TSF Library - STDTSFLib

Schema Name:- STDTSFLib
Version:- 2.1
Schema Location:- STDTSFLib.xsd
namespace:- urn:IEEE-1641:2010:STDTSFLib
prefix:- this
Description:-
The IEEE P1641 default Test Signal Framework Library for compatable IEEE716-95 Signals
This XML instance file is specified in IEEE Std 1641-20XX, "IEEE Standard for Signal and Test Definition." This schema is a World Wide Web Consortium (W3C) Extensible Markup Language (XML) binding of Annex E Test signal framework (TSF) for ATLAS Clause E.2 TSF library definition in XML" The purpose of this XML file is to provide unique TSF definitions inline with legacy ATLAS 716 signals.This files uses the W3C XML Schema definition language as the encoding. This allows for interoperability and the exchange of TSF component instances between various systems.This file shall not be modified but may be included in derivative works.

AC_SIGNAL

Definition
A sinusoidal time-varying electrical signal.

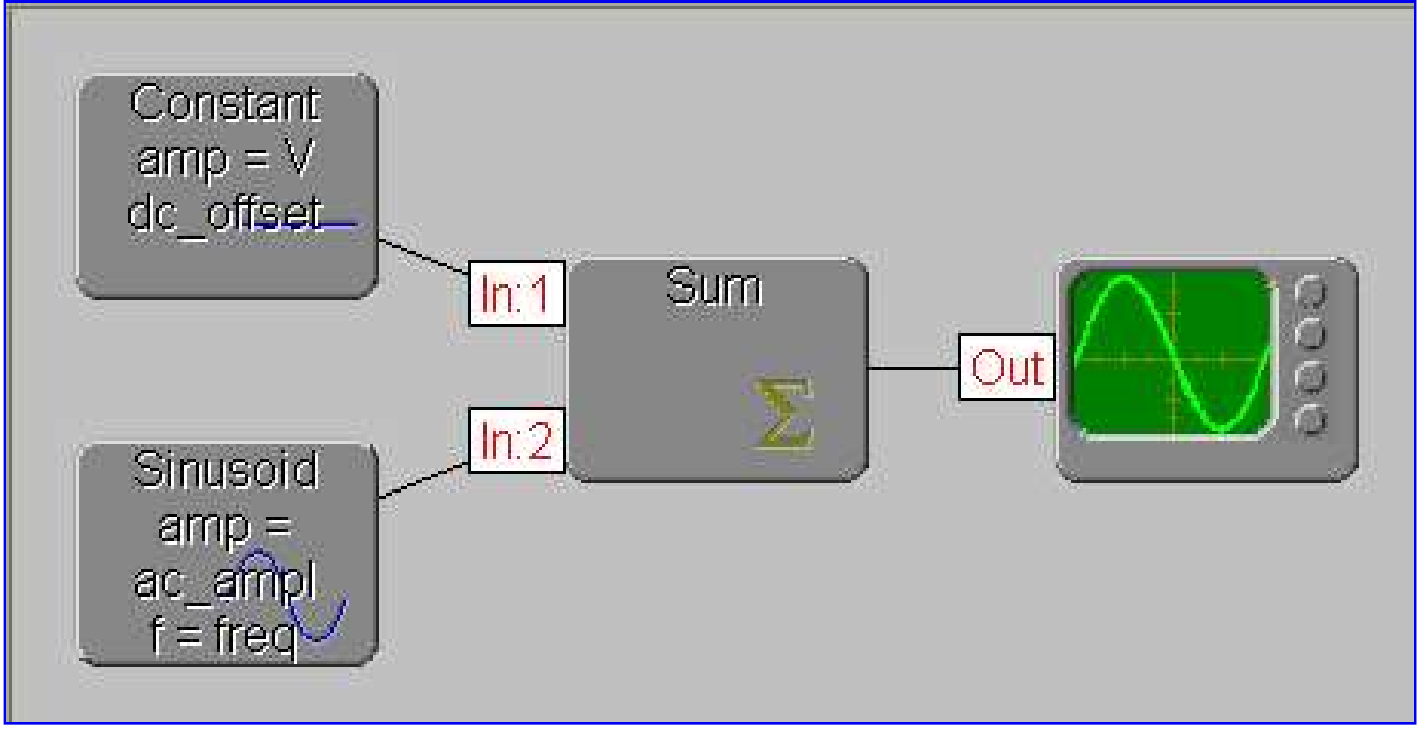

Figure 1-TSF AC_SIGNAL(AC_SIGNAL)

Interface Properties

Table 1-TSF AC_SIGNAL Interface

Description	Name	Type	Default	Range
AC Signal amplitude	ac_ampl	Physical		
DC Offset	dc_offset	Physical	0	
AC Signal frequency	freq	Frequency		
AC Signal phase angle	phase	PlaneAngle	0 rad	

Notes

Model Description

Table 2-TSF AC_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
AC_Signal	Sum	Signal [Out]			
		Signal [In]	DC_Offset		
		Signal [In]	AC_Component		
AC_Component	Sinusoid	Signal [Out]		AC_Signal	
		amplitude	ac_ampl		
		frequency	freq		
		phase	phase		
DC_Offset	Constant	Signal [Out]		AC_Signal	
		amplitude	dc_offset		

Rules

AM_SIGNAL

Definition
A continuous sinusoidal (carrier) wave whose amplitude is varied as a function of the instantaneous value of a second (modulating) wave.

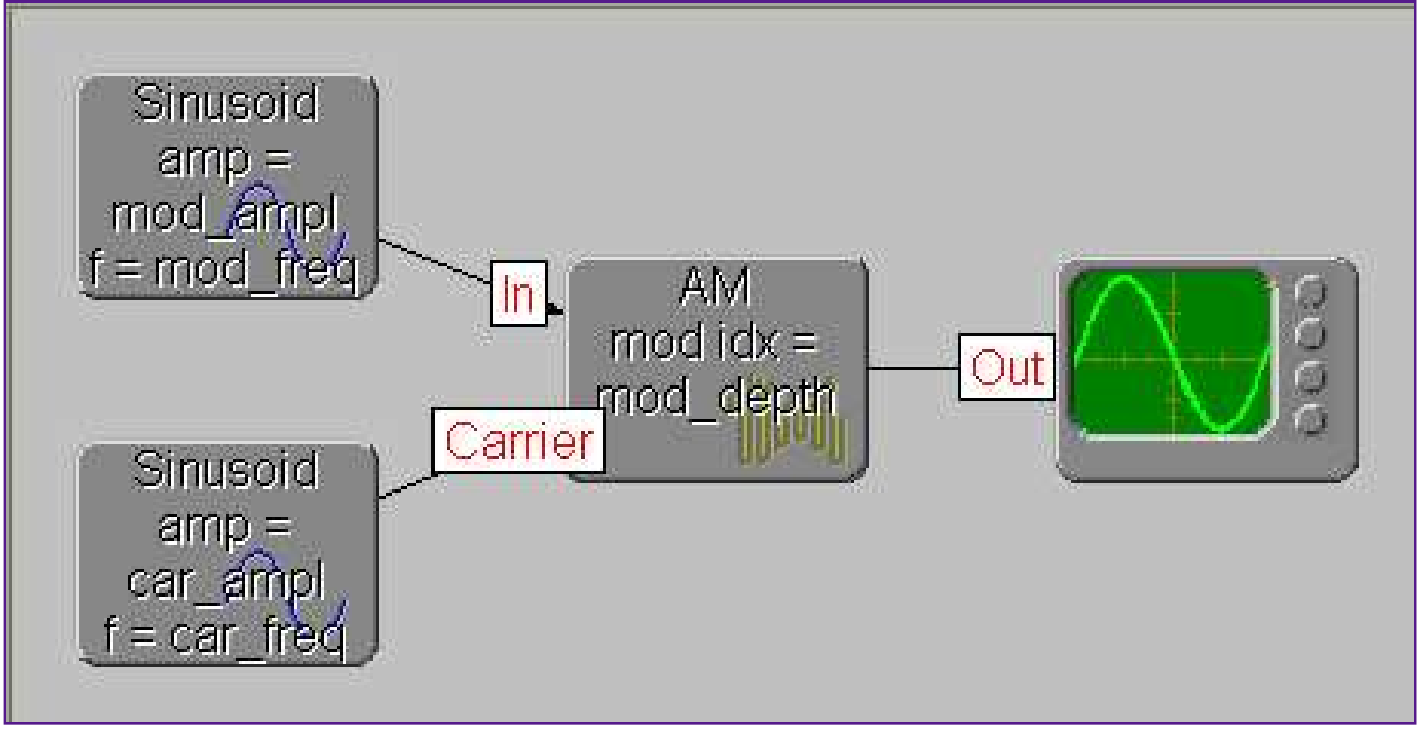

Figure 2-TSF AM_SIGNAL(AM_SIGNAL)

Interface Properties

Table 3-TSF AM_SIGNAL Interface

Description	Name	Type	Default	Range
Carrier amplitude	car_ampl	Voltage		
Carrier frequency	car_freq	Frequency		
Modulation frequency	mod_freq	Frequency		
Depth of modulation	mod_depth	Ratio		
Modulation amplitude	mod_ampl	Voltage	1 V	

Notes

Model Description

Table 4-TSF AM_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
AM_Signal	AM	Signal [Out]			
		modIndex	mod_depth		
		Carrier [In]	Carrier		
		Signal [In]	Modulation		
Modulation	Sinusoid	Signal [Out]		AM_Signal	
		amplitude	mod_ampl		
		frequency	mod_freq		
		phase			0 rad
Carrier	Sinusoid	Signal [Out]		AM_Signal	
		amplitude	car_ampl		
		frequency	car_freq		
		phase			0 rad

Rules

DC_SIGNAL

Definition

An unvarying electrical signal with an optional ac component.

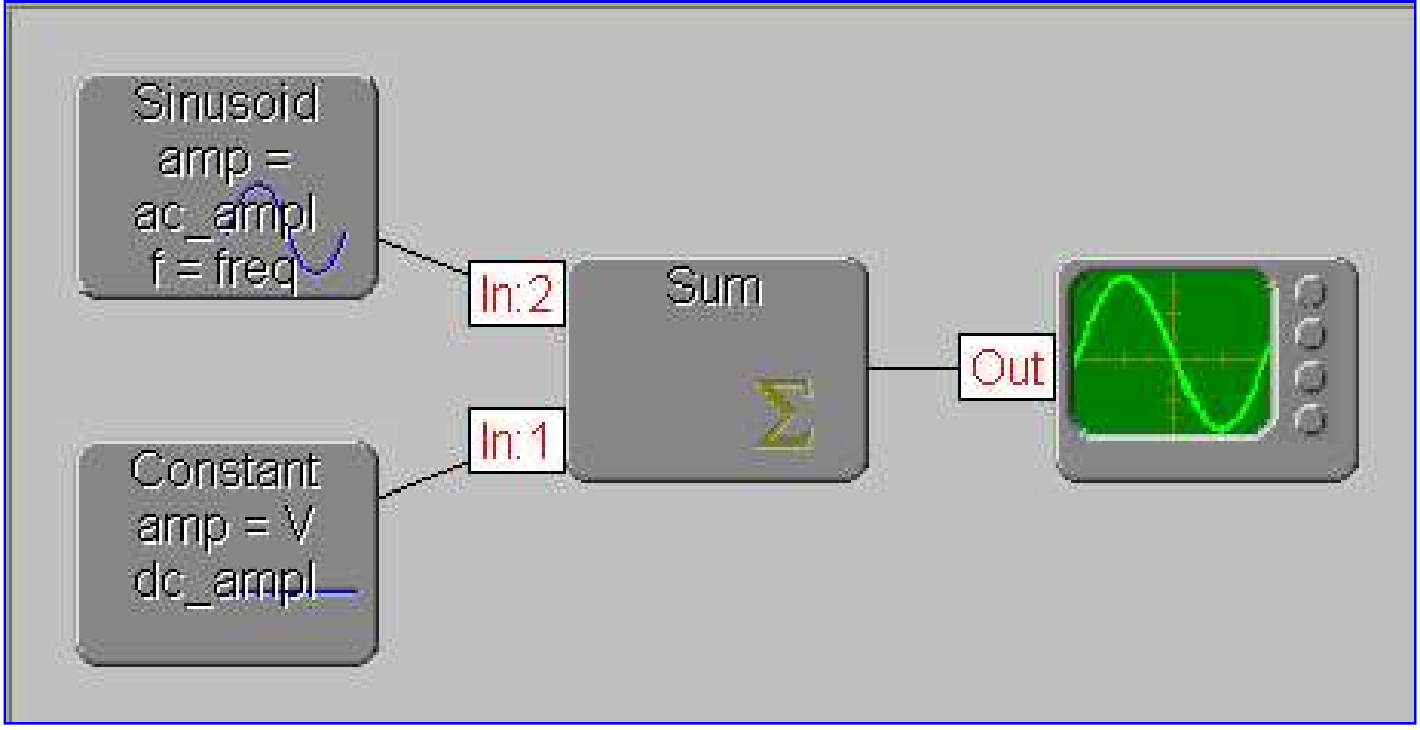

Figure 3-TSF DC_SIGNAL(DC_SIGNAL)

Interface Properties

Table 5-TSF DC_SIGNAL Interface

Description	Name	Type	Default	Range
DC Level	dc_ampl	Physical		
AC Component amplitude	ac_ampl	Physical	0	
AC Component frequency	freq	Frequency	0 Hz	
AC Component phase angle	phase	PlaneAngle	0 rad	

Notes

Model Description

Table 6-TSF DC_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
DC_Signal	Sum	Signal [Out]			
		Signal [In]	DC_Level		
		Signal [In]	DC_AC_Component		
DC_AC_Component	Sinusoid	Signal [Out]		DC_Signal	
		amplitude	ac_ampl		
		frequency	freq		
		phase	phase		
DC_Level	Constant	Signal [Out]		DC_Signal	
		amplitude	dc_ampl		

Rules

DIGITAL_PARALLEL

Definition

A parallel digital source that creates a digital logic signal in which the physical values for logic 1, logic 0 and high impedance data values are determined by the logic threshold values specified.

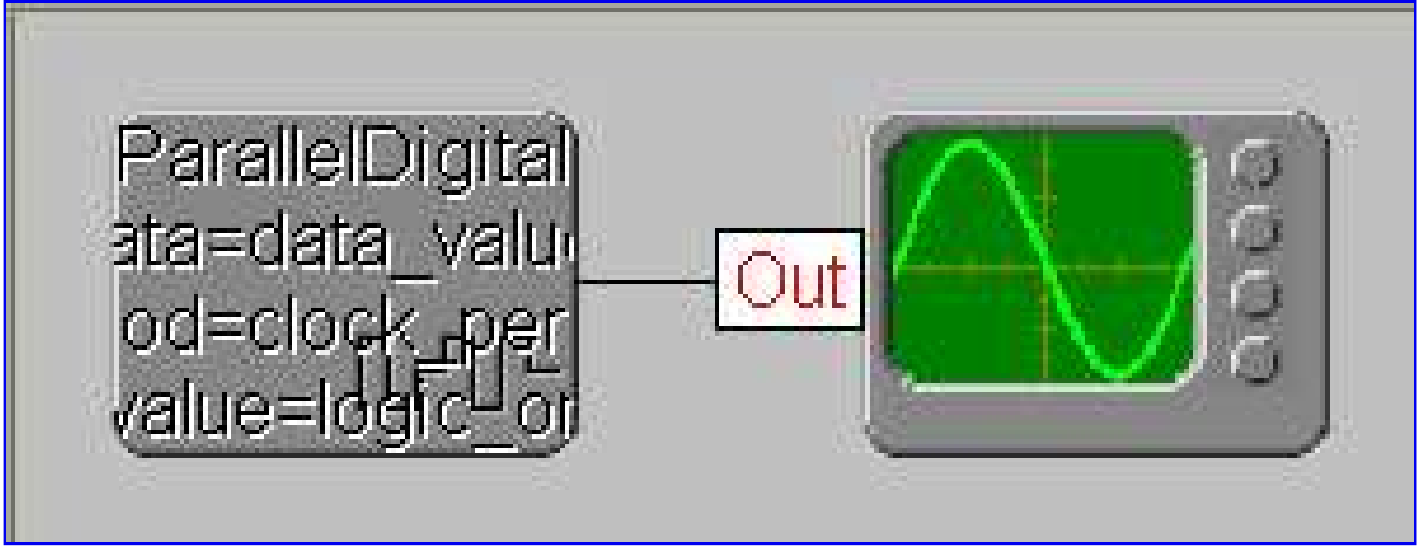

Figure 4-TSF DIGITAL_PARALLEL(DIGITAL_PARALLEL)

Interface Properties

Table 7-TSF DIGITAL_PARALLEL Interface

Description	Name	Type	Default	Range
Data Value	data_value			
Clock period	clock_period	Time		
Logic One level	logic_one_value	Voltage		
Logic Zero level	logic_zero_value	Voltage		

Notes

Model Description

Table 8-TSF DIGITAL_PARALLEL Model

Name	Type	Terminal	Inputs	Output	Formula
Digital_Stream	ParallelDigital	Signal [Out]			
		data	data_value		
		period	clock_period		
		logic_H_value	logic_one_value		
		logic_L_value	logic_zero_value		
		pulseClass	NRZ		

Rules

DIGITAL_SERIAL

Definition

A serial digital source that creates a digital logic signal in which the physical values for logic one, logic zero and high impedance data values are determined by the logic threshold values specified.

