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## Maintenance and Troubleshooting

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This section discusses unit maintenance and troubleshooting for the DMD2050 Universal Satellite Modem.



### CAUTION!!

*The DMD2050 contains a Lithium Battery. **DANGER OF EXPLOSION** exists if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries in accordance with local and national regulations.*

## 6.0 Periodic Maintenance

There is no external fuse on the DMD2050. The fuse is located on the power supply assembly inside the case, and replacement is not intended in the field.

### 6.0.1 Clock Adjustment

The DMD2050 allows for internal VCO speed adjustment from the front panel. Clock adjustment should be performed only when an internal clock source has insufficient accuracy for the custom modem application.

## 6.1 Troubleshooting

Should a unit be suspected of a defect in field operations after all interface signals are verified, the correct procedure is to replace the unit with another known working DMD2050. If this does not cure the problem, wiring or power should be suspect.

The following is a brief list of possible problems that could be caused by failures of the modem or by improper setup and configuration for the type of service. The list is arranged by possible symptoms exhibited by the modem.

Symptom	Possible Cause
The Modem will not acquire the incoming carrier:	There is an improper receive input to modem.
	The Receive Carrier Level is too low.
	The Receive Carrier Frequency is outside of the acquisition range.
	The Transmit Carrier is incompatible.
	Modem is in Test Mode.
The Async Port is not configured correctly.	The switches may not be set in the correct positions.

## 6.1.1 Alarm Faults

### 6.1.1.1 Major Tx Alarms

Alarm	Possible Cause
FPGA CFG	Indicates a transmit FPGA hardware failure.
DSP CFG	Indicates a transmit FPGA failure.
SCT Clock PLL	Indicates that the Tx SCT Clock PLL is not locked. This alarm will flash on during certain modem parameter changes. A solid indication points toward a configuration problem within the modem.
SYM Clock PLL	Indicates that the Tx Symbol Clock PLL is not locked. This alarm will flash on during certain modem parameter changes. A solid indication points toward a problem with the incoming clock to the modem (SCTE).
LB Synth PLL	Indicates that the Tx L-Band Synthesizer is not locked. This alarm will flash on during certain modem parameter changes. A solid indication points toward a configuration problem within the modem.
IF Synth PLL	Indicates that the Tx IF Synthesizer is not locked. This alarm will flash on during certain modem parameter changes. A solid indication points toward a configuration problem within the modem.
Ethernet WAN	Indicates that the WAN Port is down.

### 6.1.1.2 Major Rx Alarms

Alarm	Possible Cause
FPGA CFG	Indicates a receive FPGA hardware failure.
DSP CFG	Indicates a receive DSP failure.
SIGNAL LOCK	Indicates that the demod is unable to lock to a signal.
FRAME LOCK	Indicates that the Framing Unit is unable to find the expected framing pattern.
MULTIFRAME LOCK	Indicates that the Framing Unit is unable to find the expected framing pattern.
LB SYNTH PLL	Indicates that the Rx L-Band Synthesizer is not locked. This alarm will flash on during certain modem parameter changes. A solid indication points toward a configuration problem within the modem.
IF SYNTH PLL	Indicates that the Rx IF Synthesizer is not locked. This alarm will flash on during certain modem parameter changes. A solid indication points toward a configuration problem within the modem.
Ethernet WAN	Indicates that the WAN Port is down.

### 6.1.1.3 Minor Tx Alarms

Alarm	Possible Cause
TERR CLK ACT	Indicates no Terrestrial Clock activity.
TERR DATA ACT	Indicates no Tx Data activity.
TX TERR AIS	Indicates that AIS has been detected in the Tx Data Stream.
DnI FRAME LOCK	When running Drop Mode, indicates that the framing unit is unable to find the exported terrestrial framing pattern.
DnI M-FRAME LOCK	When running Drop Mode, indicates that the framing unit is unable to find the exported terrestrial framing pattern.
TX DVB FRAME LOCK	Indicates that the Tx Input Data Stream Framing does not match the user selected Tx Terr Framing. Incorrect Tx Terr Framing selected. Incorrectly framed Tx Input Data Stream.
BUC CURRENT	Indicates that current is either below or above the threshold limits of the LNB, as specified by the modem. Only active when voltage is enabled.
BUC VOLTAGE	Indicates that the voltage is not functioning correctly when voltage is enabled.

