C-D CHA | Clock/Data Phase Changes |
| | DAT LOSS | Count of Data Losses |
| | CLK LOSS | Count of Clock Losses |

*NOTE: If you are receiving a large number of errors, your received clock may be faulty. If the received clock is missing or unusable (a large number of C-D CHA changes is also an indication), the FIREBERD 6000 Recovered Clock Option (Option 6004) enables the DTE to extract a clock from the received data. This will enable you to determine whether the transmission line or the clock is the source of errors. See the setup below for using the Recovered Clock Option:*

*1. Set **TIMING MODE** to **RECOVD** (this enables the FIREBERD 6000 to recover timing from transitions in the incoming data).*

*2. Press the **MENU** softkey and scroll through the list and set to **SYNTH FREQ**.*

*3. Using the keypad, enter the expected receive frequency. Press the **ENTER** key to select this frequency.*

*NOTE: The Recovered Clock Option only operates up to rates of 520 kb/s.*

FB6000-RS232/Card1.1/3.97

*FIREBERD 6000 Setup*
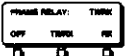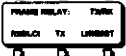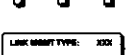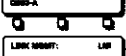
# Frame Relay Out-of-Service

*The following procedure outlines how to connect the FIREBERD 6000, with the appropriate physical interface, to the network in order to perform a Frame Relay Out-of-Service test. Please read the entire procedure BEFORE starting.*

- **WARNING** – *Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- ▲ *(up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps according to the appropriate quick card or application note before beginning the procedures below:*

*NOTE: The Rev. L software must be installed in the FIREBERD 6000 to perform this test.*

## Part 1 – Auxiliary 12: Frame Relay

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|

*Press the MENU softkey until AUXILIARY is selected. Press 1, 2, and ENTER (BER analysis as well as selections with the DATA, ERROR INSERT, and TIMING MODE keys are disabled). Follow the instructions below in the frame relay (AUX 12) menu:*

| Step | Softkey | Action/Purpose |
|------|---------|----------------|
| 1 | TX/RX | Put the FIREBERD 6000 into a transmit and receive mode. |
| 2 | LNKMGT | Access the **LINK MANAGEMENT** menu. |
| 3 | TYPE | Select the appropriate link management specification (e.g., 617-D, LMI, or Q933-A). |
| 3a | MORE | See additional selections. |
| 3b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the LINK MANAGEMENT menu. |
| 4 | RATE | Access the **STATUS POLL** interval menu. Using the **UP/DOWN** softkeys, set the value to the corresponding network value (e.g., 10 seconds). |
| 4a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the LINK MANAGEMENT menu. |
| 5 | FULL | Access the **FULL STATUS** menu. Use the keypad to enter how many status polls should pass before a full status request is transmitted (e.g., 6). |
| 5a | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the FRAME RELAY main menu. |
| 6 | RXDLCI | Access the **DLCI** results monitoring menu. Use the keypad to select the DLCI to receive results on. Press **ENTER** to set this value. |
| 6a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the FRAME RELAY main menu. |

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WWW Address: http://www.ttc.com
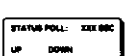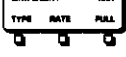
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FB6000-Fr.Relay.Out-Service/Card1.1/3.97

# ▌ Part 1 – Auxiliary 12: Frame Relay (cont.)

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 7 | TX | Access the **FRAME TRANSMIT** menu. | |
| 8 | HEADER | Access the **HEADER** menu. | |
| 8a | DLCI | Access the **TRANSMIT DLCI** menu. | |
| 8b | MORE | See additional selections. | |
| 8c | CLRALL | Clear all previously set transmit DLCIs. Use the keypad to select the DLCI frames to transmit over. Press **ENTER** to set the value. | |
| 8d | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the FRAME TRANSMIT menu. | |
| 9 | LOAD | Access the **FRAME LOAD** menu. | |
| 9a | FIXED | Use the keypad to set the transmit frame rate (in kb/s) to 10% of the line rate. Press **ENTER** to set the value. *NOTE: This value may change based on your configuration.* | |
| 9b | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the FRAME TRANSMIT menu. | |
| 10 | LENGTH | Use the keypad to set the transmit frame minimum and maximum length (in units of octets). Press **ENTER** to set the values. | |
| 11 | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the FRAME RELAY main menu. | |

# ▌ Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|
| 1 | Press **RESTART** to clear alarms and begin the test. Verify that:<br>A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating that the FIREBERD 6000 is receiving valid frame relay frames). |

