Chapter 6. Maintenance and Troubleshooting

6.1 Periodic Maintenance

6.1.1 Battery Replacement

WARNING: DANGER OF EXPLOSION if the battery is incorrectly replaced. The unit contains a Lithium Battery. Replace it with an equivalent battery that is specified by the manufacturer. Dispose of used batteries in compliance with local and national regulations.

6.1.2 Clock Adjustment

Adjust the clock only when an internal clock source is not accurate. Adjust internal VCO speed from the front panel.

6.1.3 Fuse Replacement

CAUTION: Always replace the fuses with the correct fuse type and rating. Use correct fuses to help prevent damage to the equipment.

A DMD2050E with a front panel switch has an external fuse on the rear of the unit, inside the power connector, behind the small plastic cover.

A DMD2050E with a rear panel power switch does not have an external fuse.

6.2 Troubleshooting

6.2.1 Basic Troubleshooting Procedures

1) Make sure all interface signals are correct.
2) If the unit is not operating correctly, replace it with an equivalent unit that is known to operate correctly.
3) If replacing the unit does not correct the problem, examine the power supply and electrical wiring for problems.

6.2.2 Troubleshooting Symptoms and Causes

6.2.2.1 Symptom: The modem does not acquire the incoming carrier.

Causes:

- There is an incorrect 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.
- The modem is in test mode.

6.2.2.2 Symptom: The ASYNC port is not configured correctly.

Causes:

- The switches are set incorrectly.

6.3 Alarms

6.3.1 Major Transmit Alarms

Alarm	Description	Status
FPGA CFG	A transmit FPGA hardware failure exists.	{Pass/Fail, Unmasked/Masked}
DSP CFG	A transmit FPGA failure exists.	{Pass/Fail, Unmasked/Masked}
SCT Clock PLL	The Tx SCT Clock PLL is not locked. This alarm flashes on during certain parameter changes. If the alarm is on constantly, there is a configuration problem within the modem.	{Pass/Fail, Unmasked/Masked}
SYM Clock PLL	The Tx Symbol Clock PLL is not locked. This alarm flashes on during certain parameter changes. If the alarm is on constantly, there is a configuration problem with the incoming clock to the modem (SCTE).	{Pass/Fail, Unmasked/Masked}
LB Synth PLL	The Tx L-Band Synthesizer is not locked. This alarm flashes on during certain parameter changes. If the alarm is on constantly, there is a configuration problem within the modem.	{Pass/Fail, Unmasked/Masked}
IF Synth PLL	The Tx IF Synthesizer is not locked. This alarm flashes on during certain parameter changes. If the alarm is on constantly, there is a configuration problem within the modem.	{Pass/Fail, Unmasked/Masked}
Forced Alarm	Allows the user to disable or enable forcing of the Tx summary alarm.	{DISABLED, ENABLED}
Ethernet WAN	The WAN Port is not operating.	{Pass/Fail, Unmasked/Masked}

6.3.2 Major Rx Alarms

Alarm	Description	Status
FPGA CFG	A receive FPGA hardware failure exists.	{Pass/Fail, Unmasked/Masked}
DSP CFG	A receive DSP failure exists.	{Pass/Fail, Unmasked/Masked}
SIGNAL LOCK	The demod cannot lock to a signal.	{Pass/Fail, Unmasked/Masked}
INPUT LVL THRESH	Indicates the Rx level has fallen below the input threshold level.	{Pass/Fail, Marked/Unmarked}

Alarm	Description	Status
FRAME LOCK	The Framing Unit cannot find the expected framing pattern.	{Pass/Fail, Unmasked/Masked}
MULTIFRAME LOCK	The Framing Unit cannot find the expected framing pattern.	{Pass/Fail, Unmasked/Masked}
LB SYNTH PLL	The Rx L-Band Synthesizer is not locked. This alarm flashes on during certain parameter changes. If the alarm is on constantly, there is a configuration problem within the modem.	{Pass/Fail, Unmasked/Masked}
IF SYNTH PLL	The Rx IF Synthesizer is not locked. This alarm flashes on during certain parameter changes. If the alarm is on constantly, there is a configuration problem within the modem	{Pass/Fail, Unmasked/Masked}
Forced Alarm	Allows the user to disable or enable forcing of the Rx summary alarm.	{DISABLED, ENABLED}
Ethernet WAN	The WAN Port is not operating.	{Pass/Fail, Unmasked/Masked}

