



AMT 75 Series High Speed Modem



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Introduction

Advantech's **AMT 75** High Speed Modem is a versatile and effective solution for any high speed environment.

The AMT-75 modem is designed using "Software Defined Radio" techniques to ensure unrivalled flexibility, and upgrade paths to meet the increasingly demanding requirements now and in the future.

Features

- Combines Advantech powerful DVB-S/S2 modulator and demodulator in a single 1 RU chassis.
- Powerful Forward Error Correction (FEC) choices compliant with DVB-S, DVB-DSNG, and DVB-S2. The DVB-S2 implementation includes 16APSK/32APSK and both 16k (SHORT) and 64k (NORMAL) FEC Block sizes
- 64QAM support is backed with powerful LDPC BCH implementation (4th generation turbo code) to provide 155Mbps high efficiency link.
- Also supports eTPC Turbo code for lower speed applications (up to 20Mbps).
- Supports standard Viterbi and Reed Solomon.
- Symbol Rates from 32ksps to 45Msps
- Symmetrical or asymmetrical support.
- Modulation and FEC options are all "soft key" controlled allowing simple field upgrades
- Excellent spurious performance
- L Band: 950 to 1750 MHz IF ranges
- L Band: 950 to 2000 Mhz IF ranges
- 70+/-18Mhz or 140+/-36Mhz IF ranges
- Wide range of Network Interface Cards (NIC):
 - EIA530/RS422
 - HSSI and multi-HSSI interfaces
 - 10/100Mbps Ethernet (IP routing or bridging support)
 - G.703 interfaces
 - Multi G703 interfaces
 - 1GigE L2 and bridging
 - STM1e support
- 1:1 and 1:10 redundancy switches available.
- Monitoring and control via Ethernet using Web Server, HTTP, Telnet or SNMP, or via terminal mode RS232.

Forward Error Correction (FEC)

Aside from the traditional FEC and modulations supported in DVB-S and DVB-DSNG, the AMT75 provides advanced DVB-S2 methods to improve the performance in satellite conditions. DVB-S2 is the latest open standard advanced satellite transmission technique from the DVB community. Among the key elements of DVB-S2 is its use of powerful FEC system based on concatenation of BCH (Bose-Chaudhuri-Hocquenghem) with LDPC (Low Density Parity Check) inner coding. The result is performance which is at times only 0.7dB from the Shannon limit.

Additionally, for lower speed applications, the AMT75 provides enhanced Turbo Product Code (eTPC).

Advanced Modulation modes

The AMT75 was among the first to provide advanced modulation modes such as 16APSK/32APSK supports to the DVB-S2 community. 64QAM is a new capability which is implemented using similar BCH and LDPC techniques originally intended for the high speed DVBS2 community.

Performance

The AMT75 performance gain realized by the combination of advanced modulation and FEC can be translated directly into higher data throughput, reduced antenna size or reduced satellite bandwidth, which significantly reduces transponder costs; provides more link margin or decrease antenna cost.

Coupled with wide range of interface Cards, the AMT75 can perform virtually any function under any environment.

The AMT75. Versatile. Effective. Affordable.



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Performance specifications

Data and code rates

DVB-S and Intelsat 308/309 coding

BPSK: 16kbps to 36Mbps

QPSK: 16kbps to 70Mbps

DVB-DSNG coding

QPSK: 64kbps to 70Mbps

OQPSK: 64kbps to 70Mbps

8PSK: 128kbps to 110Mbps

16QAM: 128kbps to 120Mbps

DVB-S2 short and normal FEC block coding

QPSK : 64kbps to 80Mbps

8PSK: 256kbps to 120Mbps

16APSK: 340kbps to 160Mbps

32APSK: 470kbps to 200Mbps

64QAM: 640kbps to 155Mbps

SHORT Block 16kbit 1/4*, 1/3*, 2/5*, 1/2*, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9

NORMAL Block 64kbit 1/4*, 1/3*, 2/5*, 1/2*, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

* Only available in QPSK according to DVB-S2 Specification

Roll off: 0.15, 0.20, 0.25, 0.30, 0.35

IF Output Connector:

Type N (f) 50 Ohm for L-band

BNC (f) for 70/140Mhz, 50 Ohm

Return Loss \geq 12dB

IF Input Connector:

Type N (f) 75 Ohm for L-band

Option: BNC (f) for 70/140Mhz. 50 Ohm

Return loss: \geq 10 dB

LNB Alarm for Short Circuit

RF Frequency:

L-band: 950 to 2000Mhz in 1Hz steps

Optional: 70+/-18Mhz and L-band

140+/-36Mhz and L-band

RF Output Power:

Range: +0 to -25 dBm, in 0.10 dB steps

Accuracy: +0.5 dB; Temp

Stability: +0.25 dB

RF Input Power Levels:

Nominal: 45 dBm - 10log(400/R) dBm, where

R = Symbol Rate in kSymbols

AGC range: +/-20dB minimum

Max level: 0dBm

BUC Reference Frequency and Stability

Frequency: 10 MHz, 0 dBm, +2 dB

Stability: 1 x 10⁻⁹/per day; +/-150 x 10⁻⁹ long

term, no frequency/phase hits for external ref.

BUC 10 MHz Reference Frequency Phase Noise

-115 dBc/Hz maximum @ 10 Hz

-135 dBc/Hz maximum @ 100 Hz

-148 dBc/Hz maximum @ 1 kHz

-150 dBc/Hz maximum @ 10 kHz

-160 dBc/Hz maximum @ 100 kHz

LNB Power and Control

Selectable LNB Supply Voltage: ON/OFF, 18 VDC (Horizontal Pol.) or 13 VDC (Vert Pol.)