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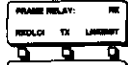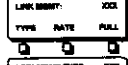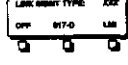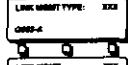
*FIREBERD 6000 Setup*
# Frame Relay In-Service

*The following procedure outlines how to connect the FIREBERD 6000, with the appropriate physical interface, to the network in order to perform a Frame Relay In-Service monitoring test. Please read the entire procedure BEFORE starting.*

- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *▲ (up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps according to the appropriate quick card or application note before beginning the procedures below:*

*NOTE: The Rev. L software must be installed in the FIREBERD 6000 to perform this test.*

## Part 1 – Auxiliary 12: Frame Relay

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|

*Press the MENU softkey until AUXILIARY is selected. Press 1, 2, and ENTER (BER analysis as well as selections with the DATA, ERROR INSERT, and TIMING MODE keys are disabled). Follow the instructions below in the frame relay (AUX 12) menu:*

| Step | Softkey | Action/Purpose |
|------|---------|----------------|
| 1 | RX | Put the FIREBERD 6000 into **RECEIVE** mode. |
| 2 | LNKMGT | Access the **LINK MANAGEMENT** menu. |
| 3 | TYPE | Select the appropriate link management specification (e.g., 617-D, LMI, or Q933-A). |
| 3a | MORE | See additional selections. |
| 3b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the LINK MANAGEMENT menu. |
| 4 | RATE | Access the **STATUS POLL** interval menu. Using the **UP/DOWN** softkeys, set the value to the corresponding network value (e.g., 10 seconds). |
| 4a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the LINK MANAGEMENT menu. |
| 5 | FULL | Access the **FULL STATUS** menu. Use the keypad to enter how many status polls should pass before a full status request is transmitted (e.g., 6). |
| 5a | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the FRAME RELAY main menu. |

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# Part 1 – Auxiliary 12: Frame Relay *(cont.)*

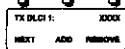| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 6 | RXDLCI | Access the **DLCI** results monitoring menu. Use the keypad to select the DLCI to receive results on. Press **ENTER** to set this value. | |
| 6a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the FRAME RELAY main menu. | |

# Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|
| 1 | Press **RESTART** to clear alarms and begin the test. Verify that:<br>A. FIREBERD 6000's **PATTERN SYNC LED** is illuminated (indicating that the FIREBERD 6000 is receiving valid frame relay frames). |

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FB6000-Fr.Relay.In-Service/Card1.1/3.97

*FIREBERD 6000 Setup*
# Frame Relay IP Ping

*The following procedure outlines how to connect the FIREBERD 6000, with the appropriate physical interface, to the network in order to perform a Frame Relay IP Ping test. Please read the entire procedure BEFORE starting.*
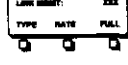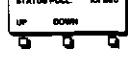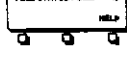
- *WARNING – Set up the FIREBERD 6000 BEFORE connecting to the network.*
- *By continuously pressing the appropriate softkey, you will scroll through the menu until you reach your desired setting.*
- *▲ (up-arrow key) is used to return to the previous menu selection.*
- *Use the MENU softkey to scroll through the options until you reach INTF SETUP (LED beside it is illuminated). Then follow the steps according to the appropriate quick card or application note before beginning the procedures below:*

*NOTE: The Rev. L software must be installed in the FIREBERD 6000 to perform this test.*

## Part 1 – Auxiliary 12: Frame Relay

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|

*Press the MENU softkey until AUXILIARY is selected. Press 1, 2, and ENTER (BER analysis as well as selections with the DATA, ERROR INSERT, and TIMING MODE keys are disabled). Follow the instructions below in the frame relay (AUX 12) menu:*

| Step | Softkey | Action/Purpose |
|------|---------|----------------|
| 1 | TX/RX | Put the FIREBERD 6000 into a transmit and receive mode. |
| 2 | LNKMGT | Access the **LINK MANAGEMENT** menu. |
| 3 | TYPE | Select the appropriate link management specification (e.g., 617-D, LMI, or Q933-A). |
| 3a | MORE | See additional selections. |
| 3b | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the LINK MANAGEMENT menu. |
| 4 | RATE | Access the **STATUS POLL** interval menu. Using the **UP/DOWN** softkeys, set the value to the corresponding network value (e.g., 10 seconds). |
| 4a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the LINK MANAGEMENT menu. |
| 5 | FULL | Access the **FULL STATUS** menu. Use the keypad to enter how many status polls should pass before a full status request is transmitted (e.g., 6). |
| 5a | ▲ | Press the ▲ (up-arrow key) on the keypad *twice* to return to the FRAME RELAY main menu. |
| 6 | RXDLCI | Access the **DLCI** results monitoring menu. Use the keypad to select the DLCI to receive results on. Press **ENTER** to set this value. The FIREBERD 6000 will automatically transmit InARPs/Pings on this receive DLCI. |