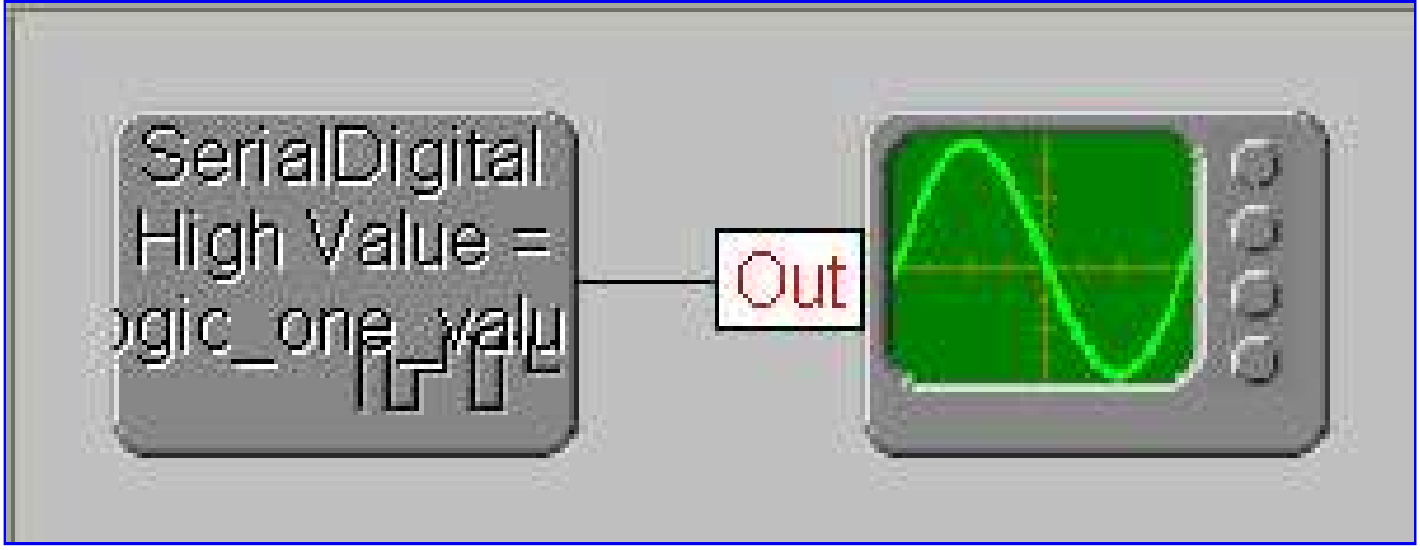

Figure 5-TSF DIGITAL_SERIAL(DIGITAL_SERIAL)

Interface Properties

Table 9-TSF DIGITAL_SERIAL Interface

Description	Name	Type	Default	Range
Data Value	data_value			
Clock period. Zero denotes infinite time for static digital data.	clock_period	Time		
Logic One level	logic_one_value	Voltage		
Logic Zero level	logic_zero_value	Voltage		

Notes

Model Description

Table 10-TSF DIGITAL_SERIAL Model

Name	Type	Terminal	Inputs	Output	Formula
Serial_Stream	SerialDigital	Signal [Out]			
		data	data_value		
		period	clock_period		
		logic_H_value	logic_one_value		
		logic_L_value	logic_zero_value		
		pulseClass	NRZ		

Rules

DME_INTERROGATION

Definition

A radio aid to air navigation that provides distance information by measuring the time of transmission from an interrogator to a transponder and return.
The DME system is composed of a transponder in the ground based unit and an interrogator in the airborne unit. The interrogator on the aircraft emits a pulse signal that, once received by the DME transponder on the ground, starts a response sequence that sends a return pulse signal on a different (paired) channel to the aircraft. The aircraft equipment receives the response from the ground station, computes the elapsed time between interrogation and response, subtracts 50 μs (to cover ground station processing time), and divides the result by 2. This result is then displayed on the DME indicator.
The DME operates on the UHF band in the range 962 MHz to 1213 MHz with a step of 1 MHz. The frequencies used by the interrogator are between 1025 MHz and 1150 MHz, and the transponder on the ground replies using two set frequencies: the first from 962 MHz to 1024 MHz and the second from 1151 MHz to 1213 MHz. The number of available frequencies is 252, making 126 available channels. Each channel has 2 frequencies: one for interrogation and the other for the response from the ground station. On each pair of frequencies, the difference between the interrogator frequency and the response frequency is always 63 MHz. For the channels between 1 and 63, the interrogation frequency is 63 MHz higher than the response frequency and for channels from 63 to 126 the response frequency is 63 MHz higher than the interrogator frequency.

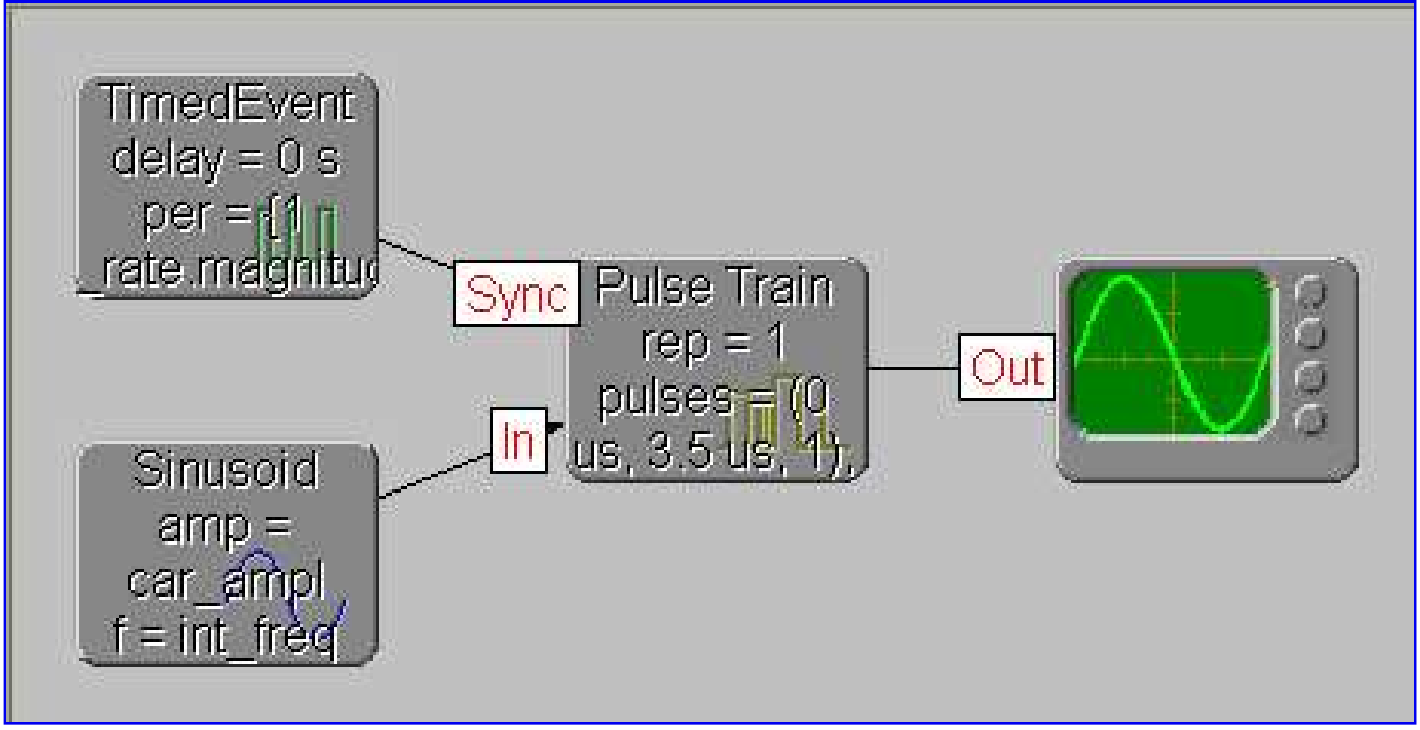

Figure 6-TSF DME_INTERROGATION(DME_INTERROGATION)

Interface Properties

Table 11-TSF DME_INTERROGATION Interface

Description	Name	Type	Default	Range
Carrier Amplitude	car_ampl	Voltage		
Interrogator Frequency	int_freq	Frequency	1025 MHz	
Interrogation Rate	int_rate	Frequency	27 Hz	

Notes

Model Description

Table 12-TSF DME_INTERROGATION Model

Name	Type	Terminal	Inputs	Output	Formula
DME_Interrogation	PulseTrain	Signal [Out]			
		pulses			(0 us, 3.5 us, 1), (15.5 us, 3.5 us,1)
		repetition			1
		Signal [In]	Int_Carrier		
		Sync[In]	Int_Event		
Int_Carrier	Sinusoid	Signal [Out]		DME_Interrogation	
		amplitude	car_ampl		
		frequency	int_freq		
		phase			0 rad
Int_Event	TimedEvent	Event [Out]		DME_Interrogation	
		delay			0 s
		duration			20 µs
		period			{1/int_rate.magnitude}
		repetition			0

Rules

DME_RESPONSE

Definition

A radio aid to air navigation that provides distance information by measuring the time of transmission from an interrogator to a transponder and return.
The DME system is composed of a transponder in the ground based unit and an interrogator in the airborne unit. The interrogator on the aircraft emits a pulse signal that once received by the DME transponder on the ground, starts a response sequence which sends a return pulse signal on a different (paired) channel to the aircraft. The aircraft

equipment receives the response from the ground station, computes the elapsed time between interrogation and response, subtracts 50 µs (to cover ground station processing time), and divides the result by 2. This result is then displayed on the DME indicator.
The DME operates on the UHF band in the range 962 MHz to 1213 MHz with a step of 1 MHz. The frequencies used by the interrogator are between 1025 MHz and 1150 MHz, and the transponder on the ground replies using two set frequencies, the first from 962 MHz to 1024 MHz and the second from 1151 MHz to 1213 MHz. The number of available frequencies is 252, making 126 available channels. Each channel has 2 frequencies: one for interrogation and the other for the response from the ground station. On each pair of frequencies the difference between the interrogator frequency and the response frequency is always 63 MHz. For the channels between 1 and 63, the interrogation frequency is 63 MHz higher than the response frequency; and for channels from 63 to 126 the response frequency is 63 MHz higher than the interrogator frequency.

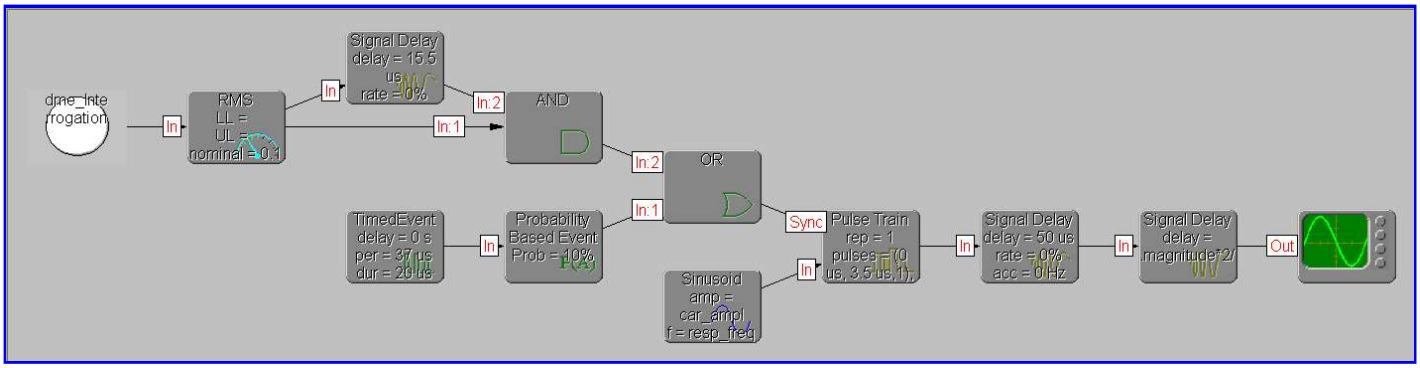

Figure 7-TSF DME_RESPONSE(DME_RESPONSE)

Interface Properties

Table 13-TSF DME_RESPONSE Interface

Description	Name	Type	Default	Range
Transponder Frequency	resp_freq	Frequency	962 MHz	
Carrier Amplitude	car_ampl	Voltage		
Slant Range	range	Distance	0 m	
Range Rate	rate	Speed	0 m/s	
Rate of Change of Range Rate	accn	Acceleration	0 m/s2	

Notes

Model Description

Table 14-TSF DME_RESPONSE Model

Name	Type	Terminal	Inputs	Output	Formula
DME_Response	SignalDelay	Signal [Out]			
		acceleration			{accn.magnitude*2/3.0e8}
		delay			{range.magnitude*2/3.0e8}
		rate			{(rate.magnitude*2)/3.0e8}
		Signal [In]	Response_Delay		
Response_Delay	SignalDelay	Signal [Out]		DME_Response	
		acceleration			0 Hz
		delay			50 us
		rate			0%
		Signal [In]	Response_Train		
Response_Train	PulseTrain	Signal [Out]		Response_Delay	
		pulses			(0 us, 3.5 us,1), (15.5us, 3.5 us,1)
		repetition			1
		Signal [In]	Resp_Carrier		
		Sync[In]	Resp_Event_Train		
Resp_Carrier	Sinusoid	Signal [Out]		Response_Train	
		amplitude	car_ampl		
		frequency	resp_freq		
		phase			0 rad
Resp_Event_Train	OrEvent	Event [Out]		Response_Train	
		Signal [In]	Resp_Event_B		
		Signal [In]	DME_Pulse_Detect		
DME_Pulse_Detect	AndEvent	Event [Out]		Resp_Event_Train	
		Signal [In]	Interrogation_Event_Window		
		Signal [In]	DME_P2_Detect		
Resp_Event_B	ProbabilityEvent	Event [Out]		Resp_Event_Train	

		seed			0
		probability			10%
		Signal [In]	Resp_Event_A		
Resp_Event_A	TimedEvent	Event [Out]		Resp_Event_B	
		delay			0 s
		duration			20 us
		period			37 us
		repetition			0
DME_P2_Detect	SignalDelay	Signal [Out]		DME_Pulse_Detect	
		acceleration			0 Hz
		delay			15.5 us
		rate			0%
		Signal [In]	Interrogation_Event_Window		
Interrogation_Event_Window	RMS	[Out]		DME_Pulse_Detect DME_P2_Detect	
		measuredVariable	DEPENDENT		
		measurement			0
		samples			0
		count			0
		gateTime			1.0e-8
		nominal			0.1
		condition	GE		
		GO	false		
		NOGO	false		
		HI	false		
		LO	false		
		UL			
		LL			
		Signal [In]	dme_Interrogation		
dme_Interrogation	In	Signal [Out]		Interrogation_Event_Window	

Rules

FM_SIGNAL

Definition

A continuous sinusoidal (carrier)wave generated when the frequency of one wave is varied in accordance with the amplitude of another (modulating)wave.

