SPECTRUM
SYSTEMENTWICKLUNG MICROELECTRONIC GMBH

DN2.66x - 8 channel 16 bit generatorNETBOX up to 1.25 GS/s

- **2, 4 or 8 channels with 625 MS/s up to 1.25 GS/s**
- **Simultaneous arbitrary generation on all channels**
- **Ouput signal bandwidth up to 400 MHz**
- **Output level ±80 mV to ±2.5 V (±2.0 V) into 50 Ω (±160 mV to ±5 V (±4 V) into high-impedance loads)**
- **Fixed trigger to output delay**
- **Huge 2 GSample (2 x 2 GSample) internal memory**
- **FIFO mode continuous streaming output**
- **Modes: Single-Shot, Loop, FIFO, Sequence Replay Mode, Gated, ...**

New generatorNETBOX
- Bumpers
- Stackable
- Handle
- GND Screw

- Ethernet Remote Instrument
- LXI Core 2011 compatible
- GBit Ethernet Interface
- Sustained streaming mode up to 70 MB/s
- Direct Connection to PC/Laptop
- Connect anywhere in company LAN
- Embedded Webserver for Maintenance/Updates
- Embedded Server option for open Linux platform

Operating Systems
- Windows XP, Vista, 7, 8, 10
- Linux Kernel 2.6, 3.x, 4.x
- Windows/Linux 32 and 64 bit

SBench 6 Professional Included
- Acquisition, Generation and Display of analog and digital data
- Calculation, Documentation and Import, Export

Drivers
- LabVIEW, MATLAB
- IVI LabWindows/CVI
- C/C++, GNU C++, VB.NET, C#, J#, Borland Delphi, Java, Python

Model	Resolution	1 channel	2 channels	4 channels	8 channels
DN2.663-04	16 Bit	1.25 GS/s	1.25 GS/s	1.25 GS/s	
DN2.663-02	16 Bit	1.25 GS/s	1.25 GS/s		
DN2.662-08	16 Bit	625 MS/s	625 MS/s	625 MS/s	625 MS/s
DN2.662-04	16 Bit	625 MS/s	625 MS/s	625 MS/s	
DN2.662-02	16 Bit	625 MS/s	625 MS/s		

General Information

The generatorNETBOX DN2.66x series allows generation of arbitrary signals on up to 8 channels with update (sampling) rates of 625 MS/s or 4 channels with up to of 1.25 GS/s. These Ethernet Remote instruments offer outstanding D/A features both in resolution and signal quality. The combination of high sampling rate and resolution makes these AWGs the top-of-the-range for applications that require high quality signal generation.
The generatorNETBOX can be installed anywhere in the company LAN and can be remotley controlled from a host PC.

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Software Support

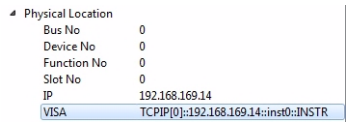
Windows Support

The digitizerNETBOX/generatorNETBOX can be accessed from Windows XP, as well as Vista, Windows 7, Windows 8,Windows 10 (each 32 bit and 64 bit). Programming examples for Visual C++, Borland C++ Builder, LabWindows/CVI, Borland Delphi, Visual Basic, VB.NET, C#, J#, Python, Java and IVI are included.

Linux Support

The digitizerNETBOX/generatorNETBOX can be accessed from any Linux system. The Linux support includes SMP systems, 32 bit and 64 bit systems, versatile programming examples for Gnu C++, Python as well as drivers for MATLAB for Linux. SBench 6, the powerful data acquisition and analysis software from Spectrum is also included as a Linux version.

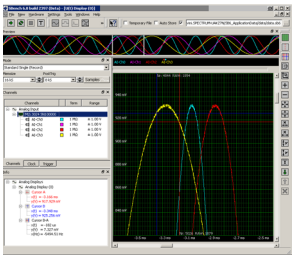
Discovery Protocol



The Discovery function helps you to find and identify any Spectrum LXI instruments, like the digitizerNETBOX and generatorNETBOX, available to your computer on the network. The Discovery function will also locate any Spectrum card products that are managed by an installed Spectrum Remote Server somewhere on the network.

