• DESCRIPTION

The DVB-S2 satellite demodulator NTC/2263/xF is a member of the field-proven modular Azimuth series and is designed to receive and demodulate a single DVB-S2 modulated signal before correcting and detecting transmission errors and restoring the output digital signal in formats such as IP or MPEG Transport packets.

The NTC/2263/xF has been designed for the reception of high-speed TELCO or IP data in backbone and trunking infrastructures, as well as for the reception of digital TV and HDTV signals for applications where these signals are not decoded immediately (such as digital turn-around for example).

This demodulator is equipped with a dual L-band input with frequency range spanning from 950 to 2150 MHz. The input is selectable and provides DC power and band selection signals compatible with most professional and commercial LNB's. Optionally, one L-band input can be fitted with a 50-180 MHz block up converter.

The FPGA based NTC/2263/xF version handles data rates in DVB-S2 from 1 Mbaud up to 29.1 Mbaud in QPSK, up to 28 Mbaud in 8PSK and up to 21 Mbaud in 16 APSK modulation schemes. As with all Newtec modulators and demodulators, the data rate can be limited (and upgraded later on via password) to lower rates, thus resulting in a lower initial investment.

The NTC/2263/xF demodulates in CCM (Constant Coding and Modulation). The demodulated signal is an MPEG Transport Stream. Future versions of the demodulator are planned within short. They will use more of the advantages offered by the DVB-S2 standard.

Two output slots can be fitted with a range of interface cards. Several DVB (ASI, SPI, LVDS) and TELCO (HSSI, G703, IP) interface cards are available.

All Control and Monitoring parameters are available locally on the front panel (LCD display & keyboard) and remotely through a web interface (HTTP) or through the RS-485/232 port or through the 10/100 Base-T Ethernet port. The last two use the RMCPv2 protocol. There is optionally an SNMP + MIB agent.

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 demodulator can be SW-upgraded to a higher capability (data rate, functionalities, etc.) after ordering the corresponding password, which is simply keyed-in by the customer.

• APPLICATIONS

Medium to high data rate reception of satellite services such as broadcast, distribution or contribution of Digital TV and HDTV signals, data content distribution, trunking and other professional applications.

• FEATURES

- DVB-S2 compliant (EN 302307), 16 k block size only
- IFL : 950-2150 MHz
- Optional IF input: 50-180 MHz (replaces one L-band input)
- Data interfaces: serial LVDS, ASI (coax or optical), SPI, HSSI, G703, de-concentrated ASI or IP (see Versions & Options)
- Programmable external LO frequency
- QPSK, 8PSK and 16APSK and 20% - 25% - 35% roll-off
- Baud rate : range 1 to 30 Mbaud
- Interface rate : in range 0.76 to 71.82 Mbit/s depending on selected baud rate and modulation
- Reception of MPEG Transport Stream framing
- CCM mode (DVB-S2)
- Ovenized 10.0 MHz reference frequency (option)and external 10.0 MHz reference input/output (option)
- Local & remote M&C access to all menus through a
  - * web interface (HTTP protocol)
  - * RS-485/RS-232 (RMCP v2 protocol)
  - * 10/100 Base-T Ethernet port (RMCP v2 protocol)
- Support for SNMP alarm trap
- User-programmable menu structure
- Excellent performance in combination with the satellite modulators NTC/2277/xF (IF-band) and NTC/2280/xF (L-band)
- Action Keys (group of commands under single button)
- Real-time clock for alarm occurrence logging
- Internal test-generator and detector (PRBS counter)
- Very compact: 1Ru (height: 4.4 cm !)
- Highly reliable Newtec design
- CE label
- Dynamic build-up of alarm menu
- Diagnostics generator

• VERSIONS & OPTIONS

The modular Azimuth architecture opens various possibilities and application fields: The two slots 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. Also, other modules, such as frequency converters can be installed within the unit.