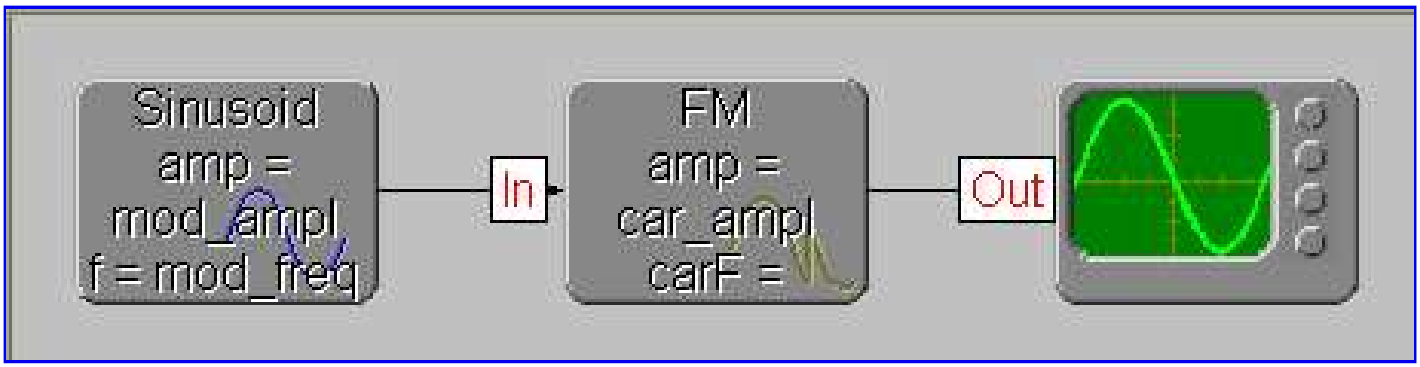

Figure 8-TSF FM_SIGNAL(FM_SIGNAL)

Interface Properties

Table 15-TSF FM_SIGNAL Interface

Description	Name	Type	Default	Range
Carrier amplitude	car_ampl	Physical		
Carrier frequency	car_freq	Frequency		
Frequency Deviation	freq_dev	Frequency		
Modulation frequency	mod_freq	Frequency		
Modulation amplitude	mod_ampl	Physical		

Notes

Model Description

Table 16-TSF FM_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
FM_Signal	FM	Signal [Out]			
		amplitude	car_ampl		
		carrierFrequency	car_freq		
		frequencyDeviation	freq_dev		
		Signal [In]	Modulating_Signal		
Modulating_Signal	Sinusoid	Signal [Out]		FM_Signal	
		amplitude	mod_ampl		
		frequency	mod_freq		
		phase			0 rad

Rules

ILS_GLIDE_SLOPE

Definition

The glide slope is the vertical guidance portion of an ILS.
At present, 40 glide slope channels exist with 150 kHz channel separation in the frequency range from 328.6 MHz to 335.4 MHz. The carrier is amplitude modulated at 90 Hz and 150 Hz in a spatial pattern, with the 90 Hz modulation predominant when the airplane is above the glide path, and the 150 Hz modulation predominant if the airplane is below the glide path. This glide slope signal is achieved by transmitting 2 beams with equal offset about the correct glide slope angle. The upper beam is modulated to a depth of 40% with a 90 Hz tone, and the lower beam is modulated to a depth of 40% with a 150 Hz tone. The carrier of both beams is phase-locked so that any receiver will treat them as a single-carrier signal with two modulating tones. If the aircraft is positioned off the glide slope, the ILS receiver will detect one signal as stronger than the other. As a result, the demodulated amplitude (or apparent depth of modulation) of one tone will be greater than that of the other. If the receiver is exactly on the glide slope, it will receive an RF carrier where the 90 Hz and 150 Hz modulation depths appear exactly the same. The greater the deviation from the glide slope, the greater will be the difference in amplitude of the tones.

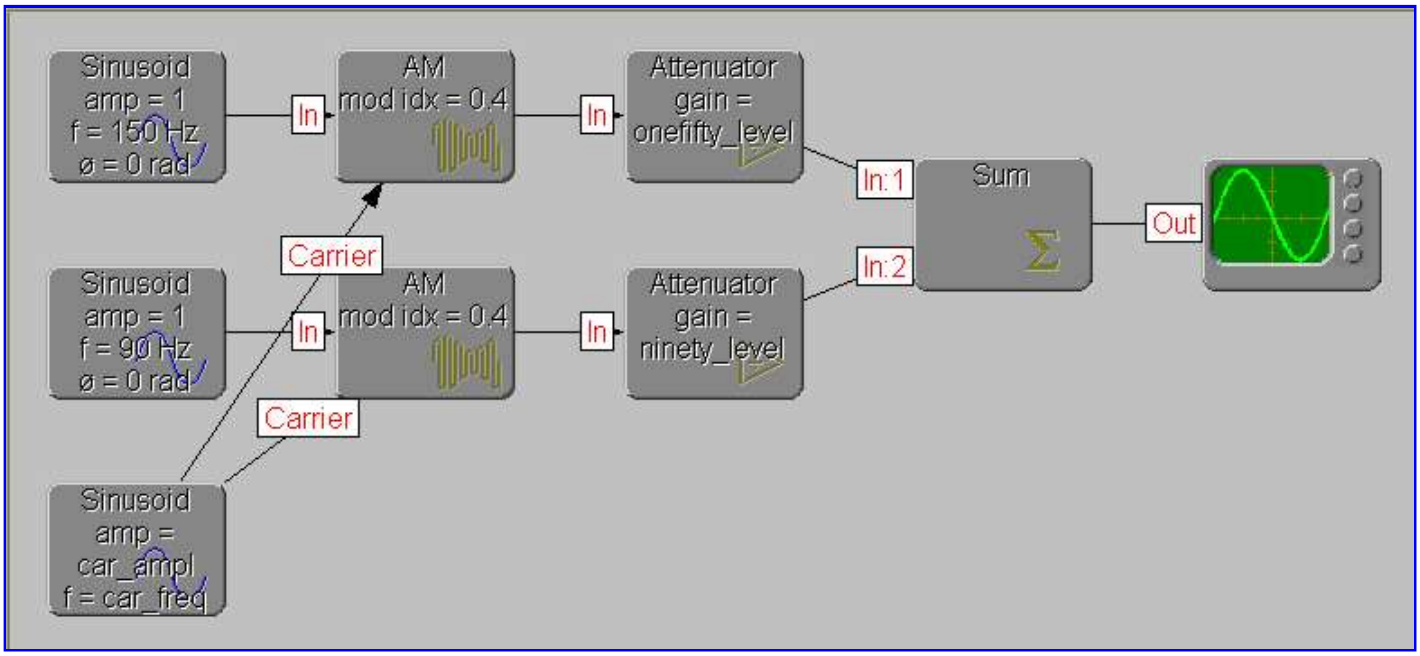

Figure 9-TSF ILS_GLIDE_SLOPE(ILS_GLIDE_SLOPE)

Interface Properties

Table 17-TSF ILS_GLIDE_SLOPE Interface

Description	Name	Type	Default	Range
Carrier amplitude	car_ampl	Physical	2 mV	
Frequency	car_freq	Frequency	328.6 MHz	
150 Hz attenuation depth	onefifty_level	Ratio	1	
90 Hz attenuation depth	ninety_level	Ratio	1	

Notes

Model Description

Table 18-TSF ILS_GLIDE_SLOPE Model

Name	Type	Terminal	Inputs	Output	Formula
Glide_Slope	Sum	Signal [Out]			
		Signal [In]	Glide_Slope_Lo		
		Signal [In]	Glide_Slope_Hi		
Glide_Slope_Hi	Attenuator	Signal [Out]		Glide_Slope	
		gain	ninety_level		
		Signal [In]	Glide_90_Hz_Modulated_Signal		
Glide_Slope_Lo	Attenuator	Signal [Out]		Glide_Slope	
		gain	onefifty_level		
		Signal [In]	Glide_150_Hz_Modulated_Signal		
Glide_90_Hz_Modulated_Signal	AM	Signal [Out]		Glide_Slope_Hi	
		modIndex			0.4
		Carrier [In]	Glide_Slope_Carrier		
		Signal [In]	Glide_90Hz_Tone		
Glide_150_Hz_Modulated_Signal	AM	Signal [Out]		Glide_Slope_Lo	
		modIndex			0.4
		Carrier [In]	Glide_Slope_Carrier		
		Signal [In]	Glide_150Hz_Tone		
Glide_90Hz_Tone	Sinusoid	Signal [Out]		Glide_90_Hz_Modulated_Signal	
		amplitude			1
		frequency			90 Hz
		phase			0 rad
Glide_150Hz_Tone	Sinusoid	Signal [Out]		Glide_150_Hz_Modulated_Signal	
		amplitude			1
		frequency			150 Hz
		phase			0 rad
Glide_Slope_Carrier	Sinusoid	Signal [Out]		Glide_90_Hz_Modulated_Signal	
		amplitude	car_ampl		
		frequency	car_freq		
		phase			0

Rules

ILS_LOCALIZER

Definition

The localizer is the lateral guidance portion of the ILS, giving azimuth guidance with reference to the runway centre line. It operates using the same principles as the Glide Slope but with forty channels in the VHF band 108.0 MHz to 112.0 MHz. Each localizer channel is paired with a glide slope channel. The carrier is modulated with 90 Hz and 150 Hz tones in a spatial pattern that makes the 90 Hz tone predominant when the aircraft is to the left of the course and the 150 Hz tone predominant when the aircraft is to the right of the course. The localizer carrier contains a Morse coded signal identifying the runway and approach direction and also may carry a ground-to-air communication channel.

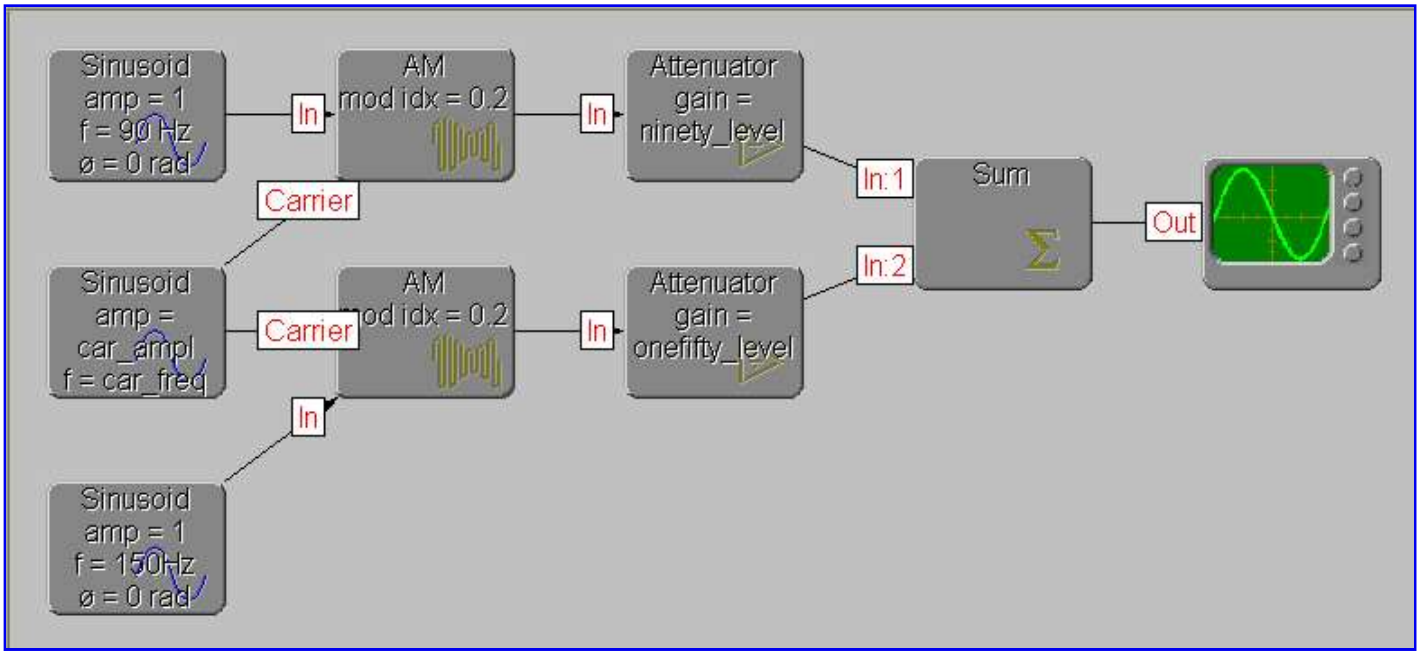

Figure 10-TSF ILS_LOCALIZER(ILS_LOCALIZER)

Interface Properties

Table 19-TSF ILS_LOCALIZER Interface

Description	Name	Type	Default	Range
Carrier Amplitude	car_ampl	Physical	2 mW	
Carrier frequency	car_freq	Frequency	108.1 MHz	
150 Hz attenuation depth	onefifty_level	Ratio	1	
90 Hz attenuation depth	ninety_level	Ratio	1	

Notes

Model Description

Table 20-TSF ILS_LOCALIZER Model

Name	Type	Terminal	Inputs	Output	Formula
ILS_Localizer	Sum	Signal [Out]			
		Signal [In]	Localizer_L		
		Signal [In]	Localizer_R		
Localizer_R	Attenuator	Signal [Out]		ILS_Localizer	
		gain	onefifty_level		
		Signal [In]	ILS_150Hz_Modulated_Signal		
Localizer_L	Attenuator	Signal [Out]		ILS_Localizer	
		gain	ninety_level		
		Signal [In]	ILS_90Hz_Modulated_Signal		
ILS_150Hz_Modulated_Signal	AM	Signal [Out]		Localizer_R	
		modIndex			0.2
		Carrier [In]	Localizer_Carrier		
		Signal [In]	ILS_150Hz_Tone		
ILS_90Hz_Modulated_Signal	AM	Signal [Out]		Localizer_L	
		modIndex			0.2
		Carrier [In]	Localizer_Carrier		
		Signal [In]	ILS_90Hz_Tone		
ILS_150Hz_Tone	Sinusoid	Signal [Out]		ILS_150Hz_Modulated_Signal	
		amplitude			1
		frequency			150Hz
		phase			0 rad
ILS_90Hz_Tone	Sinusoid	Signal [Out]		ILS_90Hz_Modulated_Signal	
		amplitude			1
		frequency			90 Hz
		phase			0 rad
Localizer_Carrier	Sinusoid	Signal [Out]		ILS_150Hz_Modulated_Signal	
		amplitude	car_ampl		
		frequency	car_freq		
		phase			0 rad

Rules

lLS_MARKER

Definition

Two or three marker beacons operate at 75 MHz to give range with reference to the touch-down point. The outer marker is modulated with a 400 Hz tone to a depth of 95%. It is located 3.5 nmi to 6 nmi (6 km to 11 km)from the end of the runway where the glide slope intersects the procedure turn altitude ± 50 ft (15 m)vertically. It radiates a fan shaped pattern vertically and normal to the localizer and activates a marker receiver when the aircraft passes through.

The middle marker is a second fan shaped marker similar to the outer marker. It is located approximately 0.5 nmi to 0.8 nmi (1 km to 1.5 km)from the ILS approach end of the runway and modulated at 1300 Hz. The inner marker, when used for category II approaches, intercepts the glide path at about the 100 ft (30 m)height to mark the over-shoot decision point (if the runway is still not visible). The marker is recognized by its 3000 Hz modulation. Category II approaches allow operation down to 100 ft (30 m)and 1300 ft (400 m) visibility.

