VIDEOCIPHER II

SUPER 2400R

INSTALLATION AND OPERATION

GENERAL INSTRUMENT

NOTE: It is important that you fill out and return the Warranty Card to General Instrument. This will validate your warranty and simplify the processing of any necessary warranty repairs.

VideoCipher® Authorization Number

Please write your 2400R Authorization Number below. You will need it to receive authorization for viewing VideoCipher II channels. Your Authorization Number can be read on your TV using the VideoCipher on-screen display feature of the 2400R. (See page 16.)

VideoCipher®
Authorization Number _____

Please write your 2400R's serial number (found on the bottom of the unit) in the space below. You will need it if you call General Instrument for service.

_____

Programming Copyright Notice

Satellite signals originate from a variety of sources and program suppliers. Some of these signals may be proprietary and intended for reception only by approved subscribers or subscription services. General Instrument assumes no responsibility for the use of home TVRO systems by the purchaser of this descrambler. However, the Federal Communications Commission has suggested that all TVRO manufacturers communicate to their customers the following policy statement:

> "Use of this device may violate Section 650 of the Communications Act of 1934, as amended, through the unauthorized interception and divulgence of radio communications; or, the use of radio communications for one's benefit where there is no entitlement to its receipt."

Programming restrictions also apply to the use of video cassette recorders (VCRs). Compatibility between your VCR and this descrambler does not imply consent or approval by General Instrument where restrictions may apply.

Resale of video signals received from broadcast satellites is explicitly regulated. Home receiver systems are generally not intended for such applications. In any use or application involving resale or distribution, the user should verify compliance with current laws, regulations, and approved procedures for use. Where required, local and federal licensing or franchise authorization is the sole responsibility of the user.

Export of this device requires a valid export license issued by the U.S. Department of State, Office of Munitions Control.

OPERATION PRECAUTIONS

WARNING:
To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture. Do not open the cabinet. Refer servicing to qualified personnel only.

CAUTION:
To prevent electric shock, do not use this (polarized) plug with an extension cord receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

ATTENTION:
Pour prévenir les chocs électriques ne pas utiliser cette fiche polarisée avec un prolongateur, une prise de courant ou une autre sortie de courant, sauf si les lames peuvent être insérées à fond sans en laisser aucune partie à découvert.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Important Safeguards

1. **Read Instructions** – All safety and operating instructions should be read before the unit is operated.
2. **Retain Instructions** – The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** – All warnings on the equipment and in the operating instructions should be adhered to.
4. **Follow Instructions** – All operating and use instructions should be followed.
5. **Cleaning** – Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning the unit.
6. **Ventilation** – Slots and openings in the cabinet are provided for ventilation and to protect it from overheating, and these openings must not be blocked or covered. This equipment should never be placed near a heat radiator or in a built-in installation such as a rack unless proper ventilation is provided.
7. **Power Sources** – This equipment should be operated only from the type of power source indicated on the marking label.
8. **Grounding** – This product is equipped with a polarized alternating-current line plug. This plug will fit into the power outlet only one way. This is a safety feature. If the plug should fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
9. **Power Cord Protection** – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles and the point where they exit from the equipment.
10. **Overloading** – Do not overload power outlets and extension cords as this can result in a risk of fire or electrical shock.
11. **Damage Requiring Service** – Unplug this equipment from the power source and refer servicing to qualified service personnel under the following conditions:
    a. When the power supply cord or plug is damaged.
    b. If liquid has been spilled or objects have fallen into the unit.
    c. If the equipment has been exposed to rain or water.
    d. If the equipment has been dropped or otherwise damaged.
    e. When the equipment exhibits a distinct change in performance— this indicates a need for service.
12. **Water and Moisture** – Do not use this product in or near water. This includes bathing, washing, doing laundry, swimming, etc.
13. **Accessories** – Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the appliance. Any mounting of the appliance should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
14. **Object and Liquid Entry** – Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
15. **Servicing** – Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
16. **Replacement Parts** – When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.
17. **Safety Check –** Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

18. **Power Lines** – The satellite antenna system should not be located near overhead power lines or other electrical light or power circuits, or where it can fall into power lines or circuits. When installing a satellite antenna system, avoid touching power lines or circuits since contact with them might be fatal.

19. **Attachments** – Do not use attachments not recommended by the product manufacturer as they may cause hazards.

20. **Outdoor Antenna Grounding** Be sure the satellite antenna is grounded to provide some protection against voltage surges and built-up static charges.

    Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to:

    1. Proper grounding of the mast and supporting structure.
    2. Grounding of the lead-in wire to the antenna discharge unit.
    3. Size of grounding conductors.
    4. Location of antenna discharge unit.
    5. Connection to grounding electrodes.
    6. Requirements for the grounding electrode.

An example of antenna grounding as per National Electrical Code as contained in Article 810, "Radio and Television Equipment" is illustrated below. Check your local building and electrical codes for other restrictions on antenna grounding.

1. Use No. 10 AWG (5.3mm^2) copper, No. 8 AWG (8.4mm^2) aluminum, No.17 AWG (1.0mm^2) copper-clad steel or bronze wire, or larger, as ground wire.
2. Secure antenna lead-in wire and ground wires to house with stand-off insulators spaced 4 ft. (1.22mm) to 6 ft. (1.83mm) apart.
3. Mount antenna discharge unit as close as possible to where the lead-in enters the house.
4. Use jumper wire not smaller than No. 6 AWG (13.3mm^2) copper, or the equivalent, when a separate antenna grounding electrode is used. Sec. NEC Section 810-21(1).

21. **Outdoor Cable Protection** – All outdoor connections should be protected from moisture. All "N""and "F""connectors on your BDC or LNB should be treated with coax seal upon installation, even if the connection is installed under a weatherproof cover. Internal heating can draw moisture or condensation into the covering of the unit and affect its operation. We do not recommend the use of silicon seal, since it has a tendency to form air pockets.

22. **Lightning** – For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.

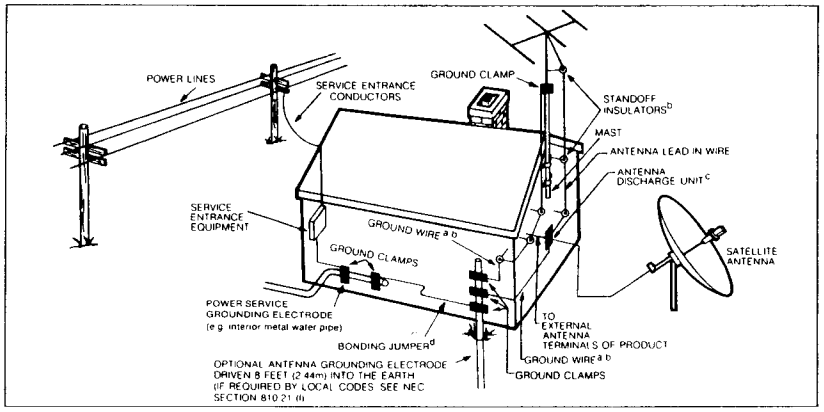


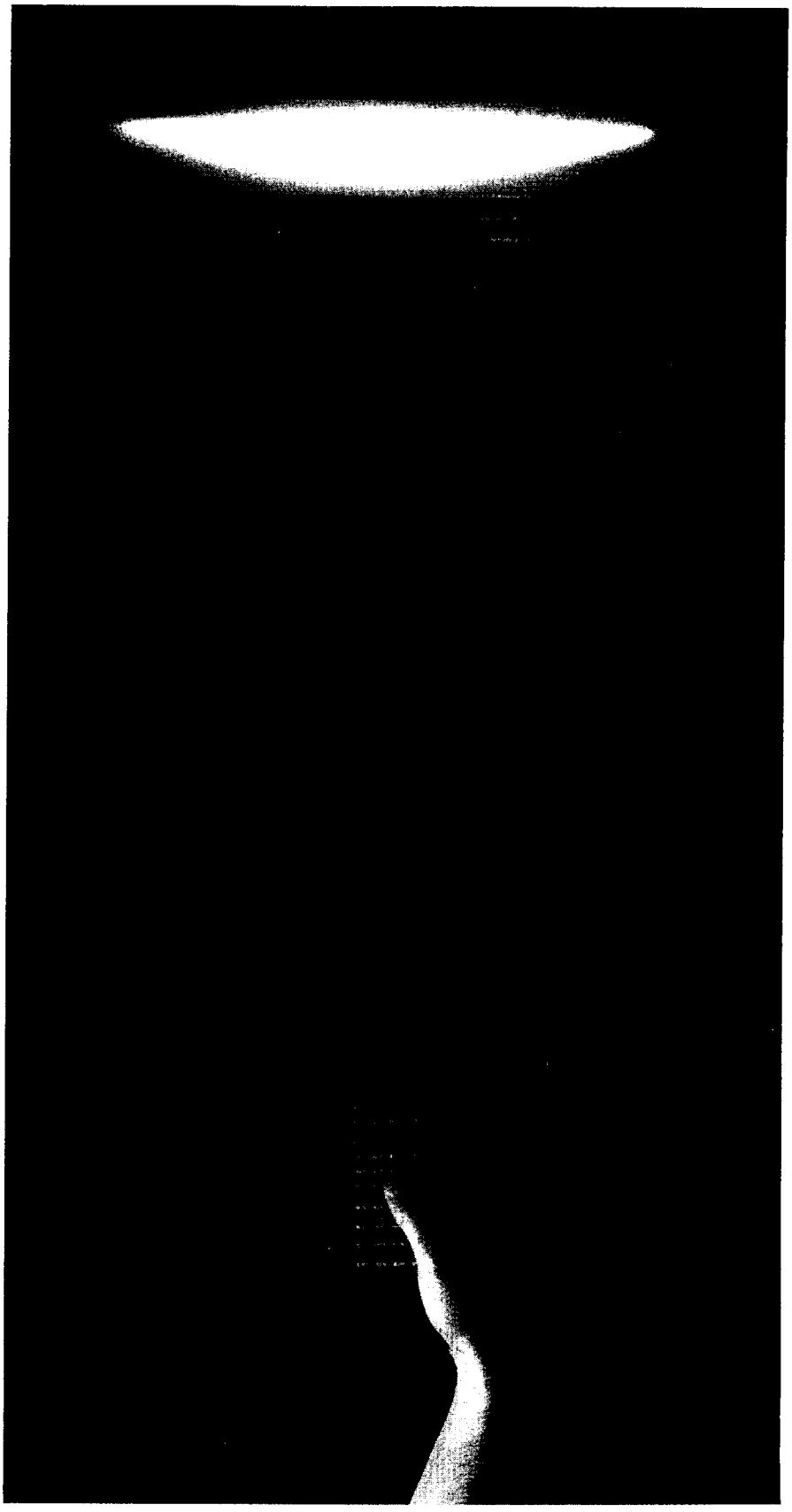
Table of Contents

A New Era in Home Entertainment

Congratulations! You're about to experience a whole new world of home entertainment. With your TVRO (TV Receive Only) satellite system, you can have access to over a hundred channels . . . 24 hours a day.

Thank you for selecting our VideoCipher® II 2400R satellite receiver. General Instrument designed it to give you the ultimate in convenience and quality for satellite TV viewing.

If this is your first experience with a TVRO system, you'll find that you can now watch an incredible variety of broadcast programs. If you are an old hand at satellite watching, you'll find that your new 2400R will provide you with the features that you've been looking for.



Using This Manual

This Manual contains the detailed instructions for installing and using your new 2400R. Use the Manual when you install the system, and use it as a reference later on, when you are modifying your program entries or trying out new features.

In this manual you will find a ***Pre-Installation Checklist,*** which will help you or your installer prepare your satellite system for the 2400R (see page 31). Please complete it before you install the receiver. We've also enclosed a brief ***User's Guide,*** which we hope you'll place near your receiver. It contains all of the directions you'll need for daily use.

2400R FEATURES

Your 2400R offers a collection of features that provide both convenience and high quality channel reception.
Some VideoCipher features described in this manual may not be offered by all programmers on all channels.

Integrated System

The 2400R combines the receiver, descrambler and positioner circuitry in a single system.

Remote Control Access

Program viewing can be controlled through the Remote Control, including satellite selection, channel tuning and VideoCipher II features. A new direct access feature allows you to go directly to the satellite desired merely by pressing a few keys.

AnyWhere™ Remote Compatible

With the optional AnyWhere UHF Remote Control, you can connect a second television set to your 2400R and control it from anywhere in the house up to 200 feet away.

Digital Stereo Sound

The 2400R provides two digital audio channels for VideoCipher II programs when connected to your home stereo system or TV with left and right audio inputs.

Channel and Program Lockout

Your 2400R provides you with two methods for restricting program viewing. You can lock out selected channels completely, or you can set program rating ceilings for VideoCipher II channels.

C and Ku-Band Ready

The 2400R can tune both C-band and the growing number of Ku-band programs. The receiver can select up to 24 C-band and 8 Ku-band satellites.

Record While Watching

The 2400R maybe connected to your VCR. You can tape a satellite program while watching local VHF or cable TV. Your options depend on how you wire the system.

