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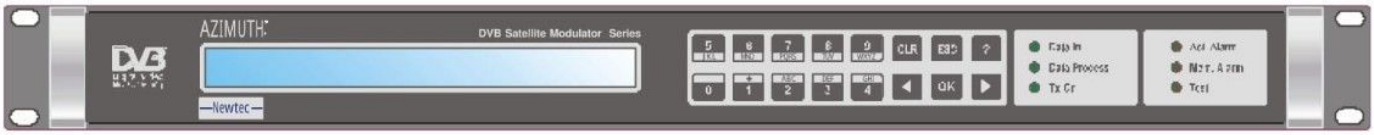
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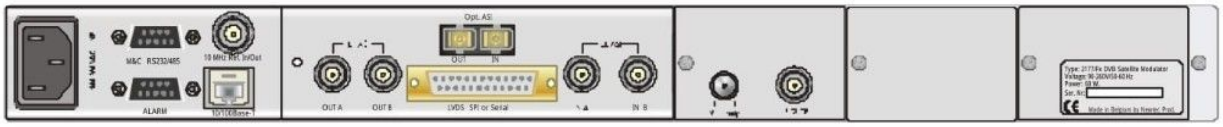
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VARIABLE RATE DVB
AZIMUTH series SATELLITE MODULATOR NTC/2177





• DESCRIPTION

As the successor of the well-established NTC/2077, the DVB modulator NTC/2177/Zx has been designed for both DVB + Skyplex contribution and distribution as well as for the TELCO and IP- world. It can be used where high product flexibility is required for interfacing with other equipment.
It handles symbol rates as low as 0.05 and up to 60 MBaud, covering all SCPC and MCPC applications.
(Remark: although the modulator is handling data up to 60 MBaud and even beyond, all existing DVB receivers or IRDs can only handle symbol rates up to max. 45 MBaud)
Besides its unique ability to transmit in SKYPLEX SCPC and TDMA modes, the DVB Modulator NTC/2177 also features 3 modulation schemes which are fully compliant to the DVB Standards: these are QPSK only for DVB distribution networks (EN300421), and QPSK, 8PSK and 16QAM for DVB contribution & DSNG networks (EN301210)
Both the high data rate (<60 MBaud) and the choice of 3 modulation schemes allows one to work in full compliancy with the more recently commercially available QPSK-8SPK-16QAM- IRD's and Demodulators.
The NTC/2177 is standard equipped with an IF output. On top of this frequency, an L-band monitoring output is provided for connection of i.e. an IRD or spectrum analyzer.
The NTC/2177 also has two interface slots that can be equipped with any combination of DVB, TELCO/IP and ASI-concentrator boards.
When fitted with the DVB ASI interface module, additional functionalities can be added as a software option. (i.e. Adaptive rate, BISS scrambling, etc.)
The modulator data input is menu-selectable for either coax inputs (2x ASI (DVB), or G703 (TELCO)), or a sub-D input (SPI-LVDS (DVB) or HSSI (TELCO))
A programmable digital equalizer is provided to compensate external amplitude slopes.
All control and Monitor parameters are available locally on the front panel (LCD display & keyboard) and remotely via the RS485/232 interface and the 10 Base-T Ethernet connection.
Also, a dual contact closure output is available for 2 types of summary alarms: one contact is operated in case of device alarms, while the other contact opens (or closes) in case of input or output interface alarms.
Inherent to its modular design, the modulator can be SW-upgraded to a higher capability (data rate, modulation schemes, functionalities, etc.) after ordering the corresponding password, which is simply keyed-in by the customer.

• APPLICATIONS

Medium to high data rate DVB Broadcast transmissions for distribution (QPSK) and contribution (QPSK+8PSK+16QAM) and for DVB-IP satellite backbones with existing IF-upconverters (70-140 MHz) and HPA's

• FEATURES

- DVB compliant and SKYPLEX compliant modes
- DVB and TELCO (*) interface boards available
- Bandwidth efficient 8PSK and 16QAM modulation, with 35% or 25% roll-off for low satellite cost
- 55 kbit/s up to 216 Mbit/s interface rate (FEC- and Modulation- dependent)
- RF frequency in the range of 50 to 180 MHz.
- On board internal reference (25 MHz)
- Optional Ovenised 10.0 MHz reference frequency and external 10.0 MHz reference input/output
- L-band monitoring output (fixed frequency and level)
- Excellent performance in combination with NTC/2179/Nx, NTC/2163/xx and NTC/4197/AB demodulators
- Programmable amplitude equalizer
- Local & remote (RS485/RS232 + 10 Mbps Ethernet + SNMP/MIB) M&C
- Support for one SNMP alarm trap
- User-programmable menu structure
- ActionKeys (group of commands under 1 button)
- Introduction of external LO frequency
- Level indication offset
- Programmable level-steps
- Real-time clock for alarm occurrence logging
- Internal test-generator, PRBS counter
- Dynamic build-up of alarm menu
- Very compact: 1 RU (height : 4.4 cm !)
- Highly reliable Newtec design
- Low cost
- CE label
- Diagnostics generator

