Standard Communications

SATELLITE & BROADBAND

PRODUCTS DIVISION

AGILE IRD-II

Satellite Receiver/Descrambler
Model: MT650

OWNER'S MANUAL

CONTENTS

SATELLITE

BROADBAND

9834

AGILE IRD-II
SATELLITE RECEIVER/DESCRAMBLER

OWNER'S MANUAL

This manual is intended for use by the end user and qualified technicians. This manual includes all necessary information pertaining to the Agile IRD-I Satellite Receiver/Descrambler applications and installation. Changes that occur after date of printing will be incorporated in later versions of this manual or in supplemental service bulletins.

SAFETY CONSIDERATIONS
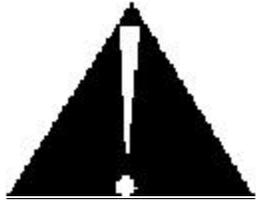
CAUTION

RISK OF ELECTRIC SHOCK

DO NOT OPEN

AVIS – RISQUE DE CHOC ELECTRIQUE – NE OAS OUVRIR

For user safety, one or more of the caution labels shown here may have been affixed to the side or rear panels of this equipment. The significance of the two symbols enclosed by triangles is described below:

This symbol means that dangerous voltage levels are present within the equipment. These voltages are not insulated, and may be of sufficient strength to cause bodily injury if touched. The symbol may also appear on schematics.

This symbol calls attention to a critical procedure, or means refer to the instruction manual for operating or service information. Only qualified service personnel are to install or service the equipment. The symbol may also appear in text and on schematics.

WARNING: TO REDUCE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE!

See the **IMPORTANT SAFEGUARDS** on the following pages for additional safety instructions.

IMPORTANT SAFEGUARDS

Standard Communications Corp. (SCC) strongly advises the user to understand the following safety instructions prior to installing and operating this equipment.
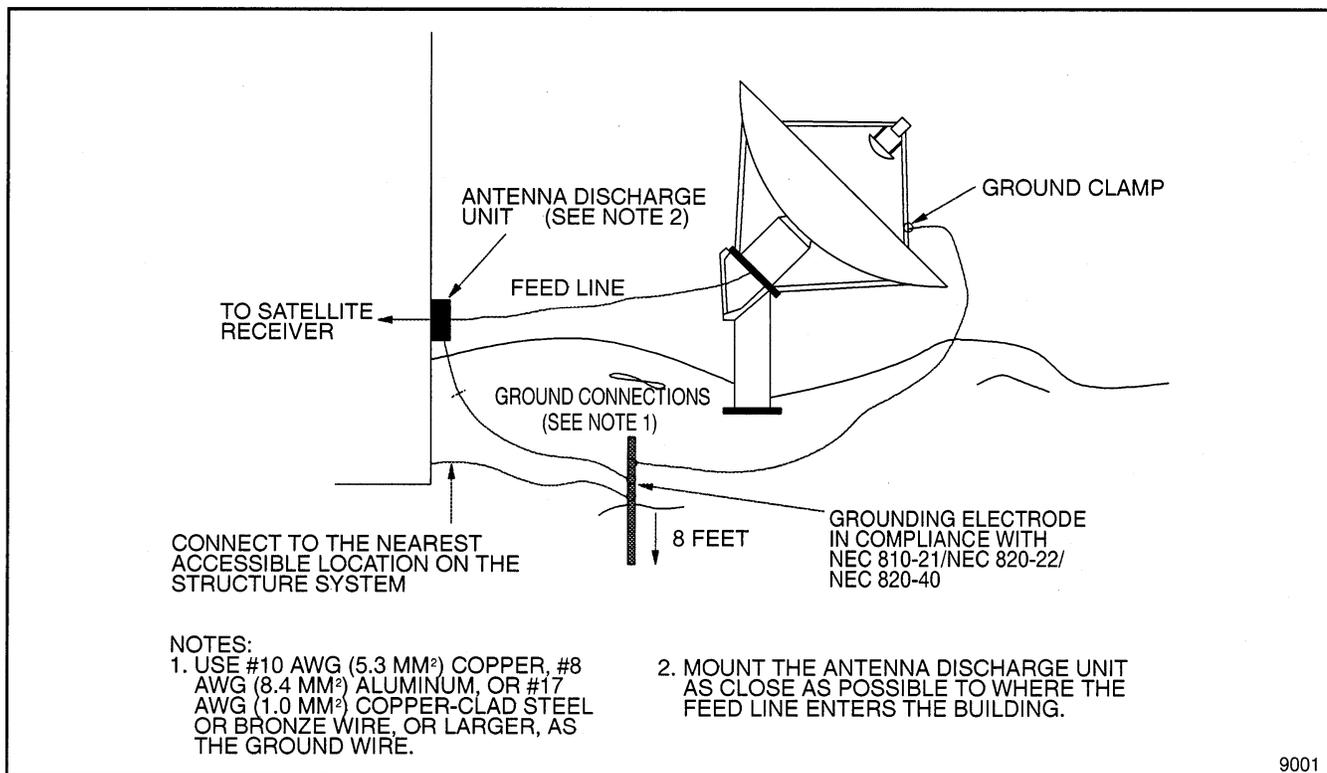
1. **⚠ VideoCipher Module Installation –** Serious electrical damage will result if power is not turned off prior to installing or removing the Videocipher Module.

