

# STEREO MODULATOR with/RDS/ARI

VP-7637A

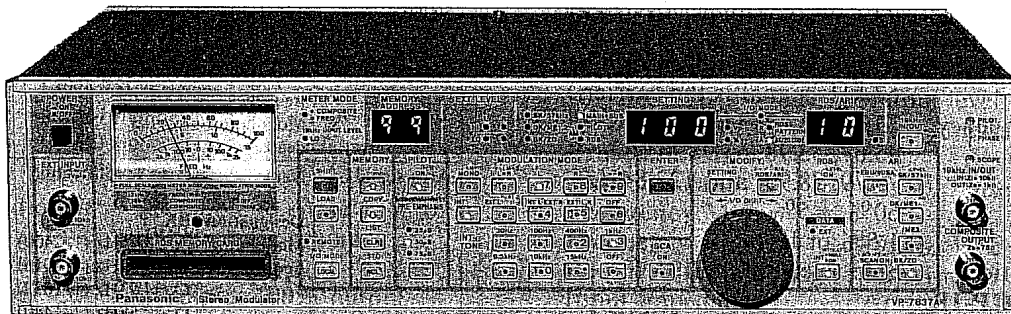
- Three Functions in One Unit
- High Performance Stereo Signal Source
- Memory Card System for RDS Data
- Simple RDS Data Transmission
- Full GP-IB Control function
- 100 Front Panel Memory
- Frequency Meter Built-in



With compliments

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## Description

The Model VP-7637A Stereo Modulator with RDS/ARI provides a composite stereo signal in combination with a standard signal generator. In addition, VP-7637A is designed to generate the RDS (Radio Data System) and ARI (Automotive Radio Information) meeting FCC and EBU specifications to be multiplexed to the stereo signal.

RDS : Radio Data System  
ARI : Automotive Radio Information  
EBU : European Broadcasting Union  
FCC : Federal Communications Commission

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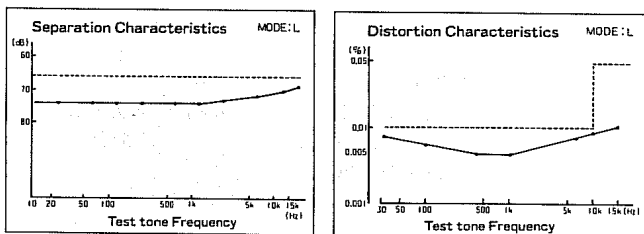
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### Equipped with Automotive Scanning Capability of Area Identification Code

The Automotive Radio Information generator section provides transmitter identification codes (SK/57kHz) which are amplitude modulated by the announcement identification code (DK/ME1, ME2) and/or the area identification code (BK/Z0). The transmitter identification coded signal can be transmitted monophonically or mixed with a multiplex stereo signal. The level of each signal can be monitored and is adjustable by front panel controls. A scanning function equipped for area identification code (BK/Z0) automatically changes the ARI identification signal frequency. This function is useful for production.

### High Separation and Low Distortion

This instrument also features high separation characteristics (66dB or more), low distortion output signals (0.01% or less) and high reliability, making the VP-7637A ideal for use in R & D laboratories.



### Analog Frequency Meter

The instrument can be used as a frequency meter for pilot frequency of 19kHz  $\pm$  2kHz. The inner scale of the meter with zero at the center is used for this application. The frequency meter directly indicates the input frequency deviation from 19kHz.

### Seven Internal Tone Signals

This is the most widely used function for stereo receiver measurement. A signal sine-wave test tone is applied to both L and R channels to produce a stereo composite signal. The frequency of the internal tone signal can be selected among seven frequencies: 30Hz, 100Hz, 400Hz, 1kHz, 6.3kHz, 10kHz, and 15kHz. A sine-wave signal with a frequency up to 15kHz can be used as the external signal.

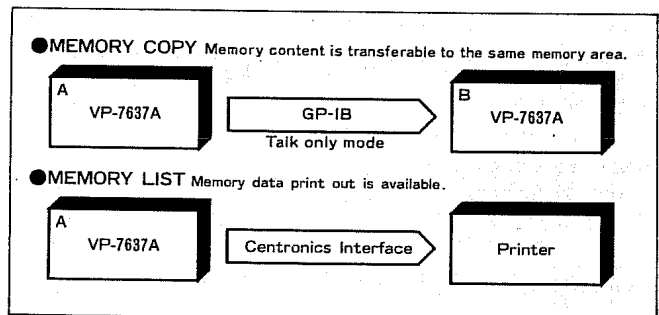
### Up to 100-Signal Memory/Recall

The assorted preset memory up to 100 sets of output amplitude, modulation mode, signal ratio and other parameters. Memorized panel conditions can be recalled by front panel key operation or remote control. A variety of recall functions are equipped, such as direct access by recall key, repetitive recall of required address and grouping (eg. 10~20, 15~35, max. 10 groups). This function is ideal for enhancing efficiency in repetitive measurement.

