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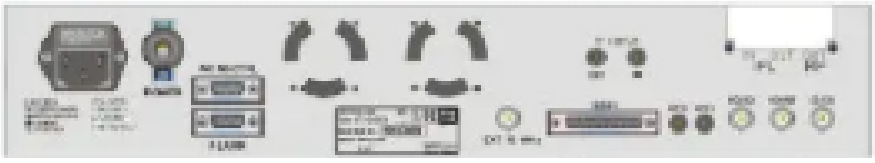
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NTC/2080/Zx-series

VARIABLE RATE (1 - 45/60 MBAUD) DVB+8+16 MODULATOR/CONVERTER





FEATURES

- **DVB compliant and SKYPLEX compliant mode**
- **SPI, RS422, ASI, G703, HSSI data interfaces**
- **bandwidth efficient 8PSK and 16QAM modulation, with 35% or 25% roll-off for low satellite cost**
- **1Mbit/s up to 110 Mbit/s interface rate**
- **RF frequency in the range 52 MHz up to 18400 MHz**
- **ovenised 10.0 MHz reference frequency**
- **external 10.0 MHz reference input**
- **excellent performance in combination with NTC/2063/xx demodulator**
- **L-band monitoring output**
- **programmable amplitude equaliser**
- **local & remote (RS485/RS232) Monitoring & Control**
- **very compact (height : 8.8 cm !)**
- **highly reliable design**
- **low cost**
- **CE label**

VERSIONS and OPTIONS :

The modular architecture, with specific baseband interface modules and converter modules, together with the firmware options, covers a wide range of applications. For all the possible versions and options, see the ordering and configuration breakdown hereafter. The "lower" spurious hardware variant is described in application note NTC/2080/APN09.
For use with Outdoor Converter NTC/2505/xx, refer to the NTC/2080/Ax datasheet.

OPERATOR INTERFACE :

All control and monitoring parameters are available locally on the frontpanel (LCD display and keyboard) and remotely via a serial interface (RS485 or RS232).
A summary alarm contact output is available for station alarm monitoring and/or redundancy switching.

CONTROL Parameters : interface rate (1 bit/s resol.) and symbol rate (1 baud resol.), FEC-rate and modulation (standard and type or pure carrier) , IFL and RF frequency (50 Hz resol.), channel equaliser, RF level and attenuator, IFL transmit, RF transmit, external IFL input, 10.0 MHz source (internal or external), internal 10.0 MHz offset; internal PRBS generator on/off, transmit clock (internal, external or rate adapted), interface type, interface equaliser, MPEG framing (188 byte, 204 byte or internal), excess bandwidth (35% or 25%), spectrum inversion on/off, amplitude slope equaliser, serial interface hardware and address.

MONITOR parameters : all control parameters, alarms (active and memorised), power supply voltages, internal temperature, 10.0 MHz oscillator temperature, 10.0 MHz frequency variation, transmit clock offset, buffer contents, occupied bandwidth, converter LO lock voltage.

DESCRIPTION

NTC/2080/Zx Baseline unit :

The Variable Rate DVB Modulator/Converter NTC/2080/Zx can be used for three modulation standards :

- DVB : compatible with the DVB-EN 300421 standard for QPSK and the DVB-EN 301210 standard for 8PSK/16QAM
- SKYPLEX SCPC : compatible with all SCPC formats of the SKYPLEX On-Board Demodulator (*)
- SKYPLEX TDMA : compatible with all TDMA formats of the SKYPLEX On-Board Demodulator (*)

(*) For more details on SKYPLEX configuration, refer to Application Notes NTC/2080/APN08 and NTC/1019/APN01.

The maximum symbol rate of 60.0 Mbaud for QPSK and 45.0 Mbaud for 8PSK/16QAM is in compliance with existing demodulators and IRD's. 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.

