



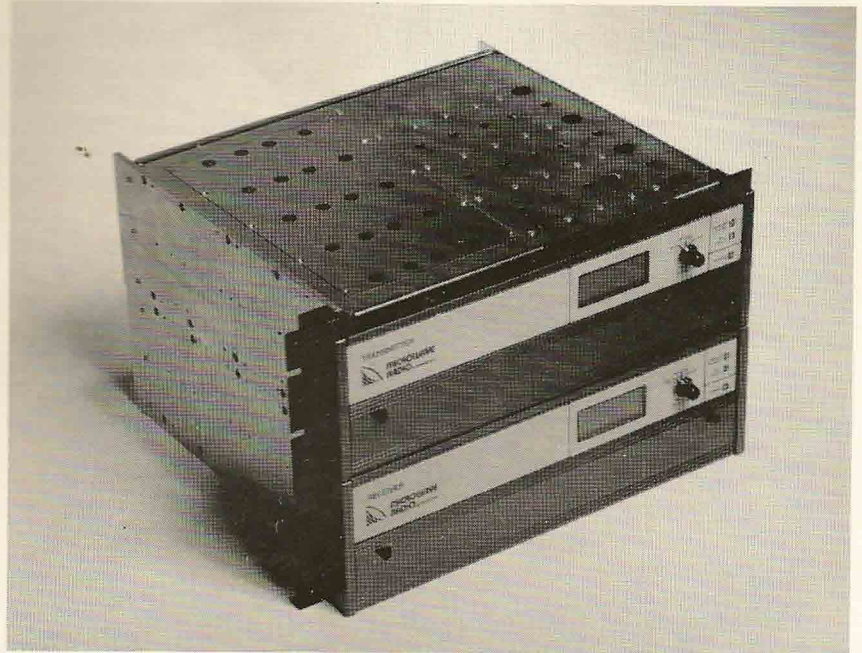
**MICROWAVE
RADIO** corporation

The Microwave Connection

FLH 2.6,7 and 12 GHz Heterodyne Microwave System

Features

- Advanced, high performance design meets EIA and CCIR requirements
- Ultra sensitive receivers feature built-in, low noise GaAs FET pre-amplifiers
- Efficient, high output broadband solid-state power amplifiers are standard in all transmitter models
- Transmitter features optional internal 70 MHz FM terminal modulator with up to four audio program channels
- Receiver can be equipped with an optional 70 MHz FM terminal demodulator with up to four audio program channels
- High power amplifiers, "HP" version option, available in all frequency bands for additional fade margin protection



The FLH Series is advanced design, long haul, heterodyne microwave equipment suitable for both domestic and international applications, including: multi-hop and/or multi-channel broadcast, CATV or ETV video system networks.

The equipment may be configured as either a simplex or full duplex system. Protection options such as hot-standby, including space and frequency diversity, are also available.

