2 to 18GHz Instantaneous Frequency Measurement Unit

DR024-M4

TELEDYNE DEFENCE & SPACE
Everywhereyoulook™

2 to 18GHz Instantaneous Frequency Measurement Unit

The DR024-M4 utilizes proprietary Teledyne Defence & Space (TDS) technology, to deliver state of the art performance in a package measuring only 152mm x 147mm x 30mm and weighing only 1.55kg.

The DR024-M4 is can be externally or internally triggered and provides a digital 12-bit output word of the RF input frequency with every sample. The internal analogue bandwidth is sufficient to capture a 50ns pulse.

With a resolution of 12 bits, the DR024-M4 gives a nominal frequency resolution of 3.93MHz and an rms accuracy of ≤4.5MHz with an input SNR of 3dB or better.

Designed specifically for fast jet applications, the DR024-M4 will withstand the most demanding of environments. It is characterized for -40ºC to +85ºC. For applications outside this range, please contact the Sales Dept.

External connections are made via a 51 way high density D type for power and digital I/O and SMA for the RF input. Other IFM configurations are available and for further information, please contact the TDS Sales Team.

FEATURES

- 12 Bit Resolution
- External or Internal Trigger
- 50ns Pulse Capable
- 16GHz Instantaneous Bandwidth
- -50dBm Sensitivity
- Small Form Factor
- Low Weight
- Low Power Consumption

APPLICATIONS

- Electronic Support Measures (ESM)
- Radar Warning Receivers (RWR)
- ECM Set-on
- Airborne, Fixed Wing & Rotary
- Land
- Naval

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ELECTRICAL SPECIFICATIONS

Ref	Parameter	Units	Value			Notes
			Min	Nom	Max	
1	Operating Frequency Range	GHz	1.955		18.045	
2	Unambiguous Bandwidth	GHz	1.5		18.5	
3	Frequency Resolution	MHz		3.93		1
4	Digital Frequency Resolution	Bits		12		
5	Throughput Time	ns	330		370	2
6	RF Input Dynamic Range	dBm	-50		10	
7	RF Input Signal/Noise Ratio	dB	3			3
8	RF Input Pulse Width	ns	50		CW	4
9	RF Input VSWR				2.2:1	
10	Frequency Error (RMS) at 0 dB SNR	MHz			5.6	5
11	Frequency Peak Error at 3 dB SNR	MHz			4.5	5
12	Simultaneous Signal: Level	dBc	10			6
13	Simultaneous Signal: Frequency Separation	MHz		100		6
14	Overload Power	dBm			20	7
15	Temperature Range (operating)	°C	-40		85	
16	Power Consumption	Watts			18.5	
17	Power Supply Current: +15v Rail	mA			850	
18	Power Supply Current: +5v Rail	mA			1000	
19	Weight (Approx.)	kg			1.55	

1. Nominal frequency resolution is unambiguous bandwidth divided by number of bits.
2. See timing diagrams.
3. Minimum SNR required for nominal operation.
4. Minimum pulse width is defined by internal video bandwidth.
5. The actual resolution, i.e.,the change of frequency required to change 1 bit of the output word varies with frequency. The rms accuracy is calculated as the standard deviation of the frequency distribution. The rms accuracy is specified for 3dB and 0dB input SNR. The rms error excludes those measurements that are flagged as "bad data".
6. Simultaneous signals are defined as signals which overlap by at least 30ns during a measurement cycle. A valid measurement will be made on the larger of two signals provided that a) the amplitude difference between them is 10dB and b) there is at least 100MHz frequency separation.
7. Maximum input power without damage.

