MERLIN Mk4

Ultra-fast scanning Spectrum Analyser

Key features

- Compact all-in-one unit
- Band width up to **30 GHz**
- Acquisition Rate **52 Terahertz** per second
- Ethernet control
- Record / Replay **3D** waterfall
- Cable or Wireless control
- Multi-format computer control (tablet supplied as standard)
- Hot Swap Battery / Mains powered
- Digital Video demodulation

MERLIN Mk4 is the latest version of our ultra-fast spectrum analyser.

Acquisition Rate –**52 Terahertz per second**

The system is based on **Ethernet** control, consequently is ideal for remote deployment.

The **Waterfall (3D and 2D)** displays can be recorded and replayed and provides both time and frequency read out.

System overview

Multi Platform. With two powerful, in built, quad core computers, the operator has a choice of graphical user interface. The unit is supplied with an tablet as standard but the choice can be any size of **MAC, PC,** desk model or laptop, or mobile such as an **iPhone**.

2 External Monitors supplies as standard

In addition to Ethernet cable, **Wireless** connection is provided for rapid deployment.

The unit is both battery and or mains powered. The battery system allows for **"Hot Swap"** and four removeable batteries and one twin gang fast charger are supplied as standard.

Both **Analogue** and **Digital** Video demodulation is available.

BLUETOOTH monitoring scan runs concurrently while scanning the RF spectrum for other types of transmission. ID / MAC address and real time signal provides for location of the Bluetooth device.

An **External Antenna** can be used and a **Directional** hand held (or tripod mount) is included for Direction Finding.

Mains / Cable monitoring input with a switchable interface: L/N, L/E, N/E.

Dimensions: Merlin unit :- 350 x 280 x 95mm. Weight:- Merlin :- 9.0 kilos

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Operational Options

System with all included options, 21” touch screen monitor, 16” USB monitor, tablet, keyboards, mice

Wireless with tablet

Cable / Ethernet with MacBook

Cable / Ethernet with PC Laptop

Antenna System

Auto switching:
HF / VHF – UHF / Microwave

Selectable:

Log Periodic Directional

Wire Line Mains Interface

System Schematic

Receiver:
Modular Digital Superhet, firmware upgradeable
Inbuilt Computing
1 x Quad Core PC – Receiver control
1 x Quad Core PC – Scanning Software
Internal Storage - One 256 Gb SSD
I/O 3 x USB, VGA, RJ45
Accessory connector for future development
Ample headroom for ongoing end-user installed upgrades – future proofed

