

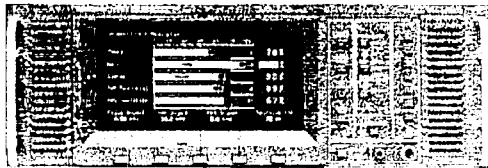
## 1450 Series Demodulators

- Measurement-quality performance resulting in negligible distortion
- Precise Nyquist slope provided by surface acoustic wave filter
- Wide dynamic range with constant bandpass characteristics
- Synchronous detection eliminates quadrature distortion
- Envelope detection for determining differential phase
- Any single VHF or UHF channel operation
- UHF and VHF tunable down converters



## TDC Television Down Converter

- Any single VHF or UHF channel



## 751 BTSC Monitor

- Precision modulation monitor for entire BTSC sound channel
- Simultaneously displays all components necessary to ensure modulation remains within legal limits
- Bars feature peak indicators with timed peak hold and easily set peak limits
- 4.5 MHz demodulator input available

The 751 BTSC aural modulation monitor/decoder provides accurate modulation monitoring and measurement of the BTSC encoded TV sound channel.

## PC 751 Remote Display Software

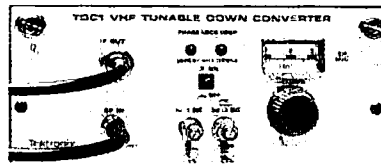
- Remote display of 751 Screens over RS-232 on a PC
- Real-time display of peak modulation and processed audio screens
- Data logging of the held peak data

## 1450-1 ONLY

- Wideband audio output for BTSC multi-channel sound applications
- Wideband audio output compatible with Japanese stereo sound with FAX channel

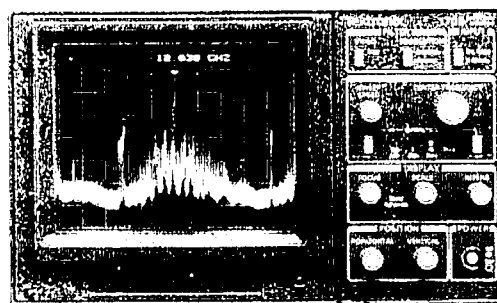
## 1450-3A ONLY

- NICAM intercarrier output compatible with 728D NICAM Decoder input



## TDC1 VHF and TDC2 UHF Tunable Down Converters

- Easy selection of any channel in the VHF (TDC1) or UHF (TDC2) bands



## 1705 Spectrum Monitor

- Designed for satellite news gathering
- Easy, reliable operation
- Cost effective
- On-screen Ku-band or C-band frequency readout
- On-screen setup menu
- L-band and 70 MHz IF inputs
- Selectable 2 dB/div or 10 B/div sensitivity
- Resolution switchable to 10 kHz or 300 kHz
- Span range and video filter selection
- Center frequency control
- Bright clear display
- DC operation available

**TDC1/TDC2**  
**1450-1/1450-2**  
**1450-3A**  
**751/PC751**  
**1705**

## ORDERING INFORMATION

1450-1 Demodulator (System M)	\$14,900
Opt.01 - 37%MHz Vision IF	NC
Opt.02 - 38%MHz Vision IF	NC
Opt.03 - 45.75%MHz Vision IF	NC
1450-2 Demodulator (System B/G)	\$13,145
1450-3A Demodulator (System I)	\$13,145
751 BTSC Aural Modulation Monitor/Decoder	\$12,000
Opt.01 - 4.5 MHz demodulator board	\$2,000
1705 Spectrum Monitor	\$3,850
TDC1 VHF Tunable Down Converters	\$7,660
TDC2 UHF Tunable Down Converters	\$7,660

## 2721/2722 Non-Interfering CATV/Broadband Sweep

- Non-interfering
- Full 5-600 MHz range
- Full Alpha Keyboard for data entry
- LCD Display visible even in bright sunlight
- Lightweight, compact Receiver
- Frequency-agile Telemetry
- 50-waveform NVRAM storage
- RS-232C downloads stored waveforms to Serial Printer or PC

For ordering information, see page 184.