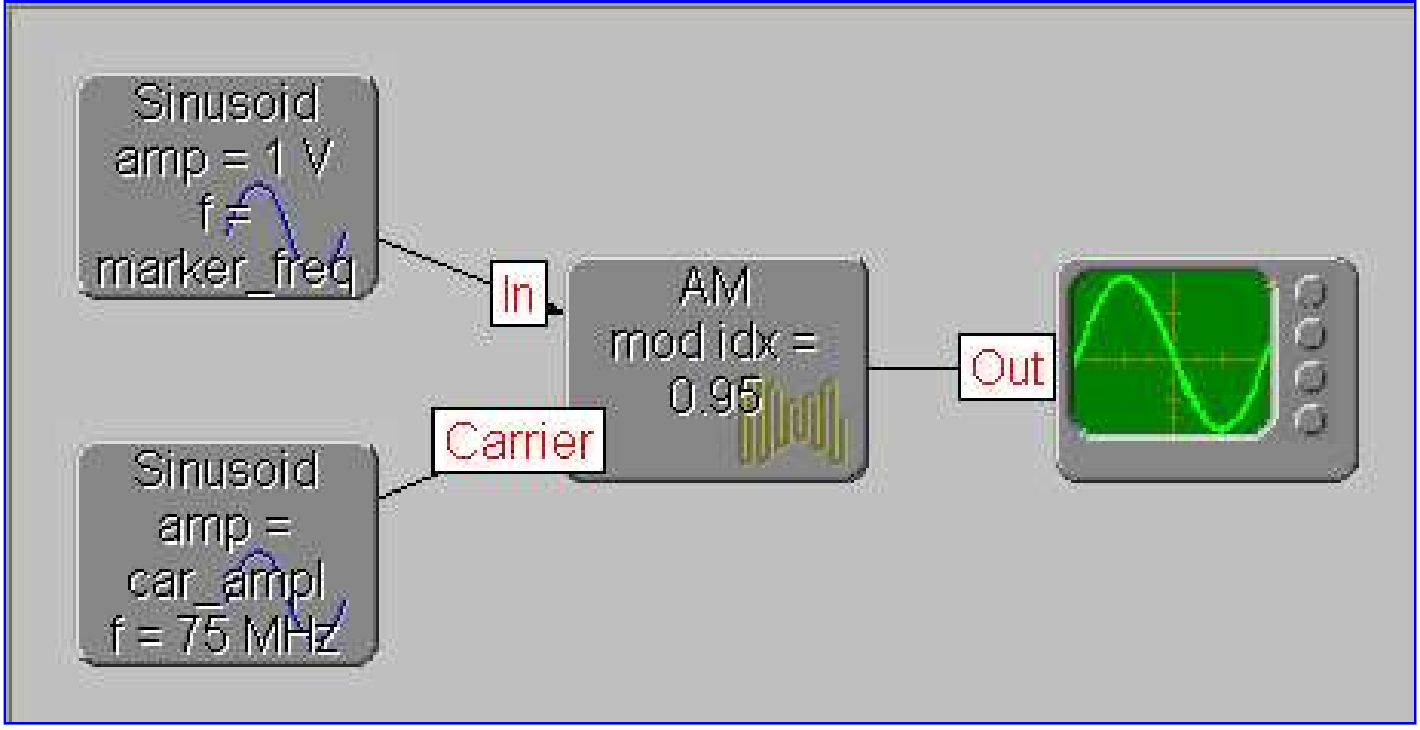

Figure 11-TSF ILS_MARKER(ILS_MARKER)

Interface Properties

Table 21-TSF ILS_MARKER Interface

Description	Name	Type	Default	Range
Marker Frequency	marker_freq	Frequency	400 Hz	
Carrier Frequency	car_ampl	Power	2 mW	

Notes

Model Description

Table 22-TSF ILS_MARKER Model

Name	Type	Terminal	Inputs	Output	Formula
Marker_Signal	AM	Signal [Out]			
		modIndex			0.95
		Carrier [In]	Marker_Carrier		
		Signal [In]	Marker_Tone		
Marker_Tone	Sinusoid	Signal [Out]		Marker_Signal	
		amplitude			1 V
		frequency	marker_freq		
		phase			0 rad
Marker_Carrier	Sinusoid	Signal [Out]		Marker_Signal	
		amplitude	car_ampl		
		frequency			75 MHz
		phase			0 rad

Rules

PM_SIGNAL

Definition

A continuous sinusoidal wave (carrier) whose phase is varied in accordance with the amplitude of another wave.

Figure 12-TSF PM_SIGNAL(PM_SIGNAL)

Interface Properties

Table 23-TSF PM_SIGNAL Interface

Description	Name	Type	Default	Range
Carrier amplitude	car_ampl	Voltage		
Carrier frequency	car_freq	Frequency		
Phase Deviation	phase_dev	PlaneAngle		
Modulation frequency	mod_freq	Frequency		
Modulation amplitude	mod_ampl	Voltage	1 V	

Notes

Model Description

Table 24-TSF PM_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
PM_Signal	PM	Signal [Out]			
		amplitude	car_ampl		
		carrierFrequency	car_freq		
		phaseDeviation	phase_dev		
		Signal [In]	PModulating_Signal		
PModulating_Signal	Sinusoid	Signal [Out]		PM_Signal	
		amplitude	mod_ampl		
		frequency	mod_freq		
		phase			0 rad

Rules

PULSED_AC_SIGNAL

Definition

A signal characterized by short duration periods of (sinusoidal) ac electrical potential.

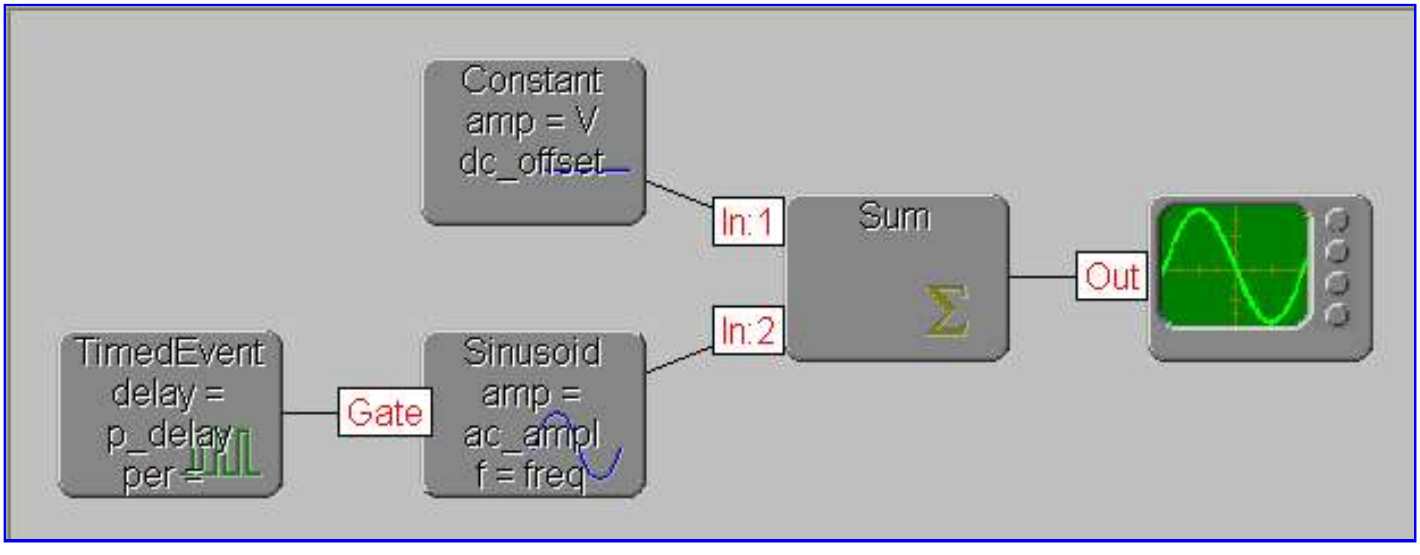

Figure 13-TSF PULSED_AC_SIGNAL(PULSED_AC_SIGNAL)

Interface Properties

Table 25-TSF PULSED_AC_SIGNAL Interface

Description	Name	Type	Default	Range
AC Signal amplitude	ac_ampl	Physical		
AC Signal frequency	freq	Frequency		
DC offset	dc_offset	Physical	0	
Initial delay	p_delay	Time	0 s	
Pulse width	p_duration	Time		
Pulse repetition frequency	prf	Frequency		
Number of pulses	p_repetition	int	0	

Notes

Model Description

Table 26-TSF PULSED_AC_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
Pulsed_AC_Signal	Sum	Signal [Out]			
		Signal [In]	PAC_DC_Offset		
		Signal [In]	PAC_AC_Component		
PAC_AC_Component	Sinusoid	Signal [Out]		Pulsed_AC_Signal	
		amplitude	ac_ampl		
		frequency	freq		
		phase	phase		
		Gate[In]	Pulse		
PAC_DC_Offset	Constant	Signal [Out]		Pulsed_AC_Signal	
		amplitude	dc_offset		
Pulse	TimedEvent	Event [Out]		PAC_AC_Component	
		delay	p_delay		
		duration	p_duration		
		period			{1/prf.magnitude}
		repetition	p_repetition		

Rules

PULSED_AC_TRAIN

Definition

A signal, characterized by a train of pulses of sinusoidal electrical ac activity with different durations and amplitudes.

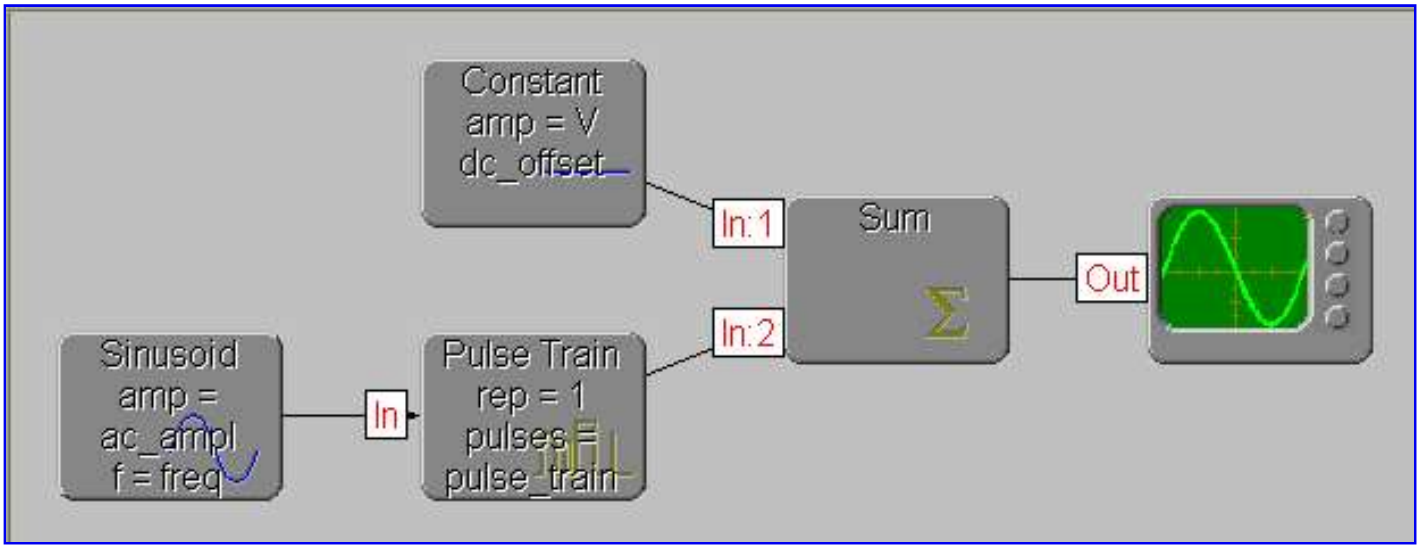

Figure 14-TSF PULSED_AC_TRAIN(PULSED_AC_TRAIN)

Interface Properties

Table 27-TSF PULSED_AC_TRAIN Interface

Description	Name	Type	Default	Range
AC amplitude	ac_ampl	Physical		
AC frequency	freq	Frequency		
DC offset	dc_offset	Physical	0	
Pulse train	pulse_train	PulseDefns		

Notes

Model Description

Table 28-TSF PULSED_AC_TRAIN Model

Name	Type	Terminal	Inputs	Output	Formula
Pulsed_AC_Train	Sum	Signal [Out]			
		Signal [In]	PACT_DC_Offset		
		Signal [In]	Pulsed_AC		
Pulsed_AC	PulseTrain	Signal [Out]		Pulsed_AC_Train	
		pulses	pulse_train		
		repetition			1
		Signal [In]	PACT_AC_Component		
PACT_DC_Offset	Constant	Signal [Out]		Pulsed_AC_Train	
		amplitude	dc_offset		
PACT_AC_Component	Sinusoid	Signal [Out]		Pulsed_AC	
		amplitude	ac_ampl		
		frequency	freq		
		phase	phase		

Rules

PULSED_DC_SIGNAL

Definition

A signal characterized by a train of pulses of electrical dc activity with different durations and amplitudes with an optional ac component.

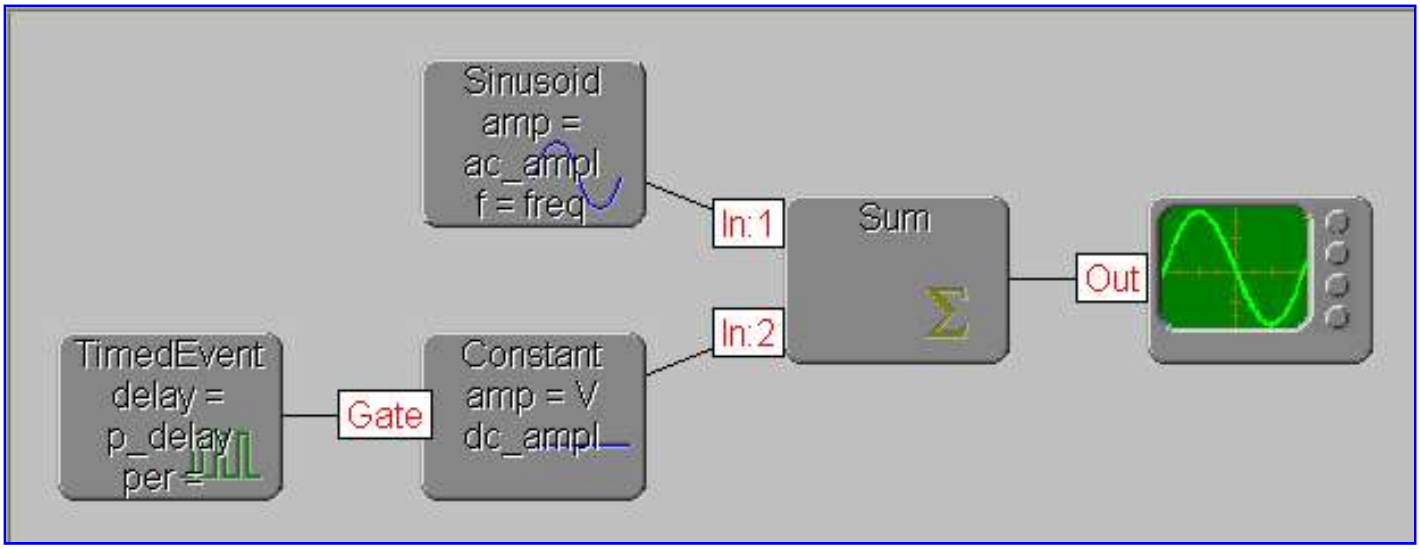

Figure 15-TSF PULSED_DC_SIGNAL(PULSED_DC_SIGNAL)

Interface Properties

Table 29-TSF PULSED_DC_SIGNAL Interface

Description	Name	Type	Default	Range
DC level	dc_ampl	Physical		
AC component amplitude	ac_ampl	Physical	0	

AC component frequency	freq	Frequency	0 Hz	
Delay before first pulse	p_delay	Time	0 s	
Pulse width	p_duration	Time		
Pulse repetition frequency	prf	Frequency		
Number of pulses	p_repetition	int	0	

Notes

Model Description

Table 30-TSF PULSED_DC_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
Pulsed_DC_Signal	Sum	Signal [Out]			
		Signal [In]	PDC_AC_Component		
		Signal [In]	PDC_DC_Level		
PDC_DC_Level	Constant	Signal [Out]		Pulsed_DC_Signal	
		amplitude	dc_ampl		
		Gate[In]	PDC_Pulse		
PDC_AC_Component	Sinusoid	Signal [Out]		Pulsed_DC_Signal	
		amplitude	ac_ampl		
		frequency	freq		
		phase			0 rad
PDC_Pulse	TimedEvent	Event [Out]		PDC_DC_Level	
		delay	p_delay		
		duration	p_duration		
		period			{1/prf.magnitude}
		repetition	p_repetition		

Rules

PULSED_DC_TRAIN

Definition
A signal, characterized by a train of different, short duration periods of dc electrical activity.