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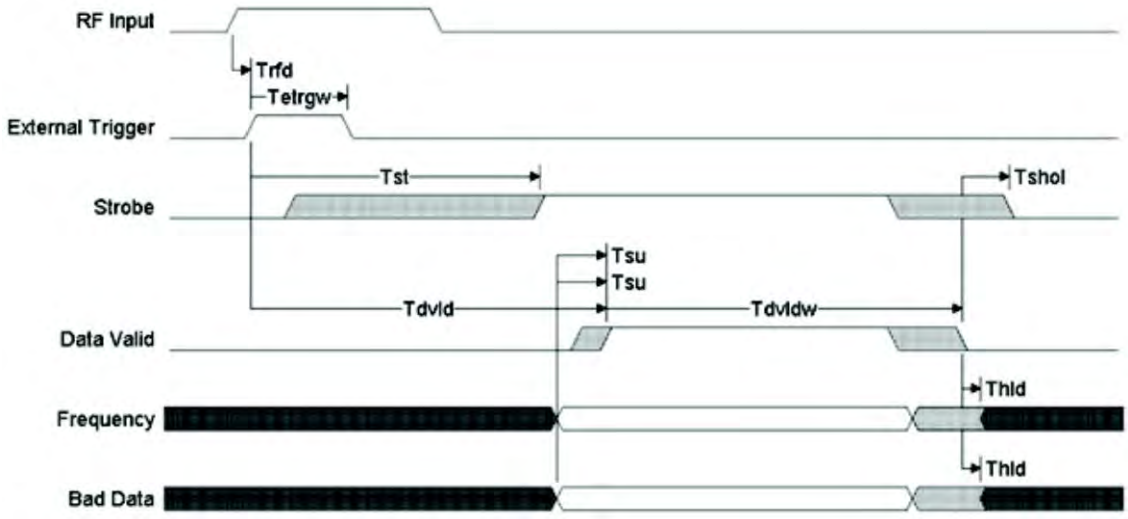
TIMING INFORMATION

Operation with external trigger



Parameter	Description	Timings Min		Max
Trfd	Delay from RF to External Trigger	4 ns		12 ns
Tetrgw	External Trigger width	50 ns		
Tst	Delay from External Trigger to Strobe	40 ns		300 ns
Tdvld	Delay from External Trigger to data Valid	330 ns		370 ns
Tdvldw	Data Valid width	330 ns		370 ns
Tsu	Data set up time w.r.t. Data Valid	20 ns		
Thld	Data hold time w.r.t. Data Valid	20 ns		
Tshol	Strobe hold time w.r.t. Data Valid	0 ns		

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PIN DESIGNATIONS

Pin	Signal	Direction
1	+15V	Power
2	+15V	Power
3	+15V	Power
4	0V	Return
5	Trigger Select	Input
6	0V	Return
7	External Trig	Input
8	0V	Return
9	Strobe	Input
10	0V	Return
11	Data Valid +	Output
12	Data Valid -	Output
13	0V	Return
14	RF Present +	Output
15	RF Present -	Output
16	0V	Return
17	Bad Data -	Output
18	Bad Data +	Output
19	0V	Return
20	Not Used	
21	Not Used	
22	Not Used	
23	Not Used	
24	+5V	Power
25	+5V	Power
26	+5V	Power
27	Freq 11+	Output
28	Freq 11 -	Output
29	Freq 10+	Output
30	Freq 10 -	Output
31	Freq 9+	Output
32	Freq 9 -	Output
33	Freq 8+	Output
34	Freq 8 -	Output
35	Freq 7+	Output
36	Freq 7 -	Output
37	Freq 6+	Output
38	Freq 6 -	Output
39	Freq 5 +	Output
40	Freq 5 -	Output
41	Freq 4+	Output
42	Freq 4 -	Output
43	Freq 3+	Output
44	Freq 3 -	Output
45	Freq 2+	Output
46	Freq 2 -	Output
47	Freq 1 +	Output
48	Freq 1 -	Output
49	Freq 0+	Output
50	Freq 0 -	Output
51	0V	Return