• VERSIONS & OPTIONS

The modular architecture opens various possibilities and application fields: a slot on the back panel will accept a wide range of data interface boards, while firmware packages will determine the usage and capabilities of the unit.

1. Baseband Data Interface Modules :

The interchangeable baseband data interface modules provide a wide range of input interfaces via coaxial and/or sub-D connectors. Optical inputs are also available.

- NTC/3453: DVB ASI/SPI/Serial-LVDS (Optional optical ASI in/out plug-in: NTC/3453x.x.A see data sheet) (optional Rate adaptor SW: NTC/3453x.xxB see data sheet) (optional BISS scrambler SW: NTC/3453/x.xxD see data sheet + OCT/1011/Ex)
- NTC/3458: TELCO HSSI + Single rate G703 w. Ext. Clock
- NTC/3454: ASI TS 4-input Concentrator (see datasheet NTC/3454)

2a. NTC/3419 Modulator Board :

The Variable Rate DVB Modulator/Converter NTC/2177 can be used with three modulation standards :

- NTC/3419.AZ.AAxx:
  Integrated DVB IF (50-180 MHz) Modulator Board; DVB
- NTC/3419.AZ.ABxx:
  Integrated DVB IF (50-180 MHz) Modulator Board ; DVB + Skyplex SCPC (*)
- NTC/3419.AZ.ACxx:
  Integrated DVB IF (50-180 MHz) Modulator Board ; DVB + Skyplex SCPC + Skyplex TDMA (*)

(*) For more details on SKYPLEX configurations, refer to the Application Notes NTC/2080/APN08 and NTC/1019/APN01.
Although the minimum symbol rate with guaranteed performance is 1.0 Mbaud, the modulator can be used at a rate down to 60.0 kbaud.

2b. Modulator Board Software Capability Versions :

The available modulation schemes and maximum rates are part of the firmware capabilities, which are password upgradeable :
Available Interface rates :
8 Mbps, 18 Mbps, 25 Mbps, 30 Mbaud, 45/60 Mbaud
Available Modulation schemes:
DVB-QPSK only; DVB-QPSK / 8PSK only;
DVB-QPSK / 8PSK / 16QAM

Types to be specified during order:

NTC/3419.x.xxAA.B	QPSK 8Mbps
NTC/3419.x.xxAB.B	QPSK 18 Mbps
NTC/3419.x.xxAC.B	QPSK 25 Mbps
NTC/3419.x.xxAD.B	QPSK 30 MBaud
NTC/3419.x.xxAE.B	QPSK 45/60 MBaud
NTC/3419.x.xxBA.B	QPSK+8PSK 8Mbps
NTC/3419.x.xxBB.B	QPSK+8PSK 18 Mbps
NTC/3419.x.xxBC.B	QPSK+8PSK 25 Mbps
NTC/3419.x.xxBD.B	QPSK+8PSK 30 MBaud
NTC/3419.x.xxBE.B	QPSK+8PSK 45/60 MBaud
NTC/3419.x.xxCA.B	QPSK+8PSK+16QAM 8 Mbps
NTC/3419.x.xxCB.B	QPSK+8PSK+16QAM 18 Mbps
NTC/3419.x.xxCC.B	QPSK+8PSK+16QAM 25 Mbps
NTC/3419.x.xxCD.B	QPSK+8PSK+16QAM 30 MBaud
NTC/3419.x.xxCE.B	QPSK+8PSK+16QAM 45/60 MBaud

3. 10 MHz Reference Board (optional) :

The NTC/3419 modulator board is standard equipped with an internal 25 MHz reference.
In case one needs a 10 MHz reference input and/or output, the following options are available:

- NTC/3462/AB.A: 10 MHz OCXO reference Oscillator (normal use)
- NTC/3462.AA.A: 10 MHz OCXO High Stability Ref. Oscillator (recommended only with carriers < 1MHz)

4. Built-in 10 dB line output amplifier (optional) :

The NTC/3419 modulator has standard a maximum IF output level of -5 dBm. An optional +10 dB line amplifier can be added in case higher levels are required:

- NTC/3736.xxD: +10 dB IF line amplifier for NTC/3419 modulator

5. SNMP agent and MIB library

Needed whenever the unit needs to be controlled over Ethernet via proprietary NMS.