6.3.3 Minor Tx Alarms

Alarm	Description	Status
TERR CLK ACT	No Terrestrial Clock activity exists.	{Pass/Fail, Unmasked/Masked}
TERR DATA ACT	No Tx Data activity exists.	{Pass/Fail, Unmasked/Masked}
TX TERR AIS	AIS is found in the Tx Data Stream.	{Pass/Fail, Unmasked/Masked}
Dnl FRAME LOCK	In Drop Mode, the framing unit cannot find the exported terrestrial framing pattern.	{Pass/Fail, Unmasked/Masked}
Dnl M-FRAME LOCK	In Drop Mode, the framing unit cannot find the exported terrestrial framing pattern.	{Pass/Fail, Unmasked/Masked}
DROP CRC	Indicates if the Circular Redundancy Check is passing in PCM-30C and PCM-31C Modes	{Pass/Fail, Unmasked/Masked}
TX DVB FRAME LOCK	The Tx Input Data Stream Framing does not match the selected Tx Terr Framing. An incorrect Tx Terr Framing is selected. Incorrectly framed The Tx Input Data Stream is framed incorrectly.	{Pass/Fail, Unmasked/Masked}
TX CLK SRC FALLBK	Indicates that the clock resource has fallen.	{Pass/Fail, Unmasked/Masked}
TPC CONFLICT CHK	Indicates that the TPC parameters are not configured correctly. (only visible when TPC enabled)	{Pass/Fail, Unmasked/Masked}

6.3.3.1 Minor Rx Alarms

Alarm	Description	Status
BUFF UNDERFLOW	A Doppler Buffer underflow occurred.	{Pass/Fail, Unmasked/Masked}
BUFF NEAR EMPTY	The Doppler Buffer is about to underflow.	{Pass/Fail, Unmasked/Masked}
BUFF NEAR FULL	The Doppler Buffer is about to overflow.	{Pass/Fail, Unmasked/Masked}
BUFF OVERFLOW	A Doppler Buffer overflow occurred.	{Pass/Fail, Unmasked/Masked}
RX DATA ACTIVITY	There is no Rx Data activity. For the Ethernet Interface, no Ethernet port is active (no cable is plugged in).	{Pass/Fail, Unmasked/Masked}
SAT AIS	AIS is detected in the receive satellite data stream.	{Pass/Fail, Unmasked/Masked}
DnI FRAME LOCK	Drop/insert data is frame locked.	{Pass/Fail, Unmasked/Masked}
DnI M-FRAME LOCK	Drop/insert data has multiframe lock.	{Pass/Fail, Unmasked/Masked}
INSERT CRC	The Circular Redundancy Check is passing in PCM-30C and PCM-31C Modes.	{Pass/Fail, Unmasked/Masked}
T1/E1 SIGNALING	The T1/E1 Signal is not locked.	{Pass/Fail, Unmasked/Masked}
IFEC LOCK	The Inner Codec is not locked.	{Pass/Fail, Unmasked/Masked}
OFEC LOCK	The Reed-Solomon Decoder is not locked.	{Pass/Fail, Unmasked/Masked}
INTERLEAVER	The Reed-Solomon Interleaver is not synchronized.	{Pass/Fail, Unmasked/Masked}
RS UNCORR, WORD	Indicates status of the Reed-Solomon uncoded word fault.	{Pass/Fail, Unmasked/Masked}
LDPC IFEC LOCK	Indicates that the Framing Unit is unable to find the expected framing pattern.	{Pass/Fail, Unmasked/Masked}
EBNO (dB)	The Eb/No is outside of limits.	{Pass/Fail, Unmasked/Masked}
RX AGC LEVEL	Indicates Rx level is below allowable limits.	{Pass/Fail, Unmasked/Masked}

Alarm	Description	Status
IBS BER	More than 1 in 1000 bits in error exist in IBS mode.	{Pass/Fail, Unmasked/Masked}
RX DVB FRAME LOCK	The Rx Satellite Data Stream Framing is not DVB.	{Pass/Fail, Unmasked/Masked}