### Unique EXT I/O Function

Its terminal equips memory control output and 8 bits/2 ports to control other components or measuring jigs and indicators.

The 2 ports in 8 bits can be used as TTL input/output, Memory Address List, Memory Data List (Via Centronics Interface to printer) and Memory Data Copy (Via GP-IB interface).



### 16 RDS Patterns

Built-in RAM is capable of storing up to 16 RDS patterns. A set of 10 patterns which are commonly used is already stored as a standard before shipping at the factory. And 6 patterns can be stored as required at user side. One of 16 data patterns can be selected by MODIFY knob on the front panel.

### Memory Card System

In addition to a built-in RAM, Memory Card System is provided for flexible application. One memory card has a capacity to store 16 data patterns. The data is programable and transferable from the PC via GP-IB interface. Efficient data handling in RAM, PC and memory card are now available.

# MODULATORS

## Full GP-IB Control

The GP-IB interface allows external remote control of panel operations as well as transfer of programmed data pattern of RDS code.

## Simplified System for RDS

The VP-7637A is an ideal stereo modulator for testing and adjusting stereo tuners. Three functions (Stereo modulator, ARI signal generator and RDS code generator) are combined in one unit resulting easy operation and high performance.

## The composition of the internal RDS data

Pattern No.	Start Group	Group Length	Group No.	Internal RAM Data			
				Block 1	Block 2	Block 3	Block 4
0	ds0	dL0	0	iiiiicc	iiiiicc	iiiiicc	iiiiicc
1	ds1	dL0	1	iiiiicc	iiiiicc	iiiiicc	iiiiicc
~	~	~	~	~	~	~	~
F	dsF	dL0	511	iiiiicc	iiiiicc	iiiiicc	iiiiicc

ds0-dsF: 0-511 dL0-dLF: 1-255

iiii: 0000-FFFF Information words of each block

ccc: 000-3FF Check words of each block

The data pattern is defined by the start group and group length. Internal RAM data from the start group to "(group length)-1" designated by the start group are set to a data pattern.

## Standard data pattern

Group Number: 10 11 12 13

Group Type: 0A 0A 0A 0A

Group Number	Code										
	PI	TP	TA	PTY	MS	DI	AF	C <sub>1</sub>	C <sub>2</sub>	PS	
10	C201	1	1	0	0	0	E7	00	00	52	44
11							22	44	01	53	20
12							66	88	10	54	45
13							AA	CC	11	53	54

Content

TP code: The signal identifying the traffic information broadcasting station.

TA code: The identification signal contained in the traffic information. The traffic information is sent using a FM voice grade program.

AF code: The frequency list broadcasting the same program.

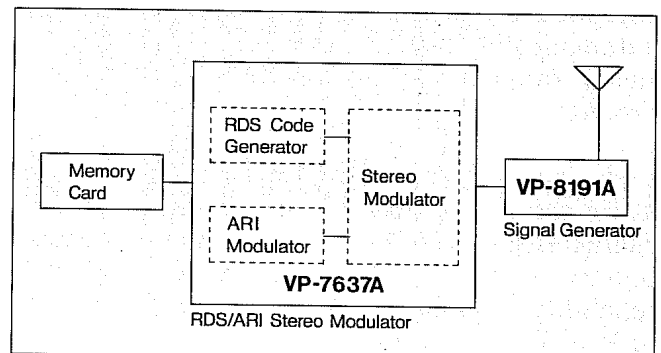
PS code: The broadcasting station name consisting of up to eight alphanumeric letters.

## RDS signal control via GP-IB

GP-IB program codes relating to RDS signal

Header Code	Data Code	Unit Code	Content
RD	ON OFF		RDS signal ON RDS signal OFF
	NULL INT EXT 0-F		RDS data NULL RDS INT data RDS EXT data Selection of pattern numbers 0 through F
	0.0-9.9	PC	RDS signal level setting between 0.0 and 9.9%

