

FIVE-CHANNEL DOWNCONVERTER MODULE WITH INPUT RF SWITCH/LIMITER AND LO AMPLIFIER/DIVIDER

MODEL SERIES: DSS0818

FEATURES

- RF/LO coverage 8 to 18 GHz
- Ideal for broadband DF receivers
- External IF phase/amplitude adjustments
- Channel-to-channel RF tracking
 - Phase $\pm 5^\circ$ typical
 - Amplitude ± 0.5 dB typical
- Remote band/blanking/BIT selection

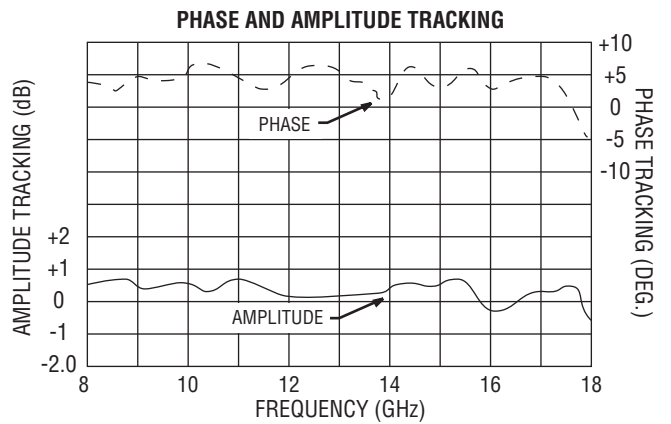
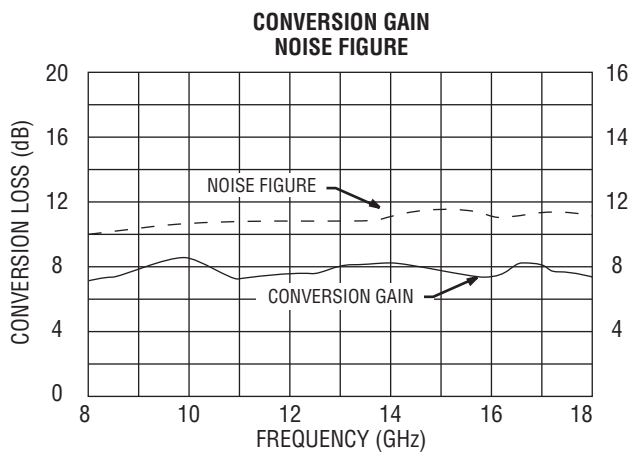
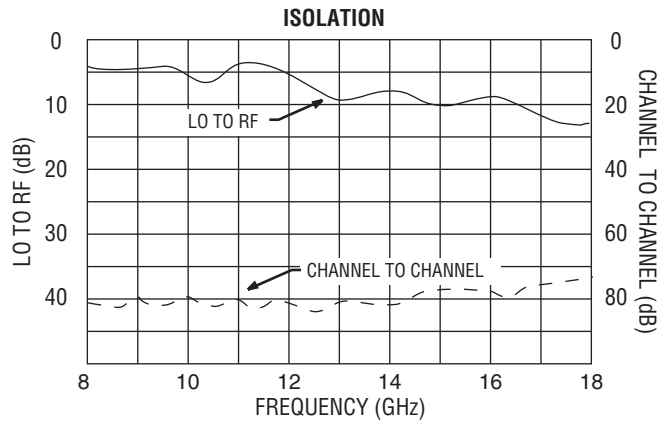
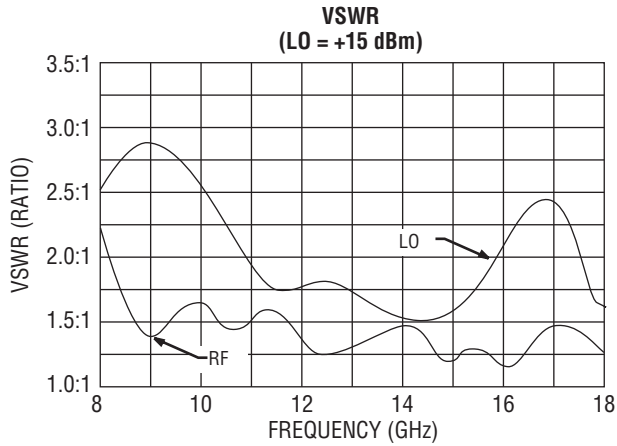


MITEQ's Model DSS Series integrates our standard broadband double-balanced mixer designs with input limiter protection diodes and IF amplifiers to provide a phase- and amplitude-tracked five-channel downconverter with an integrated LO amplifier/splitter. A three-way input switch/limiter provides remote band/blanking/BIT select and protection from undesired high signal levels. This module is most often used as the "front-end" of a direction-finding system using four antennas in the azimuth, elevation or combined directions and a fifth antenna channel to resolve additional received strong "back or side lobe" signals and to identify the receiver image response. The DSS0818 is also useful as an instantaneous frequency monitor with suitable input frequency to phase encoders (application notes available).