After running the discovery function the card information is cached and can be directly accessed by SBench 6. Furthermore the qualified VISA address is returned and can be used by any software to access the remote instrument.

SBench 6 Professional



The digitizerNETBOX and generatorNETBOX can be used with Spectrum's powerful software SBench 6 – a Professional license for the software is already installed in the box. SBench 6 supports all of the standard features of the instrument. It has a variety of display windows as well as analysis, export and documentation functions.

- Available for Windows XP, Vista, Windows 7, Windows 8, Windows 10 and Linux
- Easy to use interface with drag and drop, docking windows and context menus
- Display of analog and digital data, X-Y display, frequency domain and spread signals
- Designed to handle several GBytes of data
- Fast data preview functions

IVI Driver

The IVI standards define an open driver architecture, a set of instrument classes, and shared software components. Together these provide critical elements needed for instrument interchangeability. IVI's defined Application Programming Interfaces (APIs) standardize common measurement functions reducing the time needed to learn a new IVI instrument.

The Spectrum products to be accessed with the IVI driver can be locally installed data acquisition cards, remotely installed data acquisition cards or remote LXI instruments like digitizerNETBOX/ generatorNETBOX. To maximize the compatibility with existing IVI based software installations, the Spectrum IVI driver supports IVI Scope, IVI Digitizer and IVI FGen class with IVI-C and IVI-COM interfaces.

Third-party Software Products

Most popular third-party software products, such as LabVIEW, MATLAB or LabWindows/CVI are supported. All drivers come with examples and detailed documentation.

Embedded Webserver

The integrated webserver follows the LXI standard and gathers information on the product, set up of the Ethernet configuration and current status. It also allows the setting of a configuration password, access to documentation and updating of the complete instrument firmware, including the embedded remote server and the webserver.

Hardware features and options

LXI Instrument

The digitizerNETBOX and generatorNETBOX are fully LXI instrument compatible to LXI Core 2011 following the LXI Device Specification 2011 rev. 1.4. The digitizerNETBOX/generatorNETBOX has been tested and approved by the LXI Consortium.

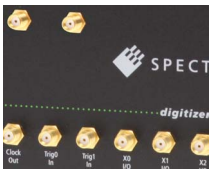
Located on the front panel is the main on/off switch, LEDs showing the LXI and Acquisition status and the LAN reset switch.

digitizerNETBOX/generatorNETBOX chassis version V2

The chassis version V2 got a complete re-design to allow some new features that improve the handling especially for mobile and shared usage:

- 8 bumper edges protect the chassis, the desk and other components on it. The bumper edges allow to store the chassis either vertically or horizontally and the lock-in structure allows to stack multiple chassis with a secure fit onto each other. For 19" rack mount montage the bumpers can be unmounted and replaced by the 19" rack mount option
- The handle allows to easily carry the chassis around in juts one hand.
- A standard GND screw on the back of the chassis allows to connect the metal chassis to measurement ground to reduce noise based on ground loops and ground level differences.

Front Panel



Standard SMA connectors are used for all analog input signals and all trigger and clock signals. No special adapter cables are needed and the connection is secure even when used in a moving environment.

Custom front panels are available on request even for small series, be it BNC, LEMO connectors or custom specific connectors.

Ethernet Connectivity

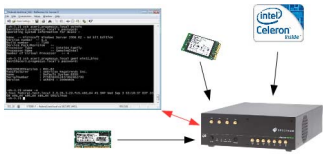
The GBit Ethernet connection can be used with COTS Ethernet cabling as well as special industrial grade Buccaneer Ethernet cables. The integration into a standard LAN allows to connect the digitizerNETBOX/generatorNETBOX either directly to a desktop PC or Laptop or it is possible to place the instrument somewhere in the company LAN and access it from any desktop over the LAN.

DC Power Supply Option

The digitizerNETBOX/generatorNETBOX can be equipped with an internal DC power supply which replaces the standard AC power supply. Two different power supply options are available that range from 9V to 36V. Contact the sales team if other DC levels are required.

Using the DC power supply the digitizerNETBOX/generatorNETBOX can be used for mobile applications together with a Laptop in automotive or airborne applications.