2. **Read Instructions –** All safety and operating instructions should be read before operating this equipment.

3. **Retain Instructions –** Safety and operating instructions should be retained for future reference.

4. **Heed Warnings –** All warnings on the equipment and in the operating instructions should be adhered to.

5. **Follow Instructions –** Installation, operating and use instructions should be followed.

6. **Cleaning –** Unplug the equipment from the ac power outlet before cleaning. Do not use liquid cleaners or aerosol cleaners.

7. **Attachments –** Do not use accessories or attachments not recommended by SCC as they may cause hazards.

8. **Water and Moisture –** Do not operate in high-humidity areas.

9. **Accessories –** Do not place this equipment on an unstable cart, stand, tripod, bracket, or table. The unit may fall, causing serious personnel injury and serious damage to the unit. Install only in a mounting rack recommended by SCC. The installation of this equipment and/or any required component or accessory must be as described in the Installation Section of this manual.

10. **Ventilation –** Do not block or cover slots and openings in this equipment. These are provided for ventilation and protection from overheating. Never place this equipment near or over a radiator or heat register. This equipment should not be placed in an environment where proper ventilation is not provided.

11. **Power Sources –** Operate this equipment only from the type of power source indicated on the marking label.

12. **Grounding or Polarization –** This equipment is equipped with a polarized ac line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug into the outlet, try reversing the plug. If the plug still does not fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

13. **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 unit.

14. **Outdoor Antenna Grounding –** Be sure that the outdoor components of the antenna system are grounded in accordance with local, Federal, and National Electric Code (NEC) requirements. Pay particular attention to NEC Sections 810 and 820. See Figure 1 for typical grounding.

15. **Lightning –** For added protection during a lightning storm, or when the equipment is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the lines between this equipment and the antenna subsystem. This will prevent damage to the equipment that could be caused by lightning or powerline surges.

16. **Power Lines –** The antenna subsystem should not be located in the vicinity of over-head power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing the antenna subsystem, extreme care should be taken to keep from touching such power lines or circuits, as contact with them might be fatal.

17. **Overloading –** Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

18. **Object and Liquid Entry** – Never push objects of any kind into this equipment through openings as the objects 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 equipment.

19. **Servicing** – Refer all servicing to qualified SCC personnel; opening or removing covers may expose dangerous voltages.

20. **Damage Requiring Service** – Unplug the equipment from the wall outlet and refer servicing to qualified SCC service personnel under the following conditions:

a. If the power supply cord or plug is damaged;

b. If liquid has been spilled, or objects have fallen into the equipment;

c. If the equipment has been exposed to rain or water;

d. If the equipment does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. An improper adjustment of other controls may result in damage and will often re-

quire extensive work by a qualified technician to restore the equipment to its normal operation;

e. If the equipment has been dropped or the cabinet has been damaged;

f. If the equipment exhibits a distinct change in performance which is an indication of need for service.