6.3.3.2 Drop and Insert Alarms

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

6.3.3.3 Common Major Alarms

Alarm	Description	Status
TERR FPGA CFG	An Interface Card FPGA configuration failure exists, possibly caused by a missing or incorrect file.	{Pass/Fail, Unmasked/Masked}
CODEC FPGA CFG	A Turbo Codec Card FPGA configuration failure exists, possibly caused by a missing or incorrect file.	{Pass/Fail, Unmasked/Masked}
CODEC DEV CFG	Indicates Turbo Codec Card ASIC configuration failure.	{Pass/Fail, Unmasked/Masked}
+1.5V RX SUPPLY	Shows the measured voltage of the 1.5 Volt Rx power bus inside the modem.	{Pass/Fail, Unmasked/Masked}
+1.5V TX SUPPLY	Shows the measured voltage of the 1.5 Volt Tx power bus inside the modem.	{Pass/Fail, Unmasked/Masked}
+3.3V SUPPLY	Shows the measured voltage of the +3.3 Volt power bus inside the modem.	{Pass/Fail, Unmasked/Masked}
+5V SUPPLY	Shows the measured voltage of the +5 Volt power bus inside the modem.	{Pass/Fail, Unmasked/Masked}

Alarm	Description	Status
+12V SUPPLY	Shows the measured voltage of the +12 Volt power bus inside the modem.	{Pass/Fail, Unmasked/Masked}
+20V SUPPLY	Shows the measured voltage of the +20 Volt power bus inside the modem.	{Pass/Fail, Unmasked/Masked}
EXT CLOCK ACT	The External Clock is not active.	{Pass/Fail, Unmasked/Masked}
EXT REF ACT	No activity exists on the External Reference.	{Pass/Fail, Unmasked/Masked}
EXT REF LOCK	The External Reference PLL is not locked.	{Pass/Fail, Unmasked/Masked}
ETHERNET WAN	Displays the current status of the WAN	{Pass/Fail, Unmasked/Masked}
TRANSEC PWR TEST	Displays the results of the Power On Self Test (POST) done by the TRANSEC module when installed.	{Pass/Fail, Unmasked/Masked}

6.4 Alarm Masks

The DMD2050E self-monitors and isolates faults. Alarms for these faults are categorized as:

- Active Alarms
- Common Equipment Alarms
- Backward Alarms

CAUTION

Masked alarms can cause unwanted effects in the performance of the unit.

You can mask certain alarms. Masking alarms can be helpful during debugging, or when you need to to lock out a known failure.

When an alarm is masked, the front panel LEDs and the Fault Relays are not activated, but the Alarm is shown in the display.

6.4.1 Active Alarms

6.4.1.1 Major Alarms

If a major alarm is on constantly, the modem has a hardware failure.

A major alarm flashes briefly during configuration changes and power-up. No action is necessary.

Alarms are grouped into transmit and receive alarms. Transmit and receive alarms are completely independent of each other.

6.4.1.2 Minor Alarms

Minor alarms show that a problem exists outside of the modem. Examples of such problems are:

- Loss of terrestrial clock
- Loss of terrestrial data activity
- Transmit or receive AIS condition

Alarms are grouped into transmit and receive alarms. Transmit and receive alarms are completely independent of each other.

6.4.2 Common Equipment Alarms

Common equipment alarms occur when the unit has problems that affect both transmit and receive operations. Most common equipment alarms occur when there is a hardware failure in the unit, such as a malfunctioning power supply.

External reference and external clock alarms occur when a unit has a configuration problem, not a hardware failure.

6.4.3 Latched Alarms

Latched alarms are used for intermittent failures. If a fault occurs, the fault indication is “latched” even if the alarm goes away.

After the unit is configured and operating correctly, clear any latched alarms.

CLEAR LATCHED ((ENTER))	Press ENTER to reset the latched alarms.

These alarms are latched to catch intermittent failures:

TX MAJOR (menu)	{Pass/Fail}	TX MINOR (menu)	{Pass/Fail}
FPGA CFG		TERR CLK ACT	
DSP CFG		TERR DATA ACT	
SCT CLOCK PLL		TX TERR AIS	
SYM CLOCK PLL		DnI FRAME LOCK	
LB SYNTH PLL		DnI M-FRAME LOCK	
IF SYNTH PLL		DROP CRC	
ETHERNET WAN		TX DVB FRM LOCK	
		TX CL,SRC FALLBK	
		TPC CONFLICT CHK	

RX MAJOR (menu)	{Pass/Fail}	RX MINOR (menu)	{Pass/Fail}
FPGA CFG		BUFF UNDERFLOW	
DSP CFG		BUFF NEAR EMPTY	
SIGNAL LOCK		BUFF NEAR FULL	
INPUT LVL THRESH		BUFF OVERFLOW	
FRAME LOCK		RX DATA ACTIVITY	

