

1. Automatic test equipment (ATE) comprising:
a first test instrument comprising digital pins, the first test instrument being
configured to output pulses on at least two of the digital pins;
circuitry to combine the pulses to produce a signal and to generate a waveform
5 based on the signal; and
a second test instrument to perform one or more tests on a device under test
(DUT) based on the waveform.

2. The ATE of claim 1, wherein the first test instrument comprises a pattern
10 generator to control the pulses.

3. The ATE of claim 1, wherein the first test instrument comprises a digital
instrument that is programmable to produce the pulses and to vary parameters of the
pulses on the at least two digital pins.

4. The ATE of claim 1, wherein the first test instrument comprises a digital
instrument that is programmable to control a timing of the pulses on the at least two
digital pins.

5. The ATE of claim 1, wherein the first test instrument comprises a digital
instrument that is programmable to control widths of the pulses on the at least two
digital pins.

6. The ATE of claim 1, wherein the first test instrument comprises a digital
25 instrument that is programmable to control polarities of the pulses on the at least two
digital pins.

7. The ATE of claim 1, wherein the first test instrument comprises a digital
instrument that is programmable to control locations of the pulses on the at least two
30 digital pins.

8. The ATE of claim 1, wherein the first test instrument comprises a digital instrument that is programmable to control delays of the pulses on the at least two digital pins.

5 9. The ATE of claim 1, further comprising:
 circuitry to modulate a radio frequency (RF) carrier signal using the waveform to produce a test signal;
 wherein the second test instrument is configured to perform the one or more tests by outputting the test signal to the DUT.

10 10. The ATE of claim 1, wherein the second test instrument is configured to perform the one or more tests by outputting the waveform to the DUT.

15 11. The ATE of claim 1, wherein the first test instrument is a digital test instrument; and
 wherein the second test instrument is a radio frequency (RF) test instrument.

 12. The ATE of claim 1, wherein the circuitry comprises a bandpass filter.

20 13. The ATE of claim 1, wherein the at least two digital pins comprises two or more pairs of digital pins, the two or more pairs of digital pins comprising a first pair of digital pins and a second pair of digital pins;
 wherein first pulses on a first pair of digital pins are wider than second pulses on the second pair of digital pins; and

25 wherein the circuitry comprise an adder to add the first pulses and the second pulses.

 14. The ATE of claim 1, wherein the at least two digital pins comprises two or more pairs of digital pins, the two or more pairs of digital pins comprising a first pair of
30 digital pins and a second pair of digital pins;

wherein first pulses on a first pair of digital pins have different amplitudes than second pulses on the second pair of digital pins; and

wherein the circuitry comprise an adder to add the first pulses and the second pulses.

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15. The ATE of claim 13, wherein the signal is an intermediate signal and generating the waveform comprises filtering the intermediate signal to produce the waveform; and

wherein adding the first pulses and the second pulses produces the intermediate signal having multiple steps.

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16. The ATE of claim 1, wherein the waveform is broken into timeslots, each timeslot encoding multiple bits of data based on a polarity of the waveform within the timeslot and a timing of a local minimum or local maximum within the timeslot.

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17. The ATE of claim 16, wherein the waveform encodes two bits per timeslot, a first of the two bits being based on the polarity and a second of the two bits being based on whether the local minimum or the local maximum is nearer to the beginning or to the end of the timeslot.

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18. The ATE of claim 1, wherein the first test instrument is configured to introduce delay into the pulses on the at least two digital pins to simulate time-of-flight delays of the waveform through air.

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19. The ATE of claim 1, wherein the waveform is produced independent of a dedicated waveform generator.

20. The ATE of claim 1, wherein at least one of the digital pins is controllable to drive three levels, the three levels including logic high, logic low, and high impedance.

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21. Automatic test equipment (ATE) comprising:

a first test instrument to receive a waveform from a device under test, the waveform being based on test signals sent from the ATE to the DUT;
circuitry to generate digital pulses based on the waveform; and
a second test instrument to receive the digital pulses over at least two digital pins
5 and to process the digital pulses to test the DUT.

22. The ATE of claim 21, wherein the first test instrument is a radio frequency (RF) test instrument; and
wherein the second test instrument is a digital test instrument.

23. The ATE of claim 21, wherein the waveform comprises multiple timeslots, each timeslot containing a part of the signal comprised of a local minimum or a local maximum; and
wherein generating the digital pulses comprises identifying the local minimum or
15 the local maximum breaking the local minimum or the local maximum into one or more digital pulses for output over the at least two digital pins.

24. A method of producing a waveform, comprising:
outputting pulses on at least two digital pins of automatic test equipment (ATE);
20 combining the pulses to produce a signal;
generating the waveform based on the signal; and
performing, based on the waveform, one or more tests on a device under test (DUT) being tested by the ATE.

25. The method of claim 24, further comprising:
controlling the pulses using a pattern generator.

26. The method of claim 25, further comprising:
programming a digital instrument to produce the pulses on the at least two digital
30 pins.

27. The method of claim 26, further comprising:
programming the digital instrument to control a timing of the pulses on the at
least two digital pins.

5 28. The method of claim 26, further comprising:
programming the digital instrument to control polarities of the pulses on the at
least two digital pins.

10 29. The method of claim 26, further comprising:
programming the digital instrument to control locations of the pulses on the at
least two digital pins.

15 30. The method of claim 26, further comprising:
programming the digital instrument to control delays of the pulses on the at least
two digital pins.

20 31. The method of claim 24, further comprising:
modulating a radio frequency (RF) carrier signal using the waveform to produce a
test signal;
wherein performing the one or more tests comprises outputting the test signal to
the DUT.

25 32. The method of claim 24, further comprising:
performing the one or more tests using the waveform.

33. The method of claim 24, wherein the ATE comprises:
a digital test instrument comprising the at least two digital pins;
a radio frequency (RF) test instrument for performing the one or more tests on
the DUT; and

circuitry modulating a radio frequency (RF) carrier signal using the waveform to produce a test signal for output to the DUT by the RF test instrument to perform the one or more tests .

5 34. The method of claim 24, wherein the waveform is filtered using a bandpass filter.

35 The method of claim 24, wherein the at least two digital pins comprises two or more pairs of digital pins, the two or more pairs of digital pins comprising a first pair of
10 digital pins and a second pair of digital pins;

wherein first pulses on a first pair of digital pins are wider than second pulses on the second pair of digital pins; and

wherein combining the pulses comprises adding the first pulses and the second pulses.
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36. The method of claim 35, wherein generating the waveform comprises filtering the signal; and

wherein the method further comprises adding the first pulses and the second pulses produces the signal having multiple steps.
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37. The method of claim 24, wherein the waveform is broken into timeslots, each timeslot encoding multiple bits of data based on a polarity of the waveform within the timeslot and a timing of a local minimum or local maximum within the timeslot.

25 38. The method of claim 37, wherein the waveform encodes two bits per timeslot, a first of the two bits being based on the polarity and a second of the two bits being based on whether the local minimum or local maximum is nearer to the beginning or to the end of the timeslot.

30 39. The method of claim 24, further comprising:

introducing delay into the pulses on the at least two digital pins to simulate time-of-flight delays of the waveform through air.

40. The method of claim 24, further comprising:

- 5 programming a digital instrument to control widths of the pulses on the at least two digital pins.