# Television Demodulator System

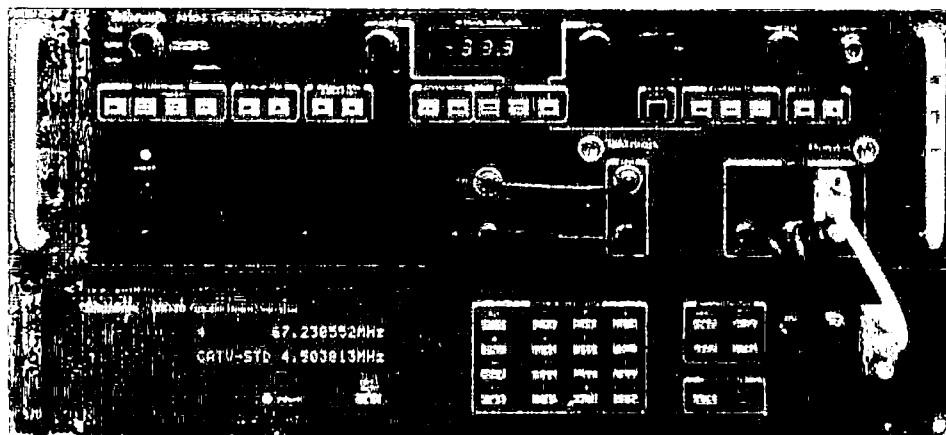
1450  
TDC-10  
TDC

## 1450 Series Demodulator Mainframe TDC-10 Tunable Down Converter TDC Fixed-Channel Down Converter

- Measurement-quality performance that is unmatched in the industry
- Tunable down converter up to 1 GHz or fixed-channel down converters
- Accurate visual and aural carrier frequency counter with the TDC-10 Tunable Down Converter
- GPIB or RS232 control with the TDC-10 Tunable Down Converter
- Low phase noise and composite triple beat distortion on the TDC-10 Tunable Down Converter
- Synchronous detection eliminates quadrature distortion
- Surface acoustic wave filter provides precise Nyquist slope; excellent long and short-term stability
- Constant-bandpass characteristics over wide dynamic range
- Cable TV, VHF and UHF tunable down converter with programmable channel tables
- Any single VHF or UHF channel operation with fixed channel down converters
- Wideband audio output for BTSC multichannel stereo sound applications (System M Only)
- Wideband audio output compatible with Japanese stereo sound with FAX channel (System M Only)
- NICAM compatible (System B/G and System I only)

A Tektronix 1450-1 (System M), 1450-2 (System B/G) or 1450-3A (System I) Demodulator Mainframe combined with a Tektronix Television Down Converter (TDC-10 Tunable or TDC Fixed Channel) provides an accurate link between your transmitter or cable TV RF signals and baseband video measurement equipment. The system also provides accurate demodulation of off-air signals for repeater sites or videotaping. Unique circuitry works to identify and eliminate any possible demodulation distortion. You see a transparent picture of your system's performance.

For demodulating an RF signal at a TV channel frequency, the 1450 Series Demodulator Mainframes must be used with a Tektronix TDC. Two compatible TDCs are available and provide a selection between tunable and fixed-channel performance.



1450-1 Demodulator Mainframe and a TDC-10 Tunable Down Converter.

### TDC-10 Tunable Down Converter

The TDC-10 Tunable Down Converter provides synthesized tunability up to 1 GHz and is compatible with worldwide off-air and cable TV channel formats. Custom channel tables can also be made by the user. The TDC-10 is designed to have low composite triple beat distortion and low phase noise which is very important in today's multichannel cable TV systems. Channel selection on the TDC-10 can be made either from the front panel or under computer control from the RS-232 or GPIB interfaces. Computer controlled channel selection allows completely automated cable TV headend testing when used with a personal computer and a VM 700A Video Measurement Set. Two selectable low noise preamps allow the user the choice of excellent noise performance in low signal level environments or very low intermodulation distortion in higher signal level environments. The TDC-10 also has a built in frequency counter that measures the visual carrier frequency and the aural carrier offset frequency.