Your Satellite Entertainment System

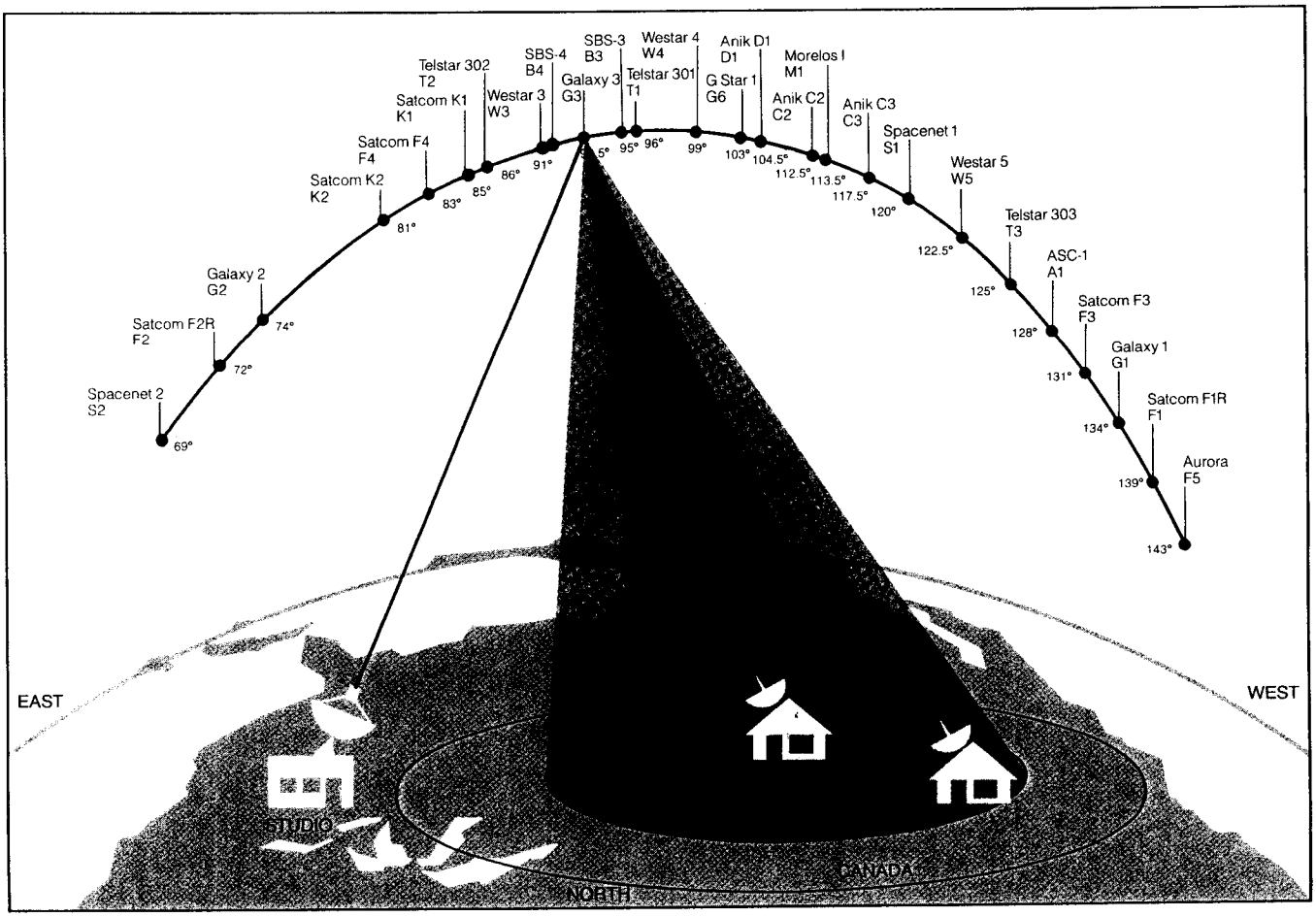
The TVRO World

A satellite TV signal originates in a TV studio. The signal is sent to a transmitter (called an uplink), which beams it to a satellite orbiting 22,000 miles above the earth. The satellite receives the signal, amplifies it, and transmits it back to earth.

Communications satellites are "parked" in an orbital arc called the Clarke Belt that circles the globe at the Equator. Because of their orbital height, speed and position, the satellites in the Clarke Belt appear to be fixed in space. Since the satellites stay in the same location relative to the earth, you can locate them and store their positions in your 2400R's memory.

Most US broadcast satellites are in orbit over the equator and aim their signals at the Midwestern United States. The signal sent from the satellite to earth is like a flashlight beam. It is most concentrated at the center and is less concentrated as you move outward in the ***footprint*** of the satellite signal. That's why you may need a larger dish in Florida to get the same picture quality as a smaller dish in Nebraska.

Satellite Footprint and Orbital Positions



Your Home TVRO System

A typical TVRO system using the 2400R will consist of the following components:

Dish Antenna

Your *dish antenna* collects and concentrates the signal from the satellite into a single focal point.

Actuator Arm

An *actuator arm* retracts and extends to move the dish along the orbital arc. The Actuator can be powered by the optional 2000PS Antenna Positioner Power Supply.

LNB

By the time the TV signal travels 22,000 miles from the satellite to your dish antenna, it is very weak. The *LNB* (Low Noise Block Downconverter) amplifies the signal over 100,000 times so that it can be used by your 2400R receiver. Your 2400R will *not* function with an *LNA* (Low Noise Amplifier) or *LNC* (LNA with 70 MHz downconverter) alone, but may be installed using an LNA connected to a *block downconverter (BDC).*

Feedhorn and Polarizer

The *feedhorn (feed)* is mounted above the center of the dish at the focal point. It contains the *polarizer,* which selects the polarity of the signal that will be sent to the LNB. You may use single or dual polarization feeds, depending on the number of receivers that you install. *Single Feeds* will accept the horizontal or vertical signals from the polarizer, depending on which channel you want to watch. *Dual Feeds* accept both horizontal and vertical signals at the same time. They are used in multiple receiver systems.

Receiver

Your *2400R Receiver* processes the signal from the LNB and allows you to tune the channel that you want to watch. The receiver can store the location and tuning information for up to 32 satellites along with specific entries for your favorite channels.

Antenna Positioner Power Supply

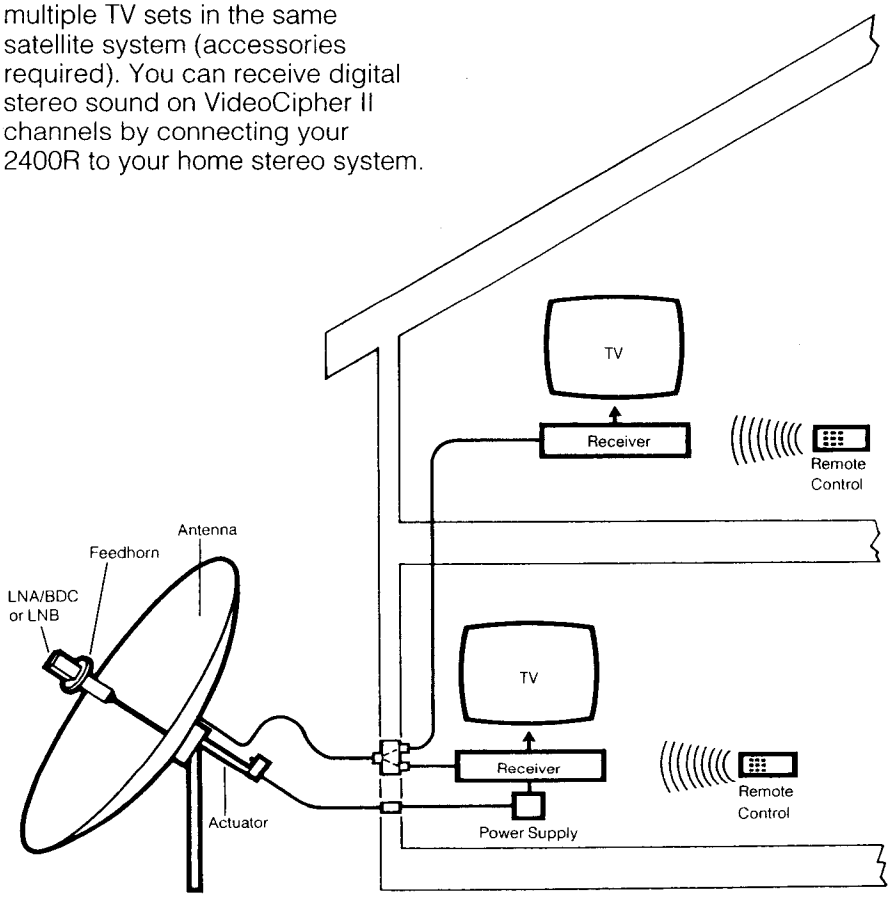
When you install your 2400R with the optional *2000PS Antenna Positioner Power Supply,* your system will be able to automatically aim the dish towards any of your pre-programmed satellites.

TV Set

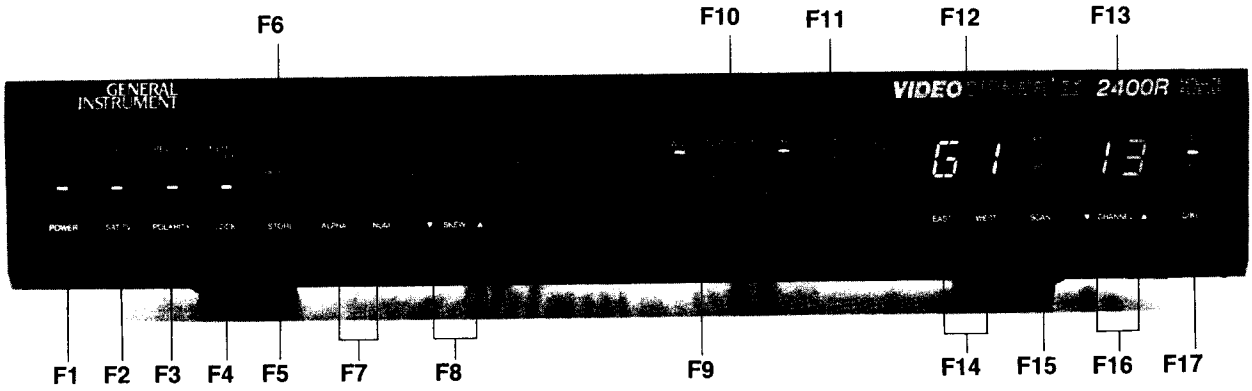
The final destination of the satellite signal is your *TV,* which can be a monitor or standard TV set. You can have multiple receivers and multiple TV sets in the same satellite system (accessories required). You can receive digital stereo sound on VideoCipher II channels by connecting your 2400R to your home stereo system.

Remote Control Unit

The *2400R Remote Control Unit* allows you to select channels and control the functions you'll need for daily viewing and operation.



Your 2400R System



FRONT PANEL KEYS AND INDICATORS

The front panel of your 2400R contains the indicators (or LEDs) and control keys that will help you to tune and adjust your reception.

NOTE: All 2400R keys are for tuning satellite channels only. They have no effect on VHF, UHF or Cable programming.

Some of the 2400R front panels keys can also be found on the Remote Control.

F = Front Panel

R = Remote Control

F1 or R1 POWER

This key turns on the main power to the 2400R. When power is ON, several LEDs on the receiver will light.

When the power is OFF (with the receiver plugged in), only the [STDBY] LED will be ON.

F2 or R2 SAT/TV

Use this key to switch the receiver's output to your TV between your VHF/ Cable TV input and your satellite system.

When your 2400R is in the satellite mode, the [SAT] LED will light.

F3 POLARITY

Use this key to store the proper polarity (Normal or Reverse) for each satellite. The [REVERSE] LED indicates that you have selected the REVERSE format.

F4 LOCK

This key selects the MEMORY LOCK ON or OFF mode of the 2400R.

[LOCK] ON (MEMORY LOCK LED lit) is used for normal daily use. [LOCK] OFF mode is used for entering satellites in the memory.

F5 STORE

Use this key to store satellite location and tuning information in the 2400R's memory.

F6 REMOTE CONTROL TARGET

This is the target point for the infrared Remote Control signal. The LED below the target will blink when it is receiving a signal from the Remote Control.

F7 ALPHA/NUM

Use these keys to name the satellites that you store in the 2400R memory. You can choose any letter A-Z (except L) and any number from 1-9.

These keys, along with the [STORE] key, are also used for MASTER RESET.

F8 SKEW ▲▼

Use these keys to adjust the angle of your system's polarizer for each satellite. This improves picture quality.

F9 AUDIO MODE

The [WIDE] LED indicates that a wide bandwidth has been selected. If the LED is off, a narrow bandwidth is selected.

The LEDs will also indicate if you are tuning 6.2 or 6.8 MHz subcarriers.

F10 SIGNAL STRENGTH

These LEDs indicate the relative strength of the satellite signal.

F11 AFC

This LED indicates if the AFC is ON. The 2400R will automatically track and adjust the video frequency for the channel if AFC is on.

F12 SATELLITE DISPLAY

This 2-digit indicator displays the "name" you select for each satellite. It also displays error codes for some system problems as well as prompts for storing and recalling Favorite Channels.

The Satellite Display is also used with the Channel Display [F13] to show subcarrier audio frequency.

F13 CHANNEL DISPLAY

This 2-digit LED will display the channel that your receiver is currently tuned to. When your are using Parental Supervision, a dot will appear in this display.

The channel Display is used with the Satellite Display [F12] to show subcarrier audio frequency.

F14 or R11 EAST/WEST

These keys can be used for continuous dish movement when the 2400R is in [LOCK] OFF mode.

When the 2400R is in the [LOCK] ON mode, use the [EAST] [WEST] keys on the front panel to select a stored satellite.

In [LOCK] ON mode, the [EAST] and [WEST] keys on the Remote Control also provide dish alignment adjustments. When the dish is moving East, the EAST LED will light. When the dish is moving West the WEST LED will light.

F15 SCAN

This key turns the automatic scanning feature ON and OFF for satellite location in the [LOCK] OFF mode.

F16 or R7 CHANNEL

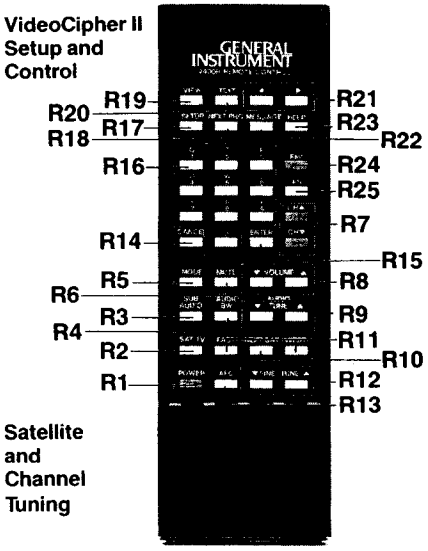
Use these keys to change channel up or down.

F17 C/Ku

This key selects the correct satellite frequency band in the [LOCK] OFF mode. LEDs will indicate which band you have selected.

REMOTE CONTROL

The Remote Control contains additional keys that are not found on the front panel.



Satellite and Channel Tuning

R1 POWER

R2 SAT/TV

R3 AUDIO BW

Use this key to select the proper bandwidth for audio subcarriers.

