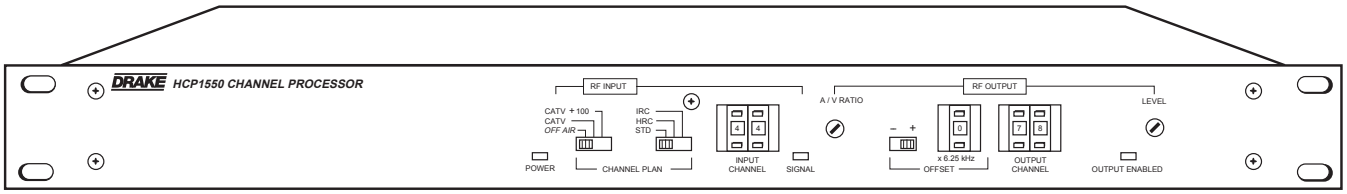
HCP1550 Heterodyne Channel Processor



DESCRIPTION

The R. L. Drake HCP1550 is a high quality, frequency agile channel processor capable of converting any VHF, UHF, or CATV input signal to any standard output channel between 54 and 550 MHz. Input and output frequency, including output frequency offset are easily set with front panel pushwheel switches. A/V ratio and output level controls are also provided along with IF loop-thru connections to offer exceptional flexibility.

The synthesized input tuning permits reception of Off-Air TV channels 2 through 69, standard CATV channels 2 through 125, and IRC, HRC channels 1 through 125. A front panel signal indicator lights for input signal strengths greater than a threshold value. The synthesized RF output can be set for any CATV channel 2 through 78 and 95 through 99. The output frequency offset can be set for none or in increments of 6.25 kHz plus or minus up to 56.25 kHz maximum offset.

Knowledge of the input signal frequency and the desired output frequency is important prior to setting any offset. RF output level is front panel adjustable to +60 dBmV maximum.

IF loop-thru capability in the HCP1550 supplies a padded IF output prior to channel conversion. This feature provides the capability to replace the standard internally generated IF output with an alternate source of composite IF, or allows the insertion of IF scrambling equipment.

Coaxial connectors are provided for the RF Input, the IF Loop-out and Loop-in, and the RF Output. All of the mentioned features, combined with a carefully designed low intermodulation output stage, provide reliable operation in a densely crowded SMATV or cable environment.

SPECIFICATIONS

INPUT SECTION

Frequency Range:	54 to 806 MHz: Off-Air TV channels 2 to 69; Standard CATV channels 2 to 125; IRC and HRC channels 1 to 125.
Input Impedance:	75 Ohms.
RF Input Level:	-10 dBmV to + 35 dBmV.
Adjacent Channel Rejection:	Greater than 60 dB.
Noise Figure:	VHF, 8 dB. UHF, 10 dB.
Tuner Image Rejection:	VHF, 65 dB. UHF, 50 dB.

COMPOSITE IF LOOP

Output Level (V carrier):	+28 dBmV ±2 dB.
Spurious Outputs:	-60 dBc minimum.
Input Level (V carrier):	+28 dBmV nominal, +30 dBmV maximum.
IF Input/Output Impedance:	75 Ohms, greater than 15 dB return loss.
Isolation:	Greater than 60 dB.

OUTPUT SECTION

Frequency Range:	82 channels, 54 to 550 MHz; Channels 2 to 78 and 95 o 99.
Output Level:	+60 dBmV (typically adjustable from +50 to +60 dBmV).
Video Frequency Response:	20 Hz to 4.2 MHz, ±3 dB.
L-C Delay:	±50 nSec.
Frequency Stability:	±5 PPM of frequency difference between input and output signals.
FCC Offset:	Selectable - None or increments of 6.25 kHz plus or minus up to 56.25 kHz maximum offset.
A/V Ratio Adjustment:	Typically 0 to -10 dB relative to input A/V ratio.
Spurious Outputs:	-58 dBc minimum, -60 dBc typical (measured at an input level of between 0 to +20 dBmV).
Broadband Noise:	-75 dBc typical, (4 MHz noise bandwidth @ ±12 MHz).

GENERAL

AC Power Input:	115 VAC (±10%), 60 Hz, 30 Watts.
Operating Temperature:	0^0 C to + 50^0 C, ambient.
Dimensions:	19" W x 1.75" H x 8.75" D.
Weight:	7.0 lbs.

