REVISIONS					
ZONE	REV	DESCRIPTION		DATE	APPROVED
	-	PRELIMINARY		8/2/19	S. PALACIO

	NAME:	DATE:	
CONTRACT NO:			**Planar Monolithics Industries, Inc.**
DRAWN:	C. Wenner	8/2/19	**7311-F GROVE ROAD**
CHECKED:			**FREDERICK, MD 21704**
PROJ ENGR:	S. Palacio	8/2/19	
PROG MGR:			OPERATING MANUAL
MFG.ENGR:			
QA ENGR:	J. Peacher	8/2/19	MODEL: DFD-2G18G-5512
RELIABILITY:			

	SIZE **A**	CAGE CODE **05XQ0**	DWG. NO. **PRELIMINARY**	REVISION -
PMI	SCALE	N/A		SHEET 1 OF 11

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DESCRIPTION	DATE	PMI
PRELIMINARY	8/2/19	S. PALACIO

PMI

SIZE	CAGE CODE	DWG. NO.	REVISION -
A	**05XQ0**	**PRELIMINARY**	
SCALE	N/A		SHEET 2 OF 11

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	SIZE **A**	CAGE CODE **05XQ0**	DWG. NO. **PRELIMINARY**	REVISION -
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PMI	**A**	**05XQ0**	**PRELIMINARY**	
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1.0 INTRODUCTION

The purpose of this document is to give the necessary information to be able to use the DFD-2G18G-5512 Digital Frequency Discriminator (DFD).

The DFD-2G18G-5512 provides a digital output representing the frequency of the input RF signal, ranging from 2.0 to 18.0 GHz. DFD-2G18G-5512 is a clocked sampling DFD which samples the RF input on the rising edge of every master clock cycle and provides a digital output accordingly.

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2.0 GLOSSARY

CW: Continuous Wave
dBm: Decibel milliWatt
DFD: Digital Frequency Discriminator
rms: root mean square
SNR: Signal to Noise Ratio

3.0 ELECTRICAL SPECIFICATIONS

Electrical specifications of DFD-2G18G-5512 are given in Table 1.

Table 1: Electrical Specifications

Frequency Range:		2.0 to 18.0 GHz 16 GHz minimum
Dynamic Range:		-50 to +15 dBm
Mean Frequency Resolution:		1 MHz
Frequency Accuracy:		3 MHz (Peak rms) @ 3 dB SNR
Peak Frequency Error:		15 MHz
Maximum RF Input Power:		+17 dBm CW
Througoutput Time:		Less than 350 ns typical
Recovery Time:		50 ns typical
Shadow Time:		100 ns typical
Minimum Pulse Width:		100 ns typical
Power consumption:		-5 VDC @ 30 mA typical
		+5 VDC@ 1.5 A typical
		+12 VDC @ 800 mA typical
Control Logic:		14-bit TTL digital output (single ended)
Connectors:	RF Input	SMA female
	Power/Control	51-pin micro-D
	Calibration/Test	15-pin micro-D

4.0 ELECTRICAL INTERFACE

Connector allocation information for 51 pin Micro-D and 15 pin Micro-D connectors of DFD-2G18G-5512 are given in Table 2 and Table 3, respectively.

Table 2: 51 Pin Micro-D Connector Allocations

	POWER/CONTROL PIN OUT TABLE					
PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	0 V	18	0 V	35	Freq. 13
2	0 V	19	IFM Clock	36	+ 12 V
3	0 V	20	0 V	37	0 V
4	0 V	21	0 V	38	Freq. 0
5	0 V	22	0 V	39	Freq. 2
6	Ext. Trigger*	23	Freq. 1	40	Freq. 4
7	0 V	24	0 V	41	Freq. 5
8	0 V	25	Freq. 3	42	0 V
9	0 V	26	0 V	43	Freq. 7
10	0 V	27	Bad Data	44	Freq. 6
11	0 V	28	0 V	45	0 V
12	0 V	29	Freq. 11	46	Freq. 9
13	Data Valid*	30	0 V	47	Freq. 8
14	0 V	31	Freq. 12	48	Freq. 10
15	0 V	32	0 V	49	0 V
16	0 V	33	0 V	50	+5 V
17	-5 V	34	0 V	51	+5 V

*Connector pins 6 and 13 are reserved for future use.