R4 SUB AUDIO

This key selects the additional subcarrier audio services that may be broadcast on some VideoCipher II channels.

R5 MODE

Press this key to select the proper audio subcarrier frequency format: Tune (5.0-8.5 MHz), 6.2 or 6.8 MHz.

R6 MUTE

This key will turn off the satellite channel audio.

R7 CHANNEL

R8 VOLUME

R9 AUDIO TUNE

Use these keys to tune the subcarrier audio frequency.

R10 NEXT SAT

Use this key to move the dish to the next programmed satellite. Use [EAST] or [WEST] after pressing [NEXT SAT] to scroll. You may also use 0-9 after [NEXT SAT] to select a satellite via direct access.

R11 EAST/WEST

R12 FINE TUNE

Use these keys to fine tune the video signal for a selected channel.

R13 AFC

When the AFC is ON (LED lit), the 2400R will automatically track and adjust the video frequency for the channel.

R24 FAV

[FAV] and the number keys are used to store and recall up to 40 favorite channels.

R25 PS

This key is used to lock out access to a specific channel for Parental Supervision. A dot will appear in the channel display when Parental Supervision is ON.

VideoCipher® II Control Keys

These keys function only when you are tuned to a VideoCipher II channel.

R14 CANCEL

Press the [CANCEL] key to clear any numbers that you enter incorrectly.

R15 ENTER

Use this key to confirm selections and password entries for VideoCipher II channel setup.

R16 NUMBER KEYS

These keys, 0-9, are used for direct channel and satellite access. They are also used to enter passwords and other selections to set up your VideoCipher II services.

R17 SETUP

Use this key along with the number keys to customize your VideoCipher II channel services.

R18 NEXT PRG

This key allows you to read information on your TV about the next scheduled program on a VideoCipher II channel.

R19 VIEW

Use this key to check the title, running time and other information about the program you are watching.

R20 TEXT

VideoCipher II messages can include news bulletins, program promotions and other special notes. Use this key to view channel and service related text on your TV screen.

R21

Use these keys to move back and forth in the VideoCipher II text files or to change program rating limits.

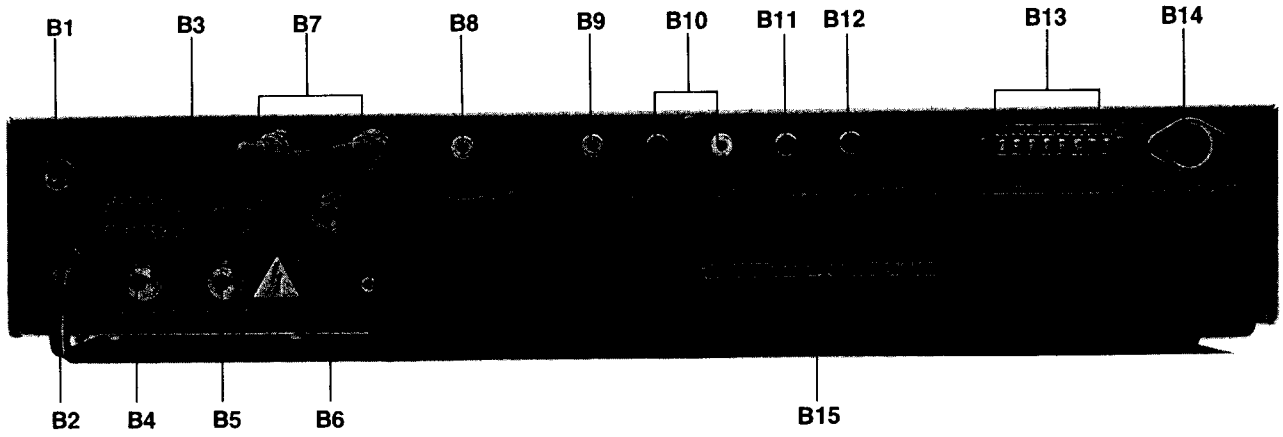
R22 MESSAGE

If there is a message for you, you will see a flashing asterisk (*) on your TV screen. Press the [MESSAGE] key to read messages on your TV screen.

R23 HELP

Press this key to read HELP messages related to VideoCipher II controls.

Your 2400R System



BACK PANEL

Your 2400R can be connected to a variety of accessories. Please refer to the wiring diagrams on pages 27-29 or have your installer verify that you have made the proper connections.

B1 FUSE

This screw cover holds the 125V 2Amp main fuse for the 2400R. (Refer servicing to a qualified technician).

B2 AC POWER

115 VAC, 60Hz, 50W AC power cord.

B3 CH3-CH4

This switch sets the VHF channel being sent to the TV. It should be set to the weaker of these two local VHF channels in your area. This switch setting should be the same as the channel setting on your TV.

B4 VHF IN FROM ANT

Connect your VHF antenna or cable system lead wire to this connector.

B5 VHF OUT TO TV

This connector should be attached to the VHF input on your television set.

B6 950-1450 MHz IF IN

This connector will accept the 950-1450MHz signal from the LNB. It will carry a +18 volt power output to the LNB.

B7 70MHz IN AND OUT

This is the 70MHz loop-through for attaching an external Ti filter (optional). Your 2400R comes with a 3-inch loop cable attached to these connectors. This cable must remain attached if you are not using an external filter.

B8 SUBCARRIER OUT

Provides unclamped, unfiltered baseband video up to 8MHz for external stereo processors, data demodulators, or external descramblers.

B9 VIDEO OUT

Connect your monitor or VCR to this output if it accepts a baseband (RCA-type) video connector. If your TV has both RF and baseband inputs, we recommend using baseband.

B10 R-AUDIO-L

Connect these RCA-type outputs to your stereo system or VCR if you want to tune or record stereo audio on VideoCipher II channels.

B11 DATA

This RCA-type connector is for data applications such as General Instrument's InfoCipher™ 1500R Data Receiver.

B12 IPPV

This RCA-type connector is for attaching a General Instrument VIDEOpal™ Order Recorder.

B13 TERMINAL BLOCK

The terminal block is used to connect accessories and system components to the 2400R.

+5V/PULSE/GND
Connect your mechanical polarizer to these terminals.

H/V
Use these terminals to attach a coaxial relay for dual LNB and multiple receiver installations.

C/Ku
Use this terminal to attach a coaxial relay for dual band installations.

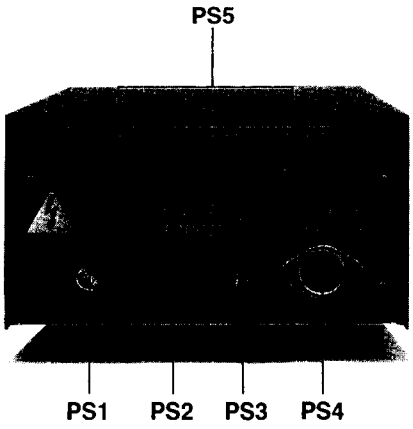
R1 and R2
These terminals are for attaching the optional General Instrument Any-Where™ UHF Remote Control receiver.

B14 ANT POSITIONER

This 5-pin DIN connector is used to attach the optional 2000PS Antenna Positioner Power Supply to the 2400R. The required cable is packed with the 2000PS Power Supply.

B15 AUTHORIZATION NUMBER

You can read the first 8 numbers of your Authorization (Address) Number through this window. See page 16 for the directions for reading your full 12-digit number.



2000PS ANTENNA POSITIONER POWER SUPPLY (Optional)

The 2000PS Power Supply is used to provide dish position control to the 2400R.

PS1 FUSE

This screw cover holds the 125V 3Amp main fuse for the Antenna Positioner Power Supply.

PS2 UNSWITCHED AC

This output provides continuous 115V 1Amp unswitched AC power for the 2400R receiver.

PS3 AC 115V 2A

AC line cord.

PS4 TO RECEIVER

Attach the 5-pin DIN cable to the 2400R here.

PS5 TERMINAL BLOCK

Power and signal wires for the dish should be connected to the 2000PS Power Supply terminal block. Actuators with Hall Effect sensors will use +5, PULSE and GND.

Actuators with a Reed Switch will use only PULSE and GND.

+5

Attach the +5 volt lead from actuators with Hall Effect sensors to this terminal.

PULSE

Attach the Pulse lead from the actuator to this terminal.

GND

Attach the Ground lead from the actuator to this terminal.

SH

Attach the uninsulated Shield wire from the actuator to this terminal.

MOTOR M1

Attach one of the Motor leads from the actuator to this terminal.

MOTOR M2

Attach the other Motor lead from the actuator to this terminal.

Programming Your 2400R

About Programming

Programming involves "teaching" your 2400R to remember your satellite and channel selections. Use the control keys on the front panel and the Remote Control to enter information in the receiver's memory.

Remember: To locate satellites and enter them in the 2400R memory, the receiver ***must*** be in [LOCK] OFF mode.

The following chart indicates how each key functions in the [LOCK] OFF mode.

[LOCK] OFF Key Functions	
Front Panel	
[EAST]	Move Dish East (continuous)
[WEST]	Move Dish West (continuous)
Remote Control	
[EAST]	Move Dish East (continuous)
[WEST]	Move Dish West (continuous)
[NEXT SAT]	No Function

Your System

Most 2400Rs will be used in single feed, single receiver installations. Please refer to the foldout at the back of this manual to see how your system can be installed.

Limits

Limits are programmed into the 2400R to prevent the dish from moving past the points that you set. Keep your eye on the dish as you move it and avoid moving the dish to its physical limit. If you hit the physical limit, damage could result.

> *NOTE:*
> Your limits ***must*** be programmed ***before*** you can enter satellite locations into the 2400R memory.

Setting the Limits

1. Set the 2400R in [LOCK] OFF mode by pressing and holding the [LOCK] key for 3 seconds.
2. Move the dish to the ***fully retracted*** position by pressing the [EAST] or [WEST] key. The satellite display will show [✳ 2] when the dish is fully retracted, then change to [✳--]

   If you are West of the Rockies, this will be the East limit.
   If you are East of the Rockies, this will be the West limit.

   2a. Use the [EAST] or [WEST] key to jog the dish back from the limit. The EAST or WEST LED will flash, and [✳--] will appear in the display.

   2b. Press [STORE] ***and*** the [EAST] or [WEST] key ***together*** (whichever one you used to move the dish to its fully retracted position). The display should now read [EL] or [WL], then blink twice to verify that the limit is stored.
3. Use [EAST] or [WEST] to move the dish to the ***fully extended*** position. When you reach the limit, the satellite display will show [✳2].

   If you are now setting the ***East*** limit, [-‹--] will appear in the display.

   If you are now setting the ***West*** limit, [›--] will appear in the display.

   Use the [EAST] or [WEST] key to jog the dish back from the limit.

   3a. Press [STORE] ***and*** the [EAST] or [WEST] key ***together*** (whichever one you used to move the dish to its fully extended position). The display should now read [EL] or [WL]. The display will blink twice to verify that the limit is stored.
4. To check that you have set the limits, use the [EAST] and [WEST] keys to move the dish. The [EAST] or [WEST] LEDs will light and the display will show [- -]. Check to see that the dish stops at the limits and [EL] or [WL] shows in the display at each limit.

ACTION	DISPLAY
[LOCK] OFF 3 Seconds	LED OFF
[EAST] Or **[WEST]**	**[✳2]** **[✳--]** (Steady)
[EAST] Or **[WEST]**	**[✳--]**
[STORE] And **[EAST]** Or **[WEST]**	**[EL]** Or **[WL]**
[EAST] Or **[WEST]**	**[✳2]** **[EAST]** LED and **[-‹--]** Or **[WEST]** LED And **[›---]**
[STORE] And **[EAST]** Or **[WEST]**	**[EL]** Or **[WL]**

Changing the Limits

If you have set the limits too far towards the center of the arc to receive certain satellites, you can reset them as follows:

1. Set the 2400R in [LOCK] OFF mode.
2. Use the [EAST] and [WEST] keys to move the dish to the limit that you want to change. [EL] or [WL] will show in the display.
3. Press and hold the [STORE] ***and*** [ALPHA] keys together for 3 seconds, until you see [›---] or [-‹--] in the display.
4. Use the [EAST] and [WEST] keys to jog the dish to the new limit position.
5. Press [STORE] ***and*** the [EAST] or [WEST] key ***together***. The display should now read [EL] or [WL], then blink twice to verify that the limit is stored.

If You Don't Have the Optional Antenna Positioner Power Supply

You can use your 2400R as a receiver only and use your existing positioner to locate satellites. However, you will still need to store [EL] and [WL] in the receiver's memory.

1. Set [LOCK] OFF.
2. Press [STORE] [ALPHA] [NUM] ***at the same time*** and hold them for 3 seconds. This clears the 2400R's memory.
3. Press [STORE] and [EAST]. The satellite display will blink twice and display [EL].
4. Press [STORE] and [WEST]. The satellite display will blink twice and display [WL]. The satellite display will then display [T0]. [T0] indicates that your 2400R is in the Tracker Off state.

If you are using the 2400R as a receiver only, you can still store satellite names for easy recall of Polarization, C/Ku selection, and Skew parameters.

ACTION	DISPLAY
[LOCK] OFF 3 Seconds	LED OFF
[EAST] Or **[WEST]**	**[EL]** Or **[WL]**
[STORE] And **[ALPHA]** 3 Seconds	**[›---]** Or **[-‹--]**
[EAST] Or **[WEST]**	
[STORE] And **[EAST]** Or **[WEST]**	**[EL]** Or **[WL]**
[LOCK] OFF	LED OFF
[STORE] Plus **[ALPHA]** Plus **[NUM]** 3 Seconds	
[STORE] And **[EAST]**	**[EL]**
[STORE] And **[WEST]**	**[WL]** **[T0]**

Programming Your 2400R

Programming Satellites: Introduction

Programming satellites is a simple step-by-step process. First, you'll locate the satellites and store their locations in the 2400R memory. You'll also store their features, including polarity, skew angle and frequency band.

It's best to start with C-band satellites. Once you have the satellite locations stored, you can begin to tune the channels. Then, you can store your favorite channels for 2-key remote control access. You can also lock out specific channels for Parental Supervision. Finally, you'll locate and tune Ku-band satellites and channels that you want to receive.

