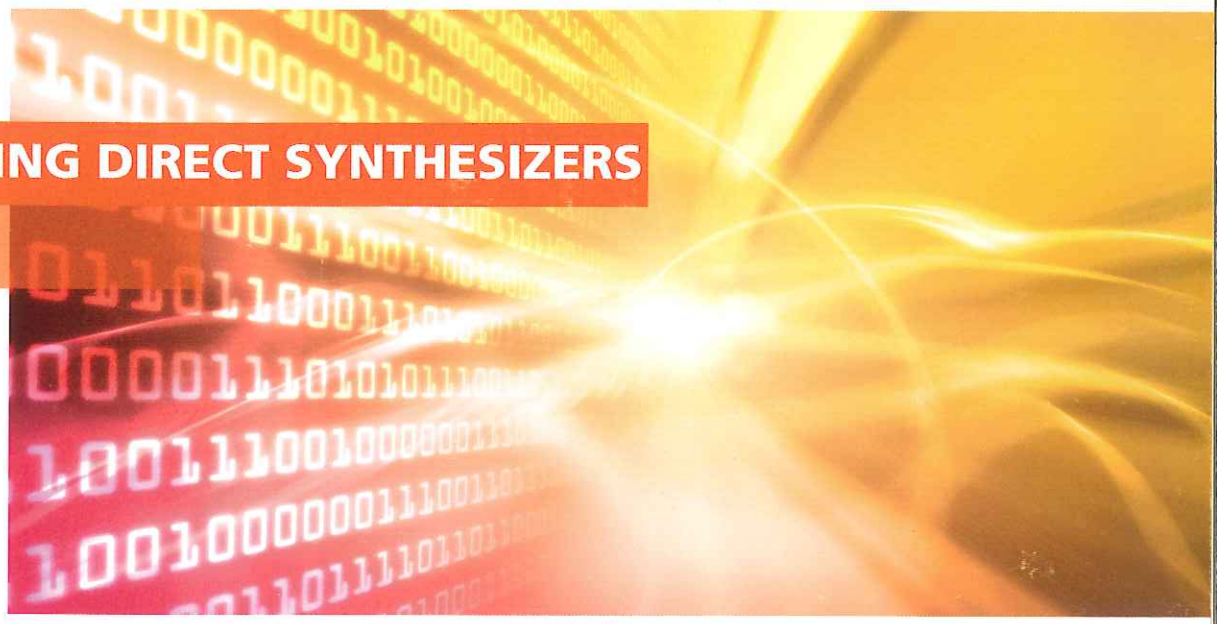
FAST SWITCHING DIRECT SYNTHESIZERS

SERIES DS



SUPPLYING HIGH PERFORMANCE, INNOVATIVE AND SOPHISTICATED RF, MICROWAVE, MILLIMETER WAVE COMPONENTS AND INTEGRATED ASSEMBLIES WORLDWIDE.

FEATURES

- Broadband 0.010 to 40.96 GHz
- Very low phase noise -120 dBc/Hz typical at 10 kHz offset at 10 GHz
- Switching speed 500 nano sec onds
- Step sizes from 1 Hz
- Low profile chassis or modular configuration
- Custom bands and step sizes
- Low spurious
- Parallel BCD programming
- Low power consumption, 100 watts from AC mains
- Coax strobe input and selection switch
- RF output mute
- Universal AC power supplied

OPTIONS

- IEEE-488/GPIB, Ethernet
- Internal 100 MHz reference with sample output
- Phase coherent switching
- Phase continuous switching (bandwidth restricted)
- PM, FM & pulse modulation
- Front panel control and display can be custom configured
- Touch Screen Computer (TSC) front panel for rack mount unit
- Digital frequency sweep via TSC
- FM with four operational modes; wide band DC, wide band AC, narrow band DC, narrow band AC
- Modulation bandwidth 10 MHz
- Expanded FM deviations
- Power flatness +/-1dB
- Coherent stepping to 1 Hz
- Downloadable list mode with fast list triggering and ready feedback signal
- Differential interface
- Linear AC power supply
- Binary control
- Harmonic filter banks.
- Switching speeds from 250 nano-seconds (consult factory)

DESCRIPTION

Ultra Electronics, Herley series of fast switching direct synthesizers have been designed for use in commercial systems and military systems where demanding performance, high reliability and fast switching are critical.

With switching speeds from 250 nanosecond, the DS delivers ample speed to meet the required response times of EW Simulator, Radar, RCS, ATE and Antenna measurement systems.

In addition, the 1 Hz step size capability allows the frequency to be controlled to a high precision.

Custom versions are available with different step sizes and bandwidths. Parallel programming is standard in order to optimize speed. Other interfaces are available as options.

This family of direct synthesizers have been designed for low power consumption and high reliability.

The complete DS synthesizer, with its combination of advanced performance features, is housed

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Bringing more benefits to RF, microwave and millimeter-wave technology for defense systems, integrated subsystems, components... and more

DESCRIPTION (continued)

in a low profile 5.25" high rack-mountable chassis or optional 1.75" or 3.5" chassis for some models. For specialized applications the DS can be tailored to suit custom bands and physical outlines due to its modular architecture. The touch screen front panel version provides simple control and versatility. SatCom and digital radio equipment, as well as in high-performance frequency-agile surveillance, radar and communications equipment. Our optional coherent switching synthesizer, unlike other technologies available, can perform coherent switching down to 1 Hz of the synthesizer. Previous to this breakthrough coherent resolutions have been limited to larger steps because switching time performance degraded as resolution is decreased.