Front Panel Controls and Indicators

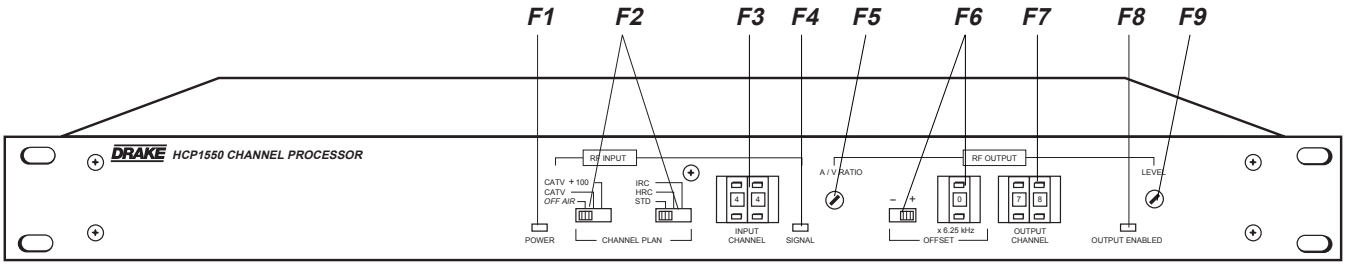
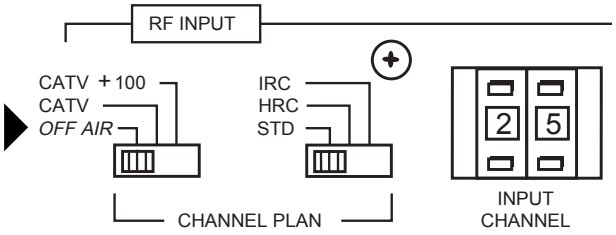


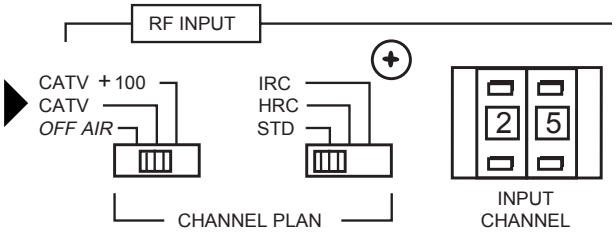
Figure 1

F1 – POWER Indicator
Lights when the unit is connected to a source of AC power.

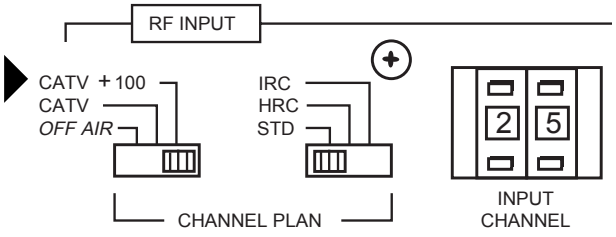
F2 – CHANNEL PLAN Switches
Sets the type of channel, Off-Air or various CATV channel plans.
- Setting the left-hand switch for “OFF AIR” electrically locks out the right-hand switch.
OFF-AIR CHANNEL 25:



- Setting the left-hand switch for “CATV” ("CATV + 100") also requires setting the right-hand switch for “IRC”, “HRC”, or “STD” (standard) as desired for the given input signal operating channel.
STANDARD CATV CHANNEL 25:



- Setting the left-hand switch for “CATV +100” sets a leading ”1” to the INPUT CHANNEL thumbwheel switch for CATV channels from 100 through 125.
STANDARD CATV CHANNEL 125:



F3 – INPUT CHANNEL Number Switch
Sets the input channel number for Off-Air TV channels 02 through 69, for standard CATV channels 02 through 125, or IRC,HRC* channels 01 through 125. See also Item F2 which sets the type of channel (Off-Air or various types of CATV channel plans) and sets the leading “1” for CATV channels 100 through 125.
*HRC - Harmonically Related Carrier.
*IRC - Incrementally Related Carrier.

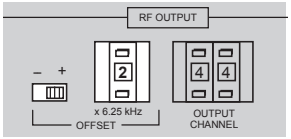
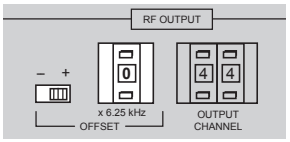
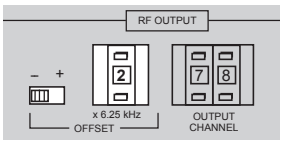
F4 – SIGNAL Indicator
Lights to indicate that an input signal is being received as set by the input channel switches and is of a signal strength greater than approximately –10 dBmV. Note that if this indicator is off (no received signal), the RF output is switched off. See also Item F8.

F5 – A/V RATIO Control
This screwdriver adjustment varies the level of the output aural carrier over a range from 0 to –10 dB relative to the input A/V ratio. The aural carrier should be adjusted to approximately 15 dB below the visual carrier (normal operation). Clockwise rotation increases the output aural carrier level and thus decreases the output A/V ratio.

F6 – OFFSET Switches
The OUTPUT CHANNEL switches set the output frequency for a visual carrier frequency of 'xx.25' or 'xxx.25' MHz only. The exact output signal frequency, however, is relative to the input signal frequency and any additional offset (plus or minus) set by the OFFSET switches. For example, an input signal of 229.2625 MHz (+12.5 kHz offset) and an OFFSET switch setting of '0' would result in an output frequency of 'xx.2625' or 'xxx.2625 MHz.

