



## FEATURES

- Field replaceable IF Demodulator trays
- High Dynamic Range (70dB)
- Low Differential Group Delay
- Up to 5 IF Demodulators per SMR-1636 Rack
- Bandwidths available from 100 kHz to 50 MHz
- Simultaneous AM (Linear and Log) and FM Demodulation on each channel
- Carrier Operated Relay (COR)
- Built-In-Test (BITE)

## DESCRIPTION

The SMR-1636 is one of two high performance IF demodulators available for use with the SMR-1600 System. It is a mainframe housing a Motorola 68000 16-bit microprocessor, power supply, and up to 5 high performance SMR-1635 IF amplifier/demodulator trays. Each IF tray has up to 6 selectable IF bandwidths and a large number of simultaneous IF and video outputs. The SMR-1635 IF trays receive an IF signal from an SMR-1629 or SMR-1660 Series Tuner and process it to provide buffered wideband outputs, linear AM video, FM video, switched AM/FM video, two 21.4 MHz outputs, and a LOG video signal.

Each SMR-1635 IF tray is field replaceable through the front panel of the SMR-1636 allowing trays to be interchanged without removing the unit from the rack. Design of the IF amplifier circuitry supports a wide variety of selectable bandwidths between 100 kHz and 50 MHz.

Two IF center frequencies are available with the SMR-1635 and SMR-1636. 160 MHz may be specified

by selecting Option 20, 250 MHz may be specified by selecting Option 21.

A COR value may be programmed via the SMR-1611 controller or external computer. The Carrier Operated Relay (COR) output is activated when the appropriate tuner is in the fixed frequency mode of operation. The COR is an open collector output and is active when the programmed COR threshold value is exceeded.

## PERFORMANCE

The SMR-1635 IF demodulator provides exceptional performance consistent with the rest of the SMR-1600 System in maintaining low differential group delay. The IF differential group delay is typically 15 nsec in a 20 MHz IF bandwidth.

Noise Power Ratio (NPR) quantizes circuit performance related to circuit linearity and local oscillator phase noise. The SMR-1635 provides high NPR (typically 35 dB) essential to receiver usage for high data rate channels.

## CONTROL

The operator may utilize the front panel controls on the SMR-1636 or control the desired functions via the SMR-1611 controller or with an external computer over the controller IEEE-488 Bus. Operator convenience is provided with the ability to observe the front panel display to verify selections under operator control or computer control. Front panel controls include the following:

- Power On/Off
- Channel Selection
- IF Gain
- Local/Remote Selection
- AGC ON/OFF
- Bandwidth Selection
- AM/FM Video selection

## SERVICEABILITY

The SMR-1635/1636 IF Demodulator was designed for optimum reliability and serviceability. Extensive use of Built-In-Test (BITE) permits expeditious instrument checkout and provides for easy fault isolation in the event of an instrument failure. The SMR-1635 trays may be easily interchanged and provide for maximum up time with a minimum inventory of spares.

Another built-in feature provides the ability to monitor and log actual operating hours through the resident microprocessor. This permits easy verification of usage and system reliability data.



FRONT VIEW (Cover Removed)



REAR VIEW

# SMR-1635/SMR-1636 SPECIFICATIONS

Input Frequency .....	250 or 160 MHz
Outputs:	
250 or 160 MHz — Gain .....	4 dB referenced to input (*)
Bandwidth .....	Limited by the SMR-1629 or SMR-1630 Tuner Bandwidth
21.4MHz IF — Gain .....	5 dB referenced to input (*)
Bandwidth .....	10 MHz
AM Video — Level .....	1 Vp-p into 50 ohm with 90% AM modulation
Baseband .....	½ IF selected Bandwidth
Distortion .....	2%, maximum, for 50% AM modulation, 50 kHz sinewave
FM Video — Level .....	1 Vp-p into 50 ohm with peak-to-peak frequency deviation equal to 2/3 of IF Bandwidth selected
Baseband .....	½ IF Bandwidth selected
Distortion .....	2%, maximum, for peak-to-peak deviation of 2/3 the IF bandwidth, 50 kHz sinewave modulation frequency
AM/FM Video .....	Same as AM and FM above
Log Video — Range .....	70 dB, linear within 2 dB
Level .....	0 to 2 V into 93 ohm
Baseband .....	5 MHz
IF Gain Control: Manual .....	70 dB minimum
AGC .....	60 dB minimum
External Reference .....	50 MHz IV p-p or TTL
COR Output .....	Open Collector, +28V/100 ma Sink, maximum
Controller Interface .....	RS-422 (Serial)
Remote/Local .....	Select front panel or interface control
Differential Group Delay (80% of Band)	

IF BW (MHz)	(nsec, max)
0.5	140
1.0	100
2.0	50
5.0	30
10.0	20
20.0	15

Temperature, operating .....	0 to 50°C
Cooling .....	Forced Air
AC Power: Voltage .....	115/230 Vac ± 10%; 47-420 Hz; 240 watts, maximum with 5 SMRs installed in one SMR-1636
Size .....	5¼" (H) x 17" (W) x 22" (D)
Weight .....	53 lbs, with 5 SMR-1635s installed in one SMR-1636

(\*) Gain does not include 9 dB of loss. The loss allows the tuner to be remoted without loss of system performance.