### TDC Fixed-Channel Down Converter

The TDC Fixed-Channel Down Converter supports your specified system channel number for single channel installations. Systems with TDC Fixed-Channel Down Converters must be ordered separately from the 1450 mainframe.

Demodulation of the transmitter or cable TV modulator IF signal may be accomplished by using only the mainframe.

### Synchronous and envelope detection

The 1450 Series demodulators allow you to select either synchronous or envelope detection. Each method has advantages, yet both are required for full measurement capability. For instance, synchronous detection is necessary for measurements that can be seriously affected by quadrature distortion.

The 1450 Series demodulators have two synchronous video detectors operating in phase quadrature. One detects the in-phase signal; the other detects the quadrature component of the video signal. (The quadrature component is a measure of change in visual carrier phase.)

However, if incidental phase modulation is present on the picture carrier, the amount of differential phase measured on a synchronously detected signal will be erroneous. Because of this, an envelope detector is necessary to determine the actual differential phase present. The envelope detector has linear transfer characteristics down to 3% carrier, providing optimum depth of modulation indication.

### ICPM (Incidental Carrier Phase Modulation)

This distortion can be easily measured with a Tektronix demodulator using synchronous detection and the quadrature signal output. It cannot be measured with envelope detection, nor can it be measured using a demodulator that is not equipped with two quadrature-phased synchronous detectors and having a quadrature output.

Control of ICPM is critical for BTSC stereo because it causes buzz, degraded separation, and "buzz beat" in the SAP channel.

ICPM can be measured on the VM 700A Video Measurement Set or 1780R Video Measurement Set using their special ICPM measurement functions.

### Quadrature distortion

Quadrature distortion occurs when a single sideband signal is demodulated with an envelope detector.

Quadrature distortion most severely affects the chrominance signal, causing a loss of brightness in highly saturated colors, especially those at high luminance levels. Narrow white picture

# 1450 TDC-10 TDC

elements against the dark backgrounds are reproduced at reduced brightness.

Synchronous detection of the television RF signal eliminates quadrature distortion, allowing the true performance of the transmitter to be determined.

## Tektronix-developed Surface Acoustic Wave filter

The 1450 Series demodulators feature a Surface Acoustic Wave filter (SAW) developed by Tektronix. The SAW filter provides more precise Nyquist slope characteristics without group delay distortion, improves long-term and short-term stability, and lowers maintenance costs when compared to conventional filter network circuitry.

## Constant-bandpass characteristics

The Tektronix 1450 Series demodulators offer constant-bandpass characteristics over the entire dynamic range of input signal level. Amplifiers in the mainframe operate at a constant gain, and pin-diode attenuators are used to adjust the overall gain of the demodulator. This more sophisticated approach to Automatic Gain Control (AGC) is necessary to maintain constant-bandpass characteristics over the entire dynamic range of input power (-69 dBm to -3 dBm). Additional attenuation of 30 dB, available in 10 dB steps, can shift the range for higher input power levels. In addition to AGC, demodulator RF/IF gain control can be set for manual operation.

## Split and intercarrier sound

For making measurements or adjustments on aural transmitters, the 1450 Series demodulators feature both split and intercarrier sound channels. The split carrier channel, which will operate without the presence of the visual carrier, may be used when making measurements on the aural transmitter only. It can also be used for measuring aural performance when the effects of ICPM need to be eliminated.

Four audio outputs give added measurement capability: a 600 ohm output, two low impedance outputs for driving a speaker or headphones, and a calibrated output for making deviation measurements with an ac voltmeter or an oscilloscope.

## Multichannel sound compatible (System M only)

The 1450-1 provides three aural detection modes — Intercarrier, Split and Quasi-Parallel. The split carrier mode will operate with or without the presence of the visual carrier. Quasi-Parallel detection is a modified intercarrier mode that substantially reduces the buzz introduced by the IF signal passing through the Nyquist filter.

The 1450-1 has four audio outputs. The speaker and headphone outputs are 8 ohm impedance outputs and are filtered and deemphasized to provide only the monophonic main channel. A 15.734 kHz notch filter is provided to reduce the BTSC stereo pilot tone to an inaudible level.