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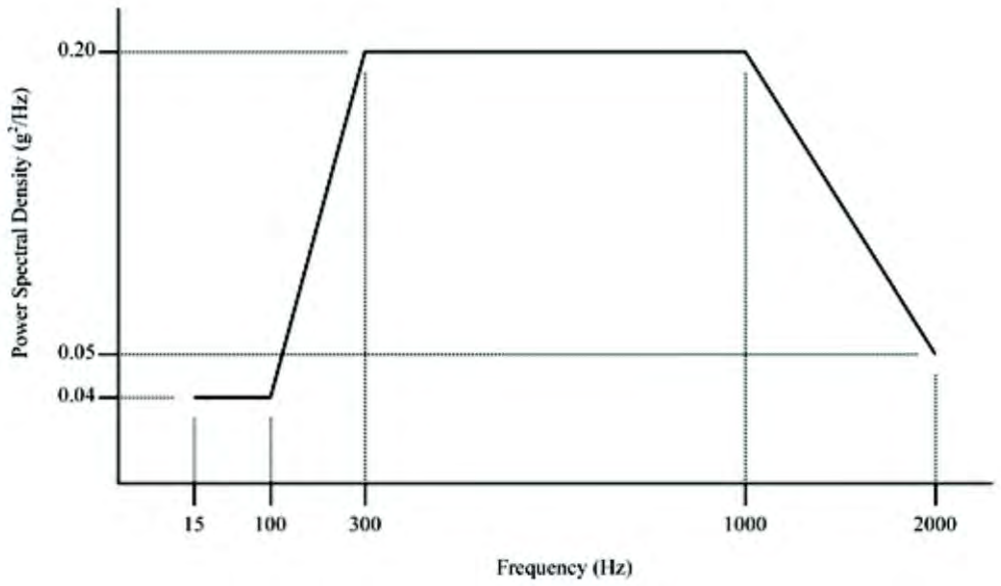
ENVIRONMENTAL SCREENING

100% of units subjected to: burn in 8 hours operational at 71ºC, random vibration (as below), 5min per axis, thermal shock (as below), random vibration (as below), 5min per axis.

Environmental Data
Compliance can be shown by similarity to the following environmental conditions:

Sinusoidal Vibration: MIL-STD-202F, Method 204 - 5g profile between 5 and 104Hz for 90 min per axis
Random Vibration: MIL-STD-810D, Method 514.3 – specified profile (below) with max of 0.2g²/Hz for 60 min per axis, 20 to 2000Hz



Mechanical Shock: MIL-STD-202F, Method 213B – 15g/11ms, 3 shocks in each axis in each direction (18 total)
Acceleration: MIL-STD-202F, Method 212A, condition B, 6 to 14g

High Temperature storage: MIL-STD-810D, Method 501.2 - 95ºC for 8 hours

High Temperature operational: MIL-STD-820D, Method 501.2 – 71ºC / 30min, 60ºC / 60min, 55ºC / 4hr Thermal Shock: 10 Cycles of –40ºC to 71ºC, 5 min ramp, 2hr dwell

Low Temperature storage: MIL-STD-810D, Method 502.2 - -54ºC for 8 hours. Low temperature operational: MIL-STD-810D, Method 502.2 - -40ºC / 60min.

Combined temperature, altitude & humidity: MIL-STD-810D. Method 520 – temperature –40ºC to 70ºC, storage condition sea level to 17000m (87.6mb), operating condition sea level to 11000m (228mb), relative humidity at sea level 75%, 10 Cycles.

Humidity: MIL-STD-810D, Method 507.2, procedure 2 – RH 85% to 95%, temperature 30ºC to 60ºC, 24 hour cycle, 10 cycles.

EMI/EMC: Generally in accordance with MIL-STD-461E. Please note that system precautions must be taken to prevent interfering signals entering the high gain RF front end.