The available modulation types and maximum rates are part of the firmware capabilities, which are password upgradable :

- NTC/2080/ZP DVB-QPSK only, interface rate = 15.0 Mbit/s
- NTC/2080/ZR DVB-QPSK only, interface rate = 25.0 Mbit/s
- NTC/2080/ZT DVB-QPSK only, symbol rate = 30.0 Mbaud
- NTC/2080/ZQ DVB-QPSK only, all interface rates
- NTC/2080/ZK QPSK-8PSK-16QAM, interf. rate = 15.0 Mbit/s
- NTC/2080/ZM QPSK-8PSK-16QAM, interf. rate = 25.0 Mbit/s
- NTC/2080/ZO QPSK-8PSK-16QAM, symbol rate = 30.0 Mbaud
- NTC/2080/ZL QPSK-8PSK-16QAM, all interface rates
- NTC/2080/Zx+SK Additional SKYPLEX SCPC mode capability
- NTC/2080/Zx+ST Additional SKYPLEX TDMA + SCPC mode capability

The very compact design allows the co-location with an HPA. An internal slope equaliser allows to compensate for possible amplitude slopes of the cabling to the HPA.

Baseband interface modules NTC/33xx/xx :

The different interface modules provide a wide range of input interfaces via coaxial and/or sub-D connector :

- NTC/3325/SG SPI, RS422 and triple rate G703
- NTC/3361/HG HSSI and triple rate G703
- NTC/3259/xE Rate adapted SPI, RS422 and ASI

The rates for the G703 interface are defined by up to three different plug-in modules.

Converter module NTC/3631/xZ :

The field replaceable converter modules converts the standard L-band output to the wanted RF-band. This band ranges from 70 MHz up to 18 GHz :

- NTC/3631/LZ IFL to 50-180 MHz converter (2 IF outputs)
- NTC/3631/Tx IFL feedthrough : L-band only (1 or 3 IFL outputs)
- NTC/3631/DZ IFL to 5625-6425 MHz converter
- NTC/3631/EZ IFL to 12800-13250 MHz converter
- NTC/3631/FZ IFL to 13750-14250 MHz converter
- NTC/3631/GZ IFL to 14000-14500 MHz converter
- NTC/3631/HZ IFL to 17300-17700 MHz converter
- NTC/3631/IZ IFL to 17700-18100 MHz converter
- NTC/3631/KZ IFL to 18100-18400 MHz converter

The upconverters (DZ to KZ) have an external L-band input which can be combined with the internal modulator IFL output. They provide also an L-band output for monitoring and IRD loopback.

Variable Rate (1 - 45/60 Mbaud) DVB Modulator/Converter (NTC/2080/Zx)

5. Output Interface Model (field replaceable hardware ; select one from list)

❑ Single L-band, feedthrough cable (950-1750 MHz ; -10/-30 dBm)	NTC/3631/TZ
❑ Triple L-band, via active splitter (950-1750 MHz ; -10/-30 dBm)	NTC/3631/TB
❑ Dual 50-180 MHz ; IF1 (-10/-30 dBm) ; IF2 (0/-20 dBm) + L-band monitor One IF output impedance configuration has to be selected from hereunder :	NTC/3631/LZ
❑ IF1 @ 75 Ohm ; IF2 @ 75 Ohm	+ NTC/3631/LA
❑ IF1 @ 75 Ohm ; IF2 @ 50 Ohm	+ NTC/3631/LB
❑ IF1 @ 50 Ohm ; IF2 @ 50 Ohm	+ NTC/3631/LC
❑ IF1 @ 50 Ohm ; IF2 @ 75 Ohm	+ NTC/3631/LD
❑ 5.925 - 6.425 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/DZ
❑ 5.925 - 6.425 GHz (+10/-10 dBm) (*) + L-band (950-1750 MHz) (slaved to RF) (*) due to extra amplifier	NTC/3631/DZ + NTC/3631/DA
❑ 12.89 - 13.25 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/EZ
❑ 13.75 - 14.25 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/FZ
❑ 13.75 - 14.50 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/GE
❑ 13.75 - 14.50 GHz (+10/-10 dBm) (*) + L-band (950-1750 MHz) (slaved to RF) (*) due to extra amplifier	NTC/3631/GE + NTC/3631/GB
❑ 14.00 - 14.50 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/GZ
❑ 14.00 - 14.50 GHz (+10/-10 dBm) (*) + L-band (950-1750 MHz) (slaved to RF) (*) due to extra amplifier	NTC/3631/GZ + NTC/3631/GA
❑ 17.3 - 17.7 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/HZ
❑ 17.7 - 18.1 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/IZ
❑ 18.1 - 18.4 GHz (-10/-30 dBm) + L-band (950-1750 MHz) (slaved to RF)	NTC/3631/KZ

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Variable Rate (1 - 45/60 Mbaud) DVB Modulator/Converter (NTC/2080/Zx)