1. Base band Data Interface Output Modules :

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

- NTC/3453.BA.Bx: DVB ASI/SPI/Serial-LVDS interface card
  Hardware option: optical ASI in/out plug-in NTC/3453.x.x.A

- NTC/3458.Ax.x: TELCO HSSI+2x single rate G703 interface card
  NTC/3458.AB.A: HSSI-G.703 output 2 to 52 Mbps
  NTC/3458.AB.B: HSSI-G.703 output 2 to 110 Mbps
  NTC/3343/AA: G.703 at 8.448 Mb/s submodule used on NTC/3458
  NTC/3343/AB: G.703 at 6.312 Mb/s submodule used on NTC/3458
  NTC/3344/AA: G.703 at 16.896 Mb/s submodule used on NTC/3458
  NTC/3344/AB: G.703 at 34.368 Mb/s submodule used on NTC/3458
  NTC/3348/AA: G.703 at 44.736 Mb/s submodule used on NTC/3458
  NTC/3349/AA: G.703 at 2.048 Mb/s submodule used on NTC/3458

- NTC/3454.AD.A: ASI Deconcentrator board with 4 coax outputs

- NTC/7015/xx: IP GbE & ASI in/out interface (ASI under development)

2. NTC/7041 Demodulator Board (Max. Data rate) :

-NTC/7041/BACC : QPSK + 8PSK + 16APSK < 30Mbaud
-NTC/7041/BACB : QPSK + 8PSK + 16APSK < 15 Mbaud
-NTC/7041/BABC : QPSK + 8PSK max. baud rate< 30Mbaud
-NTC/7041/BABB : QPSK + 8PSK < 15 Mbaud

3. NTC/3495 IF Input board

Optional L-band to IF converter: NTC/3495.AA.A

4. 10 MHz Reference Board :

One of the following 10 MHz ref. boards is always required when an external 10 MHz reference input and/or output is required.

- NTC/3462.AB.A: 10 MHz OCXO reference Oscillator (normal use)
  temperature stability: 0,05 ppm

- NTC/3462.AA.A : 10 MHz OCXO High Stability Ref. Oscillator
  (recommended only with carriers < 1Mbaud)
  temperature stability: 0,002 ppm

5. SNMP agent and MIB library :

Needed whenever the unit needs to be controlled over Ethernet via proprietary Network Management System.

NTC/2263.xx.xB

• DATA SUMMARY

IFL INPUT : dual input, selectable
frequency range : 950-2150 MHz
return loss : > 7 dB (75 Ohm-F(F))
signal level : -25 to -65 dBm
adjacent signal : < (C_0 + 7) dBm/Hz with C_0 = signal level density

IF INPUT (optional):
frequency range : 50-180 MHz (replacing one L-band input)
return loss : > 15 dB (75 Ohm) BNC(F)
signal level : -15 to -55 dBm
adjacent signal : < (C_0 + 7) dBm/Hz with C_0 = signal level density

DATA OUTPUTS :

- ASI (Asynchronous Serial Interface) :
  - BNC (F) - 75 Ohm (coax) or ST (optical)
  - rate limited by demod
  - 188 byte mode
- SPI interface
  - 25 pin sub-D connector
  - rate limited by demod
  - 188 byte mode
  - see data sheet NTC/3453
- HSSI (High Speed Serial Interface) :
  - 25 pin sub-D (F)
- G703 : BNC (F)
- ASI Deconcentrator: 4x BNC (F)
- IP GbE & ASI in/out interface (ASI under development): 2xRJ-45

MONITOR & CONTROL INTERFACES :
a) protocol : HTTP (via web browser)
connector : RJ-45
electrical : Ethernet 10 base-T
b) protocol : RMCP **version 2 only**
connector : 9 pin sub-D female
electrical : RS-485 / RS-232
c) protocol : RMCP **version 2 only** over TCP-IP or UDP, SNMP
connector : RJ-45
electrical : Ethernet 10 base-T

ALARM INTERFACE :
connector: 9 pin sub-D (F)
electrical: switch-over contact

MECHANICAL :
19" sub rack, 1 RU height (4.4 cm), 6 kg

POWER SUPPLY :
90-130/180-260V, 60 VA

LNB POWER AND CONTROL :
max. current: 350 mA (on selected IFL input)
voltage: 11.5-14 V (vertical polarization) 16-19 V (horizontal polarization) & additional 22 KHz ± 4 kHz (band selection according to universal LNB for ASTRA satellites & DiSEqC command transmission

TEMPERATURE :
operational: 0°/+40°C
storage : -40°/+70°C

CONTROL :
Interface and symbol rate
Decoding & Demodulation Mode
Spectrum Inversion On/Off/Auto
Acquisition range
Clock source selection (sat. or fallback) and buffer size
LNB band and polarization selection (13/18 V and 22 kHz)
IFL input selection, LNB-LO frequency, L-band or satellite frequency.

MONITORING:
All control parameters, Internal temp.
Input level, carrier & clock frequency offset
Channel BER, decoder BER, Eb/No
Sync status, buffer status, alarms
Pre-alarm on preset BER threshold
PRBS detector.