Configuration help :

The AZIMUTH series provides a nearly non-exhaustive number of configuration possibilities. The web-based Azimuth Configuration Engine will easily guide you through your selection criteria. Alternatively, Newtec's sales and support team are at your full disposal for any additional information you might need. (See last page for coordinates)

• DATA SUMMARY

DATA INTERFACE INPUTS:
- ASI/SPI/serial-LVDS (see data sheet NTC/3453/AA), and/or
- Single rate G703 w. Ext. clock + HSSI (*) (see data sheet NTC/3458/AA)

IF OUTPUT

Impedance	: 50 / 75 ohm
level	: -30/+5 dBm (± 3 dB)
frequency	: 50/180 MHz
connector	: BNC (F) - 75 Ohm (BNC -50 Ohm on request)
Return loss	: (50 Ohm) : > 14 dB (75 ohm) : > 20 dB
Spurious	: -65 dBc / 4 kHz @ -10 dBm

L-BAND MONITORING OUTPUT:
-45dBm at 50 Ohm. Freq: 1080 MHz

EXTERNAL 10.0 MHz REFERENCE (optional):

Input level	: -3 dBm up to +7 dBm
Output level	: +7 dBm
connector	: BNC (F) - 50

MONITOR & CONTROL INTERFACES :

a)	protocol	: RMCP
	connector	: 9 pin sub-D female
	electrical	: RS-485 / RS-232
b)	protocol	: RMCP over TCP-IP
	connector	: RJ-45
	electrical	: Ethernet 10 base-T

ALARM INTERFACE :

connector	: 9 pin sub-D (F)
electrical	: dual switch-over contacts

MECHANICAL :
19" sub rack, height: 1RU, weight 6 kg

POWER SUPPLY :
90-130/180-260V, 105VA, 47-63 Hz

TEMPERATURE:

operational	: 0° up to +40°C
storage	: -40° up to +70°C

"Technical notice
Caution : Applicable as from Serial Number **SN 04100413**, the IF output level range of this modulator has been modified from -30 / -7dBm to -30 dBm / +5 dBm."

Control

Interface rate (1 bit/s resol.) and symbol rate (1 baud resol.), FEC-rate and modulation (standard modulation or pure carrier) ,IF frequency (95 Hz resol.), RF level, IF transmit on/off, 10.0 MHz source (internal or external), internal PRBS generator on/off, transmit clock (internal, external or rate adapted), interface type, interface equalizer, MPEG framing (188 byte, 204 byte or internal), excess bandwidth (35% or 25%), spectrum inversion on/off, serial interface hardware and address, user levels, etc..

Monitoring

All control parameters, alarms (active and memorized), power supply voltages, internal temperature, transmit clock offset, buffer contents, occupied bandwidth, etc.

• PERFORMANCE

DATA RATE LIMITS :
Satellite baud rate: 50 kbaud to 60 Mbaud
(ranges 50 kbaud to 1 Mbaud and 45 to 60 Mbaud are under test)

		Interface Rate - 188 byte MPEG frames (Mbit/s)			Bandw./interf.R. -3dB	-26 dB
Modul.	FEC	50 kbaud	1 Mbaud	60 Mbaud	35%	roll-off
QPSK	1/2	0.046	0.922	55.294	1.085	1.465
QPSK	2/3	0.061	1.229	73.725	0.814	1.099
QPSK	3/4	0.069	1.383	82.941	0.723	0.977
QPSK	5/6	0.077	1.536	92.156	0.651	0.879
QPSK	6/7	0.079	1.580	94.789	0.633	0.855
QPSK	7/8	0.081	1.613	96.764	0.620	0.837
QPSK	N.A.	0.092	1.844	110.588	0.543	0.732
Modul.	FEC	50 kbaud	1 Mbaud	60 Mbaud	35%	roll-off
8PSK	2/3	0.092	1.844	110.588	0.543	0.678
8PSK	5/6	0.115	2.304	138.235	0.434	0.543
8PSK	8/9	0.123	2.458	147.451	0.407	0.509
16QAM	3/4	0.138	2.765	165.882	0.362	0.452
16QAM	7/8	0.161	3.226	193.529	0.310	0.388

PHASE NOISE :