The 600 ohm balanced output normally provides a full 150 kHz bandwidth output but can be

# Television Demodulator System



TDC Fixed Channel Down Converter.

restricted to 20 kHz by moving an internal jumper. The fourth output is a 75 ohm unbalanced output with a 150 kHz bandwidth and a calibrated level of 10 mV per kHz deviation of the aural carrier. This output can be used for accurate measurement and monitoring of the aural channel and can be used to drive a professional multichannel sound decoder, modulation monitor or spectrum analyzer.

## NICAM Compatible (1450-3A and 1450-2 Option NI Only)

The 1450-3A and the 1450-2 Option NI provide the NICAM intercarrier output for demodulation and monitoring by a separate NICAM decoder such as the Tektronix 728D.

## CHARACTERISTICS

IF	
Input Impedance ( $Z_{in}$ )	50 ohm (BNC)
Return Loss	$\geq 18$ dB
IF Level Range	20 dBm to -69 dBm (Signal to noise ratio deteriorates below a signal level of -28 dBm)
IF Frequency	
1450-1	Visual is 37MHz, 38.9 MHz, or 45.75 MHz $\pm 127$ kHz (as specified by the mainframe/TDC options) Aural is 4.5 MHz below visual
1450-2	Visual is 38.9 MHz $\pm 127$ kHz Aural is 5.5 MHz below visual
1450-3A	Visual is 38.9 MHz $\pm 127$ kHz Aural is 6.0 MHz below visual

## VIDEO

Video Output	
$Z_o$	75 ohm (2 BNC)
Return Loss	$\geq 34$ dB, Level 1 V p-p sync tip to peak white
DC Level	
Back Porch AGC	Blanking level at 0 V $\pm 50$ mV
Sync Tip AGC	Referenced to blanking level, sync tip is at -286 mV $\pm 5.7$ mV (1450-1), -300 mV $\pm 6$ mV (1450-2, 1450-3)
Line Time Distortion	$\leq 0.5\%$ , wideband IF, synchronous detection 1.0% in all other IF, detection mode combinations

## VIDEO (CONTINUED)

Field Time Distortion	$\leq 0.5\%$
Line Time Nonlinearity	$\leq 1\%$
Differential Gain	
Synchronous	$\leq 1\%$
Envelope	$\leq 4\%$
Differential Phase	$\leq 1^\circ$
Chrominance/Luminance Delay	$\leq \pm 20$ ns
Chrominance/Aural/Visual Carrier Intermod	$\geq 50$ dB down
Aural Signal Rejection	$\geq 46$ dB
Video Signal to Noise Ratio (Weighted)	$\geq 60$ dB (4.5 MHz BW)

## Quadrature Output

$Z_o$	75 ohm (BNC)
Return Loss	$\geq 34$ dB

## Zero Carrier Reference Gate

1450-1	Width is 30 $\mu$ s $\pm 10\%$ . Delay is 20 $\mu$ s $\pm 10\%$ from leading edge of sync Carrier Cutoff is $\geq 50$ dB. Zero Carrier is $\pm 0.5$ IRE. Timing is factory set to line 20 of both fields, internally selectable from line 10 through line 25 of both fields
1450-2, 1450-3A	Width is 30 $\mu$ s $\pm 10\%$ Carrier Cutoff is $\geq 50$ dB. Zero Carrier is $\pm 3.5$ mV. Timing is factory set to line 16/329 of both fields, internally selectable from line 10/323 through line 25/338 of both fields

## EXT Zero Carrier Reference Drive Input

$Z_{in}$	5 k ohm (BNC)
Level Required	$\pm 1$ V

## AUDIO

Frequency Response	
1450-1	Deviation Output and 600 ohm Output $\pm 0.1$ dB (30 Hz to 50 kHz) $\pm 0.5$ dB (30 Hz to 150 kHz). 600 ohm Output can be limited to 20 kHz by jumper. Speaker and headphone Output $\pm 0.4$ dB (30 Hz to 20 kHz, 15.734 kHz notch filter jumper selectable)
1450-2, 1450-3A	All Outputs $\pm 0.4$ dB (30 Hz to 20 kHz)