Option Embedded Server



The option turns the digitizerNETBOX/generatorNETBOX in a powerful PC that allows to run own programs on a small and remote data acquisition system. The digitizerNETBOX/generatorNETBOX is enhanced by more memory, a powerful CPU, a freely accessable internal SSD and a remote software development access method.

The digitizerNETBOX/generatorNETBOX can either run connected to LAN or it can run totally independent, storing data to the internal SSD. The original digitizerNETBOX/generatorNETBOX remote instrument functionality is still 100% available. Running the embedded server option it is possible to pre-calculate results based on the acquired data, store acquisitions locally and to transfer just the required data or results parts in a client-server based software structure. A different example for the digitizerNETBOX/generatorNETBOX embedded server is surveillance/logger application which can run totally independent for days and send notification emails only over LAN or offloads stored data as soon as it's connected again.

Access to the embedded server is done through a standard text based Linux shell based on the ssh secure shell.

Singleshot output

When singleshot output is activated the data of the on-board memory is played exactly one time. The trigger source can be either one of the external trigger inputs or the software trigger. After the first trigger additional trigger events will be ignored.

Repeated output

When the repeated output mode is used the data of the on-board memory is played continuously for a programmed number of times or until a stop command is executed. The trigger source can be either one of the external trigger inputs or the software trigger. After the first trigger additional trigger events will be ignored.

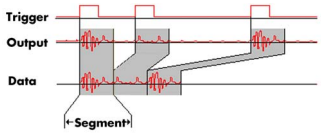
Single Restart replay

When this mode is activated the data of the on-board memory will be replayed once after each trigger event. The trigger source can be either the external TTL trigger or software trigger.

FIFO mode

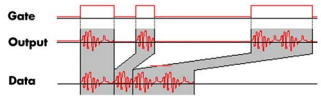
The FIFO mode is designed for continuous data transfer between PC memory or hard disk and the generation board. The control of the data stream is done automatically by the driver on an interrupt request basis. The complete installed on-board memory is used for buffering data, making the continuous streaming extremely reliable.

Multiple Replay



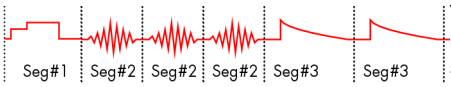
The Multiple Replay mode allows the fast output generation on several trigger events without restarting the hardware. With this option very fast repetition rates can be achieved. The on-board memory is divided into several segments of the same size. Each segment can contain different data which will then be played with the occurrence of each trigger event.

Gated Replay



The Gated Sampling mode allows data replay controlled by an external gate signal. Data is only replayed if the gate signal has attained a programmed level.

Sequence Mode



The sequence mode allows to split the card memory into several data segments of different length. These data segments are chained up in a user chosen order using an additional sequence memory. In this sequence memory the number of loops for each segment can be programmed and trigger conditions can be defined to proceed from segment to segment. Using the sequence mode it is also possible to switch between replay waveforms by a simple software command or to redefine waveform data for segments simultaneously while other segments are being replayed.

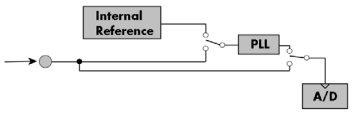
External trigger input

All boards can be triggered using up to two external analog or digital signals. One external trigger input has two analog comparators that can define an edge or window trigger, a hysteresis trigger or a rearm trigger. The other input has one comparator that can be used for standard edge and level triggers.

External clock input and output

Using a dedicated connector a sampling clock can be fed in from an external system. Additionally it's also possible to output the internally used sampling clock on a separate connector to synchronize external equipment to this clock.

Reference clock



The option to use a precise external reference clock (normally 10 MHz) is necessary to synchronize the instrument for high-quality measurements with external equipment (like a signal source). It's also possible to enhance the quality of the sampling clock in this way. The driver automatically generates the requested sampling clock from the fed in reference clock.