A Word About Polarization

Satellites broadcast channels in both horizontal and vertical polarity. Most polarizers will shift from horizontal to vertical upon command from your receiver. Other systems provide reception of both polarizations at the same time by using ***dual feed*** polarizers. This eliminates the need to shift back and forth, and is very useful for multiple receiver systems.

Some satellites will transmit Channel 1 (and all odd-numbered channels) in vertical polarity. For setup of the 2400R, this will be called ***Normal (SatCom)*** format. Others will transmit Channel 1 as horizontal. These satellites are called ***Reverse (Westar or Galaxy)*** format.

Satellite Chart

Satellite	Abbrev.	Location	Format	C	Ku
Spacenet 2	S2	69°	R	X	X
Satcom F2R	F2	72°	N	X	
Galaxy 2	G2	74°	R	X	
Satcom K2	K2	81°	R		X
Satcom F4	F4	83°	N	X	
Satcom K1	K1	85°	R		X
Telstar 302	T2	86°	N	X	
Westar 3	W3	91°	R	X	
SBS-4	B4	91°	R		X
Galaxy 3	G3	93.5°	R	X	
SBS-3	B3	95°	R		X
Telstar 301	T1	96°	N	X	
Westar 4	W4	99°	R	X	
G Star 1	G6	103°	R		X
Anik D1	D1	104.5°	R	X	
Anik C2	C2	112.5°	N		X
Morelos1	M1	113.5°	R	X	X
Anik C3	C3	117.5°	N		X
Spacenet 1	S1	120°	R	X	X
Westar 5	W5	122.5°	R	X	
Telstar 303	T3	125°	N	X	
ASC-1	A1	128°	R	X	X
Satcom F3	F3	131°	N	X	
Galaxy 1	G1	134°	R	X	
Satcom F1R	F1	139°	N	X	
Aurora	F5	143°	N	X	

Programming Your Satellites: Procedure

Be sure to have a satellite program guide available before you begin to locate and store your satellites. It will be difficult to tell one satellite from another without one.

The following activities should be completed using the ***front panel*** keys.

1. Set [LOCK] ON.
2. Turn your TV on. Set the 2400R to the TV mode using the [SAT/TV] switch and tune the TV to a local VHF station. This will verify that your TV is properly hooked up to the 2400R.
3. Press [SAT/TV] to return to satellite mode. The TV should then be set to the same channel as the [CH3/CH4] switch on the back of the 2400R.
4. Set [LOCK]OFF. (Hold for 3 seconds.)
5. Move the dish to [WL]. It's best to start at the West end of the orbital arc and move towards the East.
6. Use the satellite chart at the left to locate your satellites.
   - 6a. Start ***at the bottom*** (West) and work up (East).
   - 6b. Using the [POLARITY] key, set the satellite format according to the chart for each satellite that you try to locate.
7. Press [SCAN]. The 2400R uses a rapid scan mechanism that will ***not*** lock onto a channel when it locates one. It is a rapid scan that is used only for locating satellites.
8. Using the [EAST] key, move the dish away from the limit. The East or West LED should light as the dish moves. A [- -] will appear in the display.
9. Watch the TV screen. Your 2400R will be scanning for channels in order to locate each satellite. When your dish is pointed at a satellite, you will see quick blinks of video on the screen. Release the [EAST] key to stop the dish movement. Your 2400R will continue to scan the channels.

ACTION	DISPLAY
[LOCK] ON	LED ON
[SAT/TV]	LED OFF
[SAT/TV]	LED ON
[LOCK] OFF 3 seconds	
[EAST] Or **[WEST]**	**[WL]**
[POLARITY]	LED ON/OFF
[SCAN]	
[EAST]	**[- -]**
	Video Blink
[EAST]	

9a. Press [SCAN] when you see the video signal again. This will stop the scanning activity and lock the 2400R on a channel. Using the [CHANNEL ▲ ▼] keys, locate an ***odd*** numbered channel on the satellite.

9b. Use [EAST] and [WEST] to get the best picture. Don't worry about the audio yet. Audio will be tuned later.

9c. Use the [SKEW ▲ ▼] keys to improve the picture.

9d. Try to identify the satellite using the program guide.

10. Move to an ***even*** numbered channel. Use the [SKEW ▲ ▼] keys to adjust the picture. Use the program guide to identify the channel.

    Your 2400R stores skew information for both odd and even polarity for each satellite.

11. By checking several channels, you should be able to identify the satellite. If you guessed wrong on the satellite polarity, use the [POLARITY] key to change it.

    11a. If the Polarity setting is not correct, you will have to readjust the skew settings for both odd and even channels.

12. Use the [ALPHA/NUM] keys to name the satellite. Standard abbreviations are listed in the chart on page 12.

13. Press [STORE]. The display will blink twice. You have just stored the satellite location, polarity, name and skew adjustments in the 2400R memory.

14. Press [SCAN] again. Using the [EAST] key, look for the next satellite in the orbital arc. Repeat steps 6 through 13 for each satellite. Your 2400R can store up to 24 C-band satellite locations.

ACTION	DISPLAY
[SCAN]	Stop Scanning
[CHANNEL ▲▼]	Odd Channel
[EAST] or **[WEST]**	Best Picture
[SKEW▲▼]	Best Picture
[CHANNEL ▲▼] **[SKEW▲▼]**	Even Channel
[POLARITY]	LED ON/OFF
[SKEW▼▲]	Best Picture
[ALPHA] [NUM]	Satellite Name
[STORE]	2 Blinks
[SCAN]	

Programming Your 2400R

Satellite Recall

Once you have stored a satellite location, you can return to it by pressing a few buttons. Make sure the 2400R is in the LOCK ON mode.

Satellite Recall (Scroll Method)

If you are using the Remote Control, Press [NEXT SAT]. "NS" will appear on the front panel display. Continue pressing the [NEXT SAT] key until you see the initials of the satellite that you want to watch. When the [EAST/WEST] keys are used with [NEXT SAT], these keys will scroll forwards and backwards to select the next stored satellite.

If you are using the front panel keys on the 2400R, press the [EAST] or [WEST] keys until you see the initials of the satellite that you want to watch appear on the front panel display.

Satellite Recall (Direct Access)

To reach a satellite via the direct access method, press the [NEXT SAT] key. "NS" will appear on the front panel display. Then press the key with the letter abbreviation of the satellite you want, followed by the number. For example, if you wish to move to satellite S3, press key number 7 ("S") and then key number 3.

After the 2400R locates a satellite, you can fine tune the dish's position by using the [E] and [W] keys on the remote control.

Cancelling a Satellite

You can remove a satellite location and its tuning parameters from the receiver's memory.

1. Recall the satellite.
2. Set [LOCK] OFF. (Press key 3 seconds).
3. Press [STORE] and [ALPHA] at the same time and hold them for 3 seconds. The display will blink twice, and the satellite will be erased.

Power Outages

If AC power is lost during dish movement, you may need to realign the satellite positions in your 2400R memory.

It is important that you check the dish position carefully while you are doing the realignment.

1. Set [LOCK] ON.
2. Recall a satellite that you are familiar with, such as G1. At this point, the dish will ***not*** be pointed in the right direction to receive G1. The dish may even have moved beyond your programmed limits.
3. Press the [STORE] and [NUM] keys ***at the same time*** for 3 seconds. The display should flash between [RA] (Realign) and [G1].
4. Use the [EAST] and [WEST] keys to locate G1. The display will continue to flash [RA] and [G1].
5. Press [STORE] and [NUM] for 3 seconds. The 2400R will realign all the satellite positions that were stored before the power outage. [G1] will now show on the satellite display.

Master Reset

If your unit is returned from service or you want to completely re-enter your satellite locations and channel tuning, use the Master Reset. You should also try a Master Reset if your system appears to be installed correctly, but the dish does ***not*** move.

1. Set [LOCK] OFF. (Press key 3 seconds.)
2. Press the [ALPHA], [NUM] and [STORE] keys at the same time. Hold them for 3 seconds.

Your 2400R memory will be cleared.

ACTION	DISPLAY
[LOCK] ON	LED ON
[ALPHA] **[NUM]**	Satellite Name **[G1]**
[STORE] And **[NUM]** 3 Seconds	**[RA]** Flash **[G1]** Flash
[EAST] Or **[WEST]**	**[RA]** Flash **[G1]** Flash
[STORE] And **[NUM]** 3 Seconds	2 Blinks **[G1]**
[LOCK] OFF 3 seconds	LED OFF
[ALPHA] and **[NUM]** and **[STORE]** 3 seconds	2 Blinks [--]

Ku-Band Satellite Location

We recommend that you store C-band satellites ***before*** attempting to store Ku-band satellites.

Remember: You can't locate a Ku-band satellite unless your system is properly equipped for Ku-band reception. Your 2400R can store up to 8 Ku-band satellite locations.

1. Set [LOCK] OFF. (Press key 3 seconds).
2. Set the Ku LED ON with the [C/Ku] key on the front panel.
3. Follow the same procedures as for C-band tuning, using [SCAN], [EAST] [WEST], and [SKEW ▲ ▼] to locate, optimize and identify the satellite.
4. Name the satellite using [ALPHA] and [NUM].
5. Press [STORE] to enter the satellite location in the 2400R memory.

NOTE: Some satellites (Spacenet, Morelos) have both C and Ku transponders. Your 2400R ***cannot*** store both C and Ku parameters for the same satellite under the same name. Therefore, you should store these satellites as ***separate entries*** under different names.

For example, you can store Spacenet 1's C-band programming parameters as [S1]. You can store Spacenet 1's Ku-band parameters as [S2].

ACTION	DISPLAY
[LOCK] OFF 3 Seconds	LED OFF
[C/KU]	LED ON
[SCAN] **[EAST]** Or **[WEST]** **[SKEW▲▼]**	
[ALPHA] And **[NUM]**	
[STORE]	2 Blinks

Ku-Band Channels

Channels for Ku broadcasting have not been standardized as C-band channels have. In fact, several different Ku channel standards exist. Your 2400R has been designed to follow the format currently used by most services that are broadcasting in Ku-band.

If the satellite that you are tuning uses a different channel plan, you will still be able to receive its Ku channels. However, the channel numbers displayed on the 2400R may be different from those in your guide.

Channel Tuning

Tuning Your Channels

Once you have stored the location, skew and polarity for each satellite, you're ready to fine tune your channels and set up your VideoCipher II services.

Channel tuning activities should be done with your 2400R in the [LOCK] ON mode. In this mode, the front panel and Remote Control keys are used as follows:

[LOCK] ON Key Functions	
Front Panel	
[EAST]	Next Satellite East
[WEST]	Next Satellite West
Remote Control	
To Move to a New Satellite	
[NEXT SAT]	Initiates EAST-WEST dish movement
Within 3 Seconds	
[EAST]	Next Satellite East
[WEST]	Next Satellite West
To Tune a Satellite	
[EAST]	Move Dish East (10 Steps Max.)
[WEST]	Move Dish West (10 Steps Max.)

To move the dish to a new satellite:

1. Press[NEXT SAT]on Remote Control.
2. Press[EAST] or [WEST] ***within 3 seconds*** to move the dish in the direction you want.
3. If you pass the satellite you want, press [EAST] or [WEST] to back up.

VideoCipher® II Authorization

Here's how the VideoCipher II system works. A program supplier (premium movies, superstations, sports, news, pay-per-view) sends a scrambled signal from their uplink transmitter to the satellite. This same signal will contain coded authorization messages that are addressed ***to individual receivers***. These messages will allow your 2400R to receive the VideoCipher II programming and descramble it.

When you subscribe to VideoCipher II programming, your supplier sends authorization messages over VideoCipher II channels to your 2400R receiver. If you discontinue a VideoCipher II service, the messages will not be sent, and you won't be able to view the programming.

The presence of a VideoCipher II descrambler in your 2400R is ***not*** sufficient for program viewing. You will need to receive authorization from your local program supplier or contact the program distributors directly. They will set up an account for you and authorize your unit to descramble selected channels.

You can check the program distributor's number by tuning your 2400R to the channel that you want authorization for. Most services broadcast subscription information to unauthorized receivers. You'll need to tune an audio subcarrier on the VideoCipher II channel to hear this subscription information.

VideoCipher® II Tuning

1. Turn your TV on and set the 2400R in [LOCK] ON.
2. Move the dish to a satellite that has VideoCipher II programming, and select a VideoCipher II channel. The VideoCipher Signal LED will light, but you will see only a black screen (with text) until you subscribe to the channel and receive authorization.
3. The program distributor will need your Authorization Number, which can be read off your TV screen by pressing a few keys on your 2400R Remote Control.

   Press [SETUP] [1].

   3a. Your Authorization (Address) Number will appear on the screen. The first 8 digits of this number should be the same as those in the window on the back of your 2400R. The last 4 digits on the screen are for Program Distributor use. Write ***all*** 12 numbers in the front of this Manual.

   3b. Your TV should also show 2 signal strength numbers. For optimum system performance, both numbers should be between 45 and 50. For example, 46/48 is good, but 43/41 is not. Maximum strength is 50. Dish alignment, video fine tuning and weather conditions can affect the VideoCipher II signal strength.
4. Call the VideoCipher II service that you want to subscribe to. They will ask for your Authorization Number and other billing information.
5. Leave the 2400R tuned to a VideoCipher II channel until you receive authorization. This may take a few minutes or longer, depending on the service.

Video Fine Tuning Adjustment

Fine tuning is usually not needed for C-band satellites, since they all use a standard channel numbering and frequency plan. However, you may be able to improve the picture quality on weak signals by adjusting the Fine Tuning. Fine tuning may be necessary for Ku-band satellites.

You have two options for fine tuning the video.

AFC OFF

With [AFC] OFF, you can alter the picture to suit your own preference, and the tuning that you select will be stored for that channel in the 2400R memory.

Use the [FINE TUNE ▲ ▼] keys on the Remote Control to adjust the picture.