• PERFORMANCE

USER RATES:

sat. baud rate :		
QPSK		1 to 29.1 MBaud
8PSK		1 to 28 MBaud
16APSK		1 to 21 MBaud
interf. rate limit	(QPSK FEC2/5)	: 0.76 Mbit/s (min)
	(16APSK FEC 8/9)	: 71.82 Mbit/s (max)

BER PERFORMANCE

Measured performance (*), 188 byte PER 1E-5 (BER ~ 5E-8, no pilots)

	EN302307 Simulations (***)	Short frames @ 5 Mbaud		Short frames @ max baud rate	
CONFIG	Es/No	Es/No	Eb/No	Es/No	Eb/No
QPSK-2/5	-0.30	0.25	1.40	0.50	1.70
QPSK-1/2	1.00	1.00	1.65	1.00	1.65
QPSK-3/5	2.23	2.80	2.10	2.80	2.10
QPSK-2/3	3.10	3.40	2.30	3.50	2.40
QPSK-3/4	4.03	4.30	2.70	4.35	2.75
QPSK-4/5	4.68	4.80	3.00	4.85	3.05
QPSK-5/6	5.18	5.40	3.30	5.40	3.30
QPSK-8/9	6.20	6.50	4.10	6.70	4.30
8PSK-3/5	5.50	6.50	4.10	7.00	4.60
8PSK-2/3	6.62	7.00	4.10	7.45	4.55
8PSK-3/4	7.91	8.20	4.90	8.60	5.30
8PSK-5/6	9.35	9.80	6.00	10.30	6.50
8PSK-8/9	10.69	11.20	7.10	11.50	7.40
16APSK-2/3	8.97	9.80	5.60	10.50	6.30
16APSK-3/4	10.21	10.80	6.20	11.50	6.90
16APSK-4/5	11.03	11.50	6.70	12.05	7.25
16APSK-5/6	11.61	12.40	7.30	13.00	7.90
16APSK-8/9	12.89	13.90	8.50	14.15	8.65

(*) Measured at L-band and Ku-band (with LNB types : SKW-SX1019, SX700 & SC-series, NJR25365, SMW WDL digE, SMW X-line type C)
(**) Maximum symbol rates according to user rates for QPSK, 8PSK and 16APSK
(***) REF. PER=1E-7, normal frames. For short frames an additional degradation of 0,2 dB to 0,3 dB has to be taken into account. Values for PER =1E-5 are about 0,2 dB lower for short frames.

Low symbol rates (<5Msymbol) require a PLL LNB

FUNCTIONALITIES : EN 302307
automatic spectrum inversion

SYNCHRONISATION:

carrier acquisition range	: ± 3.5 MHz max.
clock acquisition range	: ± 200 ppm max.
average acquisition time	: < 3 sec, 90% probability at 10 Mbaud if carrier freq. offset < ± 2.0 MHz ptp and PER< 1E-7

LNB PHASE NOISE REQUIREMENT:

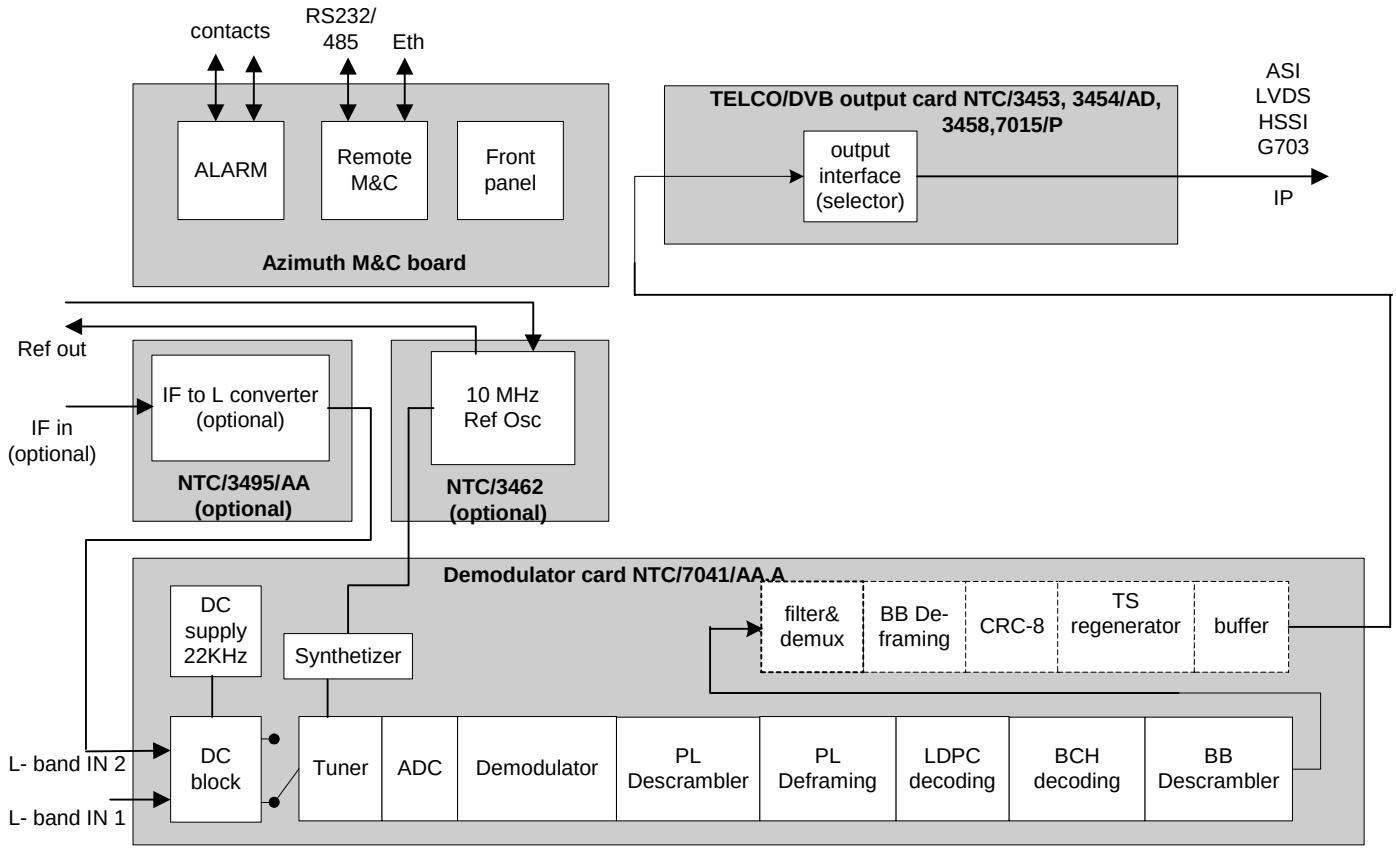
- equiv. inp. Noise : -178 dBm/Hz
- LNB gain : 55 to 70 dB
- phase noise
  - type A : for baud rates < 5Mbaud
  - type B : for baud rates > 5 Mbaud

type A (PL-DRO)	type B (free running DRO)
	< -35dBc/Hz at 10 Hz
< -70dBc/Hz at 100 Hz	< -63dBc/Hz at 100 Hz
< -75dBc/Hz at 1kHz	< -73dBc/Hz at 1kHz
< -80dBc/Hz at 10 kHz	< -85dBc/Hz at 10 kHz
< -85dBc/Hz at 10 0kHz	< -90dBc/Hz at 100 kHz
	< -96dBc/Hz at 1 MHz
	< -108dBc/Hz at >10 MHz

TYPICAL RF PARAMETER (LNB) REQUIREMENTS :

equiv. inp. Temp.	: 100K (typ.)
equiv. inp. noise	: -178 dBm/Hz
LNB gain	: 55 to 70 dB
Phase noise SSB	
Type A: all rates	
Type B: Valid for all configurations and symbol rates (modcods) with pilots ON	
LNB supply	: 13/18 V/ 0.35 A
cable loss (100m)	: < 20 dB

• BLOCK DIAGRAM



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

Other related products

NTC/2137	Stand-alone ASI 4/8:1 Concentrator & 4/8:1 Deconcentrator
NTC/2277/xF	Variable rate IF-band DVB-S2 modulator
NTC/2280/xF	Variable rate L-band DVB-S2 modulator
NTC/2088/xx	Active L-band splitter & switching matrix
NTC/3453	DVB ASI/SPI/Serial-LVDS
NTC/3454/AD	4-output ASI TS Deconcentrator
NTC/3458	TELCO HSSI + Single rate G703 w. external Data Clock input
NTC/3750/Ax	L-band conditioner & active splitter module
NTC/7015/P	IP GbE card
NTC/7041/AA.A	Universal DVB-Contribution TV Demodulator Board (1-30 Mbaud)

Application notes

NTC/2263xF/APN01	Performance comparison between NTC DVB-S and DVB-S2 demodulators
NTC/2263xF/APN02	Satmaster inputs for DVB-S2

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