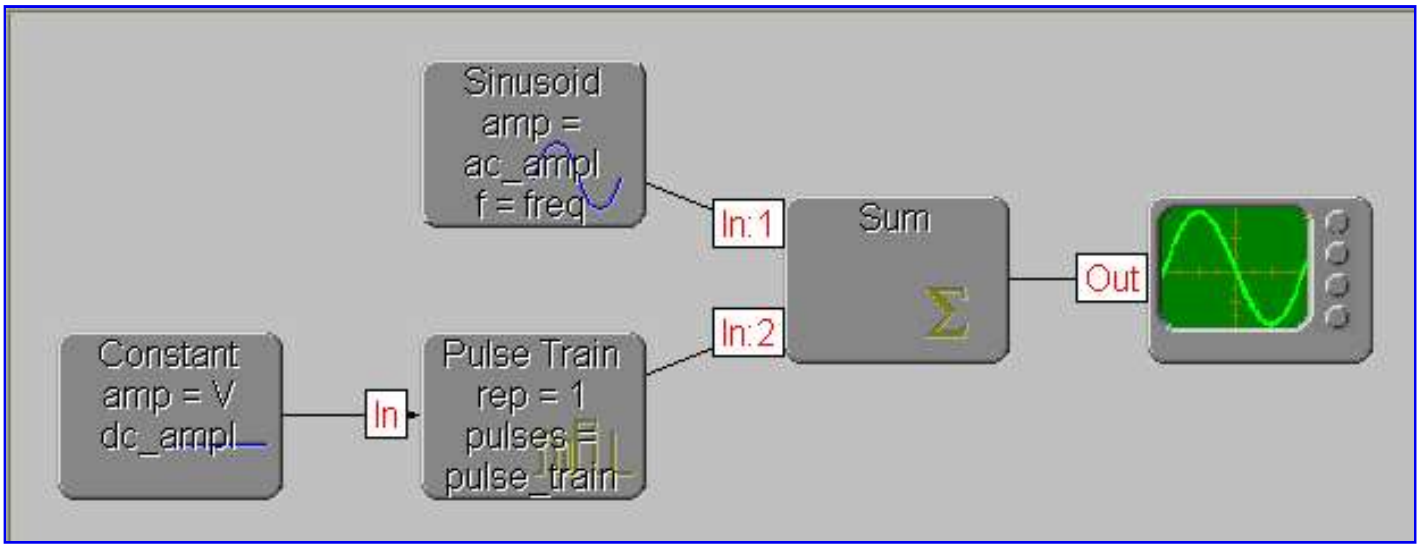

Figure 16-TSF PULSED_DC_TRAIN(PULSED_DC_TRAIN)

Interface Properties

Table 31-TSF PULSED_DC_TRAIN Interface

Description	Name	Type	Default	Range
DC level	dc_ampl	Physical		
Pulse train	pulse_train	PulseDefns		
AC Component amplitude	ac_ampl	Physical	0	
AC Component frequency	freq	Frequency	0 Hz	

Notes

Model Description

Table 32-TSF PULSED_DC_TRAIN Model

Name	Type	Terminal	Inputs	Output	Formula
Pulsed_DC_Train	Sum	Signal [Out]			
		Signal [In]	PDCT_AC_Component		
		Signal [In]	PDCT_Pulsed_DC		
PDCT_Pulsed_DC	PulseTrain	Signal [Out]		Pulsed_DC_Train	
		pulses	pulse_train		
		repetition			1
		Signal [In]	PDCT_DC_Level		
PDCT_AC_Component	Sinusoid	Signal [Out]		Pulsed_DC_Train	
		amplitude	ac_ampl		
		frequency	freq		
		phase			0 rad
PDCT_DC_Level	Constant	Signal [Out]		PDCT_Pulsed_DC	
		amplitude	dc_ampl		

Rules

RADAR_RX_SIGNAL

Definition
An appropriately delayed signal response to an input radar signal.

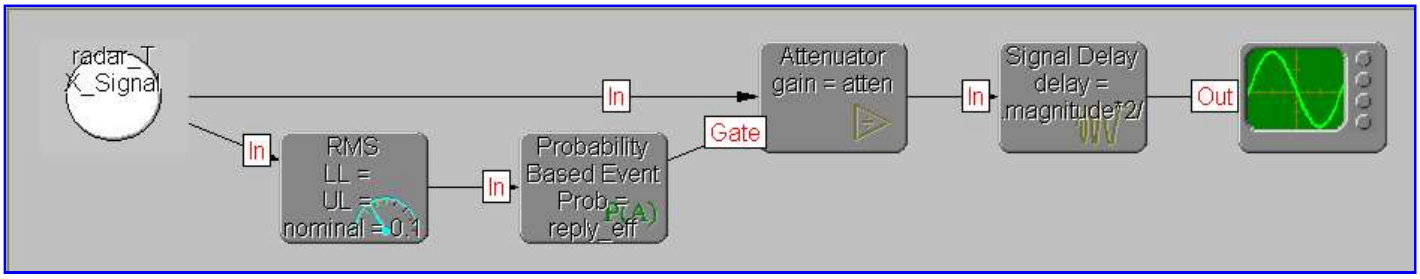

Figure 17-TSF RADAR_RX_SIGNAL(RADAR_RX_SIGNAL)

Interface Properties

Table 33-TSF RADAR_RX_SIGNAL Interface

Description	Name	Type	Default	Range
Atten	atten	Ratio	1	
Range of simulated target	range	Distance		
Rate of change of rate change	range_accn	Acceleration	0	
Rate of change of target range	range_rate	Speed	0	
Proportion of Tx pulses returned	reply_eff	Ratio	100%	

Notes

Model Description

Table 34-TSF RADAR_RX_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
Radar_RX_Signal	SignalDelay	Signal [Out]			
		acceleration			{range_accn.magnitude*2/3.0e8}
		delay			{range.magnitude*2/3.0e8}
		rate			{range_rate.magnitude*2/3.0e8}
		Signal [In]	Car_Pulse		

Car_Pulse	Attenuator	Signal [Out]		Radar_RX_Signal	
		gain	atten		
		Signal [In]	radar_TX_Signal		
		Gate[In]	Suppressed_Event_Train		
Suppressed_Event_Train	ProbabilityEvent	Event [Out]		Car_Pulse	
		seed			0
		probability	reply_eff		
		Signal [In]	Event_Train		
Event_Train	RMS	[Out]		Suppressed_Event_Train	
		measuredVariable	DEPENDENT		
		measurement			0
		samples			0
		count			0
		gateTime			1.0e-8
		nominal			0.1
		condition	GE		
		GO	false		
		NOGO	false		
		HI	false		
		LO	false		
		UL			
		LL			
		Signal [In]	radar_TX_Signal		
radar_TX_Signal	In	Signal [Out]		Event_Train Car_Pulse	

Rules

RADAR_TX_SIGNAL

Definition

A pulsed ac signal used as a reference for received radar signals (i.e., Radar_RX_Signal).

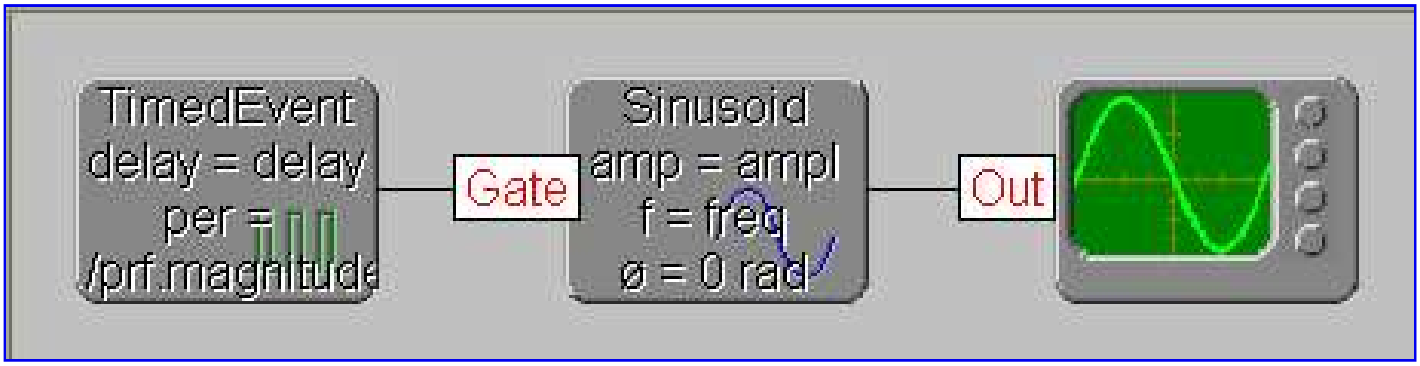

Figure 18-TSF RADAR_TX_SIGNAL(RADAR_TX_SIGNAL)

Interface Properties

Table 35-TSF RADAR_TX_SIGNAL Interface

Description	Name	Type	Default	Range
Tx signal amplitude	ampl	Physical		
Tx signal frequency	freq	Frequency		
Initial delay	delay	Time	0 s	
Pulse duration	duration	Time		
Pulse repetition frequency	prf	Frequency		
Number of pulses	repetition	int	0	

Notes

Model Description

Table 36-TSF RADAR_TX_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula

RADAR_TX_Signal	Sinusoid	Signal [Out]			
		amplitude	ampl		
		frequency	freq		
		phase			0 rad
		Gate[In]	RTX_Event_Train		
RTX_Event_Train	TimedEvent	Event [Out]		RADAR_TX_Signal	
		delay	delay		
		duration	duration		
		period			{1/prf.magnitude}
		repetition	repetition		

Rules

RAMP_SIGNAL

Definition
A periodic wave whose instantaneous value varies alternately and linearly between two specified values (i.e., initial and alternate).

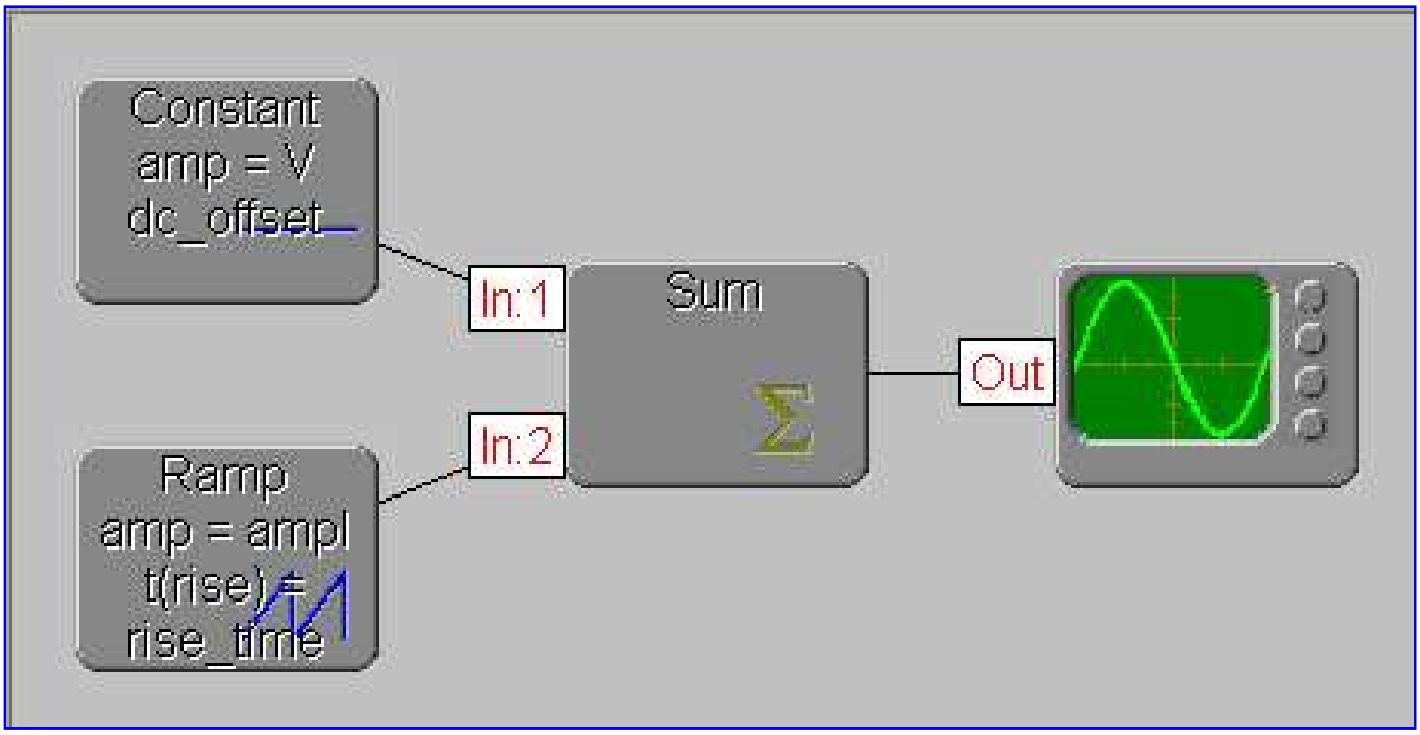

Figure 19-TSF RAMP_SIGNAL(RAMP_SIGNAL)

Interface Properties

Table 37-TSF RAMP_SIGNAL Interface

Description	Name	Type	Default	Range
Ramp signal amplitude	ampl	Physical		
DC offset	dc_offset	Physical	0	
Ramp signal period	period	Time		
Ramp signal time to rise	rise_time	Time		

Notes

Model Description

Table 38-TSF RAMP_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
Ramp_Signal	Sum	Signal [Out]			
		Signal [In]	Ramp_DC_Offset		
		Signal [In]	Ramp_Component		
Ramp_Component	Ramp	Signal [Out]		Ramp_Signal	
		amplitude	ampl		
		period	period		

		riseTime	rise_time		
Ramp_DC_Offset	Constant	Signal [Out]		Ramp_Signal	
		amplitude	dc_offset		

Rules

RANDOM_NOISE

Definition
Transient disturbances occurring unpredictably, except in a statistical sense.

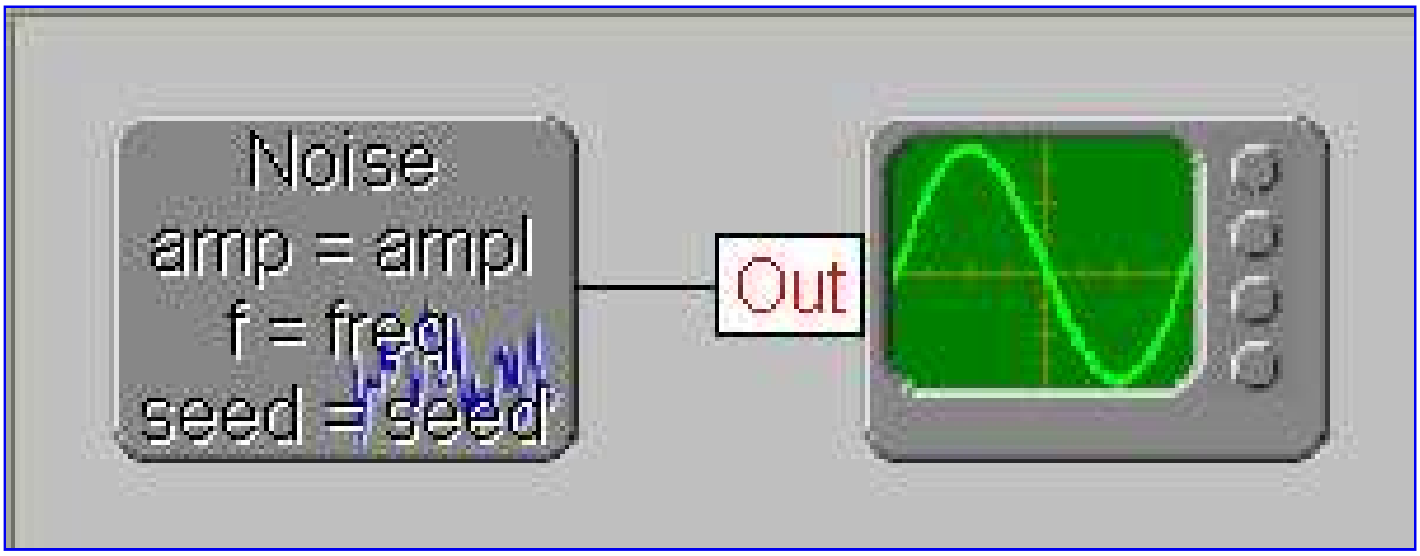

Figure 20-TSF RANDOM_NOISE(RANDOM_NOISE)

Interface Properties

Table 39-TSF RANDOM_NOISE Interface

Description	Name	Type	Default	Range
Noise signal amplitude	ampl	Physical		
Pseudo random noise frequency	freq	Frequency	0	
Pseudo random noise seed	seed	long	0	

Notes

Model Description

Table 40-TSF RANDOM_NOISE Model

Name	Type	Terminal	Inputs	Output	Formula
Noise	Noise	Signal [Out]			
		amplitude	ampl		
		seed	seed		
		frequency	freq		

Rules

RESOLVER

Definition
Two ac sine wave voltages whose relationships of amplitude represent the rotation of a shaft position of an electro-mechanical transducer,