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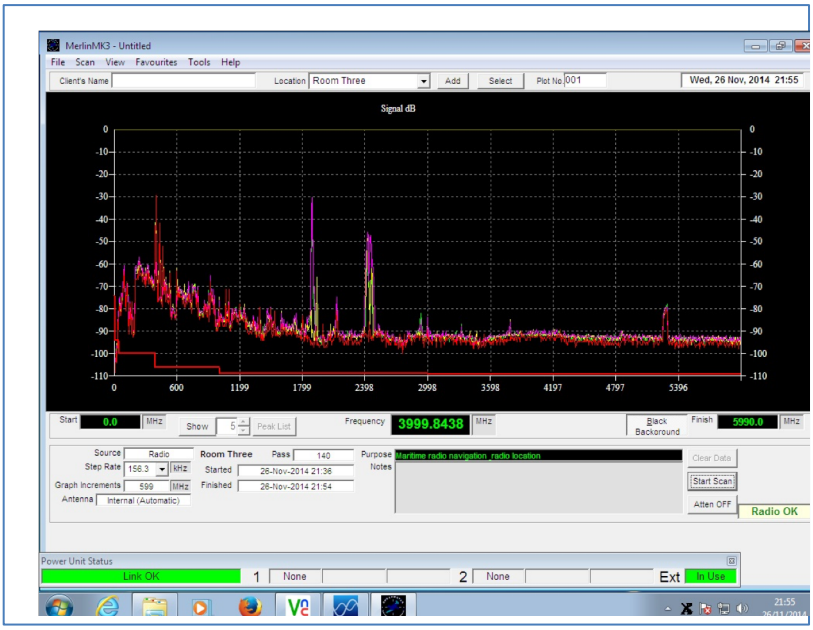
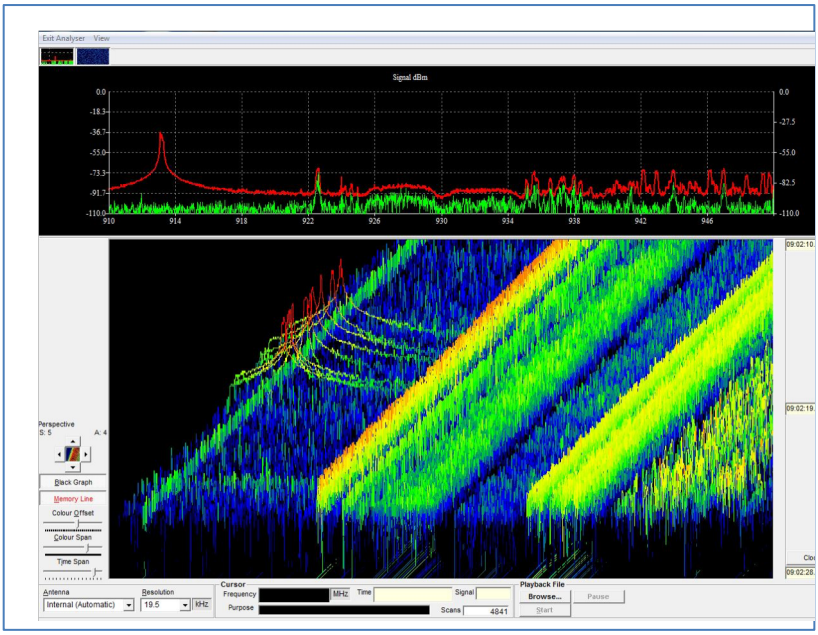
Some of Merlin's Features

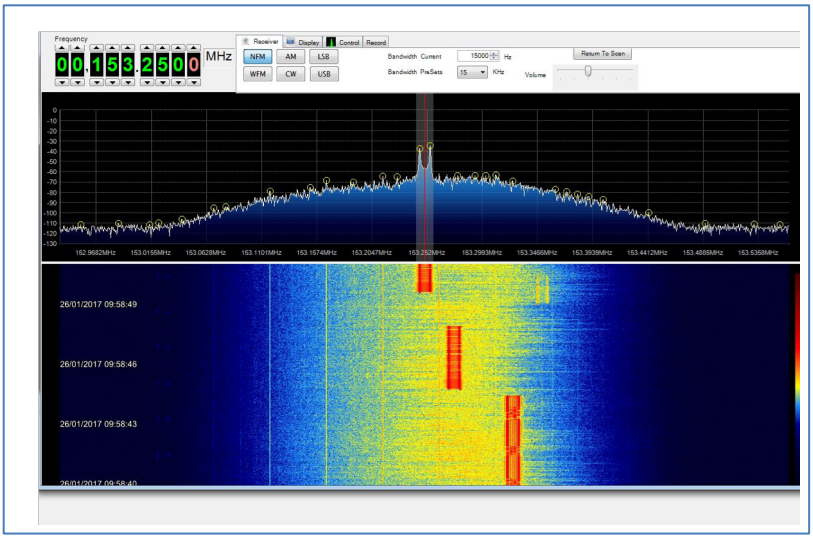
Multiple trace for RF Mapping



3D Waterfall



Demodulation screen includes waterfall



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Merlin Specifications

Project:	Merlin Mk4
Description:	The Merlin Mk4 is a high speed TSCM receiver system which performs the following functions: 1. 50kHz to 30GHz Spectrum Capture and Recording 2. SDR Demodulation 3. Realtime RF Signal Recording and Playback 4. TV Signal Demodulation 5. Bluetooth Searching and Direction Finding 6. Bluetooth/Wifi Spectral Monitor 7. DECT and GSM ID (next major software release)
Status:	Release
Issue:	5
Date:	January 2019