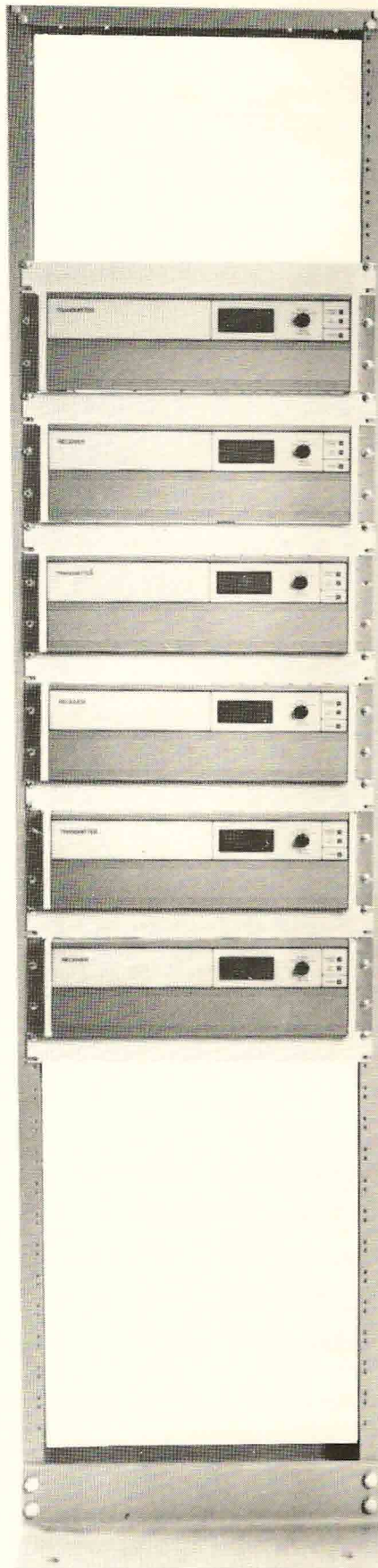
To provide the highest system gain performance available, the equipment incorporates the latest design in field-proven circuitry, such as low noise receiver pre-amplifiers and high output, solid-state broadband power amplifiers, which are standard in all frequency bands. A high power "HP" version option is also available in all frequency bands for additional fade margin protection.

Additional space is provided in the transmitter and receiver units to accommodate an optional FM terminal modulator or demodulator, and up to four program channel audio modulators or demodulators that provide full drop and insert capabilities.

The equipment uses broadband amplifiers and phase-locked sources, which are field tunable across the entire RF sub-bands. This significantly reduces sparing requirements, thus minimizing potential downtime.

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FLH

2,6,7 and 12 GHz Heterodyne Microwave System

Features (continued)

- Compact transmitter and receiver units require only three vertical rack units, or 5¼" (13.33 cm)
- Modular design employs slide-in modules and RF components that may be easily removed via the hinged front access panel
- Supports simplex with full duplex system configurations, and hot-standby, space and frequency diversity protection options
- Monitor and alarm outputs provided on rear panel "D" connector for driving fault alarms and hot-standby equipment
- Available in all FCC and CCIR approved frequency bands from 2 to 13 GHz

When equipped with the optional 70 MHz FM terminal modules, the receiver provides a filtered video output, a wide band baseband output and a standard level IF output.

These compact, integrated units (including the terminal equipment, power amplifier and AC or DC power supply) occupy only three vertical racks units, or 5¼ inches (13.33 cm), thus minimizing the number of racks required in a multi-channel system.

A "D" series connector on the rear of each unit provides access to appropriate alarm and monitoring circuits that supply switching signals and data to hot-standby and fault reporting equipment. Hinged front panels allow easy access to all modules and assemblies, including the power supply, for service and maintenance.

All FCC and CCIR approved frequency bands in the 2 GHz to 13 GHz range are supported for domestic and international applications. Model FLH 12 accommodates A, B and K channeling plans for 12 GHz CATV applications, and Model FLR 6 meet 10 MHz channel requirements for 6 GHz private user applications.

The FLR Series compact, integrated units minimize the number of rack spaces required.

FLH SERIES TRANSMITTER/RECEIVER SPECIFICATIONS

GENERAL

Frequency Bands:	
Model FLH 2	1.71 to 1.99 GHz, 1.99 to 2.11 GHz, 2.30 to 2.70 GHz
Model FLH 6	5.925 to 6.425 GHz 6.425 to 6.875 GHz, 6.875 to 7.125 GHz
Model FLH 7	7.10 to 8.50 GHz (Any 500 MHz band)
Model FLH 12	10.70 to 11.20 GHz, 11.20 to 11.70 GHz, 12.70 to 13.25 GHz
Capacity:	525 or 625 line video; up to 4 audio channels and pilot carrier or a video signal plus data above video