## RDS measuring system



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# SECTION II SPECIFICATIONS

## 2-1 ELECTRICAL CHARACTERISTICS

Designation	Performance	Supplemental information																		
<b>OUTPUT</b>																				
Amplitude																				
Setting range	0.00 to 9.99 V p-p, open end	9.99 V p-p = 100 % level																		
Resolution	0.01 V p-p																			
Accuracy	$\pm 5\%$ for voltages $\geq 1$ V p-p																			
Output impedance	75 $\Omega$ approximately																			
<b>MAIN &amp; SUB CHANNEL SIGNAL</b>																				
Modulation	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>Mode</u></th> <th style="text-align: center;"><u>Signal source</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">MONO</td> <td style="text-align: center;">INT / EXT L</td> </tr> <tr> <td style="text-align: center;">L = R</td> <td style="text-align: center;">INT / EXT L</td> </tr> <tr> <td style="text-align: center;">L</td> <td style="text-align: center;">INT / EXT L</td> </tr> <tr> <td style="text-align: center;">R</td> <td style="text-align: center;">INT / EXT L</td> </tr> <tr> <td style="text-align: center;">L = - R</td> <td style="text-align: center;">INT / EXT L</td> </tr> <tr> <td style="text-align: center;">INT L — EXT R</td> <td style="text-align: center;">Lch : INT Rch : EXT R</td> </tr> <tr> <td style="text-align: center;">EXT L, R</td> <td style="text-align: center;">Lch : EXT L Rch : EXT R</td> </tr> </tbody> </table>	<u>Mode</u>	<u>Signal source</u>	OFF	-	MONO	INT / EXT L	L = R	INT / EXT L	L	INT / EXT L	R	INT / EXT L	L = - R	INT / EXT L	INT L — EXT R	Lch : INT Rch : EXT R	EXT L, R	Lch : EXT L Rch : EXT R	
<u>Mode</u>	<u>Signal source</u>																			
OFF	-																			
MONO	INT / EXT L																			
L = R	INT / EXT L																			
L	INT / EXT L																			
R	INT / EXT L																			
L = - R	INT / EXT L																			
INT L — EXT R	Lch : INT Rch : EXT R																			
EXT L, R	Lch : EXT L Rch : EXT R																			
		No modulation																		
		Monophonic modulation																		
		Single-tone stereo modulation																		
		Single-tone stereo modulation																		
		Single-tone stereo modulation																		
		Single-tone stereo modulation																		
		Dual-tone stereo modulation																		
		Stereo modulation with two (left and right) external signals																		
Signal level																				
Setting range	0 to 127 % for MONO mode 0 to 114 % for modulation modes other than MONO																			
Resolution	1 %																			
Accuracy	$\pm 5\%$																			
Stereo separation	$\geq 66$ dB for 30 Hz to 15 kHz	At 90 % level																		
Distortion	$\leq 0.01\%$ (-80 dB) for 30 Hz to 10 kHz $\leq 0.05\%$ (-66 dB) for 10 kHz to 15 kHz	At 100 % (monophonic) or 90 % (stereo) level																		
S / N	$\geq 90$ dB	At 100 % level																		
38 kHz subcarrier leakage	$\leq -60$ dB for 100 % level																			
Pre-emphasis	25 $\mu$ s, 50 $\mu$ s, 75 $\mu$ s, OFF																			
Internal AF signal																				
Frequency and accuracy	30 Hz / 100 Hz / 400 Hz / 1 kHz / 6.3 kHz / 10 kHz / 15 kHz, $\pm 3\%$																			

## SPECIFICATIONS

Designation	Performance	Supplemental information
<b>MAIN &amp; SUB CHANNEL SIGNAL( Cont'd )</b>		
External input Frequency range and response Input level Input impedance	DC to 15 kHz, within $\pm 1$ dB with reference to 1 kHz 3 V p-p approx., set zone : $\pm 2$ % 10 k $\Omega$ approximately	
<b>PILOT SIGNAL</b> Frequency Frequency accuracy Signal level Setting range Resolution Accuracy	19 kHz $\pm 1$ Hz 0.0 to 19.9 % 0.1 % $\pm 1$ %	
<b>SCA INPUT</b> Frequency range and response Input level Input impedance	20 kHz to 99 kHz, within $\pm 1$ dB with reference to 57 kHz 0.56 V p-p (0.2 V rms) for 10 % level 10 k $\Omega$ approximately	
<b>19 kHz OUTPUT</b> Output level Output impedance	1 V rms approximately 1 k $\Omega$ approximately	Sine wave signal synchronized with the pilot signal
<b>METER</b> Indication  Accuracy	4) Level ratio, 100 % fs 2) Level ratio, 15 % fs 3) 19 kHz frequency meter, $\pm 2$ kHz fs Input level range : 10 mV - 1 V rms Input impedance : 10 k $\Omega$ approx.  1) Level ratio (100 % fs) : $\pm 5$ % 2) Level ratio (15 % fs) : $\pm 1$ % 3) Frequency : $\pm 2$ Hz at 0 Hz indication	fs : full scale  Indicates deviation from 19 kHz
<b>19 kHz FREQUENCY METER DC OUTPUT (Fx DC OUTPUT)</b>		
Output voltage Output impedance	- 2.4 V $\pm 10$ % at 0 Hz indication 1 k $\Omega$ approximately	