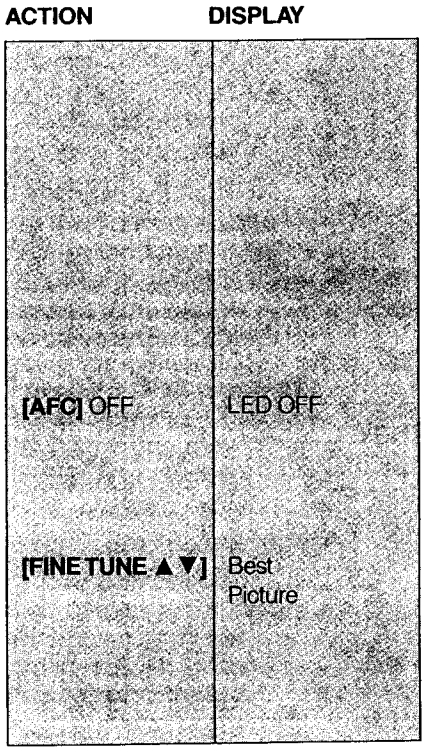
Using the 2400R with the [AFC] OFF will allow faster channel changes and also allows you to customize the tuning for each channel.

AFC ON

With [AFC] ON, the 2400R will automatically compensate for any channel drift according to factory preset guidelines.

Ku-Band Video Fine Tuning

Since Ku-band channel frequencies have not been standardized, we suggest that you allow the 2400R to fine tune your Ku-band channels with [AFC] ON. If you are not satisfied with the picture, set [AFC] OFF. Use the [FINE TUNE ▲ ▼] keys to adjust the picture.



A Note About Channel and Audio Tuning

Your 2400R can store up to 32 satellites in memory. However, you cannot store channel-specific information (such as subcarrier audio selection) for each channel on every satellite. This would require a huge system memory. The system can store one set of parameters for each unique channel number (1,2,19,22,etc.) in C-band and another set of parameters for each unique channel number in Ku-band.

When you change a parameter for a channel, it will be changed for ***all*** of the satellites in that band. For example, if you change the tuning for Channel 19 in C-band, ***all*** C-band Channel 19s will use this new setting.

However, the 2400R has a Favorite Channel memory that can store audio and other channel-specific information for up to 40 entries. You could, for example, store a C-band Channel 19 on F4 and a C-band Channel 19 on G1 as separate Favorite Channel entries.

Favorite Channel, audio subcarrier tuning, and other daily use activities are covered in the next section of this Manual.

When You Are Not Watching

If you subscribe to a VideoCipher II service, we recommend that you position your dish on a satellite with a VideoCipher II channel when you are not watching satellite TV. Your 2400R will automatically tune to a VideoCipher II channel to receive Authorization updates when the power is turned off and the receiver is in the STANDBY mode (LED ON).

Daily Use of Your Receiver

Using Your Receiver

Your receiver has been installed and you've programmed satellites into the memory. You have probably received authorization for VideoCipher II programming. It's time to sit back, pick up your remote control, and enjoy the world of satellite TV.

In these next few pages, we'll review the procedures that you'll follow for everyday viewing.

Power

We recommend that you leave your 2400R plugged in with the STDBY LED ON at all times. The STDBY LED indicates that the 2400R can receive authorization messages from VideoCipher II channel services.

If 2400R is Unplugged

If your 2400R is unplugged for a period of time, you may need to get re-authorized by your VideoCipher II services. A lack of power may also cause condensation in the LNB, which can shorten LNB life.

Channel Selection

Channel selection begins with satellite selection. You can move directly to a Favorite Channel using the Remote Control keypad, or you can switch to a specific satellite and then tune the channel that you want to watch.

You can access all normal viewing functions through the Remote Control.

Set [LOCK] ON (LED lit) for all channel selection and tuning activities.

Storing a Favorite Channel

1. Locate the channel that you want to watch by selecting the satellite, tuning the channel and tuning the audio.

NOTE: If the satellite's initials don't appear on the front panel display, you have not programmed that satellite into the 2400R's memory. A satellite must be stored into the 2400R's memory before any of its channels can be stored as Favorite Channels.

2. Press and hold [FAV] for 3 seconds until [SF] appears in the display.
3. When the front panel channel display reads [SF], use the number keypad on the remote control to enter a two digit number [# #]. The number will now appear in the channel display.

   The display will blink twice, and the new channel will be stored into memory.
4. For your convenience, you may write this satellite and channel number in the space provided on the back of the remote control.

Recalling Favorite Channels

1. Set [LOCK] on.
2. Press [FAV] [##] for the desired Favorite Channel.
3. The 2400R will automatically position the dish on the satellite and select the proper channel, skew, and subcarrier audio tuning.

Changing a Favorite Channel

To change a Favorite Channel setting, just repeat the steps for Setting a Favorite Channel. Your new entry will replace the old one in the Favorite Channel memory.

ACTION	DISPLAY
[LOCK] ON	LED ON
[NEXT SAT]	Satellite Name
[CHANNEL ▼ ▲]	Channel Number
Tune Audio	
Fine Tune Video	
[FAV] 3 seconds	**[FA]** Then **[SF]**
Number Key **[# #]**	**[SF] [# #]**
[LOCK] ON	LED ON
[FAV] [# #]	**[FA]**
	Satellite Name
	Channel Number

Recalling Satellites: Not Favorite Channel

You can view programming on any satellite as long as you store that satellite's location in memory.

See Programming Your Satellites (page 12) for details on programming satellites into memory.

Satellite Recall (Scroll Method)

If you are using the Remote Control, Press [NEXT SAT]. "NS" will appear on the front panel display. Continue pressing the [NEXT SAT] key until you see the initials of the satellite that you want to watch. When the [EAST/WEST] keys are used with [NEXT SAT], these keys will scroll forwards and backwards to select the next stored satellite.

If you are using the front panel keys on the 2400R, press the [EAST] or [WEST] keys until you see the initials of the satellite that you want to watch.

Satellite Recall (Direct Access)

To reach a satellite via the direct access method, press the [NEXT SAT] key. "NS" will appear on the front panel display. Then press the key with the letter abbreviation of the satellite you want, followed by the number. For example, if you wish to move to satellite S3, press key number 7 ("S") and then key number 3.

Channel Tuning

1. Select a specific channel on a satellite with the [CHANNEL ▲ ▼] keys.
2. Fine tune the channel (if necessary) using the [FINE TUNE ▲ ▼] keys.

As long as you are in [LOCK] ON mode, with [AFC] OFF, the 2400R will store any fine tuning changes that you make for that channel.

Parental Supervision

Your 2400R provides you with two methods for locking channels and restricting viewing.

For VideoCipher®II Channels

The Rating Ceiling method applies only to VideoCipher II channels. You can prevent viewing all rated VideoCipher II channel programs above the level that you set.

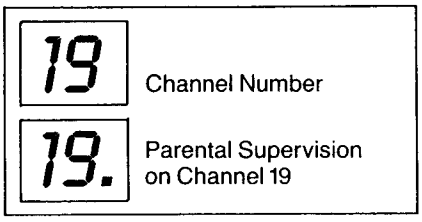
For example, if you set the level at PG-13, your system will allow only G, PG, and PG-13 rated programs. Both R and X-rated programs will be locked out. (See page 21.)

For Other Channels and VideoCipher® II Channels

The second method (Parental Supervision) provides complete channel lockout, and may be used on both VideoCipher II and unscrambled channels.

> This method requires you to completely lock out access to a channel.

1. Set [LOCK] ON.
2. Tune to the channel that you want to restrict.
3. Press and hold the [PS] key ***for 3 seconds***. The display will blink and a [●] will appear on the channel number.
4. Switch to a different channel on this satellite.



NOTE: This channel can still be selected by entering the channel number through the Direct Access number pad on the Remote Control. To completely restrict viewing of this channel, you will need to take the Remote Control with you.

Changing Parental Supervision

It's simple to remove the restriction from a locked channel.

1. Using the Remote Control number key pad, enter the channel number.
2. Press and ***hold*** the [PS] key ***for three seconds*** until the channel display blinks once and the [●] disappears.

Audio Tuning on the 2400R

Check your program guide to see which subcarrier frequency and format the channel is using.

Remember: To hear the stereo mode on VideoCipher II channels, your 2400R must be attached to a stereo or TV with left and right audio inputs. For unscrambled channels with stereo signals, you can tune one mono audio signal only.

Use the [MODE] key to select the audio format. Check the front panel LEDs to confirm your selection.

You have three options:

TUNE allows you to select any subcarrier frequency from 5.0–8.5 MHz.

6.2 selects the common 6.2 MHz frequency.

6.8 selects the common 6.8 MHz frequency.

For VideoCipher II channels, you will not normally need to tune the audio. You can select subcarrier audio for VideoCipher II channels by pressing the [SUB AUDIO] key on the Remote Control.

Your 2400R can play stereo audio ***only*** on VideoCipher II channels. If your receiver is connected to a stereo system or stereo TV and you are tuning an unscrambled stereo channel, the 2400R will play ***one*** of the available audio channels through both speakers.

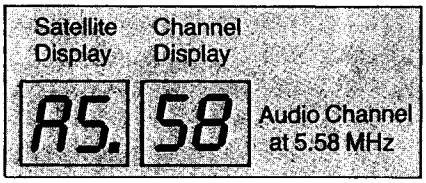
Daily Use of Your Receiver

Tuning Audio Channels

1. Press the [MODE] key to set the 2400R to [TUNE].
2. Use the [AUDIO TUNE ▲ ▼] keys to tune the audio channel. We suggest you tune the audio channel that will give you the fullest range of sound.

When you press the keys to tune the audio, the Channel and Satellite displays will show the audio subcarrier frequency.

Audio Subcarrier Display



The Satellite display shows the first number in the audio frequency. The Channel display shows the last two numbers of the frequency. The 2400R has 10 KHz resolution on audio subcarriers.

Audio Bandwidth

Some audio channels will sound best with the 2400R in the WIDE bandwidth mode ([WIDE] LED ON). Others will sound best in the NARROW bandwidth mode (LED OFF).

1. Press the [AUDIO BW] key on the Remote Control to change the bandwidth if it improves the sound quality.
2. The 2400R will store your bandwidth selection in memory on favorite channels only.

VideoCipher® II Features

Once you have received authorization, you can tune and view a VideoCipher II channel just as you would an unscrambled channel. However, VideoCipher II channels provide additional features and services. Here's how to use them.

The following features can be used only on VideoCipher II channels.

[VIEW]

Press the [VIEW] key to see information about the current program being broadcast on the channel. This will include program title, running time and rating.

After 3 seconds, this program information will disappear from the screen.

The [VIEW] key is also used when you want to exit from a VideoCipher II setup routine without completing it.

[HELP]

Press [HELP] when you are using VideoCipher II features if you need an explanation of the procedure. You will be able to read HELP messages on the TV. If you still cannot understand the procedure, press [VIEW] and consult the Manual.

[SETUP]

The [SETUP] key is used with the number keys to customize your VideoCipher II features.

If you press [SETUP], you will see the following menu on your TV:

1. Installation
2. Unit Settings
3. Rating Ceiling
4. Rating Password

You can choose one of these VideoCipher II setup activities by pressing the correct choice.

1. Installation

Press [SET UP] [1] *to see your Authorization Number* and Signal Strength displayed on the screen. Your program supplier will need these numbers to authorize you for VideoCipher II program reception.

2. Unit Settings

Personal Messages

VideoCipher II program suppliers may send you messages about your service subscription. These may concern your account balance, new services, or other information. Messages can be read on your TV.

1. A flashing asterisk [*] will appear on the screen to inform you that a message is stored for you.
2. To read the message, press [MESSAGE].

   You can set your system so that the [*] does not show on the screen.

1. Press [SETUP] [2].
2. The display will read: MESSAGE PROMPT ENABLED (ON) or MESSAGE PROMPT DISABLED (OFF).
3. Press [2] to switch back and forth and set the prompt ON or OFF.

We recommend that you turn the [*] prompt OFF when you are going to record a VideoCipher II program on your VCR. However, if you turn the prompt OFF, you may not know when a message has been sent to your receiver. The best approach is to leave it ON and turn it OFF when you record.

Second Language Audio

Some VideoCipher II channels offer second languages on their programs.

1. To listen to an ALTERNATE language, press [SETUP] [2].
2. Press [1] to switch between PRIMARY (usually English) and ALTERNATE (the second language).

3. Rating Ceilings

1. Press [SETUP] [3].
2. Enter your password if one has been set. If no password has been set, proceed to the next step.

3. Use the [◄ ►] keys to change the Rating Ceiling.

4. Rating Passwords

Passwords are used to control access to the Rating Ceiling. VideoCipher II ratings are based on standard motion picture rating guidelines.

We suggest that you pick a number that is easy to remember: your zip code, date of birth, phone number, street address, etc. ***If you forget your password,*** you will need to contact your program distributor to have it reprogrammed.

If you ***don't*** want password control:

1. Press [SETUP] [4].
2. Press [ENTER] ***twice*** when the screen prompts you to enter a new password.

To ***set*** or ***change*** a password:

1. Press [SETUP] [4].
2. Key in your new password (up to 8 digits) and press [ENTER].
   - 2a. If the system has a password stored, you will need to key it in and press [ENTER] before the system will accept a new one.
   - 2b. Key in the new password, and press [ENTER].
3. The screen will ask you to enter the new password a second time and press [ENTER] to confirm it.

The screen will then tell you that the password has been changed and return you to the main SETUP menu.

Program Messages

VideoCipher II program suppliers offer a wide variety of services, some of which may require pay-per-view or other restrictions on viewing. If this occurs, you will see one of the following messages on your TV screen when you are tuned to that channel.

No Subscription

This message indicates that your 2400R has not been authorized to receive this channel. Contact your program supplier to receive authorization.

Blackout

This message indicates that a program is not available in your geographic area.

Program Locked Out

This message will appear if the program currently being broadcast on that channel exceeds the Rating Ceiling that you have set. You can change the Rating Ceiling if you want to view the program. (See Rating Ceilings and Rating Passwords).

Next Available Program

This VideoCipher II feature allows you to quickly check upcoming programs.

1. Tune to the VideoCipher II channel that you want to watch.
2. Press [NEXT PRG].
3. You will see a message listing the title, rating, start time and other information about the next program that will be shown on that channel.
4. You may also see one of the other VideoCipher II service messages (No Subscription, Blackout, etc.).

Text Services

Some VideoCipher II channels may broadcast news bulletins, program information and other text over the channel.