#### 6.1.1.4 Minor Rx Alarms

Alarm	Possible Cause
BUFF UNDERFLOW	Indicates that a Doppler Buffer underflow has occurred.
BUFF NEAR EMPTY	Indicates that the Doppler Buffer is about to underflow.
BUFF NEAR FULL	Indicates that the Doppler Buffer is about to overflow.
BUFF OVERFLOW	Indicates that a Doppler Buffer overflow has occurred.
RX DATA ACTIVITY	Indicates that there is no Rx Data activity. For the Ethernet Interface, indicates that no Ethernet port is active (no cable is plugged in).
SAT AIS	Indicates that AIS has been detected in the receive satellite data stream.
DnI FRAME LOCK	Indicates if drop/insert data is frame locked.
DnI M-FRAME LOCK	Indicates if drop/insert data has multiframe lock.
INSERT CRC	Indicates if the Circular Redundancy Check is passing in PCM-30C and PCM-31C Modes.
T1/E1 SIGNALING	Indicates that the T1/E1 Signal is not locked.
IFEC LOCK	Indicates that the Inner Codec is not locked.
OFEC LOCK	Indicates that the Reed-Solomon Decoder is not locked.
INTERLEAVER	Indicates that the Reed-Solomon Interleaver is not synchronized.
EBNO (dB)	Indicates that the Eb/No is outside of limits.
IBS BER	Indicates that there are more than one in 1000 bits in error in IBS mode.
RX DVB FRAME LOCK	Indicates that the Rx Satellite Data Stream Framing is not DVB.
LNB CURRENT	Indicates that current is either below or above the threshold limits of the BUC, as specified by the modem. Only active when voltage is enabled.
LNB VOLTAGE	Indicates that voltage is not functioning correctly when voltage is enabled.

### 6.1.1.5 Drop and Insert Alarms

Alarm	Possible Cause
Multiframe Lock	The insert framer is not in sync.
CRC Lock	An Insert CRC Fault occurred. Valid in T1-ESF, PCM-30, or PCM-30C Modes.
T1 Signaling	An Insert T1 Yellow Fault occurred. Valid in T1-ESF, T1D4, or SCL-96 Modes.
E1 FAS (E1 Frame Acquisition Sync)	An E1 FAS Fault occurred. Valid in PCM-30, or PCM-30C, PCM-31, or PCM-31C Modes.
E1 MFAS (E1 Multi-Frame Acquisition Sync)	An E1 MFAS Fault occurred. Valid in PCM-30, or PCM-30C, PCM-31, or PCM-31C Modes.

### 6.1.1.6 Common Major Alarms

Alarm	Possible Cause
TERR FPGA CFG	Indicates an Interface Card FPGA configuration failure probably caused by a missing, or wrong file.
CODEC FPGA CFG	Indicates Turbo Codec Card FPGA configuration failure probably caused by a missing, or wrong file.
+1.5V RX SUPPLY	Displays the measured voltage of the 1.5 Volt Rx power bus located inside the modem.
+1.5V TX SUPPLY	Displays the measured voltage of the 1.5 Volt Tx power bus located inside the modem.
+3.3V SUPPLY	Displays the measured voltage of the +3.3 Volt power bus located inside the modem.
+5V SUPPLY	Displays the measured voltage of the +5 Volt power bus located inside the modem.
+12V SUPPLY	Displays the measured voltage of the +12 Volt power bus located inside the modem.
+20V SUPPLY	Displays the measured voltage of the +20 Volt power bus located inside the modem.
EXT CLOCK ACT	Indicates that the External Clock is not active.
EXT REF ACT	Indicates no activity on the External Reference.
EXT REF LOCK	Indicates that the External Reference PLL is not locked.

## 6.1.2 Alarm Masks

The DMD2050 performs a high degree of self-monitoring and fault isolation. The alarms for these faults are separated into the following three categories:

- Active Alarms
- Common Equipment Alarms
- Backward Alarms

A feature exists that allows the user to 'Mask' out certain alarms as explained below. Alarms that are recorded in the event buffer are the same as the alarm buffer.



When an alarm is masked, the Front Panel LEDs and the Fault Relays do not get asserted, but the Alarm will still be displayed. This feature is very helpful during debugging or to lock out a failure of which the user is already aware.

### 6.1.2.1 Active Alarms

#### 6.1.2.1.1 Major Alarms

Major Alarms indicate a modem hardware failure. Major Alarms may flash briefly during modem configuration changes and during power-up but should not stay illuminated. Alarms are grouped into Transmit and Receive Alarms - Transmit and Receive are completely independent.

#### 6.1.2.1.2 Minor Alarms

Minor Alarms indicate that a problem may persist outside the modem such as loss of Terrestrial Clock, loss of terrestrial data activity, or a detected transmit or receive AIS condition. Alarms are grouped into Transmit and Receive Alarms - Transmit and Receive are completely independent.

#### 6.1.2.1.3 Common Equipment Faults

Common equipment faults indicate hardware or configuration problems in the modem that effect both transmit and receive operation. Most common faults indicate a hardware failure within the modem, such as a bad power supply. Common faults for the External Reference and External Clock indicate a bad modem configuration, not a hardware failure.

### 6.1.2.2 Latched Alarms

Latched Alarms are used to catch intermittent failures. If a fault occurs, the fault indication will be latched even if the alarm goes away. After the modem is configured and running, it is recommended that the Latched Alarms be cleared as a final step.

### 6.1.2.3 Backward Alarms

Backward Alarms are alarms that are fed back to or received from the other end of the satellite link. In IBS Mode (including Drop & Insert), Backward Alarm 1 is the only one used. It would be received if the distant end demod drops lock.