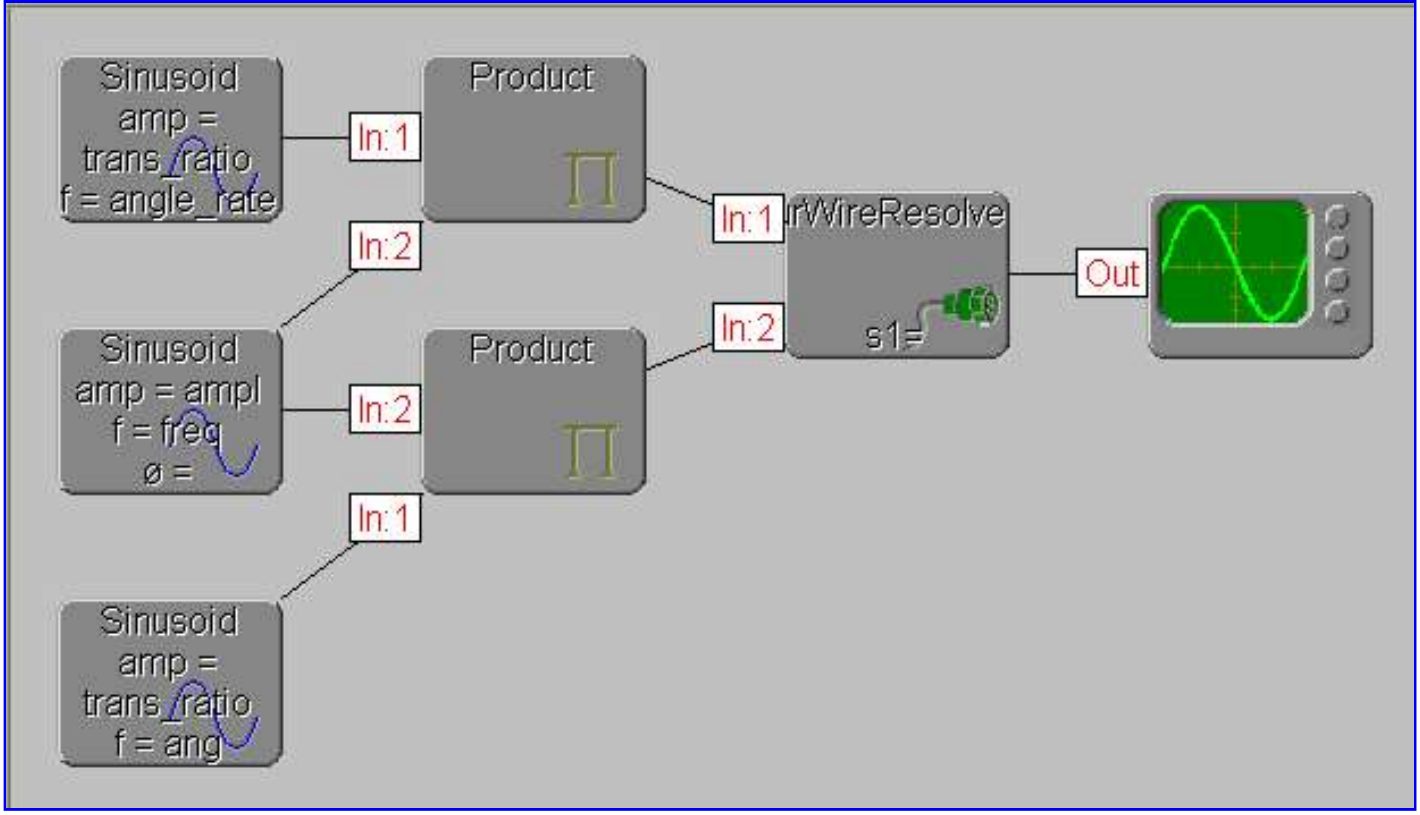

Figure 21-TSF RESOLVER(RESOLVER)

Interface Properties

Table 41-TSF RESOLVER Interface

Description	Name	Type	Default	Range
Shaft angle	angle	PlaneAngle	0	
Reference amplitude	ampl	Voltage	26 V	
Reference frequency	freq	Frequency	400 Hz	
Zero index	zero_index	PlaneAngle	0 rad	
Shaft angle rate	angle_rate	Frequency	0 Hz	
Transformer Ratio	trans_ratio	Ratio	1	

Notes

Model Description

Table 42-TSF RESOLVER Model

Name	Type	Terminal	Inputs	Output	Formula
Four_Wire_Resolver	FourWireResolver	Signal [Out]			
		channelWidth			2
		Signal [In]	S1		
		Signal [In]	S2		
S2	Product	Signal [Out]		Four_Wire_Resolver	
		Signal [In]	Field2		
		Signal [In]	Rotor		
S1	Product	Signal [Out]		Four_Wire_Resolver	
		Signal [In]	Field1		
		Signal [In]	Rotor		
Field2	Sinusoid	Signal [Out]		S2	
		amplitude	trans_ratio		
		frequency	angle_rate		
		phase			{angle.magnitude+ (pi/2)}
Rotor	Sinusoid	Signal [Out]		S2 S1	
		amplitude	ampl		
		frequency	freq		
		phase	zero_index		

Field1	Sinusoid	Signal [Out]		S1	
		amplitude	trans_ratio		
		frequency	angle_rate		
		phase	angle		

Rules

RS_232

Definition
A serial databus signal that transmits and receives strings of characters and operates according to the specification TIA-232.

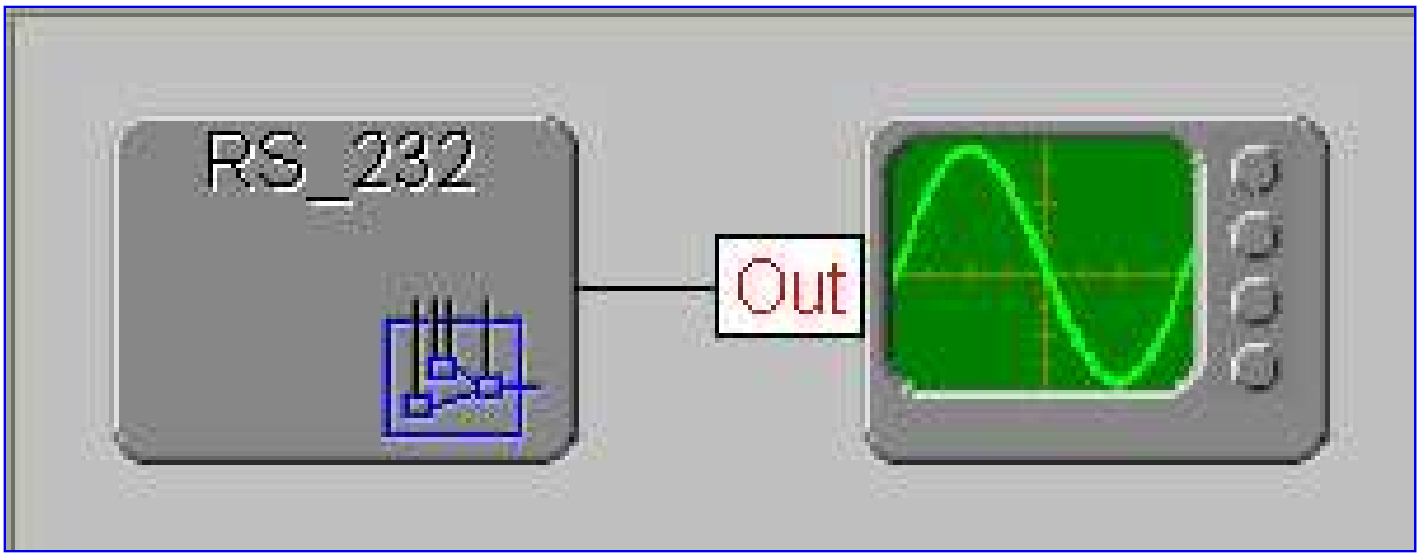

Figure 22-TSF RS_232(RS_232)

Interface Properties

Table 43-TSF RS_232 Interface

Description	Name	Type	Default	Range
Data Word	data_word	string		
Baud Rate	baud_rate	int	9600	
Data Bits	data_bits	int	8	
Parity	parity	string	None	
Stop Bits	stop_bits	string	1	
Flow Control	flow_control	string	None	

Notes

Model Description

Table 44-TSF RS_232 Model

Name	Type	Terminal	Inputs	Output	Formula
TIA_EIA_232	RS_232	Signal [Out]			
		data_word	data_word		
		baud_rate	baud_rate		
		data_bits	data_bits		
		parity	parity		
		stop_bits	stop_bits		
		flow_control	flow_control		

Rules

SQUARE_WAVE

Definition

A periodic wave that alternately assumes one of two fixed values of amplitude for equal lengths of time.

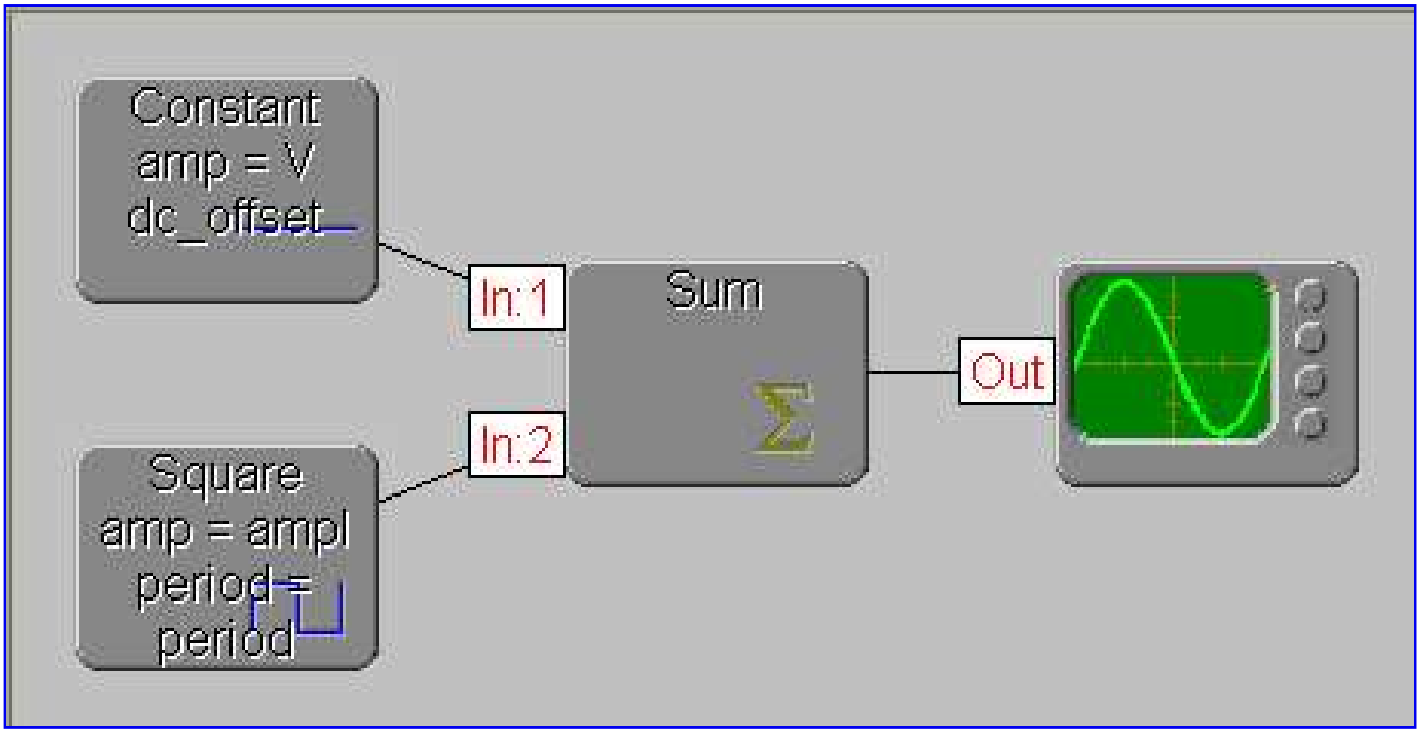

Figure 23-TSF SQUARE_WAVE(SQUARE_WAVE)

Interface Properties

Table 45-TSF SQUARE_WAVE Interface

Description	Name	Type	Default	Range
Square wave amplitude	ampl	Physical		
Square wave period	period	Time		
DC offset	dc_offset	Physical	0 V	

Notes

Model Description

Table 46-TSF SQUARE_WAVE Model

Name	Type	Terminal	Inputs	Output	Formula
Square_Wave	Sum	Signal [Out]			
		Signal [In]	Square_DC_Offset		
		Signal [In]	Square_Wave_Component		
Square_Wave_Component	SquareWave	Signal [Out]		Square_Wave	
		amplitude	ampl		
		period	period		
		dutyCycle			50 %
Square_DC_Offset	Constant	Signal [Out]		Square_Wave	
		amplitude	dc_offset		

Rules

SSR_INTERROGATION

Definition

Secondary Surveillance Radar (SSR) provides information to supplement the information obtained from a primary radar. Governing documents for civilian air traffic control (ATC) are ARINC Specification 572 and ARINC Specification 711 and for the military's identification, friend or foe system (IFF), STANAG 4193. An aircraft on-board transponder will sense an interrogation from a ground (or airborne) station on a specific frequency (i.e., 1030 MHz) and responds with coded signals on another frequency (i.e., 1090 MHz).

Figure 24-TSF SSR_INTERROGATION(SSR_INTERROGATION)

Interface Properties

Table 47-TSF SSR_INTERROGATION Interface

Description	Name	Type	Default	Range
P1 Amplitude	ampl	Physical		
Interrogation mode	mode	string	1	
P3 Start Time	p3_start	Time	3 us	
P3 level	p3_level	Ratio	1	
SLS Deviation	sls_dev	Time	0 us	
SLS Level	sls_level	Ratio	1	

Notes

Model Description

Table 48-TSF SSR_INTERROGATION Model

Name	Type	Terminal	Inputs	Output	Formula
PulseTrain	PulseTrain	Signal [Out]			
		pulses			(0 us, 0.8 us,1), ({0.000002+ sls_dev.magnitude}, 0.8 us, {sls_level}), ({p3_start}, 0.8 us, {p3_level})
		repetition			1
		Signal [In]	SSR_Carrier		
SSR_Carrier	Sinusoid	Signal [Out]		PulseTrain	
		amplitude	ampl		
		frequency			1030 MHz
		phase			0 rad

Rules

SSR_RESPONSE

Definition

The transponder response to a valid SSR interrogation. It consists of an encoded pulse train. Each pulse train consists of a number of data pulses. The number and position of these data pulses (after the start pulse) are determined by the mode selected. There are 16 pulse positions in the pulse train; however, the code or (height) information carried by the response will determine which pulses are present.

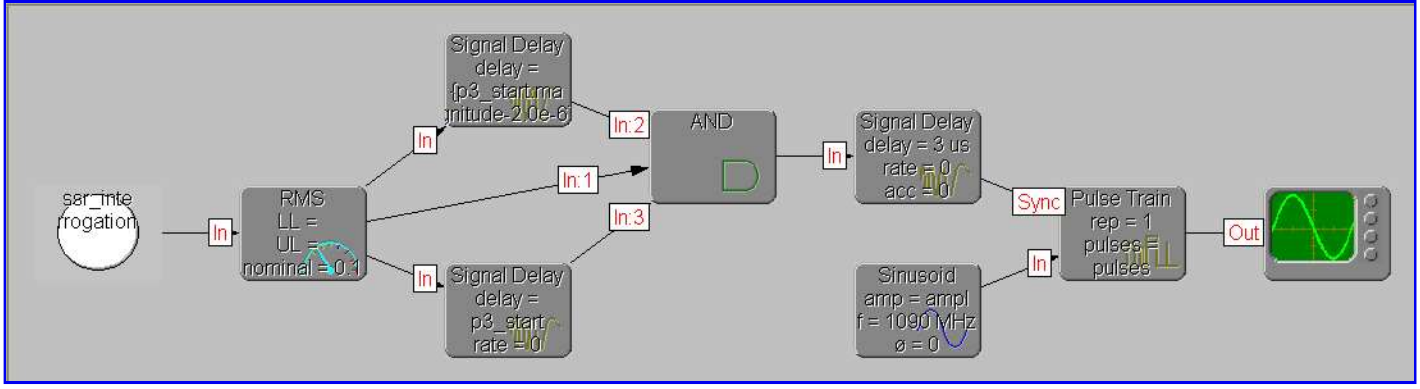

Figure 25-TSF SSR_RESPONSE(SSR_RESPONSE)

Interface Properties

Table 49-TSF SSR_RESPONSE Interface

Description	Name	Type	Default	Range
Carrier Amplitude	ampl	Physical	1	
P3 pulse start time	p3_start	Time	3 us	
SSR Response Pulse Train	pulses	PulseDefns	[]	

Notes

Model Description

Table 50-TSF SSR_RESPONSE Model

Name	Type	Terminal	Inputs	Output	Formula
Pulse_Train_Response	PulseTrain	Signal [Out]			
		pulses	pulses		
		repetition			1
		Signal [In]	Responder_carrier_frequency		
		Sync[In]	SSR_Response_Delay		
Responder_carrier_frequency	Sinusoid	Signal [Out]		Pulse_Train_Response	
		amplitude	ampl		
		frequency			1090 MHz
		phase			0
SSR_Response_Delay	SignalDelay	Signal [Out]		Pulse_Train_Response	
		acceleration			0
		delay			3 us
		rate			0
		Signal [In]	SSR_Mode_Detect		
SSR_Mode_Detect	AndEvent	Event [Out]		SSR_Response_Delay	
		Signal [In]	SSR_Detect		
		Signal [In]	P2_Detect		
		Signal [In]	P3_Detect		
P3_Detect	SignalDelay	Signal [Out]		SSR_Mode_Detect	
		acceleration			0
		delay	p3_start		
		rate			0
		Signal [In]	SSR_Detect		
P2_Detect	SignalDelay	Signal [Out]		SSR_Mode_Detect	
		acceleration			0
		delay			{p3_start.magnitude-2.0e-6}
		rate			0
		Signal [In]	SSR_Detect		
SSR_Detect	RMS	[Out]		SSR_Mode_Detect P2_Detect P3_Detect	
		measuredVariable	DEPENDENT		
		measurement			0
		samples			0
		count			0
		gateTime			10.0e-9

		nominal			0.1
		condition	GE		
		GO	false		
		NOGO	false		
		HI	false		
		LO	false		
		UL			
		LL			
		Signal [In]	ssr_interrogation		
ssr_interrogation	In	Signal [Out]		SSR_Detect	

Rules

STEP_SIGNAL

Definition
A change of dc electrical potential from one level to another, either positive or negative.