In a similar fashion, output OFFSET switch settings plus or minus in various 6.25 kHz increments will modify the exact output frequency accordingly. Multiply the thumbwheel switch number times 6.25 kHz to determine the offset. For example, a setting of '"2" sets a 2 x 6.25 kHz = 12.5 kHz offset. Remember to also set the direction of any offset plus or minus as required. Certain CATV channels require aviation or navigation offsets.

Several examples follow:

Input Channel	Output Channel	Offset Switch Settings
Off Air channel 25 (537.25 MHz)	Standard CATV channel 44 (343.2625 MHz, includes +12.5 kHz aviation offset).	**+2** x 6.25 kHz = +12.5 kHz (Output frequency = 343.2625 MHz) 
Standard CATV channel 25 (229.2625 MHz, includes +12.5 kHz aviation offset).	Standard CATV channel 44 (343.2625 MHz, includes +12.5 kHz aviation offset).	**0** x 6.25 kHz = 0 kHz (Output frequency = 343.2625 MHz) 
Standard CATV channel 25 (229.2625 MHz, includes +12.5 kHz aviation offset).	Standard CATV channel 78 (547.25 MHz, no offset required).	**-2** x 6.25 kHz = -12.5 kHz (Output frequency = 547.25 MHz) 

F7 – OUTPUT CHANNEL Number Switch
Sets the output channel number for standard CATV channels 02 through 78 and 95 through 99. Note that these switches set the output frequency for a visual carrier frequency of 'xx.25' or 'xxx.25' MHz only. Any required offset must be set by the 'OFFSET' switches with knowledge of the input signal frequency and required output frequency. See Table 2 in the 'Installation' section of this manual for a list of output channels and any required aviation offsets.

F8 – OUTPUT ENABLED Indicator
Lights to indicate that a valid channel is selected and an input signal is being received. The RF output is switched off for any invalid output channel settings, no received input signal as set by the input channel switches ('SIGNAL' indicator is off), or other conditions that would cause the unit to operate on an invalid frequency. See also Item F4.

F9 – RF OUTPUT LEVEL Control
This screwdriver adjustment varies the RF OUTPUT level. Clockwise rotation increases the level.

Rear Panel Connections

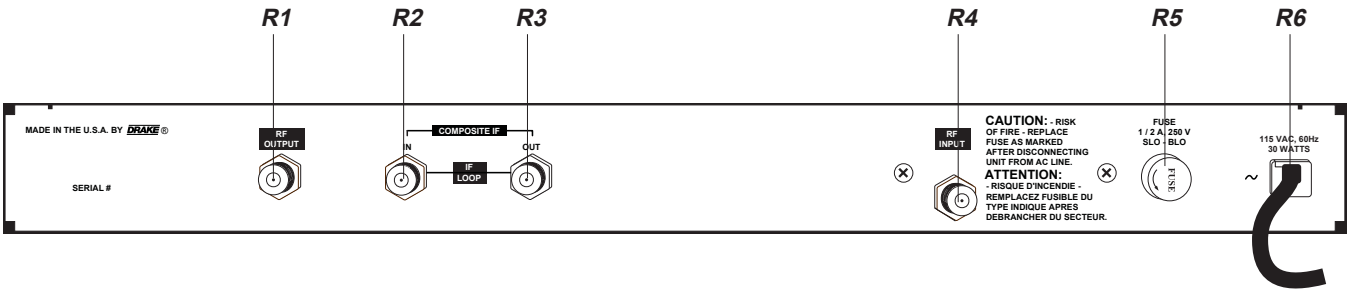


Figure 2

R1 – RF OUTPUT Connector
This is the converted channel output.

R2 – COMPOSITE IF IN Connector
This is the composite IF input to the output channel circuits. The composite IF has both the aural and visual IF combined. This connection is normally cabled directly to the "COMPOSITE IF OUT" connector (see Item R3). This external IF loop allows the use of accessories such as scramblers or alternate video sources. Note that accessory equipment must also have the visual carrier at 45.75 MHz and the aural carrier at 41.25 MHz. Both input carriers must be at their nominally specified levels.

R3 – COMPOSITE IF OUT Connector
This is the composite IF output from the IF circuits. The composite IF provides a vestigial sideband filtered visual carrier at 45.75 MHz (plus or minus any input signal offset) combined with a level controlled aural carrier at 41.25 MHz (plus or minus any input signal offset). This connection is normally cabled directly to the "COMPOSITE IF IN" connector (see Item R2).

R4 – RF INPUT Connector
This is the input to the channel processor circuits for all signals with video carrier frequencies in the range of 54 through 806 MHz.

R5 – FUSE Holder
Always replace this fuse with one of the same type and rating:
1/2 Amp, 250 V, SLO-BLO, 5 x 20 mm type.

R6 – LINE CORD
This is a three-wire power cable. When the cable is connected to a properly wired AC power line outlet, this cable grounds the instrument cabinet. Connect to a nominal 115 VAC ±10%, 60 Hz source. Do not defeat the safety purpose of the attached line cord plug.