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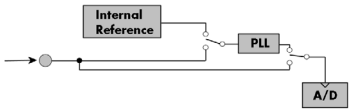
Reference clock



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Technical Data

Analog Outputs

Resolution		16 bit
D/A Interpolation		no interpolation
Output amplitude M4i.663x (1.25 GS/s version)	software programmable	±80 mV up to ±2 V in 1 mV steps into 50 Ω termination (resulting in ±160 mV up to ±4 V in 2mV steps into high impedance loads)
Output amplitude M4i.662x (625 MS/s version)	software programmable	±80 mV up to ±2.5 V in 1 mV steps into 50 Ω termination (resulting in ±160 mV up to ±5 V in 2mV steps into high impedance loads)
Output offset	fixed	0 V
Output Amplifier Path Selection	automatically by driver	Low Power path: ±80 mV to ±480 mV (into 50 Ω) High Power path: ±420 mV to ±2.5 V/±2 V (into 50 Ω)
Output Amplifier Setting Hysteresis	automatically by driver	420 mV to 480 mV (if output is using low power path it will switch to high power path at 480 mV. If output is using high power path it will switch to low power path at 420 mV)
Output amplifier path switching time		10 ms (output disabled while switching)
Filters	software programmable	bypass with no filter or one fixed filter
DAC Differential non linearity (DNL)	DAC only	±0.5 LSB typical
DAC Integral non linearity (INL)	DAC only	±1.0 LSB typical
Output resistance		50 Ω
Minimum output load		0 Ω
Max output swing in 50 Ω		± 2.5 V for 625 MS/s versions or ± 2 V for 1.25 GS/s version
Crosstalk @ 1 MHz signal ±2.5 V into 50 Ω		TBD
Output accuracy		TBD

Trigger

Available trigger modes	software programmable	External, Software, Window, Re-Arm, Or/And, Delay
Trigger edge	software programmable	Rising edge, falling edge or both edges
Trigger delay	software programmable	0 to (8GSamples - 32) = 8589934560 Samples in steps of 32 samples
Multi, Gate: re-arming time		40 samples
Trigger to Output Delay	M4i.662x series	244 sample clocks (fixed)
Trigger to Output Delay	M4i.663x series	TBD
Memory depth	software programmable	32 up to [installed memory / number of active channels] samples in steps of 32
Multiple Replay segment size	software programmable	16 up to [installed memory / 2 / active channels] samples in steps of 16
External trigger accuracy		1 sample
Minimum external trigger pulse width		≥ 2 samples

External trigger		**Ext0**	**Ext1**
External trigger impedance	software programmable	50 Ω /1 kΩ	1 kΩ
External trigger coupling	software programmable	AC or DC	fixed DC
External trigger type		Window comparator	Single level comparator
External input level		±10 V (1 kΩ), ±2.5 V (50 Ω),	±10 V
External trigger sensitivity (minimum required signal swing)		2.5% of full scale range	2.5% of full scale range = 0.5 V
External trigger level	software programmable	±10 V in steps of 1 mV	±10 V in steps of 1 mV
External trigger maximum voltage		±30V	±30 V
External trigger bandwidth DC	50 Ω /1 kΩ	DC to 200 MHz / 150 MHz	DC to 200 MHz
External trigger bandwidth AC	50 Ω	20 kHz to 200 MHz	n.a.

Clock

Clock Modes	software programmable	internal PLL, external reference clock, sync
Internal clock accuracy		≤ ±20 ppm
Internal clock setup granularity		8 Hz (internal reference clock only, restrictions apply to external reference clock)
Setable Clock speeds		50 MHz to max sampling clock
Clock Setting Gaps		750 to 757 MHz, 1125 to 1145 MHz (no samping clock possible in these gaps)
External reference clock range	software programmable	≥ 10 MHz and ≤ 1.25 GHz
External reference clock input impedance	software programmable	50 Ω fixed
External reference clock input coupling		AC coupling
External reference clock input edge		Rising edge
External reference clock input type		Single-ended, sine wave or square wave
External reference clock input swing		0.3 V peak-peak up to 3.0 V peak-peak
External reference clock input max DC voltage		±30 V (with max 3.0 V difference between low and high level)
External reference clock input duty cycle requirement		45% to 55%
External reference clock output type		Single-ended, 3.3V LVPECL
Clock output	sampling clock ≤71.68 MHz	Clock output = sampling clock/4
Clock output	sampling clock >71.68 MHz	Clock output = sampling clock/8
Star-Hub synchronization clock modes	software selectable	Internal clock, external reference clock