TRANSMITTER

Type:	Single conversion
Local Oscillator:	Phase-locked source
Frequency Stability (-30 to +50 C):	±0.005% standard ±0.0005% optional
Power Output:	(See Table 1)
IF Input Frequency:	70 MHz
IF Input Return Loss (Referenced to 75 Ohms):	26 dB Minimum ±10 MHz

RECEIVER

Type:	Single conversion
Local Oscillator:	Phase-locked source
Noise Figure:	(See Table 1)
IF Output Frequency:	70 MHz ±0.25 MHz
IF Input Return Loss (Referenced to 75 Ohms):	26 dB Minimum ±10 MHz
IF Bandwidth:	30 MHz
IF Output Level:	+3 dBm ±1 dB

SYSTEM PERFORMANCE

Signal to Noise:	70 dB Minimum
Signal to Hum:	60 dB Minimum
Signal to Discrete Tones:	65 dB Minimum
Differential Gain:	1% Maximum
Differential Phase:	±0.2 degrees Maximum

NOTE 1: One-hop, 525 or 625 line video per CCIR, -40 dBm receiver carrier level; excludes modem.

70 MHz MODEM PERFORMANCE (Back-to-Back with CCIR Emphasis)

Video Performance

Frequency Response	
10 KHz to 4.5 MHz (525 Line)	±0.25 dB
10 KHz to 5.0 MHz (625 Line)	±0.25 dB
Field Tilt:	2% Maximum
Line Tilt:	1% Maximum
Baseband Chroma Delay:	±20 nS Maximum
Baseband Chroma Gain:	±0.5 dB Maximum

Differential Phase:	0.5 degrees Maximum
Differential Gain:	1% Maximum
Signal to Noise Ratio:	70 dB Minimum
Signal to Hum:	60 dB Minimum
Video Input Level:	1V p-p
Video Input Return Loss (Referenced to 75 Ohms):	26 dB Minimum

Audio Performance

Capacity:	Up to four channels may be installed internally
Sub/carrier Frequencies:	Standard CCIR or EIA frequency plan
Audio Frequency Response:	
40 Hz to 12 KHz	±1.0 dB
12 KHz to 15 KHz	-1.5 dB Maximum
Signal to Noise Ratio (@ 75 KHz Peak Deviation):	70 dB Minimum
Distortion:	1% Maximum at 75 KHz peak deviation
Input Level at Peak Deviation:	0 to +9 dBm adjustable
Output Level:	0 to +9 dBm adjustable
Input Impedance:	600 Ohms balanced
Output Impedance:	600 Ohms balanced, standard (less than 30 Ohms optional)

NOTE: All measurements made in accordance with EIA Specifications or CCIR recommendations, unless noted.

PRIMARY POWER

AC Power:	115/230 Vac, 50/60 Hz
DC Power:	20.5 to 29 Vdc or 40 to 56 Vdc

PHYSICAL CHARACTERISTICS

Size (Space/Mounting Requirements)	
Transmitter/Receiver:	Three vertical rack units 5¼ in. (13.33 cm)
Modem, FMT-FMR (Optional):	Space for modem card in transmitter/receiver unit
Weight:	Approximately 20 lbs (9 kg)
RF Connections:	
1.71 to 2.70 GHz	Type "N" female connector
5.925 to 7.125 GHz	Type WR137
7.10 to 8.50 GHz	Type WR112
10.70 to 13.25 GHz	Type WR75
IF/Baseband Connectors:	BNC
Power, Audio and Alarm Connections:	Barrier strip, screw terminals

ENVIRONMENTAL

Operating Temperature Range:	0 to +40°C
Relative Humidity:	0 to 95%, non-condensing
FCC ID Number and Emission Designator:	(See Table 2)

Specifications subject to change without notice.

TABLE 1.