Table 3: 15 pin Micro-D Connector Allocations

CALIBRATION/TEST PIN OUT TABLE	
PIN	SIGNAL
1	0 V
2	TDI-PROM
3	TDO-FPGA
4	TCK
5	TMS
6	VCCO
7	Test. 17
8	Test. 18
9	Test. 19
10	Test. 20
11	Test. 21
12	Test. 22
13	Sync-In
14	0 V
15	Trig-In

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5.0 TYPICAL CONNECTION DIAGRAM

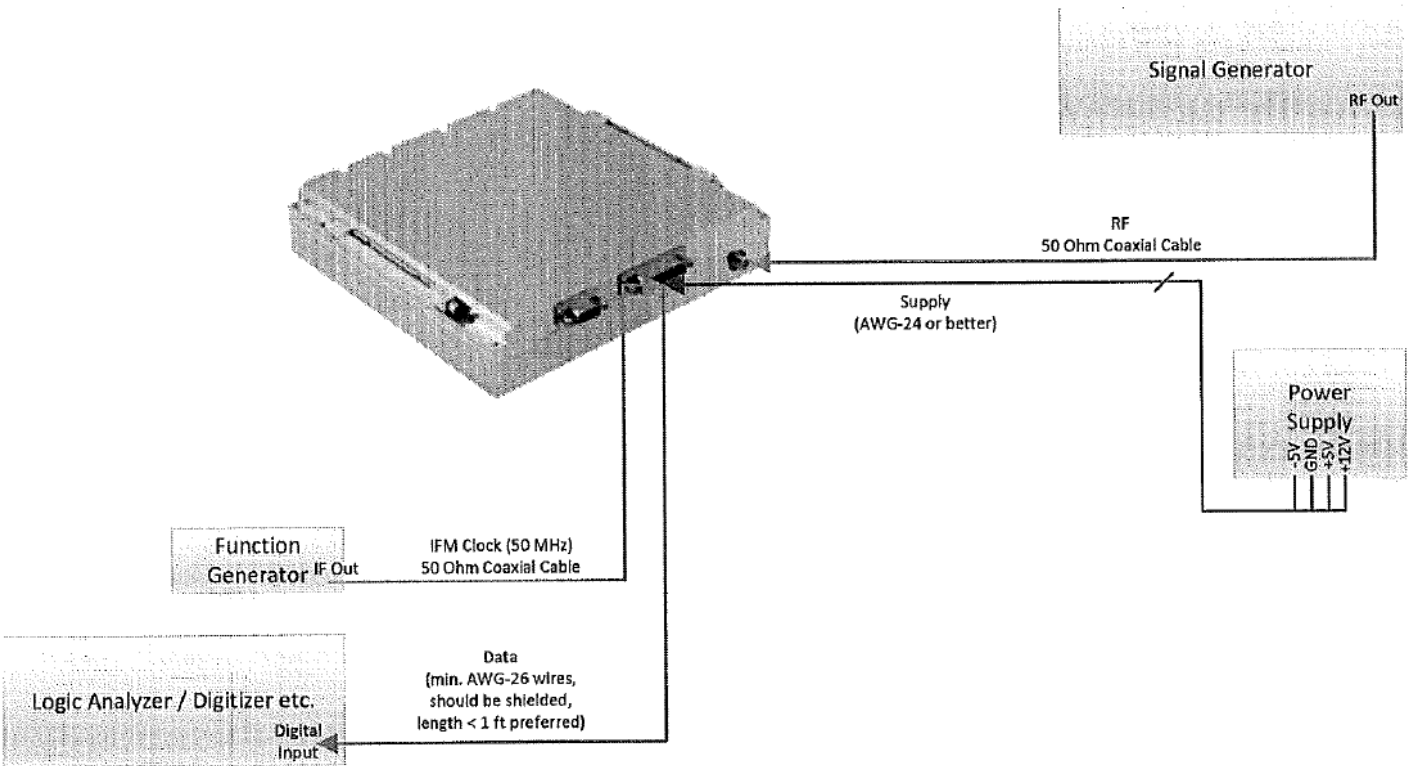Typical connection diagram is shown below:

Figure 1: Typical Connection Diagram

6.0 FREQUENCY CODING

6.1 IN BAND FREQUENCY CODING

From 1.95 GHz to 18.05 GHz, the frequency code f_N (which is an integer) should be defined as:

$f_N = INT(f_{in}-1850)$, where f_{in} is the input frequency

6.2 OUT OF BAND FREQUENCY CODING

For signals within the unambiguous bandwidth and outside the defined in-band signals, the following frequency codes should be generated.