21. **Replacement Parts** – When replacement parts are required, ensure that the service technician has used replacement parts specified by SCC. Unauthorized substitutions may result in fire, electric shock or other hazards.

22. **Safety Check** – Upon completion of any service or repair to the equipment, ask the service technician to perform safety checks to determine that the equipment is in proper operating condition.

NOTE

CATV SYSTEM INSTALLERS: Use #10 AWG (5.3mm^2) copper, #8AWG (8.4mm^2) aluminum, #17AWG (1.0mm^2) copper-clad steel or bronze wire, or larger, as ground wire. Mount antenna discharge unit as close as possible to where feed line enters the building.

ANTENNA DISCHARGE UNIT   (SEE NOTE 2)

GROUND CLAMP

FEED LINE

TO SATELLITE RECEIVER

GROUND CONNECTIONS (SEE NOTE 1)

CONNECT TO THE NEAREST ACCESSIBLE LOCATION ON THE STRUCTURE SYSTEM

8 FEET

GROUNDING ELECTRODE IN COMPLIANCE WITH NEC 810-21/NEC 820-22/ NEC 820-40

NOTES:
1. USE #10 AWG (5.3 MM^2) COPPER, #8 AWG (8.4 MM^2) ALUMINUM, OR #17 AWG (1.0 MM^2) COPPER-CLAD STEEL OR BRONZE WIRE, OR LARGER, AS THE GROUND WIRE.

2. MOUNT THE ANTENNA DISCHARGE UNIT AS CLOSE AS POSSIBLE TO WHERE THE FEED LINE ENTERS THE BUILDING.

9001

Figure 1. Typical Antenna System Installation

VideoCipher Module Installation

CAUTION

Serious electrical damage will result if power is not turned off prior to installing or removing the Video-Cipher Module.

1. Disconnect the receiver's AC power cord from the AC source.

2. Remove the 4 screws from the receiver rear panel surrounding the access panel.

3. Remove the access panel from the receiver.

4. Carefully insert the VideoCipher Module into the rear of the receiver until the module's connectors engage the receiver's internal connectors.

5. Replace the access panel and the four screws.

TABLE OF CONTENTS

1.1   DESCRIPTION

NOTE

VideoCipher® is a licensed trademark of General Instrument Corporation. SCC's AGILE IRD-II can accept either a VideoCipher II Commercial Descrambler Module, a VideoCipher II Plus Commercial Descrambler Module, or a VideoCipher RS Descrambler Module. The term "VideoCipher module" in this manual refers to all module types.

The Standard Communications Corp. (SCC) AGILE IRD-I is a commercial C-/Ku-band satellite receiver and integrated VideoCipher descrambler. The unit may be referred to as an IRD (integrated receiver/decoder) or simply a receiver in this manual.

The receiver is designed for use in MSOs, independent CATV and high-end SMATV systems. The receiver and VideoCipher module are in a common 19-inch-wide rack-mountable chassis, 1.75 inches high. The receiver uses a 950 to 1450 MHz RF input and a 70 MHz intermediate frequency (IF) output. The VideoCipher Module can be easily slid into or removed from the chassis from the rear panel. The module's address label is visible through a slot on this panel.

Satellite transponder (channel) or frequency selection is by a front-panel thumbwheel switch. Either C-Band or Ku-Band transponder frequencies may be selected directly by the thumbdial switch. Alternatively, C-Band standard channels 1–24 may be selected, eliminating the step of setting a frequency. When a frequency is selected directly, video inversion is performed automatically.