1. 50kHz to 30GHz Spectrum Capture and Recording

Receiver A/D Sampling Rate:	160 Msps (million samples per second)
Receiver A/D Resolution:	16 bit
Tuning Range:	50kHz to 30GHz
Tuning Resolution:	10Hz
Signal Acquisition:	52 Terahertz per second
Resolution Bandwidths (RBW):	5kHz to 5MHz (octave increments)
RF Input Range:	+5dBm to Displayed Average Noise Level (DANL)
Displayed Average Noise Level: dBm (DANL)	50 kHz to 1 MHz –130 1 MHz to 5 MHz –140 5 MHz to 60 MHz –155 60 MHz to 6 GHz –160 6GHz to 30GHz -140
RF Amplitude Accuracy:	+/- 2.0dB
RF input LO Leakage:	< -95dBm
System Clock Spurs (>200MHz):	< -120dBm
System Clock Spurs (<200MHz):	< -85dBm
Residual Responses: **(RF Input -20dBm, 0dB Attenuation)**	< -90dBm

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Spur and Image Rejection: **(-30dBm into Aux input, 0dB Attenuation, max RF gain)**	< -90dBc (50kHz-60MHz) < -80dBc (60Mhz-6.0GHz) < -45dBc (6.0GHz-30GHz)
Frequency Stability	50MHz TCXO reference +/- 1ppm

2. SDR Demodulation

Demodulation IF Bandwidth:	625KHz to 40MHz (octave increments)
Spur and Image Rejection:	< -90dBc
Demodulation Modes:	AM, FM Narrow, FM Wide, USB, LSB (custom modes available upon request)
Mode Bandwidth:	1kHz to 300kHz, 1 Hz adjustable, built in presets for common modes and bandwidths (custom bandwidths available upon request)
Demodulation Tuning Range:	Merlin center frequency +/- IF Bandwidth
Tuning Resolution:	10Hz
Audio Recording and Playback:	Yes

3. Real-time RF Signal Recording and Playback though SDR Demodulation

Real-time RF Bandwidth: (record or playback)	625KHz to 40MHz (octave increments) (contact factory for 80MHz option)
RF Center Frequency:	312.5kHz to 30GHz
RF Tuning Resolution:	10Hz
RF Amplitude Resolution:	16 bits
Real-time Recording Data Formats:	16 bit raw RF samples 2s complement 16 bit I/Q RF samples 2s complement (default recording mode) optional Vita 49 standard
Export Recording for External Analysis:	Yes
Simultaneous Record and SDR Demodulation:	Yes
Recording time:	Only limited by hard drive capacity. See Note 1

Note 1: Real-time RF spectrum recording time only limited by the size of the internal or external hard drive e.g. ~7 hours of record time on a 4Tbyte hard drive at 160 Mbps 40MHz BW IQ data capture.

4. TV Signal Demodulation

TV Modes:	PAL AM FM Positive FM Inverted DVBT Optional ATSC
Tuning Range:	40MHz to 30GHz
Tuning Resolution:	10Hz
FM lock range:	+/- 5MHz
Video Recording and Playback:	Yes

5. Bluetooth Searching and Direction Finding

Bluetooth Standard:	4.1
Bluetooth Search Modes:	1. Master mode LAP/MAC search. 2. Pager mode LAP/MAC search.
Tuning Range:	2.38 to 2.52 GHz
Tuning Resolution:	100kHz
Noise Floor typical:	-95dBm
Non Standard Frequency search:	Yes, manual and automatic in 100kHz steps
Single Frequency Scanning:	Yes
Single LAP Scanning for DF:	Yes, signal, noise and signal/noise readings with real time signal/noise bar graph for DF operation
Simultaneous BT Search and MerlinMK3 Spectral scanning:	Yes
Simultaneous BT Search and MerlinMK3 SDR Demodulation:	Yes
Standard BT Active Searching:	Yes

5. Bluetooth/Wifi Spectral Monitor

2.4 to 2.5 GHz Spectrum Analyzer:	Real-time Bluetooth and Wifi spectrum display
Noise Floor typical:	-95dBm
Simultaneous BT Spectrum and MerlinMK4 Spectral scanning:	Yes
Simultaneous BT Spectrum and MerlinMK4 SDR Demodulation:	Yes
BT Spectrum Recording:	Yes