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FB6000-Fr.Relay.Ping/Card1.1/3.97

# Part 1 – Auxiliary 12: Frame Relay (cont.)

| Step | Softkey | Action/Purpose | Setup Display |
|------|---------|----------------|---------------|
| 6a | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the FRAME RELAY main menu. | |
| 7 | TX | Access the **FRAME TRANSMIT** menu. | |
| 8 | LOAD | Access the **FRAME LOAD** menu. | |
| 8a | MORE | See additional selections. | |
| 8b | PING | Access the **IP PING** menu. | |
| 8c | SRC | Use the keypad to enter the source IP address. After keying in the digits, press **ENTER** to set these values. | |
| 8d | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the Ping menu. | |
| 8e | DEST | Access the destination menu. | |
| 8f | MODE | Toggle between **STATIC** and **DYNAMIC**. If set to **STATIC**, use the keypad to enter the destination address. If set to **DYNAMIC**, the unit will send InARP message to determine destination address. | |
| 8g | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the Ping menu. | |
| 8h | LENGTH | Use the keypad to enter the frame length. Press **ENTER** to set each of these values. | |
| 8i | ▲ | Press the ▲ (up-arrow key) on the keypad to return to the Ping menu. | |
| 8j | MORE | See additional selections. | |
| 8k | ENCAP | Choose an encapsulation method (e.g., NLPID, NONE, or ETHER). | |
| 9 | ▲ | Press the ▲ (up-arrow key) on the keypad *five times* to return to the FRAME RELAY main menu. | |

# Part 2 – Performing the Test

| Step | Action/Results |
|------|----------------|
| 1 | Press **RESTART** to clear alarms and begin the test. Verify that: <br> A. FIREBERD 6000's **PATTERN SYNC** LED is illuminated (indicating that the FIREBERD 6000 is receiving valid frame relay frames). |

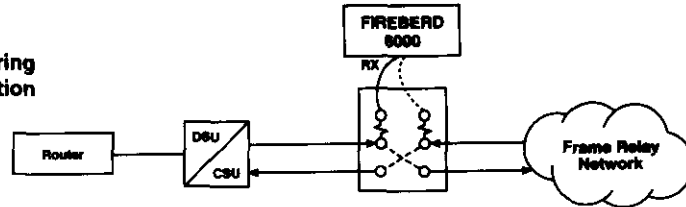**TTC Technical Support**
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FB6000-Fr.Relay.Ping/Card1.1/3.97

*FIREBERD 6000 Application*
# Frame Relay In-Service Monitoring

*The following procedure outlines how to use the FIREBERD 6000 to perform in-service monitoring of frame relay traffic. Please read the entire procedure BEFORE starting.*

**Frame Relay In-Service Monitoring
at the UNI Application**



## Part 1 – Monitoring Results at the UNI

| Category | Result Name | Result Description |
|----------|-------------|--------------------|

*Configure the FIREBERD 6000 for frame relay testing according to the FIREBERD 6000 Frame Relay In-Service Setup card.*
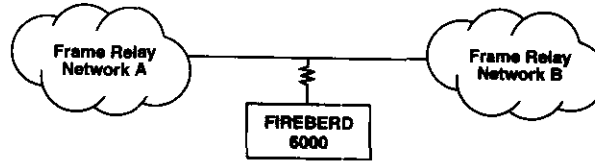
| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| **ERROR** | FRM CNT | Result should increment. If not, frames are not being transmitted through the network. |
| | LMI MSGS | Result should increment. If not, LMI "keep alive" signals are not being sent between the CPE and POP switch. |
| | LMI ERRS | Result should equal zero. If not, handshaking between the CPE and the POP switch is not occuring properly. |
| | LMI TMOS | Result should equal zero. If not, possibly the transmit link between the CPE and POP switch is down, or the receive link from the switch to the CPE is down, or the POP switch is incorrectly configured. STATUS POLL settings may also be incorrect. |
| | PVC STAT | **Should read "ACTIVE".** This indicates that the network has established a PVC and frames can be transmitted through the POP switch. **If not**, then look below for an explanation of other results:<br>• "          " – DLCI is undefined<br>• INACTIVE – DLCI is inactive<br>• NEW – DLCI was just added<br>• DELETED – DLCI was just deleted<br>*NOTE: This result is only valid when monitoring traffic in the direction from the network to the customer on one DLCI (traffic from the customer to the network does not contain PVC status information).* |
| **PERFORMANCE** | AVG%UTIL | This result should be greater than zero. It is the average percentage of link utilization on the received channel since the start of the test calculated as the number of FRM OCTS divided by the total number of octets received. |
| | AVG TPUT | This result should correspond to the rate being transmitted by the far-end. It is the average received throughput since the start of the test, calculated as the total UDF bits divided by the total seconds. This result can be used to estimate the Committed Information Rate (CIR). |