The VideoCipher right, left, and mono audio output levels are adjustable from the front panel with a single AUDIO L/R/MONO control. A detent on the control represents an internally adjustable 0 dBm output level (± 1 dB). The bypass mono audio signal is provided by the #1 audio subcarrier demodulator. An internal adjustment provides setup and calibration. The output level is adjusted for 0 dBm when tuned to a standard C-band 6.8 MHz mono subcarrier (150 kHz peak deviation). The Video/Composite output level for bypass and VideoCipher descrambling are both adjustable from the front

panel VIDEO LEVEL potentiometer. The detent position of this potentiometer is a calibrated 1 V p-p output with a standard VideoCipher scrambled video signal (10.75 MHz video deviation at C-band and 9.2 MHz at Ku-Band). A front panel VIDEO/OSD test point allows output level monitoring when terminated into a 75 ohm load. The 70 MHz IF output is a 50 ohm impedance and a level of approximately –30 dBm throughout the AGC range. The #1 audio can be turned off so that in the bypass mode, the operator can defeat the bridging of the #1 audio across the R/L & Mono outputs.

NOTE

Without a VideoCipher Module, the AGILE IRD-II will perform as a normal satellite receiver without descrambling capabilities.

1.2   SUMMARY OF AGILE IRD-I FEATURES:

- Licensed for use with VideoCipher II, II Plus, and RS Commercial Descrambler Modules

- Compatible with all satellite scrambling formats

- Active loop-through for block conversion 950 to 1450 MHz RF input

- 70 MHz IF loop-through for inserting terrestrial interference filters

- Six available 70-MHz bandpass filters for mild terrestrial interference environments and Ku-band half transponders

- Optional broadcast quality second audio subcarrier Phase-Locked-Loop demodulator

- Complete frequency agility at Ku-band and C-band frequencies, made possible with Phase-Locked-Loop frequency synthesis

- Built-in current-limited 20 VDC for powering LNBCs and LNAs

- Critical output levels are factory precalibrated at detent positions

- Gold Standard Support Program, seven-year guarantee/lifetime loaner program

SPECIFICATIONS

AGILE IRD-II

GENERAL SPECIFICATIONS

Operating Temperature Range	−4 to +122 °F (−20 to +50 °C)
Operating Humidity Range	0 to 60% (Noncondensing)
Operating Altitude Range	0 to 15, 000 ft (0 to 4, 572 m)
Primary Power	120 VAC 50–60 Hz
Power Consumption	20 W
Dimensions (H x W x D)	1.75 x 19 x 18.5 inches (44.5 x 483 x 470 mm)

RF CHARACTERISTICS

Frequency Range	950 to 1450 MHz
Input	
Level	−20 to −65 dBm
Impedance	75 ohms
Return Loss	14 dB
Noise Figure	12 dB
Gain Variation	6 dB
Loop-Thru	
Gain	0.5 dB
Noise Figure	8 dB
Return Loss	14 dB
Local Oscillator RF Input	−70 dBm
Local Oscillator Loop-Thru Output	−50 dBm

IF CHARACTERISTICS

1st IF Frequency	612 MHz
Image Rejection (1st IF)	60 dB
IM3	50 dB
2nd IF Frequency	70 MHz
2nd IF Bandwidth (3 dB)	30 MHz
2nd IF Test Level	−30 dBm
2nd IF Impedance	50 ohms
2nd IF Fine Tune Range	± 5 MHz
AGC Range	40 dB
FM Static Threshold	7.5 dB
FM Dynamic Threshold	11.5 dB

VIDEO/COMPOSITE PERFORMANCE (UNSCRAMBLED)

Video/Composite Output Level	0.5 to 1.5 V p-p
Gain Frequency Distortion	5 IRE
Output Impedance	75 ohms
Frequency Response (50 Hz to 4.2 MHz)	1.5 dB
Differential Gain	3%
Differential Phase	3 Degrees
Dispersal Rejection	40 dB
S/N Ratio (Luminance-Weighted, Maximum C/N)	60 dB
Short Time Distortion	3 IRE
Line Time Distortion	2 IRE
Chrominance to Luminance	
Gain Inequality	4 IRE
Delay Inequality	± 25 nsec

(Continued)

VIDEO PERFORMANCE CHARACTERISTICS (Unscrambled) (Continued)

Chrominance:	
Nonlinearity Gain	3 IRE
Nonlinearity Phase	3 Degrees
Vertical Interval Distortion	2 IRE
Field-Time Waveform Distortion	3 IRE
Luminance Nonlinearity	5%
Video Test Level	0.5 to 1.5 V p-p
Video Test Impedance	75 ohms