$f_N = 0$ $(1.5\ GHz < f_{in} < 1.95\ GHz)$
$f_N = 16383$ $(18.05\ GHz < f_{in} < 18.5\ GHz)$
$f_N = undefined$ $(f_{in} < 1.5\ GHz\ or\ f_{in} > 18.5\ GHz)$

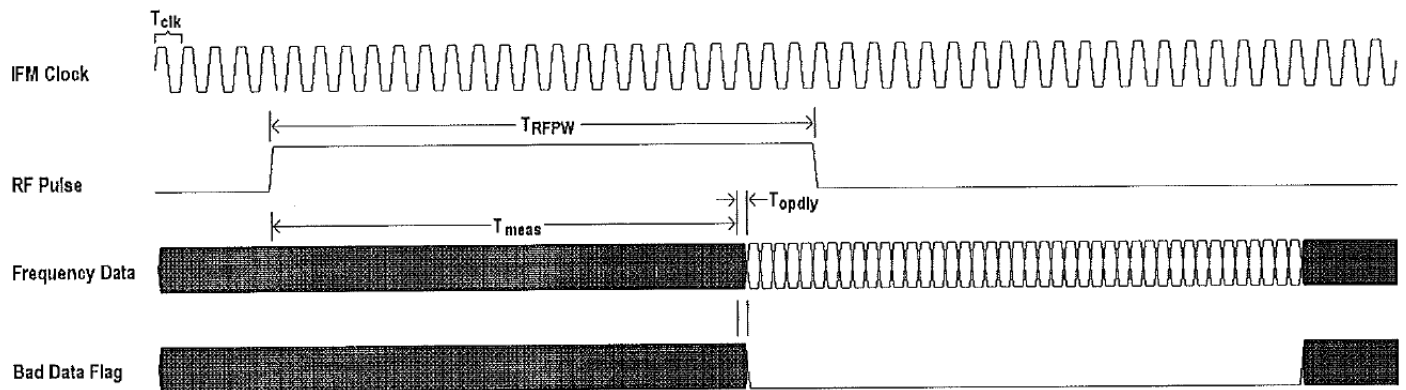| SIZE	CAGE CODE	DWG. NO.	REVISION -
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7.0 MEASUREMENT TIMINGS

Figure 2: Measurement Cycle

Timing parameters are given in Table 4.

Table 4: Timing Parameters

Parameter	Description	Timings		
		Min.	Nominal	Max.
Tclk	Clock Period	20 ns		100 ns
TRFPW	RF pulse width	Tclk+80 ns		CW
Tmeas	Measurement Time		350 ns	
Topdly	Data output delay	0 ns		10 ns

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8.0 MECHANICAL SPECIFICATIONS

8.1 DIMENSIONS

152 mm x 147 mm x 32.5 mm
5.98" x 5.79" x 1.28"

8.2 WEIGHT

The typical weight is 1.15 kg.

8.3 COOLING

Natural convection and radiation

8.3 SERVICEABILITY

The module is sealed and not user serviceable.

9.0 ENVIRONMENTAL SPECIFICATIONS

Temperature:	-40°C to +60°C (Operating)
	-55°C to +95°C (Storage)
Humidity:	MIL-STD-202, Method 103B Cond. B
Shock:	MIL-STD-202, Method 213B Cond. B
Vibration:	MIL-STD-202, Method 204D Cond. B
Altitude:	MIL-STD-202, Method 105C Cond. A
Temperature Cycle:	MIL-STD-202, Method 107G Cond. A

PMI

SIZE
A

CAGE CODE
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