## ORDERING INFORMATION

### SMR-1635 IF Demodulator Tray

The following Options provide four IF bandwidths/tray per the following table:

OPTION #	OPTION DESCRIPTION	OPTION #	OPTION DESCRIPTION
100	Standard SMR-1635 Demod Tray with: center freq. = 160 MHz (Option 20) IF BW's = 30,5,1 and 0.1 MHz (Options 32, 35, 40, and 43)	20	CENTER FREQUENCY (Must select one) 160 MHz IF center frequency
	SPECIAL FEATURES (Select 0 to 5)	21	250 MHz IF center frequency
1	21.4 MHz log video		WIDEBAND IF BANDWIDTHS (Select 1 to 4)
2	Cor options (must take option 1)	30	50 MHz IF BW
3	Video Gain control, separate AM and FM (20 dB min.)	31	40 MHz IF BW
4	Wideband AGC optimized for pulsed basebands Basebands - 500 nsec pulsewidth (min.) - duty cycle 1 : 1 to 100 : 1	32	30 MHz IF BW
5	Narrowband AGC optimized for pulsed basebands Basebands - 1.5 uS pulsewidth (min.) - Duty cycle 1 : 1 to 100 : 1	33	20 MHz IF BW
6	Audio Output - contact factory before ordering	34	10 MHz IF BW
		35	5 MHz IF BW
			NARROWBAND IF BANDWIDTHS (Select 0 to 2)
		40	1 MHz IF BW
		41	500 KHz IF BW
		42	250 KHz IF BW
		43	100 KHz IF BW

NOTE: Other IF bandwidths available upon request.

SMR-1636 IF Demodulator Rack (holds up to five SMR-1635 IF Demodulator Trays)

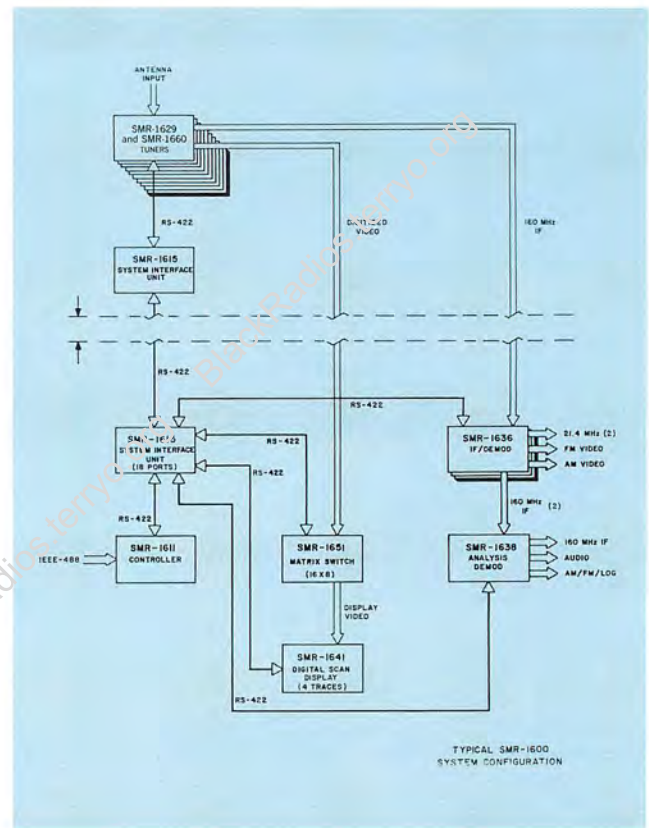
## SMR-1600 SYSTEM OVERVIEW

The SMR-1600 Broadband Microwave Receiving System incorporates the latest in technologies to provide previously unavailable performance and flexibility. The SMR-1600 system may include up to seven different instruments, each containing a Motorola 68000 sixteen Bit Microprocessor.

The figure represents a typical SMR-1600 multi-channel receiver configuration. This configuration includes multiple tuners which are located close to the antenna to provide for maximum sensitivity, multiple controllers for multiple users (each having access to the full system) and a variety of demodulation and display capabilities. The system may be expanded to handle up to 64 channels consisting of tuners, demodulators and digital displays.

## SMR-1600 FAMILY OF INSTRUMENTS

- SMR-1611 Large Screen Controller
- SMR-1615 System Interface Unit
- SMR-1629 Tuner 100 MHz to 18 GHz
- SMR-1660 Tuner 0.5 to 18 GHz
- SMR-1635 IF/Demodulator Tray
- SMR-1636 IF/Demodulator Mainframe
- SMR-1638 Analysis Demodulator
- SMR-1641 Digital Scan Display
- SMR-1651 Video Switch Matrix



## WARRANTY

All Micro-tel products are unconditionally warranted for a period of one year except for physical damage, provided the equipment is returned to the plant in Hunt Valley.

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