Designation	Performance	Supplemental information
<b>RDS SIGNAL</b> Subcarrier frequency and accuracy Signal level Setting range Resolution Accuracy  57 kHz subcarrier leakage Internal data	57 kHz $\pm$ 6 Hz  0.0 to 9.9 % ( 0.0 to 5.9 % when the ARI signal is on) 0.1 % $\pm$ 1 %  $\leq$ - 30 dB for 2.7 % level  Number of patterns : 16 Maximum number of data : 512 groups Maximum pattern length : 255 groups	0 to F
<b>ARI SIGNAL</b> System Subcarrier Frequency and accuracy Signal level Setting range Resolution Accuracy Announcement signal modulation Frequency  AM depth Setting range Resolution Accuracy Distortion Area signal modulation	EBU / USA SK / 57 kHz 57 kHz $\pm$ 6 Hz  0.0 to 9.9 % ( 0.0 to 8.7 % when the RDS signal is on) 0.1 % $\pm$ 1 % DK / ME1, ME2 amplitude-modulate the subcarrier DK : 125 Hz / ME1 : 142.5 Hz ME2 : 154.9 Hz  0 to 39 % / 0 to 79 % 1 % $\pm$ 5 % $\leq$ 0.8 % BK / ZO amplitude-modulate the subcarrier	SK : Transmitter ID code  DK : Announcement ID code ME : Message signal DK : 125 Hz = 57 kHz / 456 ME1 : 142.5 Hz = 57 kHz / 400 ME2 : 154.9 Hz = 57 kHz / 368  SK / 57 kHz : 5.3 % level, 60 % AM BK : Area ID code ZO : Zone signal

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## SPECIFICATIONS

Designation	Performance	Supplemental information
<b>ARI SIGNAL (Cont'd)</b>		
Frequency	A : 23.75 Hz / 1 : 23.75 Hz B : 28.27 Hz / 2 : 28.27 Hz C : 34.93 Hz / 3 : 34.93 Hz D : 39.58 Hz / 4 : 39.58 Hz E : 45.67 Hz / 5 : 45.67 Hz F : 53.98 Hz / 6 : 53.98 Hz 7 : 63.62 Hz 8 : 75.79 Hz 9 : 98.95 Hz 10 : 122.84 Hz	57 kHz / 2400 57 kHz / 2016 57 kHz / 1632 57 kHz / 1440 57 kHz / 1248 57 kHz / 1056 57 kHz / 896 57 kHz / 752 57 kHz / 576 57 kHz / 464
AM depth		
Setting range	0 to 79 % / 0 to 79 % (0 to 39 % when the ME1 or ME2 is on)	
Resolution	1 %	
Area signal modulation		
AM depth		
Accuracy	± 5 %	
Distortion	≤ 1.5 %	SK / 57 kHz : 5.3 % level, 60 % AM
Scan time		
Setting range	0.1 to 9.9 s	
Resolution	0.1 s	
<b>PRESET MEMORY</b>		
Number of addresses	100	00 to 99
<b>EXT CONTROL I/O</b>	Functions : Remote sequential recall Remote direct recall Remote modify Control output Print out of memory contents Data read	External control interface  List output
<b>GP-IB CONTROL</b>	SH1, AH1, T7, L3, SR4, RL1, PP0, DC1, DT0, C0 Memory copy function and memory sync function with talk-only and listen-only operation	

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Designation	Performance	Supplemental information
<b>POWER REQUIREMENTS</b>		
Mains voltages	100 V : 90 V to 110 V 120 V : 108 V to 132 V 230 V : 198 V to 244 V 240 V : 216 V to 250 V	
Mains frequency	50 / 60 Hz	
Power consumption	40 VA or less	

**2-2 ENVIRONMENTAL CONDITIONS**

Ambient temperature and humidity	Temperature	Relative humidity
Limit range of guaranteed performance	10 °C to 35 °C	30 % to 85 %
Limit range of operation	0 °C to 40 °C	30 % to 90 %
Storage and transportation	- 20 °C to 70 °C	30 % to 90 %

**2-3 MECHANICAL CHARACTERISTICS**

Designation	Performance	Supplemental information
Dimensions	426 mm (W), 99 mm (H), 250 mm (D)	Knob, connectors, handle and feet excluded
Mass	Approx. 8.5 kg	

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