10 Hz	: < -50 dBc/Hz
100 Hz	: < -70 dBc/Hz
1 kHz	: < -80 dBc/Hz
10 kHz	: < -85 dBc/Hz
100 kHz	: < -95 dBc/Hz

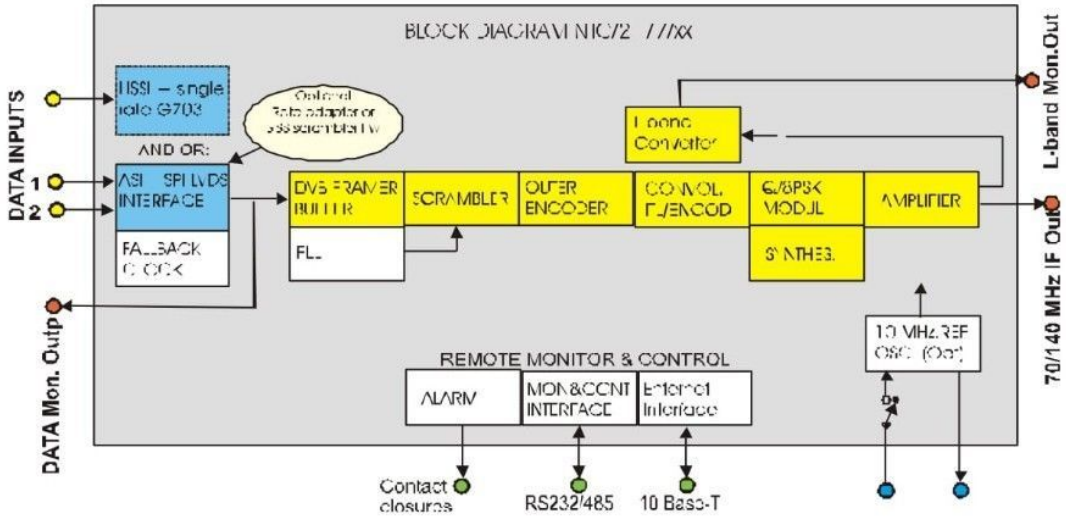
SPURIOUS : better than 65 dBc @ -10 dBm

EN 300421 and EN 301210 compliant :
MPEG-2 interface synchronization
MPEG-2 transport adaptation
Energy dispersal (synchronous)
RS-coding : 188/204
Convolutional interleaving I = 12
FEC-coding : 1/2, 2/3, 3/4, 5/6, 7/8 with QPSK modul.
2/3, 5/6, 8/9 with 8PSK modulation
3/4, 7/8 with 16QAM modulation
Baseband shaping (roll-off filter): 35% or 25%, selectable

INTERNAL REFERENCE FREQUENCY
- standard : ± 5 ppm
ageing : ± 5 ppm /10 years
- optional 10 MHz reference board :
see datasheet NTC/3462/Ax
AA version : ± 0.1 ppm
AB version : ± 0.5 ppm

REMARK : The maximum symbol rate of 45 Mbaud for QPSK/ 8PSK/16QAM is in compliance with existing demodulators and IRD's.

• BLOCK DIAGRAM



• TECHNICAL LITERATURE & REFERENCES (ALSO AVAILABLE ON OUR WEBSITE)

Other related products

AZIMUTH	Product families
AZIMUTH	Modulator Family
NTC/2180/xx	L-band DVB Modulator / Upconverter
NTC/2187/Ax	Stand-alone ASI 4 or 8:1 Concentrator and 4 or 8:1 Deconcentrator
NTC/2073/zN	Stand-alone 4 or 8 L-band input combiner /Frequency converter
OCT/1011/EB	Stand-alone BISS DSNG scrambler

Application notes

NTC/2080/APN03	Choice of QPSK, 8PSK or 16QAM in DVB satellite links
NTC/2080/APN04	Data broadcast concepts possible with DVB modem equipment
NTC/2080/APN05	DTV Uplink stations with HPA indoor or close to indoor
NTC/2080/APN06	DTV Uplink stations with outdoor HPA far away from indoor
NTC/2080/APN07	Channel equalization for high data rate modulators
NTC/2080/APN08	Configuring the DVB modulator for SkyPlex operation

Technical publications

March 2001	Fractional OC-3 ATM over a DVB/ASI satellite system
Newtec News Febr.2001	Adaptive vs. Fixed ASI data rate: Why and How?
Newtec News Oct. 2000	ASI interface has auto detect input feature?
February 1997	New trends in DVB-S Technology
December 1996	Performance considerations of multiphase and multilevel digital modulation techniques

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