FB6000-Fr.Relay.In.MON/Card1.1/3.97

Frame Relay In-Service Monitoring
at the NNI Application



# Part 2 – Monitoring Results at the NNI

| Category | Result Name | Result Description | |
|---|---|---|---|

*Configure the FIREBERD 6000 for frame relay testing according to the FIREBERD 6000* **Frame Relay In-Service Setup** *card.*

**ERROR**  FRM CNT — Result should increment. If not, frames are not being transmitted between frame relay networks.

LMI ENQS — Result should increment. If not, LMI status enquires are not being sent between frame relay switches.

LMI STAT — Result should increment. If not, LMI status responses are not being sent between frame relay switches.

LMI ERRS — Result should equal zero. If not, handshaking between the two frame relay switches is not occurring properly.

LMI TMOS — Result should equal zero. If not, possibly the transmit link or the receive link between the two switches is down, or one of the switches is incorrectly configured. STATUS POLL settings may also be incorrect.

PVC STAT — **Should read** "**ACTIVE**". This indicates that a PVC exists between frame relay networks and that frames can be transmitted between frame relay switches. **If not**, then look below for an explanation of other results:

- "          " – DLCI is undefined
- INACTIVE  – DLCI is inactive
- NEW        – DLCI was just added
- DELETED  – DLCI was just deleted

**PERFORMANCE** AVG%UTIL — This result should be greater than zero. It is the average percentage of link utilization on the received channel since the start of the test calculated as the number of FRM OCTS divided by the total number of octets received.

AVG TPUT — This result should correspond to the rate being transmitted by the far-end. It is the average received throughput since the start of the test, calculated as the total UDF bits divided by the total seconds. This result can be used to estimate the Committed Information Rate (CIR).

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*FIREBERD 6000 Application*

# Frame Relay Local Connectivity Test

## (Link Management Verification)

*The following procedure outlines how to use the FIREBERD 6000 to verify proper link management between the CPE and the POP switch within the frame relay network. Please read the entire procedure BEFORE starting.*



**Frame Relay Local Connectivity Application**
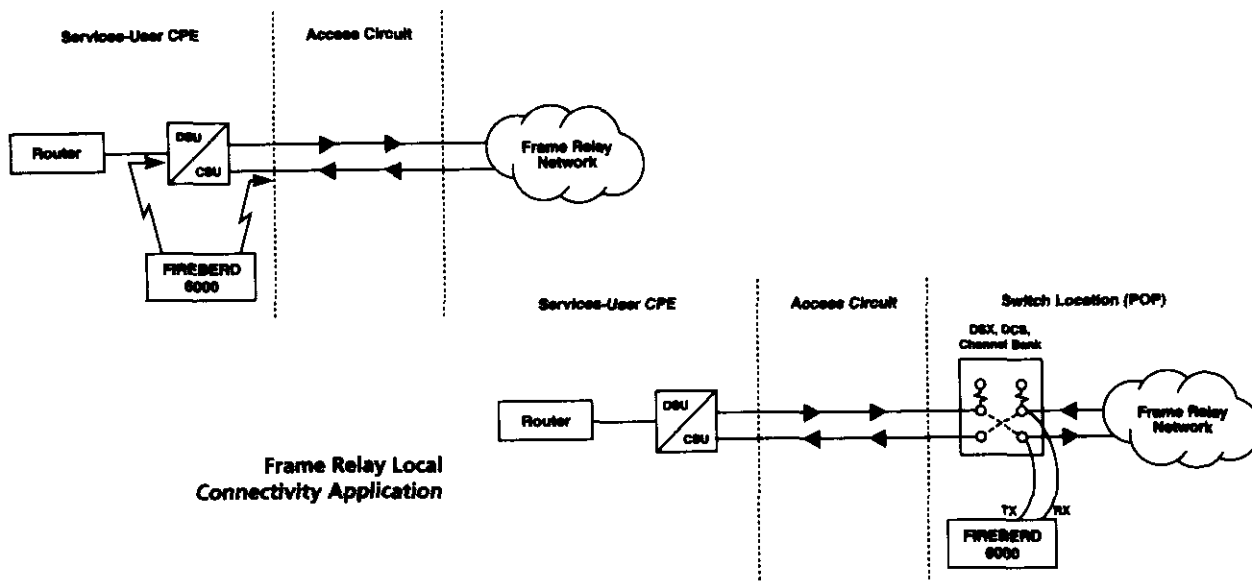
## Part 1 – Verify Link Management