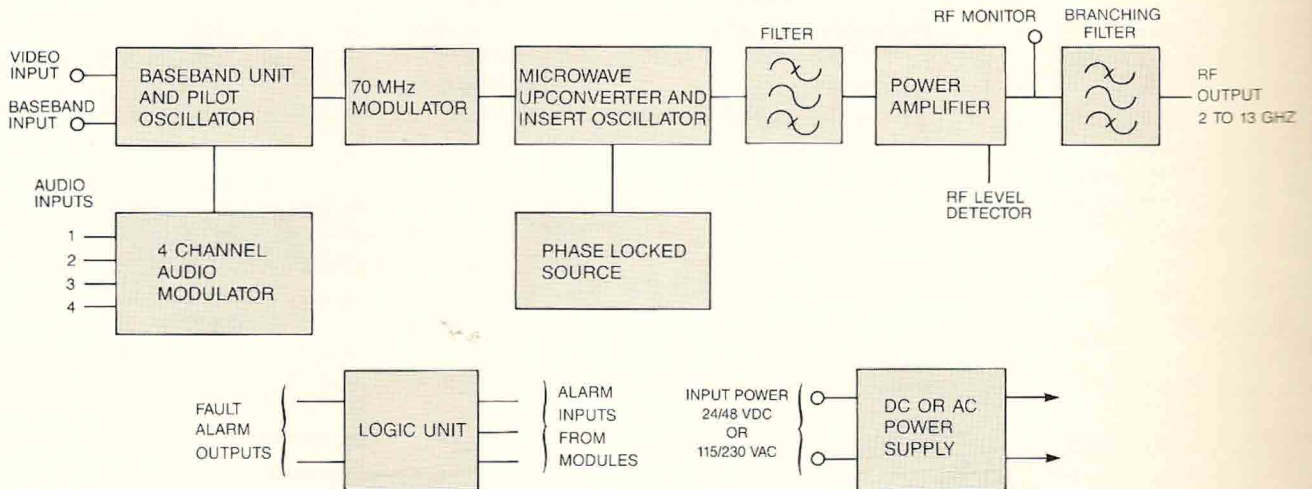
FLH SERIES OPERATING SPECIFICATIONS SUMMARY						
Model	Freq. Range (GHz)	TX Output Power* (dBm)	RX Noise Figure** (dB)	RX Thresh-hold*** (dBm)	System Gain*** (dB)	Signal/Noise*** (dB)
FLH 2	1.7-2.7	+39	2.5	-86	125	75
FLH 6	5.9-7.1	+33	3.5	-85	118	73
FLH 6HP		+37	3.5	-85	122	73
FLH 7	7.1-8.5	+30	3.5	-85	115	70
FLH 7HP		+34	3.5	-85	119	70
FLH 12	10.7-13.2	+30	4.0	-84	114	70
FLH 12HP		+33	4.0	-84	117	70

TABLE 2.

FLH SERIES FCC DATA					
Model	FCC ID Number	Emission Designator	Frequency Tolerance	Power Output	FCC Rules Part No.
FLH 2	FC35DZMRCFLH2	17M0F8W	± 0.005%	12W	(export)
FLH 6	FC35DZMRCFLH6	10M0F8W	± 0.005%	2.5W	21, 74, 94
		20M0F8W	± 0.005%	2.5W	21, 74, 94
		25M0F8W	± 0.005%	2.5W	21, 74, 94
FLH6HP	FC35DZMRCFLH6HP	10M0F8W	± 0.005%	6.0W	21, 74, 94
		20M0F8W	± 0.005%	6.0W	21, 74, 94
		25M0F8W	± 0.005%	6.0W	21, 74, 94
FLH 12	FC35DZMRCFLH12	12M5F8W	± 0.005%	1.5W	78
		25M0F8W	± 0.005%	1.5W	21, 74, 78, 94

NOTE: Model "HP" suffix indicates high power option.
***NOTE:** Minimum power to branching network.
****NOTE:** Does not include branching filter.
*****NOTE:** For one-hop, NTSC video; EIA/CCIR weighting.

FLH TRANSMITTER



FLH RECEIVER