# Television Demodulator System

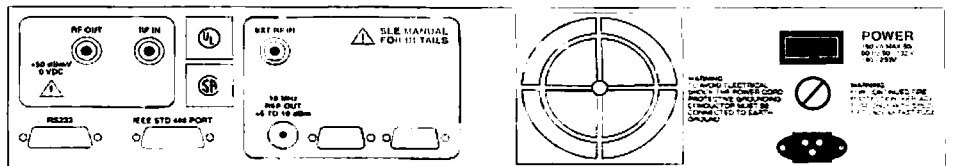
1450  
TDC-10  
TDC

## AUDIO (CONTINUED)

<b>De-emphasis</b>	
1450-1	Follows standard 75 $\mu$ s de-emphasis curve $\pm 0.4$ dB
1450-2, 1450-3A	Both follow standard 50 $\mu$ s de-emphasis curve $\pm 0.5$ dB
<b>Harmonic Distortion</b>	
1450-1	$\leq 0.1\%$ for 30 Hz to 15 kHz inputs measured with 50 kHz band limiting, $\leq 0.5\%$ for 16.5 kHz to 50 kHz inputs measured with 120 kHz band limiting (with 25 kHz deviation)
1450-2, 1450-3A	$\leq 0.2\%$ (30 Hz to 15 kHz, with $\pm 50$ kHz deviation)
<b>Audio Signal to Noise Ratio</b>	
1450-1 wide band mode	$\geq 50$ dB in all detection modes measured at the 75 ohm output, band limited to 130 kHz with modulation of visual carrier $\geq 60$ dB in all detection modes measured at the 75 ohm output, band limited to 50 kHz and no modulation of the visual carrier
1450-1 narrow band mode,	
1450-2, 1450-3A	$\geq 55$ dB
Intercarrier Mode	$\geq 55$ dB
Split Carrier Mode	1450-1, 1450-2 is $\geq 75$ dB 1450-3A is $\geq 70$ dB
External Aural Intercarrier In	$\geq 75$ dB
Aural Only Mode	$\geq 75$ dB
	All at 1 kHz modulation and $\pm 25$ kHz ( $\pm 50$ kHz for 1450-2 and 1450-3A) deviation and modulation of the visual carrier
<b>Deviation Output</b>	
1450-1	10 mV/kHz $\pm 1\%$ (75 ohm BNC)
1450-2, 1450-3A	50 mV/kHz $\pm 1\%$ (600 ohm BNC)
<b>Aural Intercarrier In</b>	
$Z_{in}$	50 ohm (BNC)
Return Loss	$\geq 20$ dB
Level	-30 dBm $\pm 5$ dB
<b>Aural Intercarrier Output</b>	
$Z_o$	50 ohm (BNC)
Return Loss	$\geq 20$ dB
Level Nominal	-6 dBm up to 0 dBm
<b>600 ohm Balanced Line Output</b>	
1450-1 Wideband Mode	50 mV/kHz $\pm 3\%$
Narrowband Mode	10 dBm at $\pm 25$ kHz deviation
1450-2	10 dBm at $\pm 50$ kHz deviation
1450-3A	8 dBm at $\pm 50$ kHz deviation
	Connector XLR
<b>8 ohm Speaker Output</b>	
	Level up to 5 W RMS, front panel adjustable
	Connector Barrier block
<b>Headphone Output</b>	
	Level up to 50 mW into 8 ohm headphone (stereo or mono style)
	Connector phone jack (monaural output only)
<b>Remote Connector</b>	
	Alarm output SPDT relay contact rated at 28 V, 3 A. External synchronous/envelope switch. Ground for envelope detection



1450-1 Television Demodulator rear panel.



TDC-10 Tunable Down Converter rear panel.