The design from Ultra Electronics, Herley overcomes this limitation and provides a new tool for Signature Measurement Technologists.

This new synthesizer can be ordered with many options and can be custom configured to meet your requirements. As an example, an FM modulator can be added to the coherent unit to make it interchangeable between Simulator and Signature Measurement applications.

TYPICAL PERFORMANCE SPECIFICATIONS

- Frequency range 10 MHz to 20.48 GHz, option to 40.96 GHz
- Custom bandwidths
- Output power +10 dBm ±2.5 dB
- Spurious
  -75 dBc 10 MHz to 5120 MHz
  -70 dBc 5120 to 10240 MHz
  -65 dBc 10240 to 20480 MHz
  -60 dBc 20480 to 40960 MHz
- Harmonics -15 dBc, -50 dBc optional
- External reference 10 MHz or 100 MHz
- Frequency accuracy with internal reference ±0.2 ppm over temperature, 1 ppm/year aging
- External reference accuracy required for phase locking internal reference ±1 ppm @ +3 ± -3 dBm power level
- Frequency accuracy with external reference, same as external reference for step sizes 250 kHz to 20 MHz; same as external reference $\pm 1 \times 10^{-12}$ for 1 Hz step size
- Step size from 1 Hz
- Switching speed 500 ns
- Summary alarm TTL low = alarm for modular configuration, red LED= alarm on front panel for rack configurations

TYPICAL PHASE NOISE (dBc/Hz)

Offset	10GHz	18GHz	40GHz
• 100 Hz	-90	-84	-77
• 1 kHz	-110	-104	-97
• 10 kHz	-120	-114	-107
• 100 kHz	-120	-114	-107
• 1 MHz	-130	-124	-117
• 10 MHz	-136	-130	-123

FM DEVIATION CAPABILITY

Frequency Band (MHz)	±1 V p-p into 50 ohms typical deviation (MHz)	±1 V p-p into 50 ohms expanded deviation (MHz)
10 - 20	±0.234375	N/A
20 - 40	±0.4687	N/A
40 - 80	±0.9375	N/A
80 - 160	±1.875	N/A
160 - 320	±3.75	N/A
320 - 640	±6.25	±7.5
640 - 1280	±12.5	±15
1280 - 2560	±25	±30
2560 - 5120	±50	±60
5120 - 10240	±100	±120
10240 - 20480	±200	±240
20480 - 40960	±400	±480

LIST MODE

List	The operator may perform a list from 1 to 48000 random frequencies via GPIB/Ethernet interface. The frequencies in the list starting at address A and ending at address B can be swept from A to B, B to A or A to B and back to A.
Continuous mode 1	The unit will perform any of the sweep modes as discussed above, that was previously communicated over GPIB/Ethernet interface. The mode is triggered by an external single start pulse applied to Strobe In. The unit will perform one sweep and stop. For this mode a previously loaded dwell time is required.
Continuous mode 2	The unit will perform any of the sweep modes as discussed above that was previously communicated over the GPIB interface. This mode is triggered by a GPIB command, and sweeps until stopped by a GPIB command. For this mode a previously loaded dwell time is required.
External Trigger	Same as above but each step through the address list requires an external trigger pulse on the strobe In. No dwell time required as external pulses control dwell time. Lock signal provided with each step.
Start, stop, step	Via GPIB/Ethernet interface a start frequency, stop frequency and step size is communicated. The unit starts operation at the start frequency and with each trigger-in pulse applied to strobe in will step with an increment of step size.

TOUCH SCREEN COMPUTER FUNCTIONS

- Frequency entry display
- Reference select
- Local/parallel J1/ GPIB
- Frequency step up or step down
- Alarm indicator
- Power on/off
- Sweep
  - Range
  - Direction
  - Dwell time
  - Trigger mode
  - Step size
  - Stop sweep
  - Resume sweep
- Ping-pong
  - Jump frequencies
  - Dwell time
  - Trigger mode
  - Stop ping-pong
  - Resume ping-pong

POWER, DIMENSIONS AND ENVIRONMENTAL

- AC input voltage 120 VAC to 240 VAC auto switching, 47-400 Hz
- DC input voltage +10 VDC, +6 VDC, +15 VDC, -12 VDC (measured at synthesizer for modular configuration)
- Ripple on DC 5 mVpp max 50 Hz to 50 kHz, 50 mVpp max 50 kHz to 10 MHz
- Operating temperature 0° C to +50° C
- 19 inch rack mount, 2U or 3U high depending on options
- Modular configuration 10.63" x 9.5" x 4.5"
- Approximate weight 40 lbs rack mount, 17 lbs modular configuration

CONNECTORS AND CONTROL

- Reference input SMA-F
- RF and reference outputs SMA-F
- 50 pin D-type for frequency control
- Frequency control parallel BCD plus strobe standard, binary control optional

Ultra ELECTRONICS

making a difference

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