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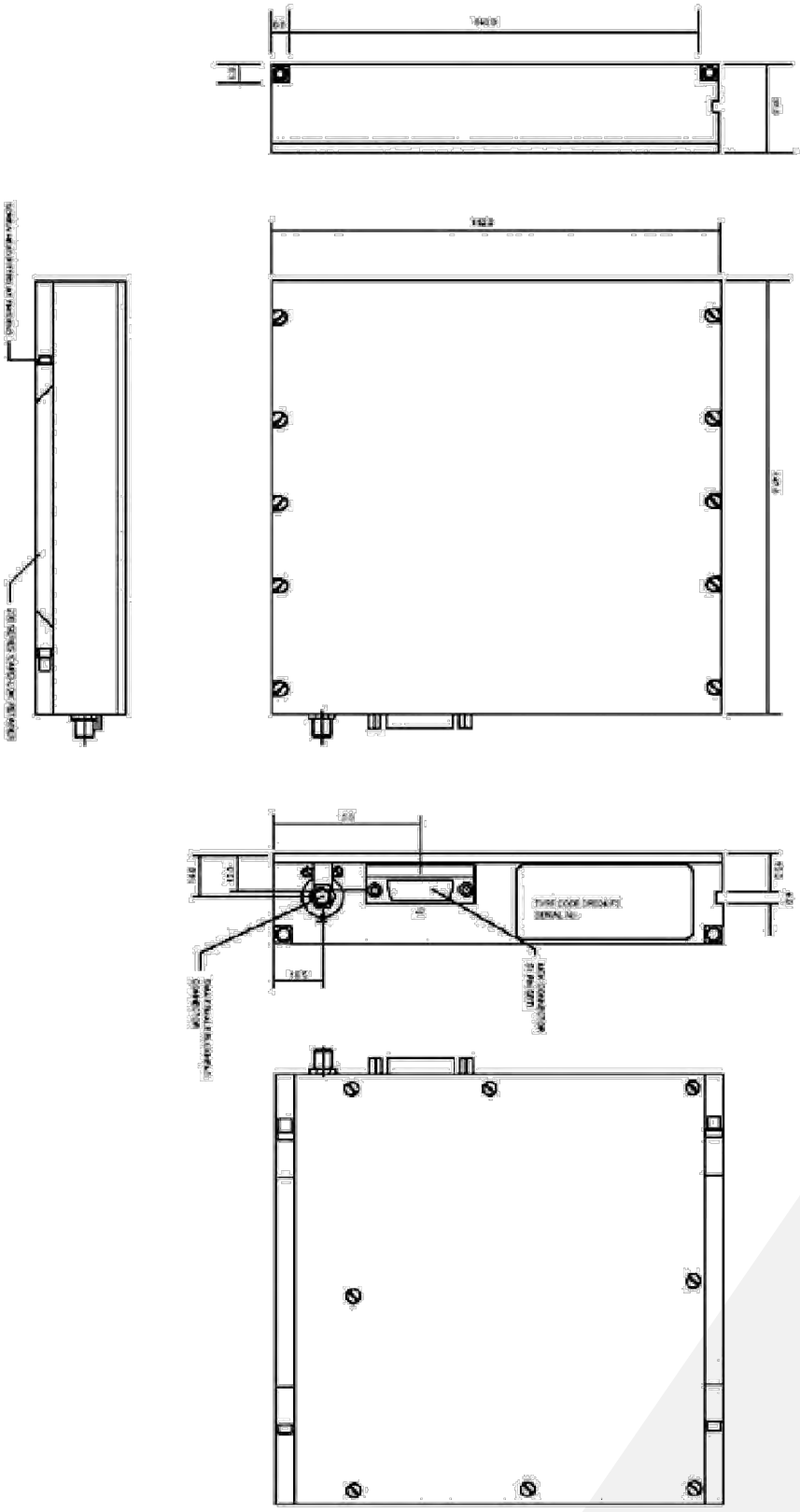
OUTLINE DRAWING



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