Sequence Replay Mode (Mode available starting with firmware V1.14)

Number of sequence steps	software programmable	1 up to 4096 (sequence steps can be overloaded at runtime)
Number of memory segments	software programmable	2 up to 64k (segment data can be overloaded at runtime)
Loop Count	software programmable	1 to (1M - 1) loops
Sequence Step Commands	software programmable	Loop for #Loops, Next, Loop until Trigger, End Sequence
Special Commands	software programmable	Data Overload at runtime, sequence steps overload at runtime, readout current replayed sequence step

Multi Purpose I/O lines (front-plate)

Number of multi purpose lines		three, named X0, X1, X2
Input: available signal types	software programmable	Asynchronous Digital-In
Input: impedance		10 kΩ to 3.3 V
Input: maximum voltage level		-0.5 V to +4.0 V
Input: signal levels		3.3 V LVTTL
Output: available signal types	software programmable	Asynchronous Digital-Out, Synchronous Digital-Out, Trigger Output, Run, Arm, Marker Output, System Clock
Output: impedance		50 Ω
Output: signal levels		3.3 V LVTTL
Output: type		3.3V LVTTL, TTL compatible for high impedance loads
Output: drive strength		Capable of driving 50 Ω loads, maximum drive strength ±48 mA
Output: update rate		sampling clock

Connectors

Analog Channels		SMA male (one for each single-ended input)	Cable-Type: Cab-3fa-xx-xx
Clock Input		SMA male	Cable-Type: Cab-3fa-xx-xx
Clock Output		SMA male	Cable-Type: Cab-3fa-xx-xx
Trg0 Input		SMA male	Cable-Type: Cab-3fa-xx-xx
Trg1 Input		SMA male	Cable-Type: Cab-3fa-xx-xx
X0/Trigger Output/Timestamp Reference Clock	programmable direction	SMA male	Cable-Type: Cab-3fa-xx-xx
X1	programmable direction	SMA male	Cable-Type: Cab-3fa-xx-xx
X2	programmable direction	SMA male	Cable-Type: Cab-3fa-xx-xx

Environmental and Physical Details DN2.xxx

Dimension of Chassis without connectors or bumpers	L x W x H	366 mm x 267 mm x 87 mm
Dimension of Chassis with 19" rack mount option	L x W x H	366 mm x 482.6 mm x 87 mm (2U height)
Weight (4 and 8 channels version)		6.3 kg, with rack mount kit: 6.8 kg
Weight (16 channels version)		6.7 kg, with rack mount kit 7.2 kg
Warm up time		10 minutes
Operating temperature		0°C to 50°C
Storage temperature		-10°C to 70°C
Humidity		10% to 90%

Power Consumption

	230 VAC		12 VDC		24 VDC	
2 channel versions, standard memory	TBD	TBD	TBD	TBD	TBD	TBD
4 channel versions, standard memory	TBD	TBD	TBD	TBD	TBD	TBD
8 channel versions, standard memory	TBD	TBD	TBD	TBD	TBD	TBD

MTBF

MTBF	50000 hours

Bandwidth and Slewrate

	Filter	Output Amplitude	Mi4.6630-x8 M4i.6631-x8 DN2.663-xx	M4i.6620-x8 M4i.6621-x8 M4i.6622-x8 DN2.662-xx
Maximum Output Rate			1.25 GS/s	625 MS/s
-3d Bandwidth	no Filter	±480 mV	400 MHz	200 MHz
-3d Bandwidth	no Filter	±1000 mV	320 MHz	200 MHz
-3d Bandwidth	no Filter	±2000 mV	320 MHz	200 MHz
-3d Bandwidth	Filter	all	65 MHz	65 MHz
Slewrate	no Filter	±480 mV	4.5 V/ns	2.25 V/ns