ORDERING - CONFIGURATION BREAKDOWN

1. Basic Chassis (hardware, select one from list)

❑ Variable rate DVB+8+16 modulator	NTC/2080/Zx
❑ Variable rate DVB+8+16 modulator with "lower" spurious option	NTC/2080/Zx + NTC/2080/LS

2. Password upgradeable Firmware Options (select if applicable)

❑ Skyplex mode - SCPC only	NTC/2080/SK
❑ Skyplex mode - SCPC and TDMA	NTC/2080/ST

3. Device Capabilities (password upgradeable firmware, select one from list) :

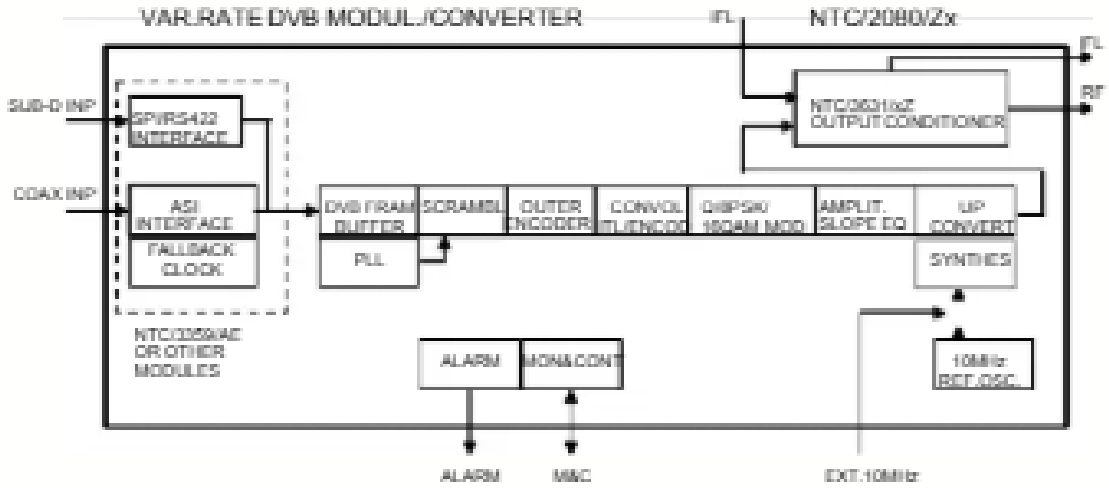
❑ 0.922 - 18.0 Mbit/s interface rate, QPSK only	NTC/2080/ZP
❑ 0.992 - 25.0 Mbit/s interface rate, QPSK only	NTC/2080/ZR
❑ 1.0 - 30.0 Mbaud symbol rate, QPSK only	NTC/2080/ZT
❑ 1.0 - 60.0 Mbaud symbol rate QPSK only	NTC/2080/ZQ
❑ 0.922 - 18.0 Mbit/s interface rate, QPSK - 8PSK - 16QAM	NTC/2080/ZK
❑ 0.922 - 25.0 Mbit/s interface rate, QPSK - 8PSK - 16QAM	NTC/2080/ZM
❑ 1.0 - 30 Mbaud symbol rate, QPSK - 8PSK - 16QAM	NTC/2080/ZO
❑ 1.0 - 60.0 Mbaud symbol rate QPSK ; 1.0 - 45.0 Mbaud 8PSK - 16QAM	NTC/2080/ZL

4. Input Interface Model (hardware ; select one from list)

❑ Adaptive rate "SPI, RS422 and dual coax ASI"	NTC/3359/AE
❑ Adaptive rate "SPI, RS422, coax ASI and optical ST ASI"	NTC/3359/OE
❑ SPI, RS422 and triple rate G703 for G703, select 0 to 3 plug-ins from list hereunder :	NTC/3325/SG
❑ 2 Mbit/s G703	+ NTC/3349/AA
❑ 6 Mbit/s G703	+ NTC/3343/AB
❑ 8 Mbit/s G703	+ NTC/3343/AA
❑ 17 Mbit/s G703	+ NTC/3344/AA
❑ 34 Mbit/s G703	+ NTC/3344/AB
❑ 45 Mbit/s G703	+ NTC/3348/AA
❑ HSSI and triple rate G703 for G703, select 0 to 3 plug-ins from list hereunder :	NTC/3361/HG
❑ 2 Mbit/s G703	+ NTC/3349/AA
❑ 6 Mbit/s G703	+ NTC/3343/AB
❑ 8 Mbit/s G703	+ NTC/3343/AA
❑ 17 Mbit/s G703	+ NTC/3344/AA
❑ 34 Mbit/s G703	+ NTC/3344/AB
❑ 45 Mbit/s G703	+ NTC/3348/AA