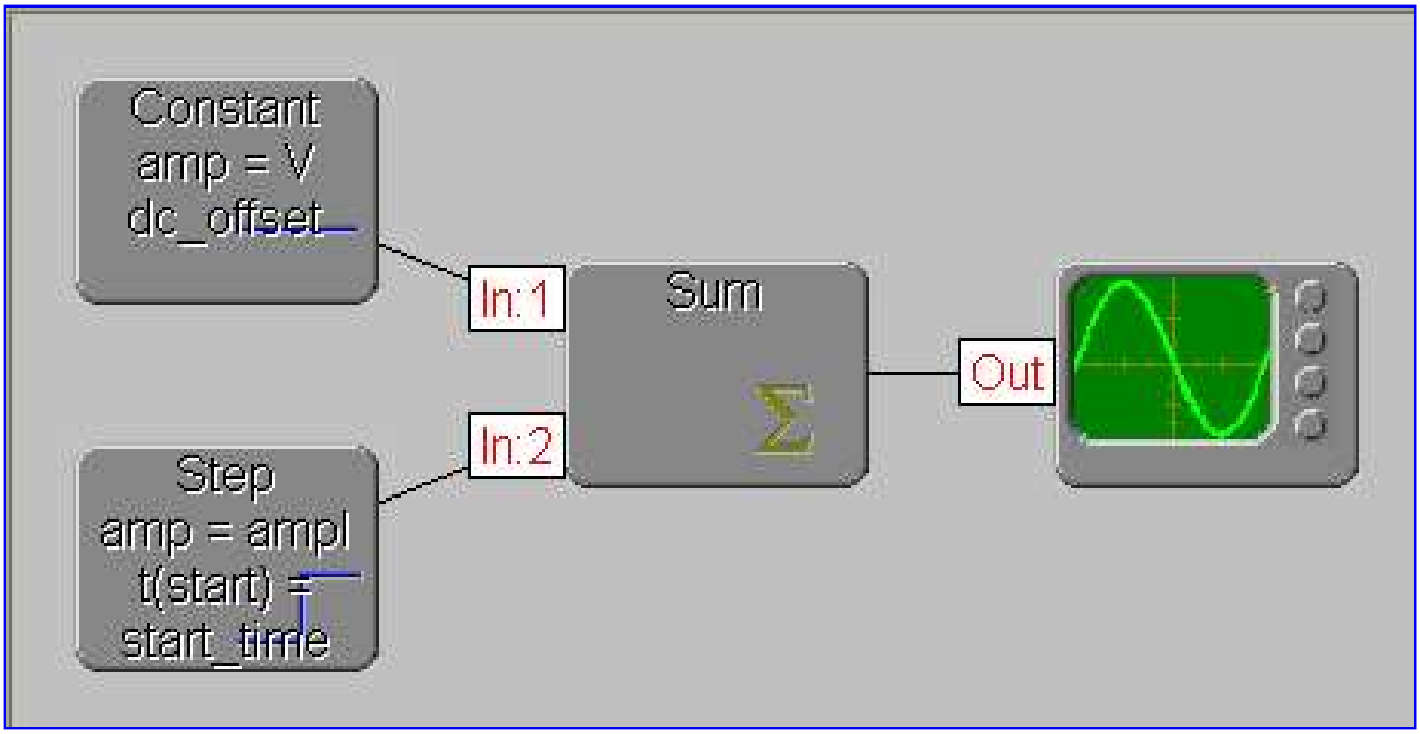

Figure 26-TSF STEP_SIGNAL(STEP_SIGNAL)

Interface Properties

Table 51-TSF STEP_SIGNAL Interface

Description	Name	Type	Default	Range
Step size	ampl	Voltage		
DC offset	dc_offset	Voltage	0	
Step time	start_time	Time		

Notes

Model Description

Table 52-TSF STEP_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
Step_Signal	Sum	Signal [Out]			
		Signal [In]	Step_DC_Offset		
		Signal [In]	Step_Component		
Step_Component	Step	Signal [Out]		Step_Signal	
		amplitude	ampl		
		startTime	start_time		

Step_DC_Offset	Constant	Signal [Out]		Step_Signal	
		amplitude	dc_offset		

Rules

SUP_CAR_SIGNAL

Definition
An amplitude modulated signal in which the carrier is suppressed.

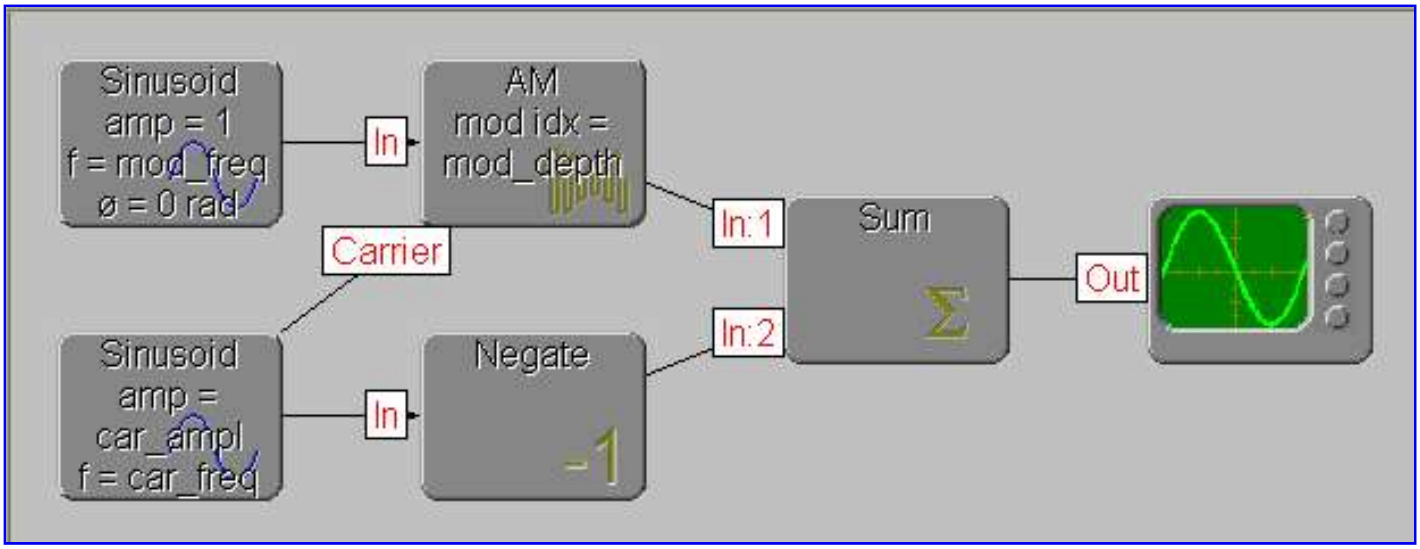

Figure 27-TSF SUP_CAR_SIGNAL(SUP_CAR_SIGNAL)

Interface Properties

Table 53-TSF SUP_CAR_SIGNAL Interface

Description	Name	Type	Default	Range
Carrier amplitude	car_ampl	Voltage		
Carrier frequency	car_freq	Frequency		
Modulation frequency	mod_freq	Frequency		
Depth of modulation	mod_depth	Ratio		

Notes

Model Description

Table 54-TSF SUP_CAR_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
Suppressed_Carrier_Signal	Sum	Signal [Out]			
		Signal [In]	SUP_AM_Signal		
		Signal [In]	SUP_Inverted_Carrier		
SUP_Inverted_Carrier	Negate	Signal [Out]		Suppressed_Carrier_Signal	
		Signal [In]	SUP_Carrier		
SUP_AM_Signal	AM	Signal [Out]		Suppressed_Carrier_Signal	
		modIndex	mod_depth		
		Carrier [In]	SUP_Carrier		
		Signal [In]	SUP_Modulation		
SUP_Modulation	Sinusoid	Signal [Out]		SUP_AM_Signal	
		amplitude			1
		frequency	mod_freq		
		phase			0 rad
SUP_Carrier	Sinusoid	Signal [Out]		SUP_Inverted_Carrier SUP_AM_Signal	
		amplitude	car_ampl		
		frequency	car_freq		
		phase			0 rad

Rules

SYNCHRO

Definition

Three ac sinusoid voltages whose relationship of amplitudes represent the rotational shaft position of an electro-mechanical transducer.

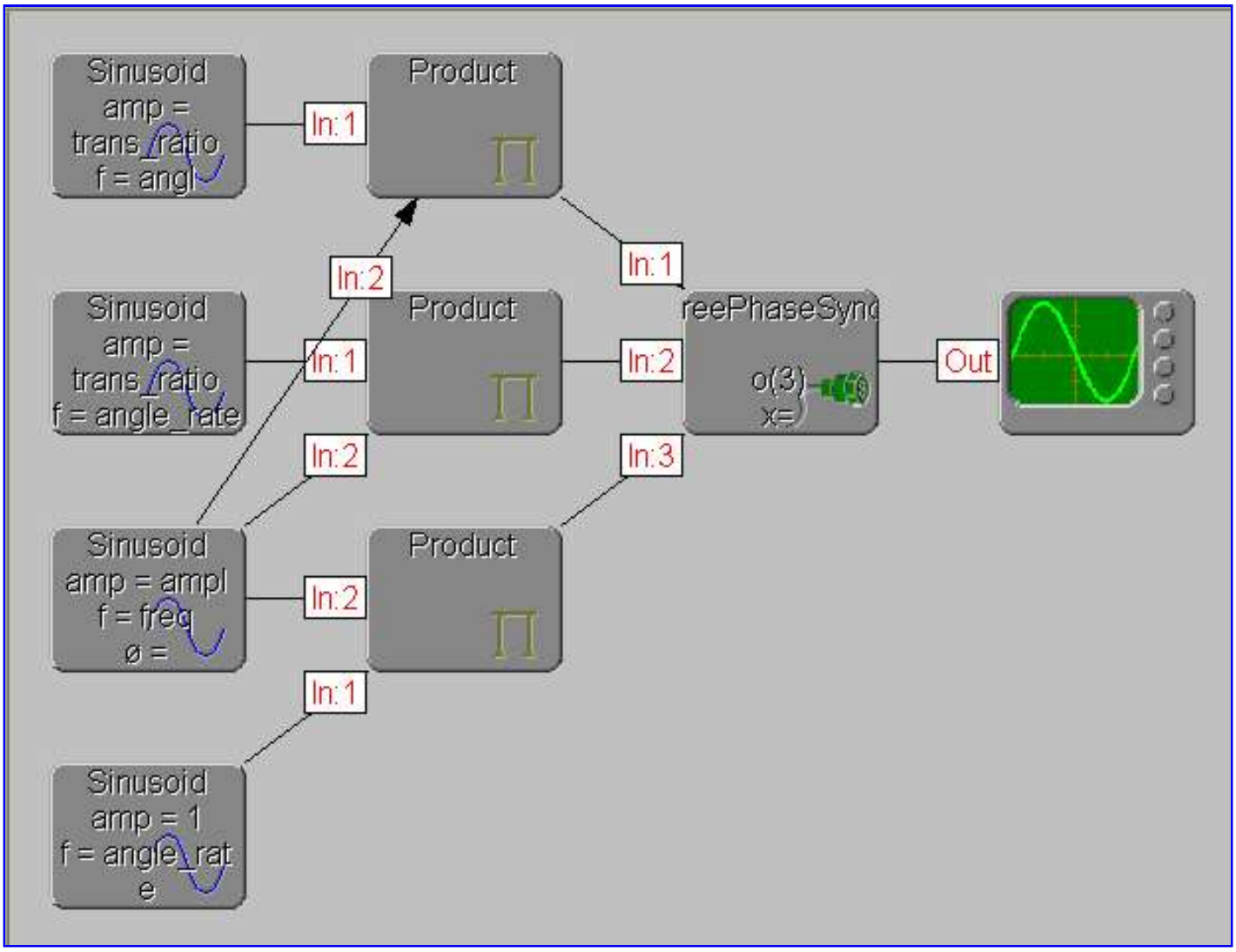

Figure 28-TSF SYNCHRO(SYNCHRO)

Interface Properties

Table 55-TSF SYNCHRO Interface

Description	Name	Type	Default	Range
Shaft angle	angle	PlaneAngle	0 rad	
Reference amplitude	ampl	Voltage	26 V	
Reference frequency	freq	Frequency	400 Hz	
Zero index	zero_index	PlaneAngle	0 rad	
Shaft angle rate	angle_rate	Frequency	0 rad	
Transformer Ratio	trans_ratio	Ratio	1	

Notes

Model Description

Table 56-TSF SYNCHRO Model

Name	Type	Terminal	Inputs	Output	Formula
ThreePhaseSynchro_Output	ThreePhaseSynchro	Signal [Out]			
		channelWidth			3

		Signal [In]	TPS_S1		
		Signal [In]	TPS_S2		
		Signal [In]	TPS_S3		
TPS_S3	Product	Signal [Out]		ThreePhaseSynchro_Output	
		Signal [In]	TPS_Field3		
		Signal [In]	TPS_Rotor		
TPS_S2	Product	Signal [Out]		ThreePhaseSynchro_Output	
		Signal [In]	TPS_Field2		
		Signal [In]	TPS_Rotor		
TPS_S1	Product	Signal [Out]		ThreePhaseSynchro_Output	
		Signal [In]	TPS_Field1		
		Signal [In]	TPS_Rotor		
TPS_Field3	Sinusoid	Signal [Out]		TPS_S3	
		amplitude			1
		frequency	angle_rate		
		phase			{angle.magnitude+(2*pi/3)}
TPS_Field2	Sinusoid	Signal [Out]		TPS_S2	
		amplitude	trans_ratio		
		frequency	angle_rate		
		phase	angle		
TPS_Rotor	Sinusoid	Signal [Out]		TPS_S3 TPS_S1 TPS_S2	
		amplitude	ampl		
		frequency	freq		
		phase	zero_index		
TPS_Field1	Sinusoid	Signal [Out]		TPS_S1	
		amplitude	trans_ratio		
		frequency	angle_rate		
		phase			{angle.magnitude-(2*pi/3)}

Rules

TACAN

Definition

Tactical air navigation (TACAN) is a complete UHF polar coordinate navigation system using pulse techniques. The function operates identically as a DME and the bearing function is derived by rotating the ground transponder antenna so as to obtain a rotating multi-lobe pattern for coarse and fine bearing information, as defined in MIL-STD-291B

The model defines a subset of the TACAN X signal concerned with bearing, rather than the complete signal, as test requirements dealing with TACAN distance can be refined using the DME model.

The transponder emits RF pulses that are amplitude modulated to provide bearing information. The amplitude modulation is produced by rotating a parasitic reflector array about the antenna radiating element. The array consists of one 15 Hz and nine 135 Hz reflectors. As the pattern from the 15 Hz reflector passes through the magnetic east azimuth, a main reference burst (MRB) is transmitted. As the pattern from the 135 Hz reflectors passes through east, an auxiliary reference burst (ARB) is transmitted, except when the pattern is coincident with the 15 Hz pattern. This produces a total of one MRB and eight ARB bursts per antenna rotation. The airborne receiving equipment determines the aircraft bearing from the ground station by measuring elapsed time, first, from the MRB to the 0° phase of the 15 Hz component and second, from the ARB to 0 ° of the 135 Hz component.

The TACAN beacon also generates a 2 or 3 letter Morse identification signal every 37.5 s.