## SYSTEM CHARACTERISTICS

System RF Characteristics	TDC-10 Tunable Down Converter	TDC Fixed Channel Down Converter
RF Input Impedance	50 or 75 ohm	50 ohm
Return Loss with 0 dB Attenuation	40 MHz to 550 MHz $\geq 8.5$ dB	$\geq 10$ dB
Return Loss with $\geq 10$ dB Attenuation	$\geq 20$ dB	
Return Loss with $\geq 20$ dB Attenuation		$\geq 30$ dB
Frequency Range	Any System M, B, G, or I channel assignment from 40 MHz to 1076 MHz. Channel assignments can be user programmed.	Any System M, B, G, or I assigned carrier frequency $\pm 20$ kHz
<b>Level Range</b>		
0 dB Mainframe attenuation	-65 to +1 dBm	-69 to -3 dBm
10 dB Mainframe attenuation	-55 to +11 dBm	-59 to +7 dBm
20 dB Mainframe attenuation	-45 to +21 dBm	-49 to +17 dBm
30 dB Mainframe attenuation	-35 to +31 dBm	-39 to +27 dBm
AGC range	61 dB	66 dB
VHF Noise Figure		$\leq 10$ dB
UHF Noise Figure		$\leq 11$ dB
Noise Figure	$\leq 25$ dB 40 MHz to 550 MHz	
Preamp Gain 0 dB	$\leq 26$ dB 550 MHz to 860 MHz	
0 dB RF Attenuation	$\leq 30$ dB 860 MHz to 1075 MHz	
Noise Figure	$\leq 13$ dB 40 MHz to 550 MHz	
Preamp Gain -17 dB	$\leq 14$ dB 550 MHz to 860 MHz	
0 dB RF Attenuation	$\leq 18$ dB 860 MHz to 1075 MHz	
Noise Figure	$\leq 9$ dB 40 MHz to 550 MHz	
Preamp Gain -27 dB	$\leq 10$ dB 550 MHz to 860 MHz	
0 dB RF Attenuation	$\leq 14$ dB 860 MHz to 1075 MHz	
Alternate Channel Cross Modulation	$\geq 60$ dB	$\geq 60$ dB
Composite Triple Beat (CTB) (78 Channels, 6 MHz Spacing, CW Carriers)	Typically $\geq 58$ dB @ Input Level 0 dB Preamp: $< -29$ dBm -17 dB Preamp: $< -46$ dBm -27 dB Preamp: $< -56$ dBm	
Variation in System Frequency Response across the channel	Typically $\pm 0.25$ dB	(VHF) $\leq 0.1$ dB (UHF) $\leq 0.15$ dB
Damage Level at RF Input	+20 dBm continuous AC with 0 dB attenuation	1 watt
Level Readout Accuracy	$\pm 2$ dB Preamp off	$\pm 2$ dB
Level Readout Resolution	$\pm 0.1$ dB	$\pm 0.1$ dB
Frequency Counter Readout Accuracy (Internal Reference)	$\pm 202$ Hz @ 1 GHz $\pm 22$ Hz @ 100 MHz	
Frequency Counter Readout Accuracy (External Reference)	Ext. Ref. Accuracy X (Fin) $\pm 2$ Hz	
Frequency Counter Readout Resolution	1 Hz	
External Reference Input	0 to 10 dBm 1, 2, 5 or 10 MHz 50 $\Omega$	

**1450**  
**TDC-10**  
**TDC**

# Television Demodulator System

**AC POWER**

<b>Line Voltage Ranges</b>	
1450 Series:	100 V ac ±10%, 120 V ac ±10% 220 V ac ±10%, 216 V ac to 250 V ac
TDC-10	90 V ac to 130 V ac, and 180 V ac to 260 V ac

**Power Consumption**

1450 Series	100 W maximum
TDC-10	100 W maximum

**Mains Frequency**

1450 Series	48 Hz to 62 Hz
TDC-10	50/60 Hz

**ENVIRONMENTAL**

<b>Temperature Range</b>	
Operating	0°C to 50°C
<b>Altitude Range</b>	
Operating	Sea level to 4570 m (15,000 ft)

**PHYSICAL CHARACTERISTICS**

	1450 Series		TDC-10	
	mm	in	mm	in
Height	133	5.3	89	3.5
Width	483	19.0	483	19.0
Depth	486	19.1	559	22.0
Weight	kg	lb	kg	lb
Without TDC	16.3	36.0	12.7	28.1
With TDC	18.6	41.0		