## 6.2 IBS Fault Conditions and Actions

Figure 6-10 and Table 6-4 illustrate the IBS Fault Conditions and Actions to be taken at the Earth Station, at the Terrestrial Data Stream, and the Satellite. These faults include those detected on the Terrestrial link and those detected from the satellite.

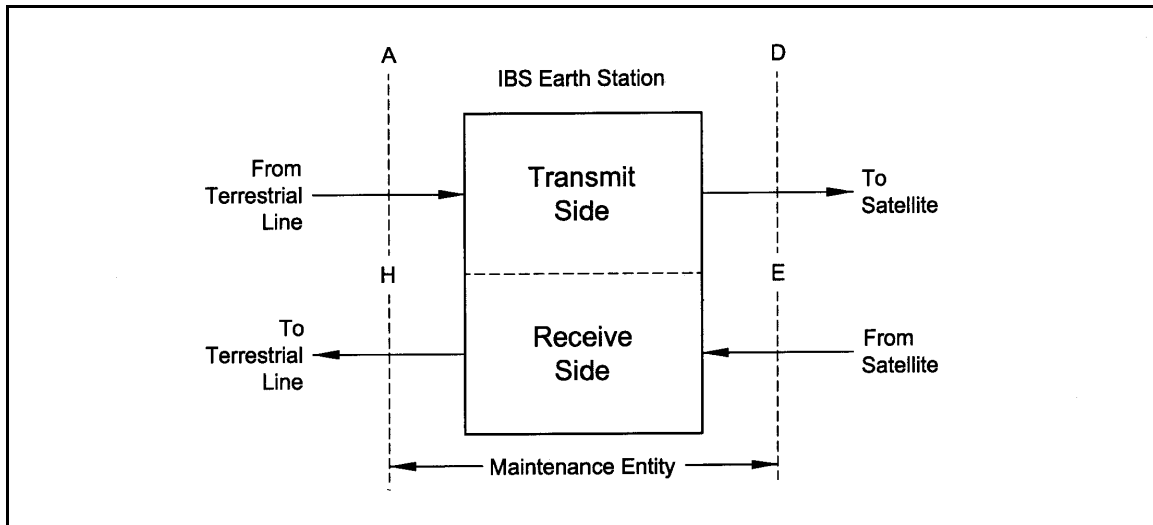


Figure 6-10. IBS Alarm Concept

**Table 6-4. IBS Fault Conditions and Actions (includes Drop and Insert)**

<b>Fault Detected on Terrestrial Link (Across Interface A)</b>	<b>Action In Earth Station</b>	<b>Action to Terrestrial (Across Interface H)</b>	<b>Action to Satellite (Across Interface D)</b>
FA1 - Loss of Terrestrial Input	AS1, 2 - IBS Prompt, Service Alarm	AH2 - '1' in Bit 3 of NFAS TSO, Yellow Alarm	AD1 - AIS in Relevant TSs
FA2 - Loss of Terrestrial Signaling	AS1 - - IBS Prompt Alarm	AH2 - '1' in Bit 3 of NFAS TSO, Yellow Alarm	AD3 - '1111' in Relevant TS16's
FA3 - Loss of Terrestrial Frame	AS1 - - IBS Prompt Alarm	AH2 - '1' in Bit 3 of NFAS TSO, Yellow Alarm	AD1 - AIS in Relevant TSs
FA4 - Loss of Terrestrial Multiframe	AS1 - IBS Prompt Alarm	AH2 - '1' in Bit 3 of NFAS TSO, Yellow Alarm	AD3 - '1111' in Relevant TS16's
FA5 - BER of $1 \times 10^{-3}$ or Greater on Terrestrial Input	AS1 - IBS Prompt Alarm	AH2 - '1' in Bit 3 of NFAS TSO, Yellow Alarm	AD1 - AIS in Relevant TSs
FA6 - Alarm Indication Received on Terrestrial Input	---	---	AD2 - '1' in Bit 3 of Byte 32
<b>Fault Detected From Satellite (Across Interface E)</b>			
FA1 - Loss of Satellite Signal Input	AS1, 2 - IBS Prompt, Service Alarm	AH1, 3 - AIS in TSs, '1111' in TS16	AD2 - '1' in Bit 3 of Byte 32
FA2 - Loss of Satellite Frame	AS1, 2 - IBS Prompt, Service Alarm	AH1, 3 - AIS in TSs, '1111' in TS16	AD2 - '1' in Bit 3 of Byte 32
FA3 - Loss of Satellite Multiframe	AS1, 2 - IBS Prompt, Service Alarm	AH1, 3 - AIS in TSs, '1111' in TS16	AD2 - '1' in Bit 3 of Byte 32
FA4 - BER of $1 \times 10^{-3}$ or Greater From Satellite Input	AS1, 2 - IBS Prompt, Service Alarm	AH1, 3 - AIS in TSs, '1111' in TS16	AD2 - '1' in Bit 3 of Byte 32
FA5 - Alarm Indication Received From Satellite Input	AS2 - IBS Service Alarm	AH2 - '1' in Bit 3 of NFAS TSO, Yellow Alarm	---