Variable Rate (1 - 45/60 Mbaud) DVB Modulator/Converter (NTC/2080/Zx)

BLOCK DIAGRAM



DATA SUMMARY

INTERFACE

COAX Input :
- connector : BNC (F) - 75 Ohm
- interfaces : ASI see NTC/3359/xx
  G703 see NTC/3325-61/xx

SUB-D Input :
- connector : 25 pin sub-D (F)
- interfaces : SPI+RS422 see NTC/3325-59/xx
  HSSI see NTC/3361

IFL INPUT & IFL OUTPUT :
- level : -10/-30 dBm (± 5 dB)
- frequency : 950/1750 MHz
- connector : SMA (F) - 50 Ω
- return loss (50Ω) : > 10 dB

RF OUTPUT : see data sheet NTC/3631/xZ
- level : -10/-30 dBm (± 5 dB)
- connector : SMA (F) - 50 Ω
- return loss (50Ω) : > 10 dB
- spurious. in chan. : < -55 dBc/4 kHz @ -10 dBm
- spurious outside excl. band (dBc/4 kHz) @ -10 dBm
  - standard -60 (30Mbaud) -55 (6Mbaud) (TBC)
  - "lower" spur. -70 (30Mbaud) -65 (6Mbaud) (TBC)

EXTERNAL 10.0 MHz REFERENCE :
- level : 0 up to +7 dBm
- connector : BNC (F) - 50 Ω

MONITOR & CONTROL INTERFACES :
- connector : 9 pin sub-D (F)
- electrical : RS485 or RS232

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

MECHANICAL :
19" subrack, 8.8 cm height, 47 cm dept, weight 9 kg

POWER SUPPLY :
90-130/160-260V, 105VA, 47-63 Hz

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

PERFORMANCE

RATE LIMITS :
satellite baud rate : 1 Mbaud to 45(60) Mbaud
60 kbaud to 1 Mbaud (under test)

Modul.	FEC	Interface Rate - 188 byte MPEG frames (Mbit/s) 60kbaud	1Mbaud	60Mbaud	Bandw./Interf.R. -3dB 35% roll-off	-20 dB
QPSK	1/2	0.056	0.922	55.294	1.085	1.465
QPSK	2/3	0.074	1.229	73.725	0.814	1.099
QPSK	3/4	0.083	1.383	82.941	0.723	0.977
QPSK	5/6	0.093	1.536	92.156	0.651	0.879
QPSK	6/7	0.095	1.580	94.769	0.633	0.855
QPSK	7/8	0.097	1.613	96.764	0.620	0.837
QPSK	N.A.	0.111	1.844	110.000	0.543	0.732

Modul.	FEC	60kbaud	1Mbaud	45Mbaud	25% roll-off	
8PSK	2/3	0.111	1.844	82.941	0.543	0.676
8PSK	5/6	0.139	2.304	103.676	0.434	0.543
8PSK	8/9	0.148	2.458	110.000	0.407	0.509
16QAM	3/4	0.166	2.765	110.000	0.362	0.452
16QAM	7/8	0.148	3.226	110.000	0.310	0.388

ETS 300421 and EN 301210 compliant :
- MPEG-2 interface synchronisation
- 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 : 35% or 25%, selectable
- 3dB bandwidth (pb)
  - $fb_{(3dB\ Bandw.\ [MHz])} = (2 * FEC * 188/204) / fb_{(Data\ Rate\ [Mbit/s])}$ for QPSK
  - $fb_{(3dB\ Bandw.\ [MHz])} = (3 * FEC * 188/204) / fb_{(Data\ Rate\ [Mbit/s])}$ for 8PSK
  - $fb_{(3dB\ Bandw.\ [MHz])} = (4 * FEC * 188/204) / fb_{(Data\ Rate\ [Mbit/s])}$ for 16QAM

INTERNAL 10.0 MHz REFERENCE (OVENISED)
stability : ± 1E-7/month
± 4E-7/year

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