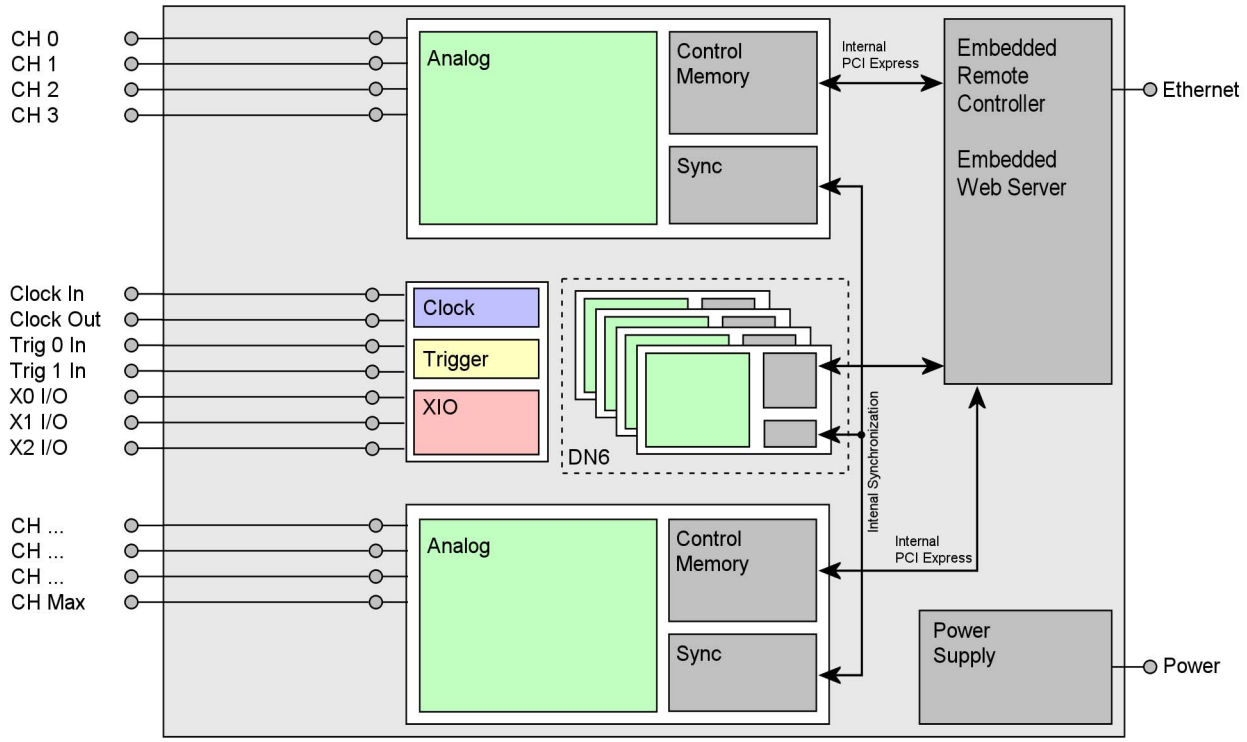
Dynamic Parameters

	M4i.6620-x8 M4i.6621-x8 M4i.6622-x8 DN2.662-xx						
Test - Samplerate	625 MS/s			625 MS/s		625 MS/s	
Output Frequency	10 MHz			50 MHz		50 MHz	
Output Level in 50 Ω	±480 mV	±1000mV	±2500mV	±480 mV	±2500mV	±480 mV	±2500mV
Used Filter	none			none		Filter enabled	
NSD (typ)	-150 dBm/Hz	-149 dBm/Hz	-149 dBm/Hz	-150 dBm/Hz	-149 dBm/Hz	-150 dBm/Hz	-149 dBm/Hz
SNR (typ)	70.7 dB	72.4 dB	63.1 dB	65.3 dB	64.4 dB	67.5 dB	69.4 dB
THD (typ)	-73.3 dB	-70.5 dB	-49.7 dB	-64.1 dB	-39.1 dB	-68.4 dB	-50.4 dB
SINAD (typ)	69.0 dB	67.7 dB	49.5 dB	61.6 dB	39.1 dB	64.9 dB	50.3 dB
SFDR (typ), excl harm.	98 dB	98 dB	99 dB	86 dB	76 dB	88 dB	89 dB
ENOB (SINAD)	11.2	11.0	8.0	10.0	6.2	10.5	8.1
ENOB (SNR)	11.5	11.7	10.2	10.5	10.4	10.9	11.2