#1 AUDIO PERFORMANCE (UNSCRAMBLED)

Subcarrier Frequency	6.8 MHz
De-emphasis	75 μsec
Output Level R/L/ & Mono	$\pm$ 17 dBm (Peak)
Output Impedance R/L/ & Mono 600 ohms Balanced	0 dBm at Center Detent
Harmonic Distortion (50 Hz to 90 kHz)	1%
Frequency Response (50 Hz to 15 kHz)	1 dB
Hum and Noise (50 Hz to 15 kHz)	60 dB

OPTIONS

Space and power are provided in the receiver for the options described below.	

CAD800C Option

The CAD800C is a second audio subcarrier demodulator that can be installed in the front panel of the receiver. Specifications follow.	
Subcarrier Frequency	5.0 to 8.5 MHz
Tuning method (adjustable)	Thumbdial
Frequency Response ($\pm$ 1 dB)	50 Hz to 15 kHz
Output impedance	600 Ohms balanced
De-emphasis	75 μsec
Output Level	10 dBm @ 150 kHz Deviation (Adjustable)
Bandwidth:	
Narrow	150 kHz
Medium	330 kHz
Wide	440 kHz
Harmonic Distortion:	
Narrow	1.0%
Medium	1.0%
Wide	1.0%

CBP70

The CBP70 is a 2nd IF bandpass filter that can be installed internally to replace the standard 30 MHz 2nd IF bandpass filter. The CBP70 allows the standard filter to be replaced with either a 16, 18, 22, 25, or 31 MHz bandpass filter. There are no external controls or specifications related to its operation.	

TERRESTRIAL INTERFERENCE FILTERS

|	
Commercial notch filters are available to reduce the effects of terrestrial interference (TI). SCC recommends the use of filters from Microwave Filter Company telephone (800) 448-1666–such as their part number 3217LS-60/80/F. These filters may be connected to the two F-type connectors marked EXT 70 MHz TRAP on the receiver rear panel. The same company makes tunable filters at 950 to 1450 MHz (such as part numbers 5111 or 5316) that may be installed in the line prior to the receiver's rear-panel RF INPUT 950 to 1450 MHz connector (F-type). Use the manufacturer's specifications for these filters.	

This section describes the receiver's controls, indicators, and connectors. Figure 3-2 on the following page shows front and rear views of IRD-I controls, indicators, and connectors.

NOTE

Numbers in parentheses in this section refer to circled callouts in Figure 3-2.

3.1   FRONT PANEL

3.1.1   Indicators (See Figure 3-1)

2477
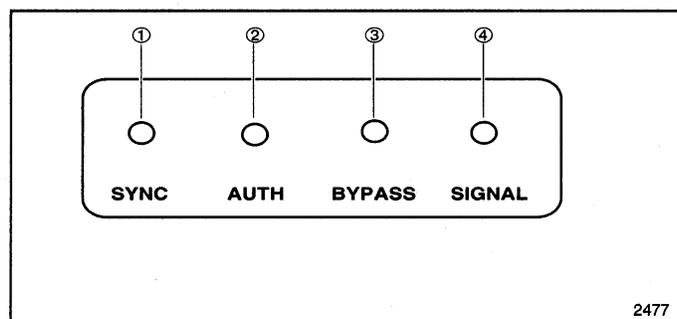
Figure 3-1. LED Display

(1) **SYNC** (Green LED). Lights when an encrypted signal is recognized by the VideoCipher Module. Note that this does not mean that the signal is descrambled by the module; descrambing occurs only if authorized.

(2) **AUTH** (Green LED). Lights when a scrambled signal is recognized by the VideoCipher Module and descrambling is authorized by the module.

(3) **BYPASS** (Red LED). Lights when an unscrambled signal is received, indicating that the VideoCipher Module is bypassed, and the receiver video and 6.8 MHz audio baseband circuits are functioning as a conventional receiver.