To view these services:

1. Tune to a VideoCipher II channel.
2. Press [TEXT].
3. Use the [◄ ►] keys to move back and forth within the text.
4. You can move to a specific page by keying in a 3-digit page number. For example, page 6 would be 006. It will usually take several seconds before the page is displayed. If you request a page that is not in the file (for example page 006 in a 5-page file), the screen will stay as it is.

Installing Your 2400R

Installation Options

Your 2400R can be installed with single or multiple receivers, single or dual feeds, and with single or dual band reception. Refer to the foldout diagram at the back of this Manual to determine the best way to meet your personal viewing requirements.

Make sure that you have the required parts, connectors and cables for the type of installation that you will be doing ***before*** you begin.

Receiver Connections

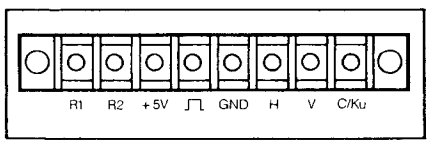
1. Check that no power is on in the system. No LEDs should be lit.
2. Connect your VHF input to the VHF IN FROM ANT connector.

   Your VHF input to the 2400R should be 75 ohm. If you have 300 ohm output from your antenna, you will need to purchase a 300-75 ohm adapter.

   There is no connection for a UHF antenna on the 2400R. If you want to watch UHF programming, you will need to connect the UHF antenna directly to your TV set.
3. If you are using a standard TV set, attach it to the VHF OUT TO TV connector on the 2400R.

   If you are using a TV monitor, connect the input to your monitor to the VIDEO OUT connector on the 2400R. Attach the R(Right) and L(Left) audio connectors to your monitor or to a separate stereo receiver.
4. Connect the polarizer wires to the terminal block as follows:

GND	Black ground wire.
PULSE	White pulse wire.
+ 5V	Red 5-volt wire.



2400R Receiver Terminal Block

5. Attach the output cable from your LNB to the 950-1450 MHz IF IN connector on the 2400R.

   The 950-1450 MHz IF IN connector is also used for installation of the General Instrument Matrix Switch for dual feed and multiple receiver installations.
6. We recommend that you set up your system without an external TI filter, and add one later if you need it for specific channels.

   If you are not using an external TI Filter, make sure that you attach the 6-inch 70MHz cable (supplied) to the IN-70MHz-OUT connectors. ***Both connectors on this loop-through circuit must be attached.***

   Connect coaxial switches for dual feed or dual band installations, to the H/V and C/Ku connectors on the terminal block.

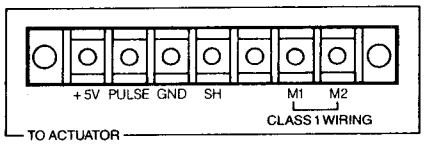
   If you are using the optional Any-Where™ UHF Remote Control, connect its cables to the R1 and R2 terminals on the 2400R.
7. Check all your connections.

   If you ***are*** using the optional Antenna Positioner Power Supply, follow the directions in the shaded box to connect it to your actuator.

Connecting the 2000PS Antenna Positioner Power Supply

With the optional 2000PS Power Supply, your 2400R can control dish movement. Wiring the 2000PS depends on the type of actuator that you have.

Motor wire should be a minimum of 14 gauge. Sensor wire should be shielded 20 gauge.



Antenna Positioner Power Supply Terminal Block

a. Attach the actuator leads to the 2000PS terminal block according to the foldout at the back of this Manual.

b. Attach the 2000PS Power Supply to the 2400R with the 5-pin DIN cable.

c. Plug the 2400R power cord into the UNSWITCHED AC convenience outlet on the 2000PS.

d. Place the 2000PS Power Supply on the floor near your receiver. You won't need frequent access to it.

8. Connect your 2400R to AC power.

   8a. If you ***are*** using the optional 2000PS Power Supply, plug it into an unswitched AC wall outlet.

   8b. If you are ***not*** using the 2000PS Power Supply, plug the 2400R into the wall outlet.

When the receiver is in STANDBY mode ([STDBY] LED lit), it can receive VideoCipher II authorization messages and will also supply constant power to the LNB.

9. Turn the 2400R [POWER] on. Several of the front panel LEDs and displays will light.

   The Satellite Display should show [* –]. If the Satellite Display shows [– –], indicating that limits have already been set, you should perform a Master Reset. See page 14.

10. *After* you complete the installation of the 2400R, verify that your dish is moving in the right direction when you press the [EAST] and [WEST] keys. If not, disconnect the AC Power, reverse the M1 and M2 leads on the 2000PS Antenna Positioner Power Supply and reconnect the AC power.

> Keep your eye on the dish and move it just enough to check for proper direction. ***Do not*** approach the physical limits, or you could damage the dish.

If the dish does not move when you press [EAST] or [WEST], use the Master Reset procedure.

Next Steps

Once you have wired the receiver and checked for proper dish movement, you're ready to begin programming your satellites.

Turn to page 10 and begin.

Accessory Connections

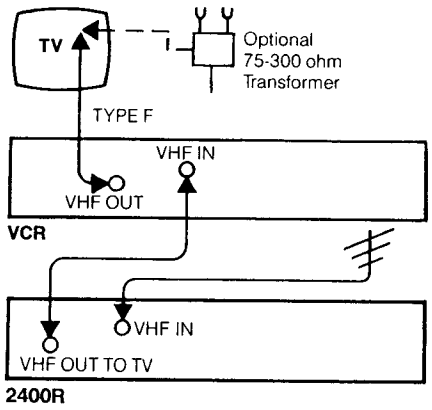
Many standard satellite TV accessories can be used with the 2400R, including VCRs, TV monitors, cable system converters, and your stereo system. You can use A/B switches and splitters to position your accessories at different points in the system.

Cables, A/B switches, splitters and connectors should be supplied with the accessory or purchased from your local video equipment dealer. Please consult your dealer on wiring installations more complex than those described in this Manual.

VCR Connection

Depending on how you wire the system, you can record the same program that you are watching or record one program while watching another.

Option 1. Record Satellite or Local TV/ Cable, Watch What You Record.



1. Connect the VHF OUT TO TV output connector on the 2400R to the Type F VHF IN on your VCR.
2. Connect the Type F VHF OUT connector on your VCR to the Type F VHF IN connector on your TV.

   You may need to add a 75-300 ohm transformer to the VHF IN connector on your TV if it does not accept a Type F input.
3. To record a satellite program, make sure that your VCR is set to the correct channel (3 or 4).

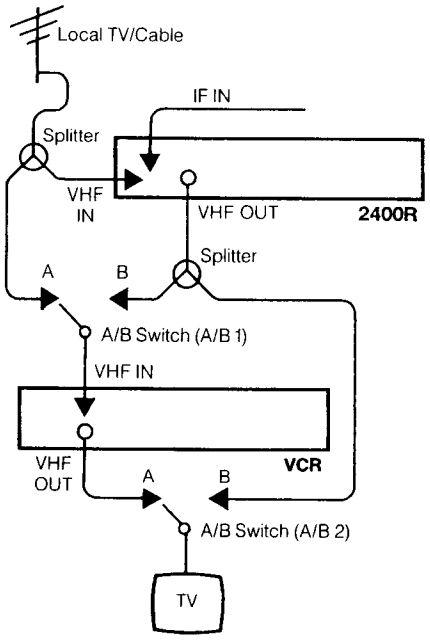
Your switch settings on the 2400R and your VCR will determine what you see on the screen.

Option 1

2400R	VCR	YOU'LL SEE
SAT	TV	SAT
TV	TV	Local TV/Cable
SAT	VCR	VCR
TV	VCR	VCR

Option 2. Record Satellite or Local TV/Cable, Watch Anything

This installation requires the use of 2 signal splitters, 2 A/B switches, and several lengths of Type F coaxial cable. Follow the diagram to make your connections. Note: If A/B 2 is a 3-way switch and input 3 is the VHF IN cable that was connected to the 2400R, then you can watch local TV cable and record satellite simultaneously.



Your switch settings on the 2400R and your VCR will determine what you see on the screen.

Remember: ***If you are recording a satellite program, you should not use the Remote Control to change the volume; it will affect the recording volume. Leave the 2400R volume set at maximum.***

Option 2

2400R	VCR	A/B 1	A/B 2	YOU'LL SEE	RECORD
TV	—	—	B	TV	—
SAT	—	—	B	SAT	—
TV or SAT	TV	A	A	TV	TV
TV or SAT	VCR	A	A	VCR	TV
TV	TV or VCR	B	A	TV or VCR	TV
SAT	TV or VCR	B	A	SAT or VCR	SAT

Installing Your 2400R

Dish Adjustments

Your dish antenna must be able to track the satellites in the orbital arc with no obstructions. In addition, the dish must track the ***proper*** arc or your reception will be degraded.

Your antenna should be adjusted according to the antenna manufacturer's instructions.

Replacement Systems

If you are ***replacing*** an existing receiver with the 2400R, ***do not disconnect your old system yet.***

We suggest that you move the cables from the old system to the 2400R, cable by cable. If you don't have sufficient cable length to place your 2400R on the floor near your old system while you are transferring wires, label each wire that is attached to your old system. Then, remove your old system and attach the connectors to the 2400R.

New Systems

If this is a ***new*** system installation, you may want to set the 2400R up at the dish. This allows you to see the effects of each dish or receiver adjustment immediately.

Wiring

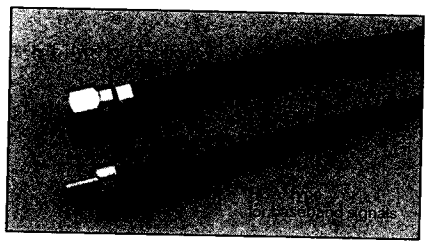
Most satellite TV system wiring has standard color coding. Check the manuals for each device in your system to verify the proper coding for each wire. Wiring connections are listed on the foldout at the back of this Manual.

DC Pass Splitters

All splitters used in your installation (for dual band, dual feed or multiple receivers) must be capable of passing a 1500 MHz signal and DC voltage even if the master receiver is turned OFF. If the splitters do not pass DC, you may lose video, audio, descrambler authorization or be unable to select different polarities on second receivers.

Cabling

Several types of cables can be used in a standard installation. To get the best performance from your system, it is important to use the cable recommended in the chart. All system wiring should meet UL standards.



Connector Types

Coaxial cable can lose 10 dB or more of signal for every 100 feet of length (dB is a measure of signal strength). This loss is called attenuation. If there is too much loss, you may have to install line amplifiers. All coaxial cable used in your 2400R installation should be capable of a band pass of 950-1450 MHz as well as passing DC voltage up to 20 volts.

We recommend that you use wiring as large or larger than specified on this chart or the separate insert on Important Safeguards.

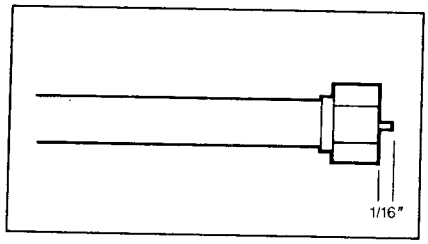
Cable Run Loss

1.5 GHz Loss	Loss Per 100 Feet	100'	200'	300'	400'	500'
RG-59	12 db / 100FT	12db	24db	*	*	*
RG-6	8.5db / 100FT	8.5db	17db	25.5db	*	*
RG-11	6.5db / 100FT	6.5db	13db	19.5db	26db	*

* Indicates next larger size cable or additional amplifiers should be inserted.

RG-6 and RG-59 Cable

When using RG-6 or RG-59 cable, avoid bending the center wire. To minimize damage, we suggest that you trim the center wire back so that it extends no more than 1/16" beyond the cable end connector.



RF Cable Trimming

LNA/Block Downconverter, LNC or LNB

Your 2400R ***cannot*** function with a Low Noise Amplifier (LNA) alone. If you are using an LNA, it will need a minimum gain of 50 dB and a ***Block Downconverter*** with a minimum gain of 20 dB.

If you are installing your 2400R with a Low Noise Block Downconverter (LNB), it must have a minimum gain of 55 dB.

Signal Strength and Line Amplifiers

If your cable runs are over 150 feet, or if terrain or other factors affect your signal strength, you may need to install a line amplifier.

Check the [SIGNAL STRENGTH] LEDs on the 2400R. If no LEDs are lit, install a 950-1450 MHz 20 dB Line Amplifier on the IF IN line to the 2400R. If one LED is lit, a line amplifier may improve your reception.

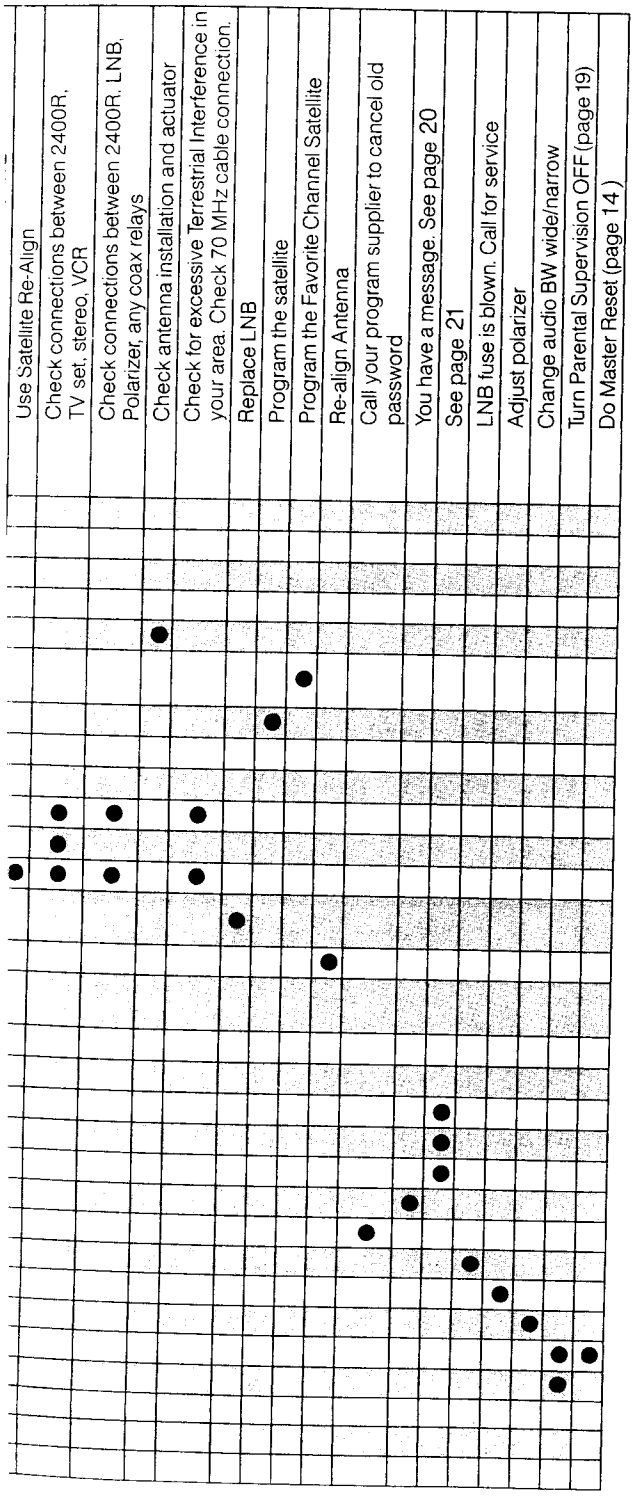
These tests should be run ***after*** your system is installed.