LNB Control: 22 +4 kHz single tone burst, amplitude = 0.6 +0.2 V p-p

Typical Eb/No Performance (margin with regards to DVB ideal requirements):

	DVB-S	DVB-DSNG	DVB-S2
QPSK	<0.5dB	<0.5dB	<0.5dB
8PSK		<0.7dB	<0.7dB
16APSK			<1.0dB
32APSK			<1.5dB

Data Interfaces:

ASI interfaces:

BNC (f), 75 Ohms for ASI

Encoded Line Rate: 270 Mbps+100 ppm

Sensitivity (D21.5 idle pattern): 200 mV

Max. Input Voltage: 880 mV p-p

Min. Connector Return Loss: 15 dB

Max. Distance: 150 Meters

Optional interfaces:

IPE-222: Provides 2 ASI IN and 2 ASI out multiplexing ports and dual 10/100BaseT (RJ-45) ports.

IPE-422: Provides 2 ASI IN and 2 ASI out multiplexing ports and quad 100/1000BaseT (RJ-45) ports.

STM1e: STM1e support for 155Mbps TDM

TG-410/810: Telecom gateway with either quad or octal G703 and 10/100Base T IP Router/Bridge support.

Multi-IO Interface: Support for 10/100BaseT IP router/bridge and standard serial EIA-530/RS422 andHSSI support.

Physical and Power Specifications

Dimensions:

1RU standalone chassis,

19W X 15.75D X 1.75H inches

(48W X 40D X 4.4H cms)

Weight: 8lbs (3.7kgs)

Power: 90 – 264VAC (50/60H)

or -48VDC (32 to 72VDC).

Power consumption: 50Watts (no BUC power supply)

Optional: BUC Power Supply 24VDC@4A,

48VDC@2A, 48VDC@4A.

Operating temp: 0°C to 45°C (32°F to 122°F)

Storage temp: -25°C to 85°C (-13°F to 185°F)

Relative humidity:

Operating: Up to 90% non-condensing

Non-Operating: Up to 95% non-condensing

Altitude: Operating: up to 10,000' (3,045M)

During Transit: up to 40,000' (12,180M)

Interface options

EIA530/RS422: traditional interfaces supporting mixed traffic loads. Can either be transported transparently or can interface and interoperate with Frame relay or HDLC.

HSSI and Triple-HSSI interface: High-Speed Serial Interface (HSSI) is a serial interface that supports transmission rates up to 52 mbps. It is traditionally used to connect routers on local area networks over VSAT or over wide area networks (WAN).

Multi-IO Gateway: 10/100Mbps Ethernet (IP router/ Bridge) + EIA530/RS422 and HSSI: A powerful interface card supporting serial ports and an IP router/bridge:

IP options:

- Static and Dynamic IP routing (RIPv1&2)
- OSPF
- DHCP Server
- Network Address Translation
- Packet Filtering (Firewall)
- Quality of Service support to Level 3
- Command line interface (Industry Standard)
- SNMP v.1 & v.3, MIB II
- AAA (Authentication, Authorisation & Accounting)
- Local AAA (Access Rights Table)
- PAP, CHAP, MS-CHAP (Client/Server Authentication)
- RADIUS, TACACS+ (Client, Remote server authentication)
- Ping, Traceroute, Discovery Protocol
- IP, TCP, UDP, ICMP Protocol Statistics
- Interface Statistics
- IPSec (up to 256bit AES)

Bridging options:

- Spanning Tree Protocol (STP)
- Rapid STP (RSTP)
- MAC filtering

STM1e: Provides a single STM1e interface providing supporting for the 155.52Mbps TDM data rate and format. STM1e is available on AMT75 modems supporting 32APSK or 64QAM.

TG-810/TG-410 (Telecomm Gateway):

Available in either Quad G703 or Octal G703 options with 10/100BaseT Ethernet (IP Gateway). The versatility and capabilities provided by the interfaces make the TG ideal for applications such as Cellular backhaul, point-to-point and point-to-multipoint transmission for voice, video and data services.

This interface allows for the deployment of single or fractional G.703 interfaces (up to 8 G.703 interfaces) and IP together over a low overhead optimized framing format (Advanced Packet over Carrier – APOC)

IPE-222: Provides 2 ASI IN and 2 ASI out multiplexing ports and dual 10/100BaseT IP Encapsulator/ forwarder supporting up to 20,000 packets per second (pps). The card can be used as a multi-service media router (combining ASI video streams) and Ip streams or may be used as an IP Encapsulator only.

IPE-422: Provides 2 ASI IN and 2 ASI out multiplexing ports and quad 100/1000BaseT IP Encapsulator/ forwarder supporting up to 200,000 packets per second (pps). The card can be used as a multi-service media router (combining ASI video streams) and Ip streams or may be used as an IP Encapsulator only. In Ethernet mode, the AMT75 can provide L2 forwarding and/or use bridge protocols, such as RSTP, to build local and remote forwarding MAC tables. The IPE-422 also supports VLAN and even jumbo frames. Available August 2008.

Advantech Redundancy Modules:

ARM-71x: 1:1 redundancy for EIA530 or HSSI and IF.

ARM-72x: 1:1 redundancy supporting 8 G703 and IP and IF.

ARM-81x: 1:10 redundancy for EIA530 or HSSI.

ARM-82x: 1:4 redundancy for octal G703/IP.