(4) **SIGNAL** (Green/Red LED). Lights GREEN when the RF input signal is between -25 and -60 dBm. Lights RED when the RF input signal is above or below this range. Note that this LED might go red if the AGC ON/OFF switch is turned off, or if, while the switch is off, the MGC CONTROL is rotated to compensate for TI.

3.1.2   Controls (See Figure 3-2)

(5) **OSD OFF/ON**. Slide switch, normally set to OFF. Functional only on receivers that have the VideoCipher II Plus or RS Module installed. Turns the On-Screen Display (OSD) on or off.

CAUTION

The On-Screen Display, when turned on, is included with the receiver's video signal output. Make sure this is acceptable with current operations before setting the OSD switch to ON.

(6) **AFC OFF/ON**. Slide switch, normally ON. In the ON position, automatic frequency control circuitry will "lock on" to incoming RF signals that drift up to ± 6 MHz in frequency. In the OFF position, automatic frequency control circuitry is disabled.

(7) **AGC OFF/ON**. Slide Switch. Turns the receiver's automatic gain control circuitry on or off. The switch is normally ON.

(8) **MGC CONTROL**. Rotary Potentiometer. Active only when the AGC switch is OFF. Manually controls the receiver's gain.

(9) **VIDEO LEVEL**. Controls the video level at the rear-panel VIDEO OUTPUT and COMPOSITE OUTPUT connectors. A center detent is factory set to provide a 1 V p-p output.

(10) **AUDIO L/R/MONO**. Simultaneously controls the audio levels at the rear-panel terminal connectors for left, right, and mono audio. A center detent is preset for 0 dBm output.

(11) **FINE TUNE**. Provides a ± 5 MHz fine tuning adjustment of the receiver frequency. This adjustment resets the AFC center frequency for TI rejection.

FRONT PANEL

STANDARD AGILE IRD-II VIDEOCIPHER® RS

COMMERCIAL DESCRAMBLER CAPABLE

SYNC   AUTH   BYPASS   SIGNAL

OSD   AFC   AGC
OFF ON   OFF ON   OFF ON

MGC CONTROL   VIDEO LEVEL   AUDIO L/R/MONO   FINE TUNE

SATELLITE FREQ

1 1 7 5 4

CH #

6800 FREQUENCY

WIDE   MED   NAR   LEVEL

CAD800C BANDWIDTH   #2 SUBCARRIER

70 MHz IF 50 OHMS

① ② ③ ④   ⑤ ⑥ ⑦   ⑧ ⑨ ⑩ ⑪   ⑫   ⑬

CAD800C (OPTIONAL)

REAR PANEL

⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒   ㉓

DISCONNECT AC BEFORE REMOVING VCII MODULE

CAUTION

AVIS - RISQUE DE CHOC ELECTRIQUE-
NE PAS OUVRIR

DATA   CLOCK   CAD800C   LEFT   RIGHT   MONO   VIDEO OUTPUT

+ - + - LANGUAGE + OUT - + OUT - + OUT - + OUT - GND

COMPOSITE OUTPUT   RF INPUT   EXT 70 MHz TRAP   LOOP THRU

Remove four screws to install or remove the VidoeCipher® Module

VideoCipher® ModuleAddress

㉔ ㉕   ㉖   ㉗ ㉘ ㉙

REAR PANEL DETAIL

DATA   CLOCK   CAD800C   LEFT   RIGHT   MONO   VIDEO OUTPUT

+ - + - LANGUAGE + OUT - + OUT - + OUT - + OUT - GND

COMPOSITE OUTPUT   RF INPUT 950-1450 MHz   EXT 70 MHz TRAP   LOOP-THRU 950-1450 MHz

2519

Figure 3-2. IRD-II Controls, Connections, & Indicators

2517

(12) **SATELLITE FREQ/CH**. Five-digit thumbdial switch. The switch may be used to set one of 24 C-Band channels (see Figure 3-3) or either C-Band or Ku-Band satellite frequencies (see Figures 3-4 and 3-5). The following notes are applicable to this switch:

a. For convenience, the five 0-9 segments of the thumbdial switch are referenced 1 through 5 in this document, with the 1st segment being the one on the left.