Troubleshooting guide

Before calling your General Instrument dealer or the General Instrument Customer Service Department, check the following chart for the possible cause of your problem. A minor adjustment by you may eliminate the trouble and restore your reception. To use this chart, simply identify the Error Message or the problem you are experiencing on the chart. Then look across for possible solutions.

Error Message	CHECK THESE THINGS: Check power on TV set, stereo	Check 2400R fuse	Verify that 2400R and your TV are on same channel (3 or 4)	Try holding key for 3 seconds.	Enter satellite with memory LOCK OFF	Try East and West with Memory LOCK OFF	Try another channel	Try another satellite	Set Memory LOCK ON	Turn Volume up with Remote Control	Check the program guide for stereo broadcast	With 2400R on, disconnect 950-1450 MHz IF IN Cable	If signal level decreases 2400R is ok. Problem may be in LNB.	Verify that EL and WL are programmed.	Check tuning of channel	Verify that you are on a VideoCipher II channel	Verify that you are in correct mode (SAT/TV)	Check that your polarizer moves	Check that 2400R Remote LED Blinks	Check that Parental Supervision is not ON	DO THE: Replace batteries in Remote Control	Move antenna away from Limit. Re-set Limit EL or WL	Program Limits EL and/or WL
✱-- Limits are not programmed														●									●
--✱- West limit not set														●									●
--✱ East limit not set														●									●
✱ 4 Satellite memory full (24C or 8 Ku)					●																		
✱ 2 No return pulse from Actuator																						●	
✱ 3 Satellite not in memory for Favorite Channel recalled																							
✱ 6 Enter satellite before storing Favorite Channel																							
PS Parental Supervision is in effect																							
Remote Control not working									●										●		●		
No picture and/or no sound	●	●	●			●	●	●				●											
No stereo on VideoCipher II Channel										●	●												
Noisy picture/noisy sound						●	●	●				●											
Signal strength maximum, but no picture and no sound on any satellite						●	●	●				●	●										
No VideoCipher II LED															●	●							
Number keys and other VideoCipher II keys do not work																●							
Cannot change channel																	●						
Cannot watch VHF or Cable																	●						
TV displays "NO SUBSCRIPTION"																							
TV displays "NEEDS AUTHORIZATION"																							
TV displays "PROGRAM BLACKED OUT"																							
✱ Blinks in corner of screen																							
You forgot your rating password																							
STANDBY LED is OFF																							
Can't switch Normal to Reverse Polarity																		●					
Poor Audio on Non-VideoCipher II Channels																							
Dish does not move East or West														●						●			
Receiver skips a channel																				●			
Memory lock will not turn off				●																			
No AFC LED									●					●									
Won't change between SAT and TV									●														

ESE THINGS



Before You Call

If you can't solve your problem with the Troubleshooting Guide, try one more thing before you call.

1. Pull the Power Plug from the AC receptacle.
2. Wait 5 minutes.
3. Plug the 2400R back in and try your procedure again.
4. Try a Master Reset (page 14).

Getting Help

If you still can't correct an operating problem, contact your dealer. If your dealer is unable to solve your problem, contact General Instrument Customer Service. ***Please don't open the cabinet*** and attempt to repair the unit, as this will void your warranty.

Unplug the receiver and refer servicing to qualified service personnel when:

- The power supply or plug is damaged.
- The receiver has been exposed to rain or water.
- A solid object or liquid has fallen into the receiver.
- The receiver exhibits a distinct change in performance or does not operate normally.
- The receiver has been dropped or the cabinet has been damaged.

Maintaining Your 2400R

The only maintenance that your 2400R should require is an occasional dusting.

To Service The Receiver

1. Customer Service may be reached at 1-800-344-6754 (Alaska, Hawaii, Canada and Caribbean call 1-704-327-4700), Monday through Friday, 8:30 a.m. - 9:00 p.m., Eastern Time.
2. Do not ship your unit to General Instrument until you are asked to do so. You will be given a Return Material Authorization (RMA) number that ***must*** be sent with your unit. We suggest you attach a piece of masking tape to the bottom of the unit and write the RMA number on it. Use this RMA number in all correspondence with General Instrument about your repair.
3. Label each wire and connector ***before*** disconnecting the receiver.
4. Ship the unit to General Instrument in its original packing box or an equivalent padded container. Prepay the freight to send the unit to General Instrument. We suggest that you insure it for its full value.

   Out of warranty repair costs will be billed to you C.O.D. Freight and handling charges may also be billed C.O.D. See your Warranty Card for details.

Replacement Parts

When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or those which have the same characteristics as the original part. Unauthorized substitutions may result in fire, electrical shock or other hazards.

Safety Check

After completing any service or repairs to this receiver, ask the service technician to perform safety checks to determine that the receiver is in proper operating condition.

Wiring Diagrams

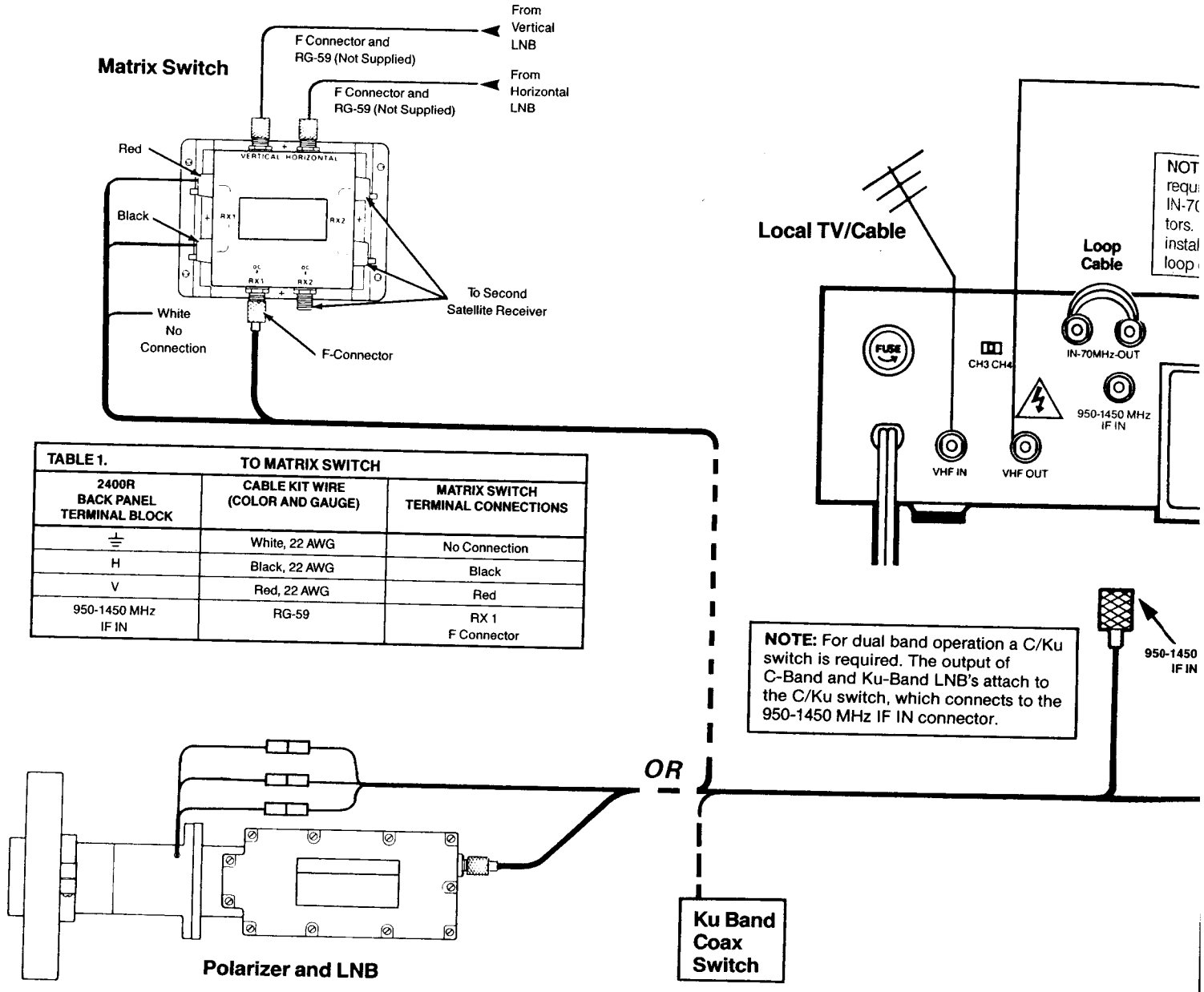


TABLE 1.	TO MATRIX SWITCH	
2400R BACK PANEL TERMINAL BLOCK	CABLE KIT WIRE (COLOR AND GAUGE)	MATRIX SWITCH TERMINAL CONNECTIONS
⏚	White, 22 AWG	No Connection
H	Black, 22 AWG	Black
V	Red, 22 AWG	Red
950-1450 MHz IF IN	RG-59	RX 1 F Connector

NOTE: For dual band operation a C/Ku switch is required. The output of C-Band and Ku-Band LNB's attach to the C/Ku switch, which connects to the 950-1450 MHz IF IN connector.

TABLE 2.	TO POLARIZER AND LNB (MOTOR-TYPE POLARIZER)		
2400R BACK PANEL TERMINAL BLOCK	CABLE KIT WIRE (COLOR AND GAUGE)	POLARIZER (COLOR AND GAUGE)	LNB
⏚	Black, 19 AWG	Brown, 19 AWG	———
⎍	White, 19 AWG	Orange, 19 AWG	———
+5	Red, 19 AWG	Red, 19 AWG	———
950-1450 MHz IF IN	RG-59	———	F-Connector

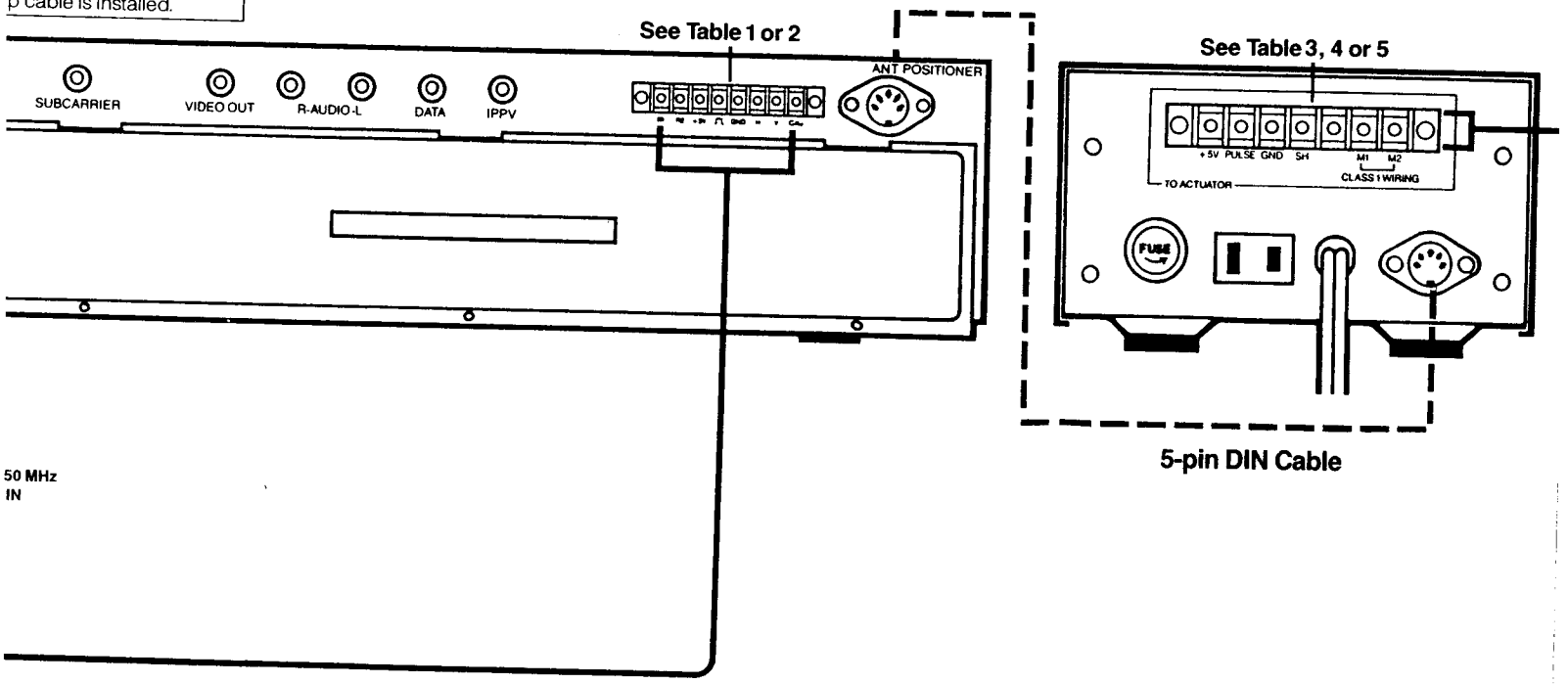
Note to installer:
At the installation, ground the antenna according to Section 250-81 of NEC/NFPA No. 70.