| Category | Result Name | Result Description |
|----------|-------------|--------------------|

*Configure the FIREBERD 6000 for frame relay testing according to the FIREBERD 6000 Frame Relay Out-of-Service Setup card.*

**ERROR**     LMI ERRS     Result should equal zero. If not, handshaking between the CPE and the POP switch is not occurring properly.

                 LMI TMOS     Result should equal zero. If not, possibly the transmit link between the FIREBERD 6000 and the network is down, or the receive link from the switch to you is down, or the POP switch is incorrectly configured. STATUS POLL settings may also be incorrect.

                 LMI MSGS     Result should increment. If not, LMI "keep alive" signals are not being sent between the CPE and the POP switch.

*NOTE: Link management must be operating properly BEFORE performing Part 2.*

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## Part 2 – Verify Each PVC

| Category | Result Name | Result Description | |
|----------|-------------|--------------------|--|

*Use **Step 6** of the FIREBERD 6000 **Frame Relay Out-of-Service Setup** card to set the next available DLCI to receive PVC information. Continue this step until all available DLCIs are tested.*

**ERROR**  PVC STAT  **Should read** "ACTIVE". This indicates that the network has established a PVC and frames can be transmitted through the POP switch. **If not**, then look below for an explanation of other results:

- " " – DLCI is undefined
- INACTIVE – DLCI is inactive
- NEW – DLCI was just added
- DELETED – DLCI was just deleted

*NOTE: This result is **not** valid when ALL has been selected under RXDLCI.*

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*FIREBERD 6000 Application*

# Frame Relay End-to-End Connectivity Test

*The following procedure outlines how to use the FIREBERD 6000 to verify the end-to-end transmission of frame relay traffic. Please read the entire procedure BEFORE starting.*

Services-User
Location A

Services-User
Location B

| FIREBERD 6000 | Frame Relay Network | FIREBERD 6000 |

**Frame Relay End-to-End
Connectivity Application**

## Part 1 – Verify Proper Transmission of Frames

| Category | Result Name | Result Description |
|----------|-------------|--------------------|

*Configure **BOTH** FIREBERD 6000s for frame relay testing according to the FIREBERD 6000 **Frame Relay Out-of-Service Setup** card. The procedures below should be followed for **BOTH** FIREBERD 6000s.*

*Use **Steps 9a** and **10** of the FIREBERD 6000 **Frame Relay Out-of-Service Setup** card to set the load to **FIXED** and the frame minimum and maximum length to **250 OCTETS**, respectively.*

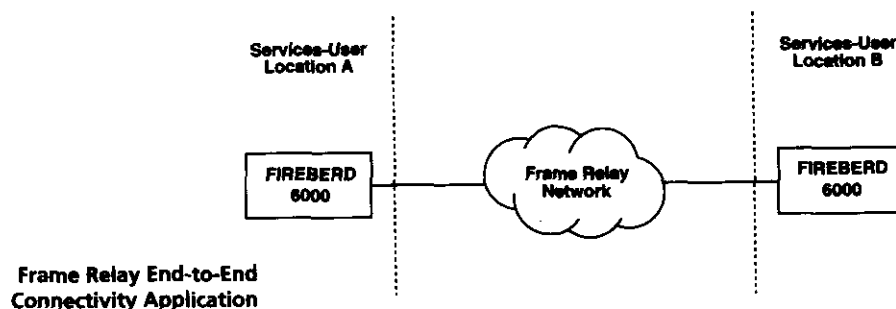| Category | Result Name | Result Description |
|----------|-------------|--------------------|
| **ERROR** | LOST FRM | Result should equal zero. If result is incrementing, then frames are being discarded by the network. Possible causes of lost frames: (1) there are bit errors at the physical layer, or (2) there is congestion in the switching network – frames are dropped. |
| | FRM CNT | Result should rapidly increment, indicating that valid test frames are being received. If not, the far-end FIREBERD 6000 is not transmitting test frames or the switching network is not configured properly. |
| **PERFORMANCE** | AVG TPUT | Should correspond to the FIXED rate being transmitted by the far-end FIREBERD 6000 (assuming this fixed rate is below the near-end line rate). |
| | AVG%UTL | Result should equal 10% (assuming both ends have equal line rates and the frame relay transmit rate is equal to 10% of the line rate). |