b. The 1st segment is not electrically connected inside the unit. However, if set to 0 for C-Band and 1 for Ku-Band, the segment can provide a quick visual reminder of the band selected.

c. The 2nd segment of the thumbdial switch is valid only for numbers 0, 1, 2, 3, and 4. The unit's microprocessor recognizes 0, 1, or 2 as the second digit of a Ku-band frequency whose first digit is 1 as in the following examples (where x= any number):

x0950 =10950 MHz (2nd digit of switch =0)
x1730 =11730 MHz (2nd digit of switch =1)
x2750 =12750 MHz (2nd digit of switch=2)

If the 2nd segment is 3 or 4, this is recognized as the most significant digit of a C-band frequency as in the following examples (where x=any number):

x3720 = 3720 MHz (2nd digit of switch=3)
x4180 = 4180 MHz (2nd digit of switch=4)

d. The 3rd, 4th, and 5th segments of the thumbdial switch may each be any number 0 through 9.

e. When the 2nd and 3rd segments of the thumbdial switch are set to zeros, the microprocessor recognizes the 4th and 5th segments as a C-BAND CHANNEL NUMBER. Channel numbers are 1 through 24 (0001 through 0024).

f. Tables of all valid switch settings and their corresponding frequencies are included in the Installation & Operation Section of this manual.

3.1.3   Connectors

(13) **70 MHz IF**. BNC Connector. Provides a test point for the receiver's 70 MHz IF. Impedance is 50 ohms.
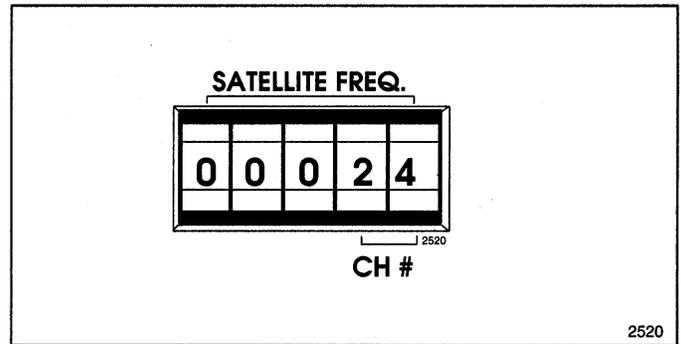

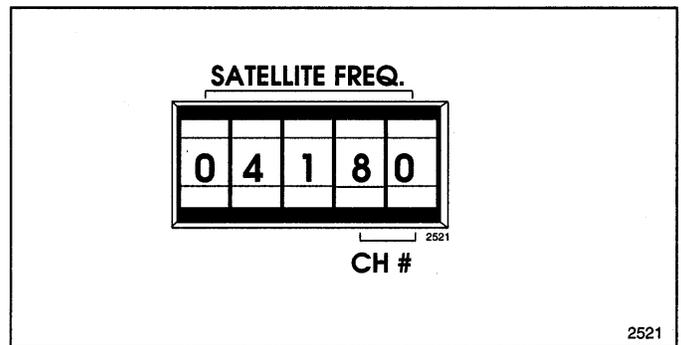**Figure 3-3. Switch Setting for a C-Band Channel**

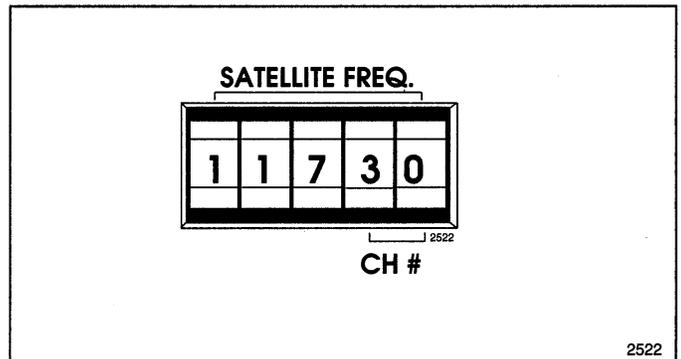**Figure 3-4. Switch Setting for a C-Band Frequency**

Figure 3-5. Switch Setting for a Ku-Band Frequency

3.2 Rear Panel

3.2.1 Controls

There are no controls on the rear panel.