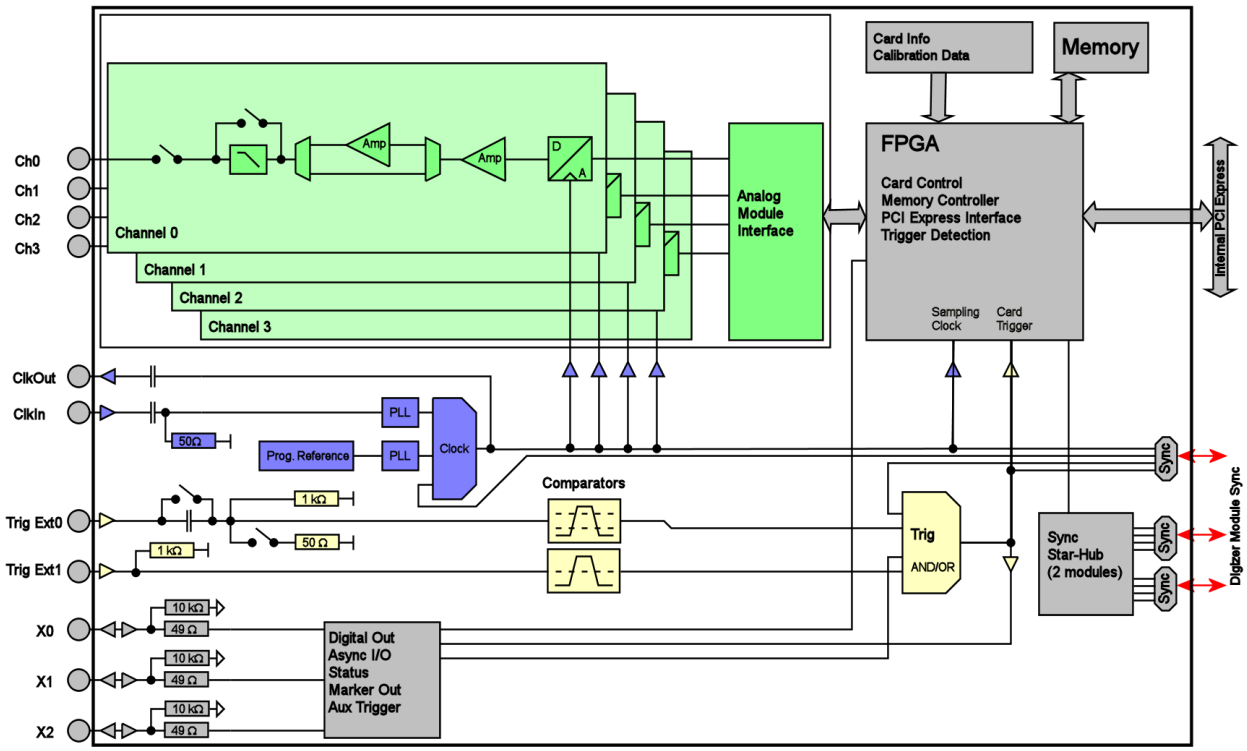
	M4i.6630-x8 M4i.6631-x8 DN2.663-xx						
Test - Samplerate	1.25 GS/s			1.25 GS/s		1.25 GS/s	
Output Frequency	10 MHz			50 MHz		50 MHz	
Output Level in 50 Ω	±480 mV	±1000mV	±2000mV	±480 mV	±2000mV	±480 mV	±2000mV
Used Filter	none			none		Filter enabled	
NSD (typ)	-150 dBm/Hz	-149 dBm/Hz	-149 dBm/Hz	-150 dBm/Hz	-149 dBm/Hz	-150 dBm/Hz	-149 dBm/Hz
SNR (typ)	70.5 dB	72.1 dB	71.4 dB	65.2 dB	65.0 dB	67.2 dB	68.2 dB
THD (typ)	-74.5 dB	-73.5 dB	-59.1 dB	-60.9 dB	-43.9 dB	-67.9 dB	-63.1 dB
SINAD (typ)	69.3 dB	69.7 dB	59 dB	59.5 dB	43.9 dB	64.5 dB	61.9 dB
SFDR (typ), excl harm.	96 dB	97 dB	98 dB	85 dB	84 dB	87 dB	87 dB
ENOB (SINAD)	11.2	11.2	9.5	9.6	6.9	10.4	10.0
ENOB (SNR)	11.5	11.5	11.5	10.5	10.5	10.9	11.0