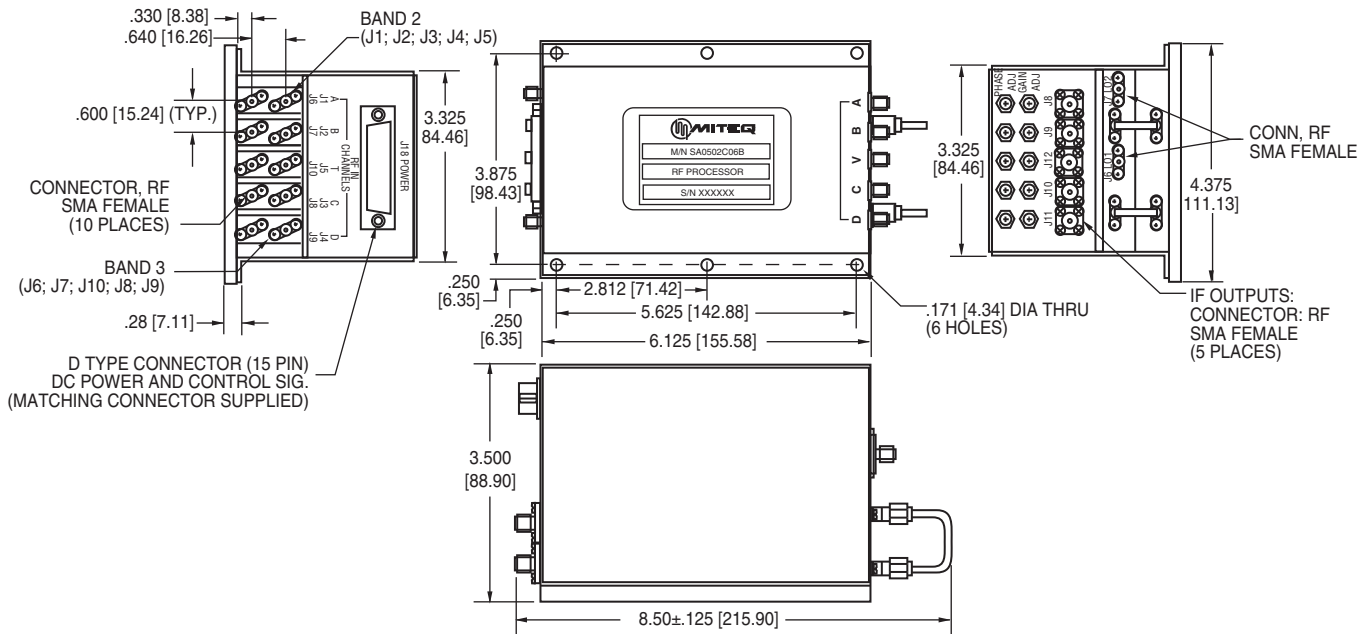
ELECTRICAL SPECIFICATIONS

INPUT PARAMETERS	CONDITION	UNITS	MIN.	TYP.	MAX.
RF/LO frequency range	LO ₁ and LO ₂	GHz	8		18
RF power, 1 dB compression	@ 6 dB gain nominal	dBm		-7	
RF power	Maximum average	Watts		2	
RF power (maximum peak, 5 μ s pulse, 1% duty cycle)		Watts		200	
LO power, operating	LO ₁ and LO ₂	dBm	-18	-15	-12
RF and LO VSWR (RF = -10 dBm, LO = -15 dBm)		Ratio		1.5:1	
BIT (built-in-test) control (3 BITS)		Logic		TTL	
DC current at ± 12 V		mA		700	
TRANSFER CHARACTERISTICS	CONDITION	UNITS	MIN.	TYP.	MAX.
Conversion gain (RF input to IF output, with gain adjustment of ± 5 dB)		dB	3	8	13
Conversion gain flatness	Across RF band	\pm dB		1	
Single-sideband noise figure at 25°C		dB		10	14
LO-to-RF isolation	Including LO amplifier gain	dB	0	5	10
LO-to-IF isolation		dB		50	
RF-to-IF isolation		dB		60	
Output two-tone third-order intercept point	LO = -15 dBm	dBm		+25	
Output two-tone second-order intercept point		dBm		+48	
Channel-to-channel isolation		dB		40	
Channel-to-channel amplitude tracking		dB		± 0.5	± 1
Channel-to-channel phase tracking		Degrees		± 5	± 15
IF gain adjust		\pm dB			5
IF phase adjust		\pm Degrees			20
OUTPUT PARAMETERS		UNITS	MIN.	TYP.	MAX.
IF frequency range	-3 dB bandwidth	MHz	80	160	240
IF VSWR (IF = -10 dBm, LO = -15 dBm)	Ratio		2:1		