**ORDERING INFORMATION**

**SYSTEM M**

**1450-1 Television Demodulator** — For System M. (Order one vision IF option)  
Includes: Pair rackmount slide guide (351-0301-03); N to BNC coaxial adapter (103-0045-00); extender circuit board (670-5034-00); 50 ohm BNC coax cable (012-0751-00); 50 ohm SMA double shield coax cable (012-0752-00); two BNC to square-pin adapter cables (175-2140-00); BNC to Peltola adapter cable (067-0709-00); TORX screwdriver (003-0816-00); male connector (131-1007-00); hood (200-1170-00); two screws (213-0260-00); lowpass filter (015-0352-00). For 1450-1: ICPM graticule (331-0393-12); 0.6 A slowblow fuse (159-0043-00); manual (070-5568-00).

**1450-1 OPTIONS**

- Option 01 — 37 MHz Vision IF
- Option 02 — 38.9 MHz Vision IF
- Option 03 — 45.75 MHz Vision IF
- Option M2 — Remedial Service Support
- Option M8 — Calibration Service
- 1450F20 Field Upgrade Kit For upgrading 1450-1 and 1450 (S/N BO 19999 and below) to provide a wideband audio output suitable for use with BTSC System multichannel sound in North America.

*For demodulation of RF signals, one of the following down converters must be connected to the 1450-1 mainframe.*

**TDC-10 Tunable Down Converter** — No options are available for this product. The TDC-10 is compatible with all 1450 Series products both past and current.

Includes: TDC-10 Interface (015-0649-00); 1450 Remote Cable (174-2885-00); 50 Ohm BNC Cable (012-0751-00); 50 Ohm SMA Cable (012-0752-00); TDC-10 Interface Cable (174-2884-00); Rackmount Guide (351-0636-00); Manual (070-8665-00).

**TDC Fixed Channel Down Converter** — (Stipulate channel number when ordering)

Order one vision IF option and either Option 11 or Option 14.

Includes: Manual (070-2597-01)

**TDC OPTIONS**

- Option 01 — 37 MHz Vision IF
- Option 02 — 38.9 MHz Vision IF
- Option 03 — 45.75 MHz Vision IF
- Option 11 Countries: **System M** — Antigua, Barbados, Bermuda, Brazil, Canada, Chile, Columbia, Costa Rica, Cuba, Curacao, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Johnston Islands, Korea, Mexico, Micronesia, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Samoa, St. Kitts, Surinam, Taiwan, Trinidad/Tobago, Uruguay, U.S.A., Venezuela, Virgin Islands.
- Option 14 Countries: **System M** — Japan and Okinawa.

**SYSTEM B/G**

**1450-2 Television Demodulator** — For System B/G, Visual IF 38.9 MHz and CCIR General One Half Group Delay (+90 ns / -170 ns Group Delay).

Includes: Pair rackmount slide guide (351-0301-03); N to BNC coaxial adapter (103-0045-00); extender circuit board (670-5034-00); 50 ohm BNC coax cable (012-0751-00); 50 Q SMA double shield coax cable (012-0752-00); two BNC to square-pin adapter cables (175-2140-00); BNC to Peltola adapter cable (067-0709-00); TORX screw-driver (003-0816-00); male connector (131-1007-00); hood (200-1170-00); two screws (213-0260-00); lowpass filter (015-0352-00); ICPM graticule (331-0393-15); 1.25 A slowblow fuse (159-0041-00); manual (070-2998-00).