TV

)TE: If TI Filter is
quired, connect TI Filter to
70 MHz-OUT connec-
s. If no TI Filter is
talled, ***make sure*** the
p cable is installed.

The circuit between M1 and M2 is capable of producing up to 50 volts and may result in severe electrical shock. The wiring should be installed by a qualified electrician and should conform to all Local codes.

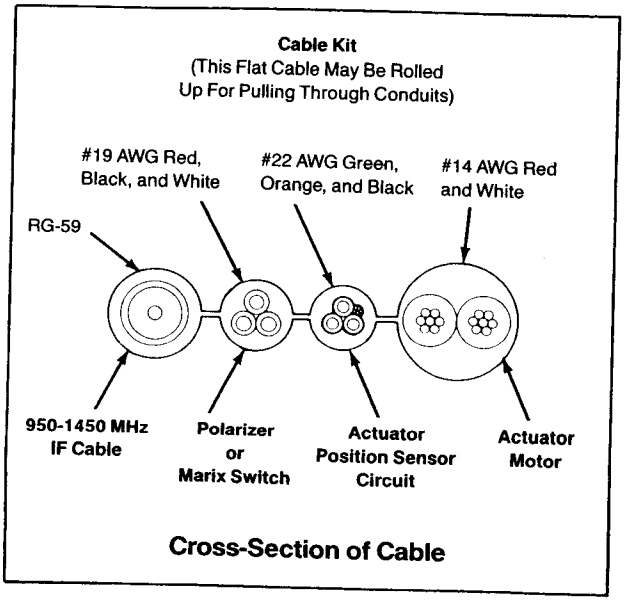
The 2400R must be unplugged during wiring and troubleshooting, or severe electrical shock may result.



MATRIX SWITCH NOTES	
1. When Red (V) is +, TV is being received from vertical LNB. When Black (H) is +, TV is being received from horizontal LNB.	2. The Matrix Switch is designed for indoor use only.

Note to Satellite System Installer:

Please pay close attention to Article 810-20 of the National Electrical Code that provides guidelines for proper installation of antenna discharge units. In particular, this article specifies that each conductor of a "lead-in" from an outdoor antenna shall be provided with a listed antenna discharge unit except where the lead-in conductors are enclosed in a continuous metallic shield that is effectively grounded.



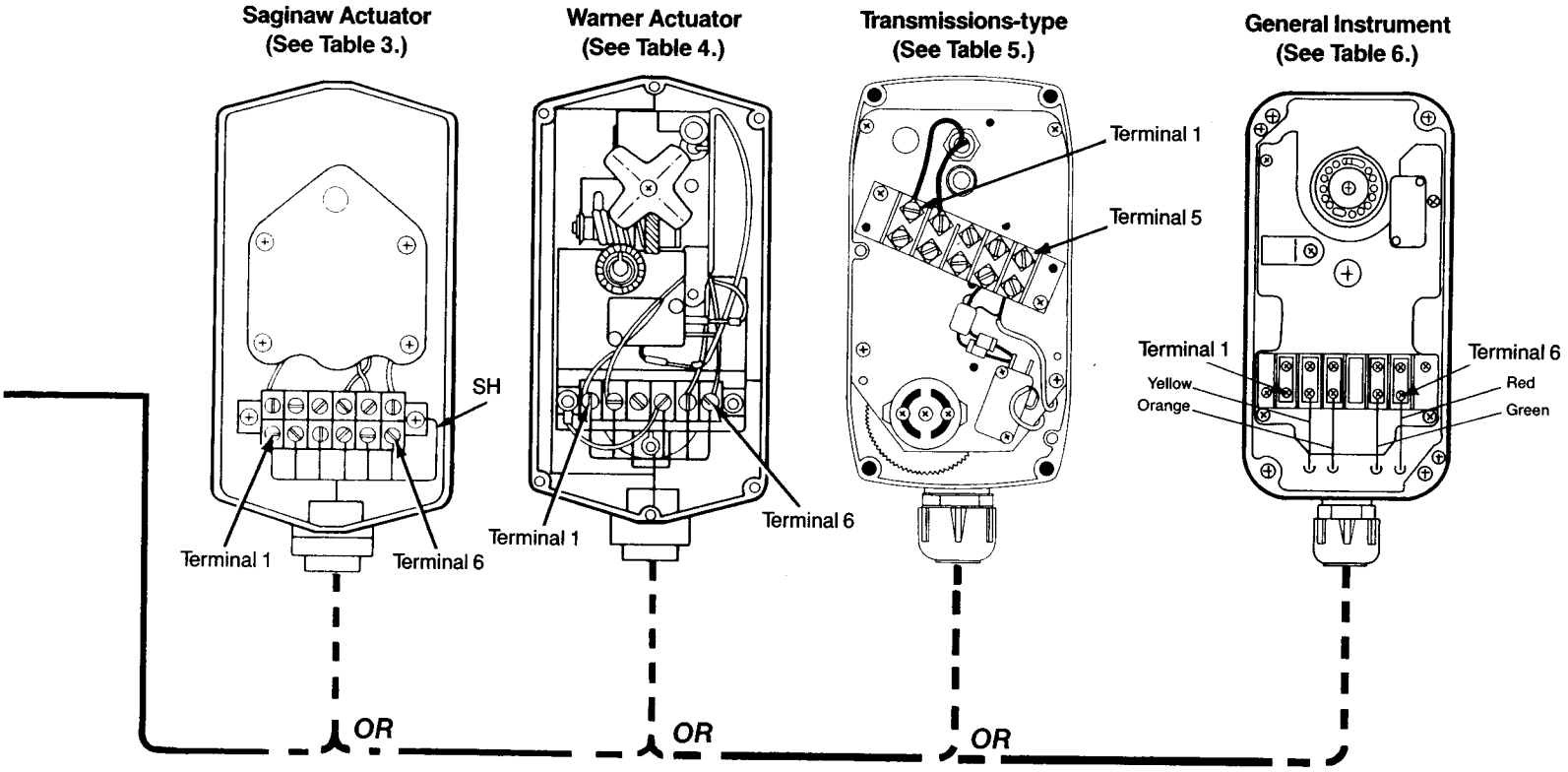


TABLE 3. TO SAGINAW ACTUATOR (ACTUATOR WITH MECHANICAL POSITION SENSOR)

ANTENNA POSITIONER TERMINAL BLOCK	CABLE KIT WIRE (COLOR AND GAUGE)	ACTUATOR CONNECTION (EASTERN)	ACTUATOR CONNECTION (WESTERN)
+5	Orange, 22 AWG	Terminal 4	Terminal 4
Pulse	Green, 22 AWG	Terminal 5	Terminal 5
⏚	Black, 22 AWG	Terminal 6	Terminal 6
SH	Uninsulated Drain Wire	As shown	As shown
M1	Red, 14 AWG	Terminal 2	Terminal 1
M2	White, 14 AWG	Terminal 1	Terminal 2

TABLE 4. TO WARNER ACTUATOR (ACTUATOR WITH REED SWITCH POSITION SENSOR)

ANTENNA POSITIONER TERMINAL BLOCK	CABLE KIT WIRE (COLOR AND GAUGE)	ACTUATOR CONNECTION (EASTERN)	ACTUATOR CONNECTION (WESTERN)
+5	Orange, 22 AWG	No Connection	No Connection
Pulse	Green, 22 AWG	Terminal 1	Terminal 1
⏚	Black, 22 AWG	Terminal 2	Terminal 2
SH	Uninsulated Drain Wire	Terminal 4	Terminal 4
M1	Red, 14 AWG	Terminal 6	Terminal 5
M2	White, 14 AWG	Terminal 5	Terminal 6

TABLE 5. TO TRANSMISSION-TYPE DRIVE (MOTOR WITH REED SWITCH POSITION SENSOR)

ANTENNA POSITIONER TERMINAL BLOCK	CABLE KIT WIRE (COLOR AND GAUGE)	ACTUATOR CONNECTION (EASTERN)	ACTUATOR CONNECTION (WESTERN)
+5	No Connection	No Connection	No Connection
Pulse	Green, 22 AWG	Terminal 1	Terminal 1
⏚	Black, 22 AWG	Terminal 2	Terminal 2
SH	Uninsulated Drain Wire	Terminal 3	Terminal 3
M1	White, 14 AWG	Terminal 4	Terminal 5
M2	Red, 14 AWG	Terminal 5	Terminal 4

TABLE 6. TO GENERAL INSTRUMENT ACTUATOR (ACTUATOR WITH REED SWITCH POSITION SENSOR)

ANTENNA POSITIONER TERMINAL BLOCK	CABLE KIT WIRE (COLOR AND GAUGE)	ACTUATOR CONNECTION (EASTERN)	ACTUATOR CONNECTION (WESTERN)
+5	Orange, 22 AWG	No Connection	No Connection
Pulse	Green, 22 AWG	Terminal 2	Terminal 2
⏚	Black, 22 AWG	Terminal 3	Terminal 3
SH	Uninsulated Drain Wire	Terminal 4	Terminal 4
M1	Red, 14 AWG	Terminal 6	Terminal 5
M2	White, 14 AWG	Terminal 5	Terminal 6

EAST/WEST CONNECTIONS

NOTE: Eastern refers to the US east of 104° west longitude.
Western refers to the US west of 104° west longitude.

Specifications

IF

Input Frequency	950 to 1450 MHz
Input Impedance	75 ohm
Input Level	– 60 to – 20 dBm
Noise Figure	18dB maximum
Number of Channels	24 channels in C-band 32 channels in Ku-band
Second IF Frequency	70 MHz and 403 MHz
Bandwidth	27 MHz at 3 dB point
Threshold (static)	9.0 dB C/N maximum
Local Oscillator Radiation	Less than -60 dBm
AFC Characteristics	Pull-in and tracking range of ±5 MHz
Demodulator	PLL Demodulator

Video

De-emphasis	525 line CCIR Rec. 405-1
Frequency Response	10 Hz to 4.2 MHz at – 3 dB
DG and DP	10% and 5° maximum at 10 to 90 APL
Output Impedance	75 ohm
Clamping	Better than 40 dB
S/N	50 dB min. weighted at 16 dB C/N (10.7 MHz peak dev.)
Output Level	1V p-p

VHF Output

Impedance	75 ohm
Channel	CH 3 or 4
Level	9.5 dBmv max.

Audio

Subcarrier	5.0 to 8.5 MHz
Bandwidth	180 KHz narrow at – 6 dB 280 KHz wide
Modes	6.2, 6.8 MHz, Tunable. Mono only.
Frequency Response	±1.0 dB, 30 Hz to 15 kHz in VC mode. ±2.0 dB, 30 Hz to 15 kHz in non-VC mode.
De-emphasis	75 micro sec.
Harmonic Distortion	0.5% maximum in VC mode 1.5% maximum in non-VC mode
S/N	75 dB minimum in VC mode at 12 dB C/N 50 dB minimum in non-VC mode at 16 dB C/N

Sub Carrier Output

De-emphasis	525 line CCIR Rec. 405-1
Frequency Response	10 Hz to 8 MHz
Output Impedance	75 ohm
Output Level	1V p-p

Physical/Environmental

Temperature	0 to 40° C
Humidity	95% relative
Dimension	17.12 " x 2.95" x 11.98"
Weight	16 lb., 12 oz.
Power Input	115V ± 10% AC 50W Nominal, 60 Hz

All specifications subject to change without notice.

Pre-Installation Checklist

System Components

Check that all of the following items have been packed with the 2400R. If any of the items are missing or appear damaged, contact your dealer.

70 MHz Loop Cable

A single 3" RF-type cable is packed with the receiver for 70MHz loop-through. *This cable must be connected if no external TI Filter is being used.*

Remote Control Unit

The Remote Control can be used to control most 2400R functions.

Manual

The Manual contains detailed installation and operating instructions.

User's Guide

Keep this Guide near your 2400R It contains the information that you'll need for daily use.

Warranty Card

Please return the Warranty Card to General Instrument after you complete the installation.

2000PS Antenna and Positioner Power Supply and Cable (Optional)

The optional 2000PS Power Supply controls the position of the dish. The 5-pin DIN cable packed with the Power Supply is used to connect it to your 2400R.

Complete the Pre-Installation Checklist.

The Pre-Installation Checklist items can affect the performance of the 2400R.

Please review the Checklist to make sure that you have completed each item that applies to the type of system that you are installing.

How To Use This Checklist

A satellite TV system has many sophisticated electronic and mechanical components in addition to the 2400R Receiver. Unless these components are installed and operating correctly, you will not get the best possible reception from the system.

Please keep this Checklist available for reference and provide it to any installer or service technician who is working on your satellite system.

1. Read ***"Important Safeguards"*** at the beginning of this manual.
2. Complete sections 1 and 2 ***before*** installing the 2400R.
3. Complete sections 3, 4 and 5 ***before*** turning the power ON.

1. Electrical

___ Unit is disconnected.
___ Unit is not located near water or moisture.
___ Unit will be attached to a properly grounded receptacle.
___ AC plug will be held securely in receptacle.
___ Power cord is protected from pinching.
___ Circuit will not be overloaded.
___ Outdoor antenna is properly grounded.
___ Outdoor antenna is away from power lines.

2. Location

___ Unit will be adequately ventilated.
___ Unit will not be installed near heat source.
___ Unit will be on a stable surface.

3. Wiring

___ All wiring corresponds to manufacturer's recommendations or equivalent.
___ Long cable runs have been fitted with line amplifiers.
___ RG-6/RG-59 connectors have had their center wires trimmed.
___ All Splitters will pass DC voltage up to 20 volts.
___ Actuator is wired according to diagrams.
___ All F and N connectors have been weatherproofed with coax seal.

4. Equipment

___ LNA/BDC or LNB meets minimum gain guidelines.

5. Dish Adjustments

___ Polar axis has been aligned.
___ Elevation has been set.
___ Declination has been adjusted.

Publication #73359-1 Rev. B
Printed in USA 4/90

GENERAL INSTRUMENT

VideoCipher Division
Technical Service Dept.
P.O. Box 700
Hickory, NC 28603