DSS0818 TYPICAL TEST DATA

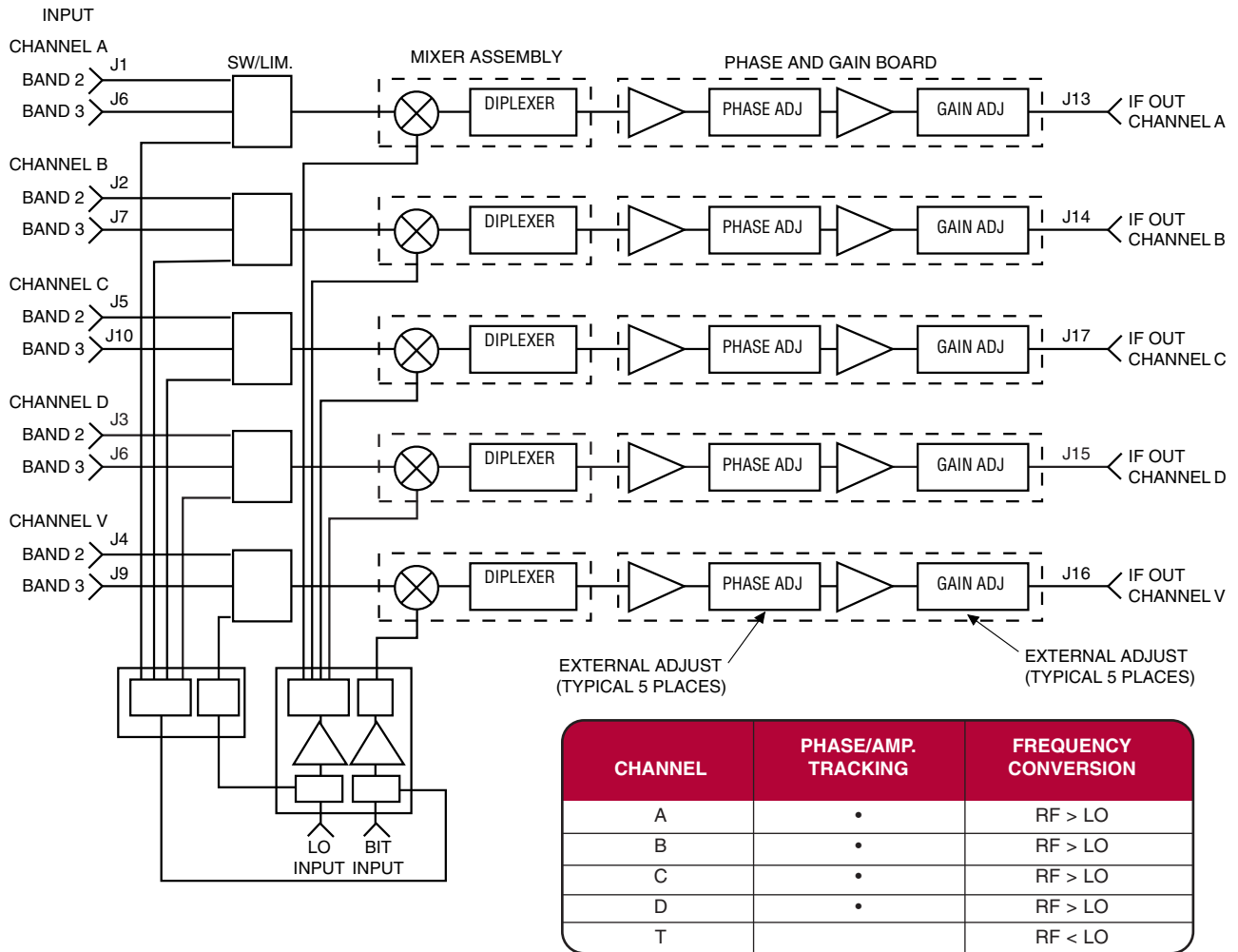


OUTLINE DRAWING



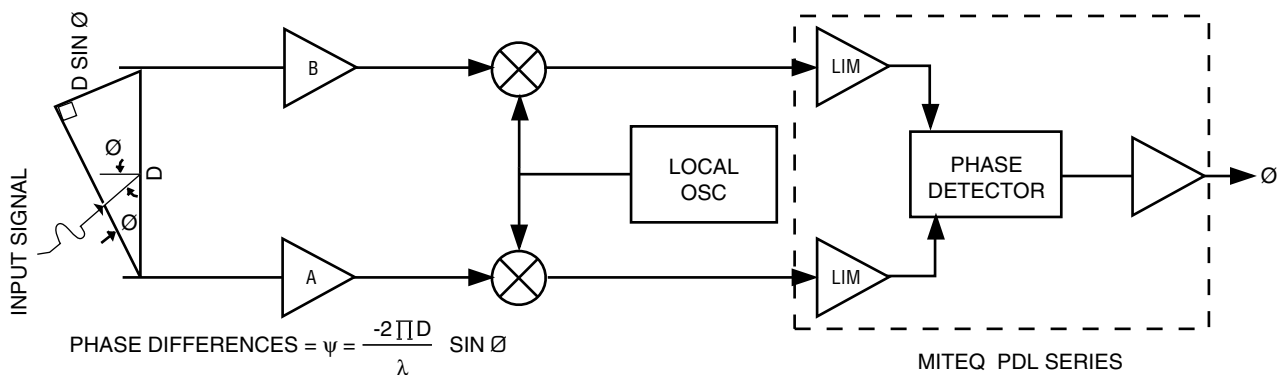
NOTE: All dimensions shown in brackets [] are in millimeters.

BLOCK DIAGRAM OF MITEQ 5-CHANNEL GAIN- AND PHASE-MATCHED FRONT END



APPLICATION NOTES

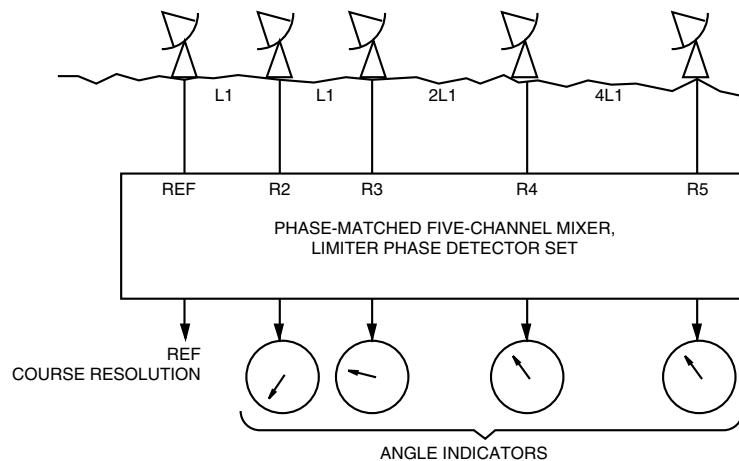
BLOCK DIAGRAM OF SIMPLE TWO-CHANNEL ANGLE OF ARRIVAL (A.O.A) MEASUREMENT SYSTEM (REF 1.)



1. "Microwave Passive Direction Finding", S. Lipsky, 1987, John Wiley & Sons publisher TK6565.D5L57.

APPLICATIONS OF FIVE-CHANNEL FRONT ENDS

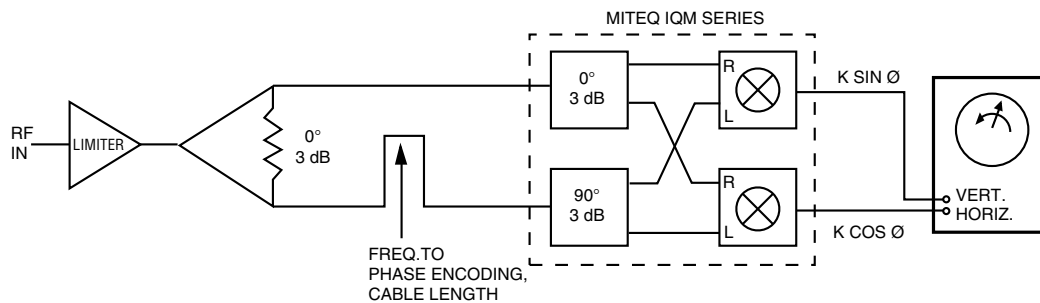
DIRECTION FINDING APPLICATIONS



ALTERNATIVE APPLICATIONS

Can the basic direction-finding receiver also be used to measure incoming frequency?

Yes, by first encoding the received signal into two separate outputs that have a phase difference in direct proportion to their frequency:



A large cable length difference in the two splitter outputs will yield rapidly varying phase with frequency. If these outputs are applied to a two-channel DF system, the output phase difference, together with knowledge of the encoder cable lengths, can be used to determine input frequency. This is the basic principle of an instantaneous frequency monitor (IFM). In actual practice, several frequency encoders are used with progressively greater frequency resolution, similar to how one reads the dials of a gas or an electric meter.