THD and SFDR are measured at the given output level and 50 Ohm termination with a high resolution M3i.4860/M4i.4450-x8 data acquisition card and are calculated from the spectrum. Noise Spectral Density is measured with built-in calculation from an HP E4401B Spectrum Analyzer. All available D/A channels are activated for the tests. SNR and SFDR figures may differ depending on the quality of the used PC. NSD = Noise Spectral Density, THD = Total Harmonic Distortion, SFDR = Spurious Free Dynamic Range.

Block diagram of generatorNETBOX DN2



Block diagram of generatorNETBOX module DN2.66x



Order Information

The generatorNETBOX is equipped with a large internal memory and supports standard replay, FIFO replay (streaming), Multiple Replay, Gated Replay, Continuous Replay (Loop), Single-Restart as well as Sequence. Operating system drivers for Windows/Linux 32 bit and 64 bit, drivers and examples for C/C++, IVI (Function Generator class), LabVIEW (Windows), MATLAB (Windows and Linux), LabWindows/CVI, .NET, Delphi, Visual Basic, Java, Python and a Professional license of the oscilloscope software SBench 6 are included.

The system is delivered with a connection cable meeting your countries power connection. Additional power connections with other standards are available as option.

generatorNETBOX DN2 - Ethernet/LXI Interface

Order no.	D/A Resolution	Bandwidth	Single-Ended Channels	Update Rate	Installed Memory
DN2.662-02	16 Bit	200 MHz	2 channels	625 MS/s	1 x 2 GS
DN2.662-04	16 Bit	200 MHz	4 channels	625 MS/s	1 x 2 GS
DN2.662-08	16 Bit	200 MHz	8 channels	625 MS/s	2 x 2 GS
DN2.663-02	16 Bit	400 MHz	2 channels	1.25 GS/s	1 x 2 GS
DN2.663-04	16 Bit	400 MHz	4 channels	1.25 GS/s	2 x 2 GS

Options

Order no.	Option
DN2.xxx-Rack	19" rack mounting set for self mounting
DN2.xxx-Emb	Extension to Embedded Server: CPU, more memory, SSD. Access via remote Linuxs secure shell (ssh)
DN2.xxx-DC12	12 VDC internal power supply. Replaces AC power supply. Accepts 9 V to 18 V DC input. Screw terminals.
DN2.xxx-DC24	24 VDC internal power supply. Replaces AC power supply. Accepts 18 V to 36 V DC input. Screw terminals
DN2.xxx-BTPWR	Boot on Power On: the generatorNETBOX automatically boots if power is switched on.

Calibration

Order no.	Option
DN2.xxx-Recal	Recalibration of complete generatorNETBOX DN2 including calibration protocol

Standard SMA Cables

The standard adapter cables are based on RG174 cables and have a nominal attenuation of 0.3 dB/m at 100 MHz and 0.5 dB/m at 250 MHz. For high speed signals we recommend the low loss cables series CHF

for Connections	Connection	Length	to BNC male	to BNC female	to SMB female	to MMCX male	to SMA male	
All	SMA male	80 cm	Cab-3mA-9m-80	Cab-3mA-9f-80	Cab-3mA-3f-80	Cab-1m-3mA-80	Cab-3f-3mA-80	
All	SMA male	200 cm	Cab-3mA-9m-200	Cab-3mA-9f-200	Cab-3mA-3f-200	Cab-1m-3mA-200	Cab-3f-3mA-200	
Probes (short)	SMA male	5 cm		Cab-3mA-9m-5				

Low Loss SMA Cables

The low loss adapter cables are based on MF141 cables and have an attenuation of 0.3 dB/m at 500 MHz and 0.5 dB/m at 1.5 GHz. They are recommended for signal frequencies of 200 MHz and above.

Order no.	Option
CHF-3mA-3mA-200	Low loss cables SMA male to SMA male 200 cm
CHF-3mA-9m-200	Low loss cables SMA male to BNC male 200 cm

Technical changes and printing errors possible