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# Part 2 – Verify the Committed Information Rate (CIR)

| Category | Result Name | Result Description | |
|----------|-------------|-------------------|---|

*Use **Step 9a** of the FIREBERD 6000 **Frame Relay Out-of-Service Setup** card to increase the fixed rate to the CIR.*

| | | |
|----------|-------------|-------------------|
| **ERROR** | DE FRMS | Result should be incrementing, indicating that the switch has set the DE bit (e.g., 1) due to transmission above the CIR. If not, DE functionality has not been implemented by the network or there is not transmission above the CIR. |
| | FRM CNT | Result should rapidly increment, indicating that valid test frames are being received. If not, the far-end FIREBERD 6000 is not transmitting valid test frames or the frame relay network is not configured properly. |
| | LOST FRM | Result should equal zero. If result is incrementing, then frames are being discarded by the network. Possible causes of lost frames: (1) there are bit errors at the physical layer, or (2) there is congestion in the switching network – frames are dropped. If there is congestion, FECN FRMs may increase. |

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*FIREBERD 6000 Application*
# Frame Relay IP Ping Test

*The following procedure outlines how to use the FIREBERD 6000 to verify end-to-end connectivity of a new PVC via an in-service IP Ping test. Please read the entire procedure BEFORE starting.*



**Frame Relay IP Ping Test Application**
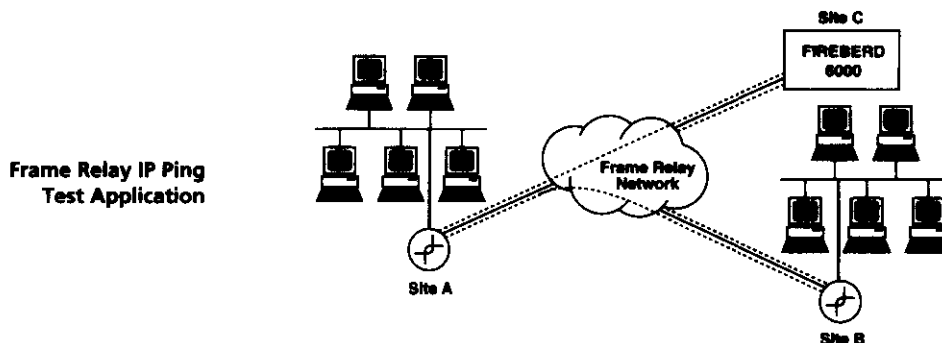
## Part 1 – Verify Ping Echo Transmission/Proper Echo Reply Response

| Category | Result Name | Result Description |
|---|---|---|

*Configure the FIREBERD 6000 for frame relay testing according to the FIREBERD 6000 Frame Relay IP Ping Setup card.*

| Category | Result Name | Result Description |
|---|---|---|
| **ERROR** | TX PNG | Result should increment. If not, your FIREBERD 6000 is not transmitting Ping packets. |
| | ECHO PNG | Result should increment. If not, the far-end device may not be sending Ping packets successfully to your FIREBERD 6000. |
| | LOST PNG | Result should not increment. If so, your FIREBERD 6000 is not receiving proper echo replies in response to transmitted Ping echo packets. |

## Part 2 – Determine Roundtrip Delay Throughout the Network

| Category | Result Name | Result Description |
|---|---|---|

*Monitor the following results:*

| Category | Result Name | Result Description |
|---|---|---|
| **PERFORMANCE** | MIN PNG | Minimum time taken for a Ping echo packet to be transmitted and an echo reply received. |
| | MAX PNG | Maximum time taken for a Ping echo packet to be transmitted and an echo reply received. |
| | AVG PNG | Average time taken for a Ping echo packet to be transmitted and an echo reply received. |

**TTC Technical Support**
**1-800-638-2049**

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