RX MAJOR (menu)	{Pass/Fail}	RX MINOR (menu)	{Pass/Fail}
MULTIFRAME LOCK		SAT AIS	
LB SYNTH PLL		DnI FRAME LOCK	
IF SYNTH PLL		DnI M-FRAME LOCK	
ETHERNET WAN		INSERT CRC	
		T1/E1 SIGNALING	
		IFEC LOCK	
		TPC CONFLICT CHK	
		OFEC LOCK	
		INTERLEAVER	
		RS UNCORR. WORD	
		EBNO	
		RX AGC LEVEL	
		IBS BER	
		RX DVB FRM LOCK	

COMMON (menu)	{Pass/Fail}	VOLTAGE (menu)	{Pass/Fail}
TERR FPGA CFG		+1.5V RX SUPPLY	
CODEC FPGA CFG		+1.5V TX SUPPLY	
CODEC DEV CFG		+3.3V SUPPLY	
EXT CLOCK ACT		+5V SUPPLY	
EXT REF ACT		+12V SUPPLY	
EXT REF LOCK		-12V SUPPLY	
ETHERNET WAN		+20V SUPPLY	
TRANSEC PWR TEST			

NOTE

These alarms show the status of the alarms RECEIVED FROM the distant satellite end.

IDR1 SAT ALARM 1	{PASS, FAIL}	
IDR1 SAT ALARM 2	{PASS, FAIL}	
IDR1 SAT ALARM 3	{PASS, FAIL}	
IDR1 SAT ALARM 4	{PASS, FAIL}	
IBS SAT ALARM	{PASS, FAIL}	
T1E1 SATTERR ALM	{PASS, FAIL}	
SAT MAP SUMMARY	{NONE, BK 1; BK 2; BK 1&2; BK 3; BK 1&3; BK 2&3; BK 1&2&3; BK 4; BK 1&4; BK 2&4; BK 1&2&4; BK 3&4; BK 1&3&4; BK 2&3&4; BK 1&2&3&4}	Summary alarm is given when criteria meets the selection above.

NOTE

These alarms show the control status of the alarms TRANSMITTED TO the distant satellite end.

IDR1 SAT CNTRL	{STNDRD, FRC ON, FRC OFF}
STNDRD:	Set Alarm functions in a normal configuration
FRC ON:	Forces an ON alarm status that is transmitted to the distant end.
FRC OFF:	Forces an OFF alarm status that is transmitted to the distant end.
IDR2 SAT CNTRL	{STNDRD, FRC ON, FRC OFF}
IDR3 SAT CNTRL	{STNDRD, FRC ON, FRC OFF}
IDR4 SAT CNTRL	{STNDRD, FRC ON, FRC OFF}
IBS SAT CNTRL	{STNDRD, FRC ON, FRC OFF}
T1E1 TERR CNTRL	{STNDRD, FRC ON}
IBS TX PROMPT	{STNDRD, FRC ON}
IBS TX SERVICE	{STNDRD, FRC ON}

6.4.4 Backward Alarms

Backward alarms are received from the distant end of the satellite link.

In IBS mode (including Drop & Insert), Backward Alarm 1 is the only alarm used. If the demodulator at the distant end loses the signal lock, Backward Alarm 1 is received.

6.5 IBS Alarms and Actions

Figure 6-1 and Table 6-1show the IBS alarms and actions to be taken at the earth station, the terrestrial data stream and the satellite. These alarms include those detected on the terrestrial link and those detected from the satellite.

Figure 6-1. IBS Alarms

Table 6-1. IBS Fault Conditions and Actions (includes Drop and Insert)

Fault Detected on Terrestrial Link (Across Interface A)	Action In Earth Station	Action to Terrestrial (Across Interface H)	Action to Satellite (Across Interface D)
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 RelevantTS16s
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 TS16s
FA5 - BER of 1x 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 Received on Terrestrial Input	---	---	AD2 - ‘1’ in Bit 3 of Byte 32
Fault Detected From Satellite (Across Interface E)	**Action In Earth Station**	**Action to Terrestrial (Across Interface H)**	**Action to Satellite (Across Interface D)**
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 1E-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 Received From Satellite Input	AS2 - IBS Service Alarm	AH2 - ‘1’ in Bit 3 of NFAS TS0, Yellow Alarm	---