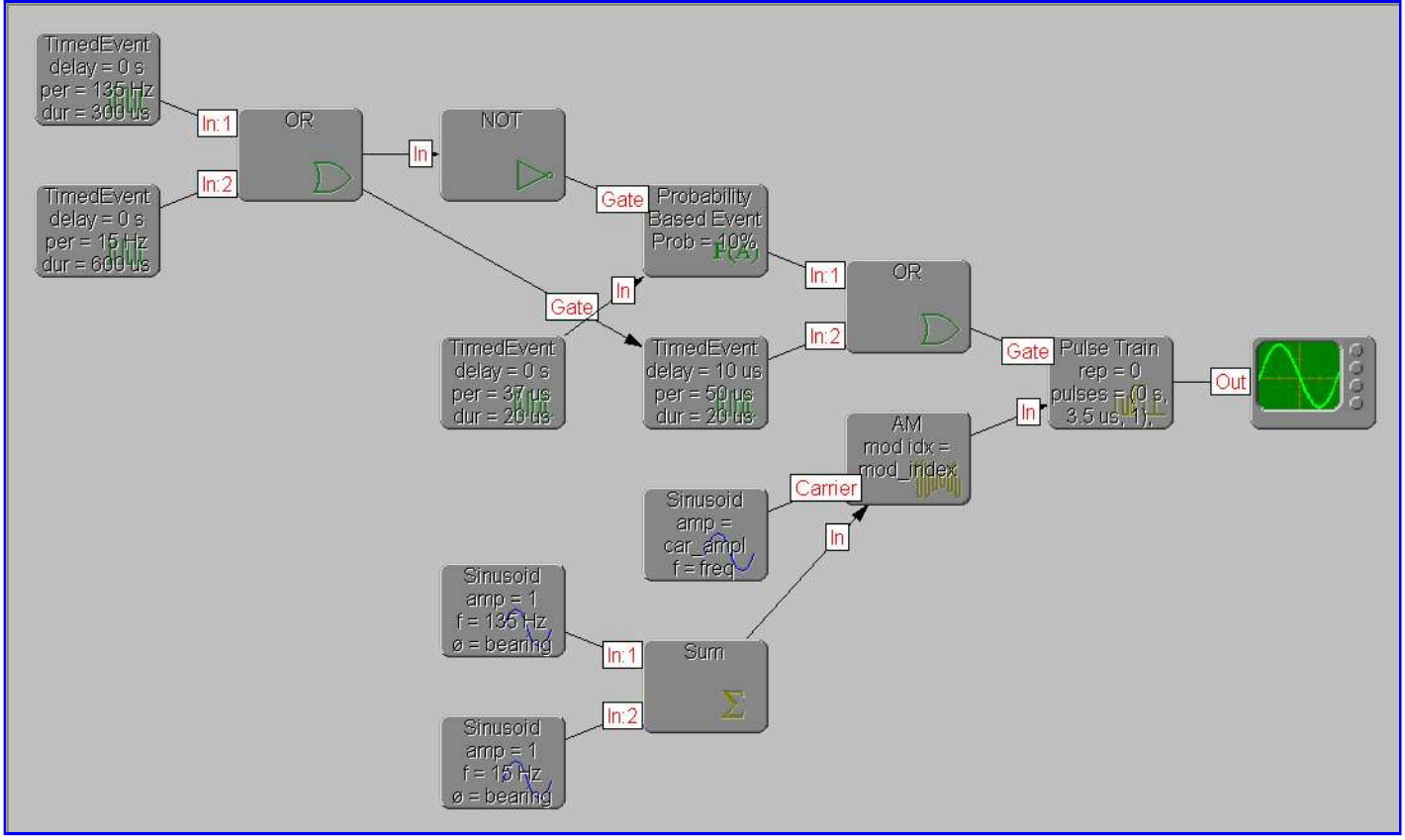

Figure 29-TSF TACAN(TACAN)

Interface Properties

Table 57-TSF TACAN Interface

Description	Name	Type	Default	Range
Transponder Frequency	freq	Frequency	962 MHz	
Modulation Index	mod_index	Ratio	0.3	
Magnetic Bearing	bearing	PlaneAngle	0	
er Amplitude	car_ampl	Voltage		

Notes

Model Description

Table 58-TSF TACAN Model

Name	Type	Terminal	Inputs	Output	Formula
Tacan_Response_Train	PulseTrain	Signal [Out]			
		pulses			(0 s, 3.5 us, 1), (15.5 us, 3.5 us, 1)
		repetition			0
		Signal [In]	Tacan_Modulated_Carrier		
		Gate[In]	Tacan_Event_Train		
Tacan_Modulated_Carrier	AM	Signal [Out]		Tacan_Response_Train	
		modIndex	mod_index		
		Carrier [In]	Tacan_Carrier		
		Signal [In]	Tacan_Modulation		
Tacan_Event_Train	OrEvent	Event [Out]		Tacan_Response_Train	
		Signal [In]	Random_Event_B		
		Signal [In]	Reference_Burst		
Tacan_Modulation	Sum	Signal [Out]		Tacan_Modulated_Carrier	
		Signal [In]	Tacan_135Hz_Modulation		
		Signal [In]	Tacan_15Hz_Modulation		
Reference_Burst	TimedEvent	Event [Out]		Tacan_Event_Train	
		delay			10 us
		duration			20 us

		period			50 us
		repetition			0
		Gate[In]	RB_Gate		
Random_Event_B	ProbabilityEvent	Event [Out]		Tacan_Event_Train	
		seed			0
		probability			10%
		Signal [In]	Random_Event_A		
		Gate[In]	RB_Mask		
Tacan_Carrier	Sinusoid	Signal [Out]		Tacan_Modulated_Carrier	
		amplitude	car_ampl		
		frequency	freq		
		phase			0 rad
Random_Event_A	TimedEvent	Event [Out]		Random_Event_B	
		delay			0 s
		duration			20 us
		period			37 us
		repetition			0
Tacan_15Hz_Modulation	Sinusoid	Signal [Out]		Tacan_Modulation	
		amplitude			1
		frequency			15 Hz
		phase	bearing		
Tacan_135Hz_Modulation	Sinusoid	Signal [Out]		Tacan_Modulation	
		amplitude			1
		frequency			135 Hz
		phase	bearing		
RB_Mask	NotEvent	Event [Out]		Random_Event_B	
		Signal [In]	RB_Gate		
RB_Gate	OrEvent	Event [Out]		RB_Mask Reference_Burst	
		Signal [In]	ARB_Gate		
		Signal [In]	MRB_Gate		
MRB_Gate	TimedEvent	Event [Out]		RB_Gate	
		delay			0 s
		duration			600 us
		period			15 Hz
		repetition			0
ARB_Gate	TimedEvent	Event [Out]		RB_Gate	
		delay			0 s
		duration			300 us
		period			135 Hz
		repetition			0

Rules

TRIANGULAR_WAVE_SIGNAL

Definition

A periodic wave whose instantaneous value varies alternately and linearly between two specified values (i.e., initial and alternate). The interval required to transition from the initial value to the alternate value is equal to the interval to transition from the alternate value to the initial value.

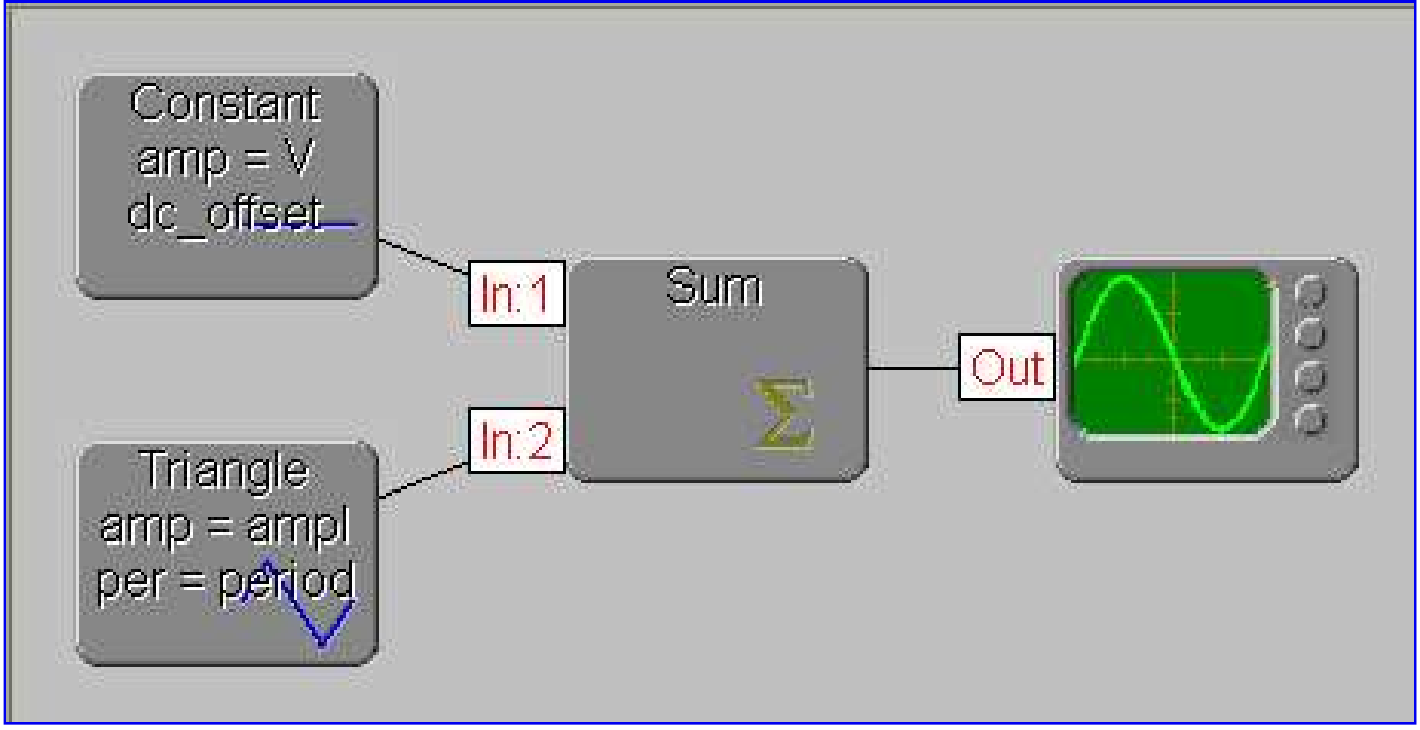

Figure 30-TSF TRIANGULAR_WAVE_SIGNAL(TRIANGULAR_WAVE_SIGNAL)

Interface Properties

Table 59-TSF TRIANGULAR_WAVE_SIGNAL Interface

Description	Name	Type	Default	Range
Triangular wave signal amplitude	ampl	Physical		
Trianglar wave signal period	period	Time		
DC offset	dc_offset	Physical	0	

Notes

Model Description

Table 60-TSF TRIANGULAR_WAVE_SIGNAL Model

Name	Type	Terminal	Inputs	Output	Formula
Triangular_Wave_Signal	Sum	Signal [Out]			
		Signal [In]	Triangle_DC_Offset		
		Signal [In]	Triangular_Wave		
Triangular_Wave	Triangle	Signal [Out]		Triangular_Wave_Signal	
		amplitude	ampl		
		period	period		
		dutyCycle			50%
Triangle_DC_Offset	Constant	Signal [Out]		Triangular_Wave_Signal	
		amplitude	dc_offset		

Rules

VOR

Definition

VHF omnidirectional range (VOR) is a system combining ground based and airborne equipment to provide bearing to or from a ground station, as defined in ARINC Specification 579-2. The VOR radiates an RF carrier in the band 108.0 MHz to 117.975 MHz, with which are associated two separate 30 Hz modulations. The phase of one of these modulations is independent of the point of observation (i.e., reference phase). The phase of the other modulation (variable phase) is such that, at a point of observation, it differs from the reference phase by an angle equal to the bearing of the point of observation with respect to the VOR. The two separate modulations consist of the following:
A sub-carrier of 9960 Hz, frequency modulated at 30 Hz, modulating the carrier to a nominal depth of 30%. This 30 Hz component is fixed independent of the azimuth and is termed the reference phase.
A 30 Hz component, modulating the carrier to a nominal depth of 30%. This 30 Hz component is caused by a rotating antenna producing a change in phase with azimuth and is termed the variable phase.

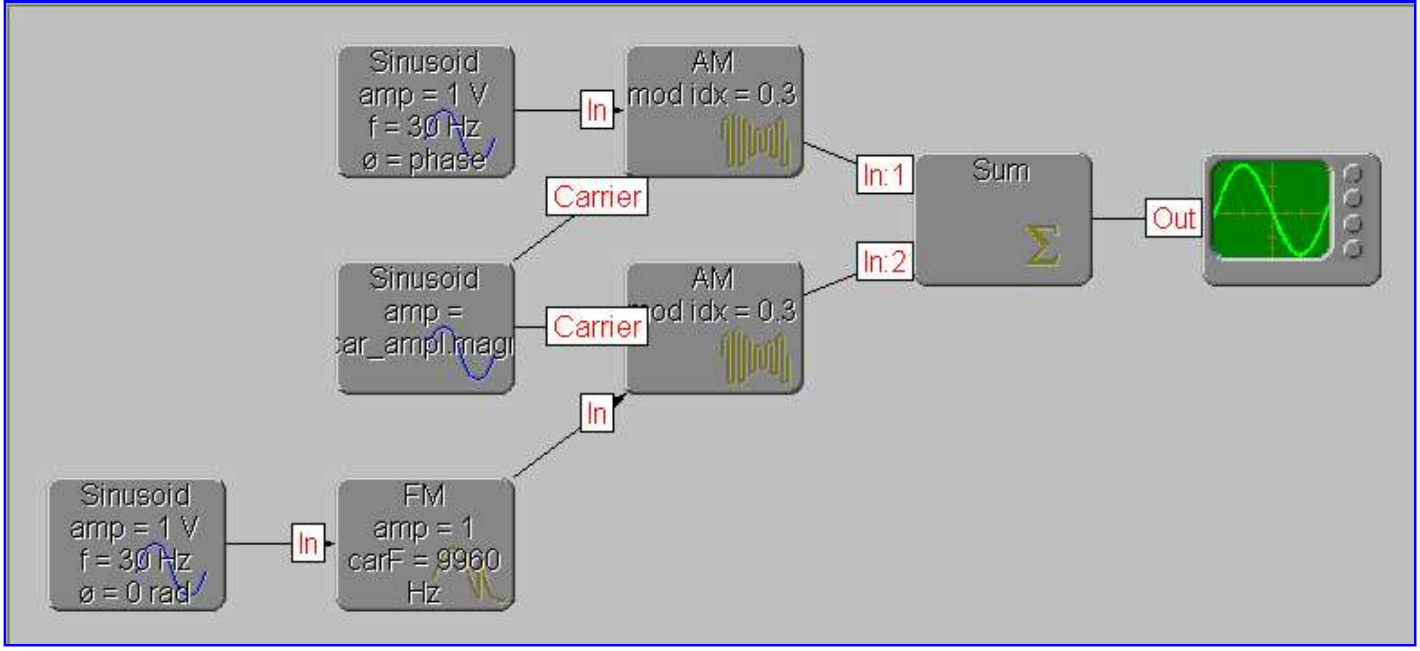

Figure 31-TSF VOR(VOR)

Interface Properties

Table 61-TSF VOR Interface

Description	Name	Type	Default	Range
Carrier amplitude	car_ampl	Voltage	2 mV	
Carrier frequency	car_freq	Frequency	107.975 MHz	
Radial bearing	phase	PlaneAngle	90 deg	

Notes

Model Description

Table 62-TSF VOR Model

Name	Type	Terminal	Inputs	Output	Formula
VOR_Signal	Sum	Signal [Out]			
		Signal [In]	Variable_Phase		
		Signal [In]	Reference_Phase		
Reference_Phase	AM	Signal [Out]		VOR_Signal	
		modIndex			0.3
		Carrier [In]	VOR_Carrier		
		Signal [In]	Modulated_Sub_Carrier		
Variable_Phase	AM	Signal [Out]		VOR_Signal	
		modIndex			0.3
		Carrier [In]	VOR_Carrier		
		Signal [In]	Var_Tone		
Modulated_Sub_Carrier	FM	Signal [Out]		Reference_Phase	
		amplitude			1
		carrierFrequency			9960 Hz
		frequencyDeviation			480 Hz
		Signal [In]	Ref_Tone		
Var_Tone	Sinusoid	Signal [Out]		Variable_Phase	
		amplitude			1 V
		frequency			30 Hz
		phase	phase		
VOR_Carrier	Sinusoid	Signal [Out]		Reference_Phase	
		amplitude			{car_ampl.magnitude/2}
		frequency	car_freq		
		phase			0 deg
Ref_Tone	Sinusoid	Signal [Out]		Modulated_Sub_Carrier	
		amplitude			1 V
		frequency			30 Hz
		phase			0 rad

Rules