**1450-2 OPTION**

- Option NI — NICAM Capability
- For demodulation of RF signals, one of the following down converters must be connected to the 1450-2 main frame.*
- TDC-10 Tunable Down Converter** — No options are available for this product. The TDC-10 is compatible with all 1450 Series products both past and current products.
- Includes: TDC-10 Interface (015-0649-00); 1450 Remote Cable (174-2885-00); 50 Ohm BNC Cable (012-0751-00); 50 Ohm SMA Cable (012-0752-00); TDC-10 Interface Cable (174-2884-00); Rackmount Guide (351-0636-00); Manual (070-8665-00).
- TDC Fixed Channel Down Converter** — (Stipulate channel number when ordering.)
- Includes: Manual (070-3525-00)

**SYSTEM B/G (CONTINUED)**

**TDC OPTION**

**Option 12** — System B/G/I Countries (Must be ordered for use in 1450-2)  
Algeria, Austria, Bahrain, Bangladesh, Belgium<sup>1</sup>, Brunei, Cyprus, Denmark, East Germany, Egypt, Equatorial Guinea, Ethiopia, Finland, Ghana, Gibraltar, Greece, Hong Kong, Iceland, India, Indonesia, Iran, Iraq, Israel, Ireland (UHF)<sup>1</sup>, Italy (UHF), Jordan, Kenya, Kuwait, Lebanon, Liberia, Libya, Malta, Mauritius, Netherlands, Nigeria, Norway, Oman, Pakistan, Portugal, Qatar, Rhodesia, Saudi Arabia<sup>2</sup>, Sierra Leone, Singapore, South Africa (UHF)<sup>1</sup>, Spain, Sudan, Sweden, Switzerland, Syria, Tanzania, Thailand<sup>2</sup>, Tunisia, Turkey, Uganda, United Arab Emirates, United Kingdom (UHF)<sup>1</sup>, West Germany, Yemen Arab Republic, Republic of Yemen, Yugoslavia, Zambia.

**SYSTEM I**

**1450-3A Television Demodulator** — For system I, 38.9 MHz Visual IF.  
Includes: Pair rackmount slide guide (351-0301-03); N to BNC coaxial adapter (103-0045-00); extender circuit board (670-5034-00); 50 Q BNC coax cable (012-0751-00); 50 Q SMA double shield coax cable (012-0752-00); two BNC to square-pin adapter cables (175-2140-00); BNC to Peltola adapter cable (067-0709-00); TORX screw-driver (003-0816-00); male connector (131-1007-00); hood (200-1170-00); two screws (213-0260-00); lowpass filter (015-0352-00); ICPM graticule (331-0393-15); 1.25 A slowblow fuse (159-0041-00); manual (070-3660-01).

*For demodulation of RF signals, one of the following down converters must be connected to the 1450-3A mainframe.*

**TDC-10 Tunable Down Converter** — No options are available for this product. The TDC-10 is compatible with all 1450 Series products both past and current products.

Includes: TDC-10 Interface (015-0649-00); 1450 Remote Cable (174-2885-00); 50 Ohm BNC Cable (012-0751-00); 50 Ohm SMA Cable (012-0752-00); TDC-10 Interface Cable (174-2884-00); Rackmount Guide (351-0636-00); Manual (070-8665-00).

**TDC Fixed Channel Down Converter** — (Stipulate channel number when ordering.)

Includes: Manual (070-3525-00)

**TDC OPTION**

**Option 12** — System B/G/I Countries (Must be ordered for use in 1450-3A)  
Algeria, Austria, Bahrain, Bangladesh, Belgium<sup>1</sup>, Brunei, Cyprus, Denmark, East Germany, Egypt, Equatorial Guinea, Ethiopia, Finland, Ghana, Gibraltar, Greece, Hong Kong, Iceland, India, Indonesia, Iran, Iraq, Israel, Ireland (UHF)<sup>1</sup>, Italy (UHF), Jordan, Kenya, Kuwait, Lebanon, Liberia, Libya, Malta, Mauritius, Netherlands, Nigeria, Norway, Oman, Pakistan, Portugal, Qatar, Rhodesia, Saudi Arabia<sup>2</sup>, Sierra Leone, Singapore, South Africa (UHF)<sup>1</sup>, Spain, Sudan, Sweden, Switzerland, Syria, Tanzania, Thailand<sup>2</sup>, Tunisia, Turkey, Uganda, United Arab Emirates, United Kingdom (UHF)<sup>1</sup>, West Germany, Yemen Arab Republic, Republic of Yemen, Yugoslavia, Zambia.

<sup>1</sup> System I. <sup>2</sup> System B only.