3.2.2 Connectors

Items (15) through (22) below are fourteen #4 spade lug screw terminals of a barrier terminal strip on the rear of the receiver (see Figure 3-2).

(15) **DATA**. Two screw terminals (+ and –). RS422 differential outputs. Data + corresponds to the inverting output of an RS-422 line driver. Used only when the VideoCipher Module is installed.

(16) **CLOCK**. Two screw terminals (+ and –). RS422 differential outputs. Clock + corresponds to the inverting output of an RS-422 line driver. Used only when the VideoCipher Module is installed.

(17) **LANGUAGE**. One screw terminal. Used only when the VideoCipher Module is installed. When the VideoCipher uplinked channel is in the bilingual mode, grounding this terminal will cause the audio on the left uplinked audio channel to be output on both the left and right audio output terminals (19 and 20 below); an open circuit causes the audio on the right uplinked audio channel to be output on the same terminals.

(18) **CAD800C OUT**. Two screw terminals. Provide a 600-ohm balanced output (used with ground terminal) when the optional CAD800C Audio Demodulator is installed in the receiver. See Section 2.4 for a description.

(19) **LEFT**. Two screw terminals for 600 ohms balanced left audio out. Used with ground terminal.

(20) **RIGHT**. Two screw terminals for 600 ohms balanced right audio out. Used with ground terminal.

(21) **MONO**. Two screw terminals. Contains the sum of the signals the right and left audio terminals (19 and 20 above). 600 ohms balanced; used with ground terminal.

(22) **GND**. Screw terminal. Chassis/signal ground.

(23) **VIDEO OUTPUT**. F-type Connector. Provides the filtered and clamped video out of the VideoCipher Module. If the module is bypassed (BYPASS LED on the front panel lit) or not installed, filtered and clamped video from the receiver's FM demodulator circuits is present at this output.

(24) **COMPOSITE OUTPUT**. F-type Connector. Provides a selectable de-emphasized (default) or unde-emphasized composite video out of the receiver. A de-emphasized signal is provided internally to the VideoCipher module via a low-pass filter. The same de-emphasized signal is provided to the video output via a low-pass filter and clamping circuit. The de-emphasis select does not affect the video output.

(25) **RF INPUT**. F-type connector. Input for 950 to 1450 MHz from an antenna subsystem or the RF loop-through out of another receiver.

NOTE

20 VDC is present on the center conductor the RF INPUT connector for use in powering external in-line downconverters , such as LNBCs and LNAs. The 20 VDC is blocked from the LOOP-THRU connector.

(26) **EXT 70 MHz TRAP**. Two F-type connectors. Used for installing optional bandpass filters in the 70 MHz IF signal line. If the filters are not installed, a jumper cable must be installed between these two connectors.

(27) **LOOP-THRU**. F-type connector. Provides an amplified output of the 950 to 1450 MHz RF input to allow serial connection of other receivers. It is suggested that a 75-ohm termination be made at the connector when not used.

(28) **AC POWER CORD**. A two-wire cord with a two-prong polarized ac plug on the free end. The receiver is on when this cord is connected to ac power; there is no power on/off switch on the receiver.

(29) **FUSE**. 250 VAC, 1 Ampere, fast-blow line fuse.

4   INSTALLATION & OPERATION

4.1 MODULE INSTALLATION

CAUTION

Serious electrical damage will result if power is not turned off prior to installing or removing the VideoCipher® Module.

To install a VideoCipher Module into the receiver, perform the following steps:

1. Disconnect the receiver's AC power cord from the AC source.

2. Remove four screws from the receiver rear panel as shown in Figure 3-2.

3. Remove the VideoCipher Module access panel from the left rear of the receiver.

4. Carefully insert the VideoCipher Module into the back of the receiver until the module's connectors engage the receiver's internal connectors.

5. Replace the panel and the four screws.

4.2 INSTALLATION IN SYSTEM

Figure 4-1 shows the basic cabling interconnections required for installing the Agile IRD-I in a typical system.
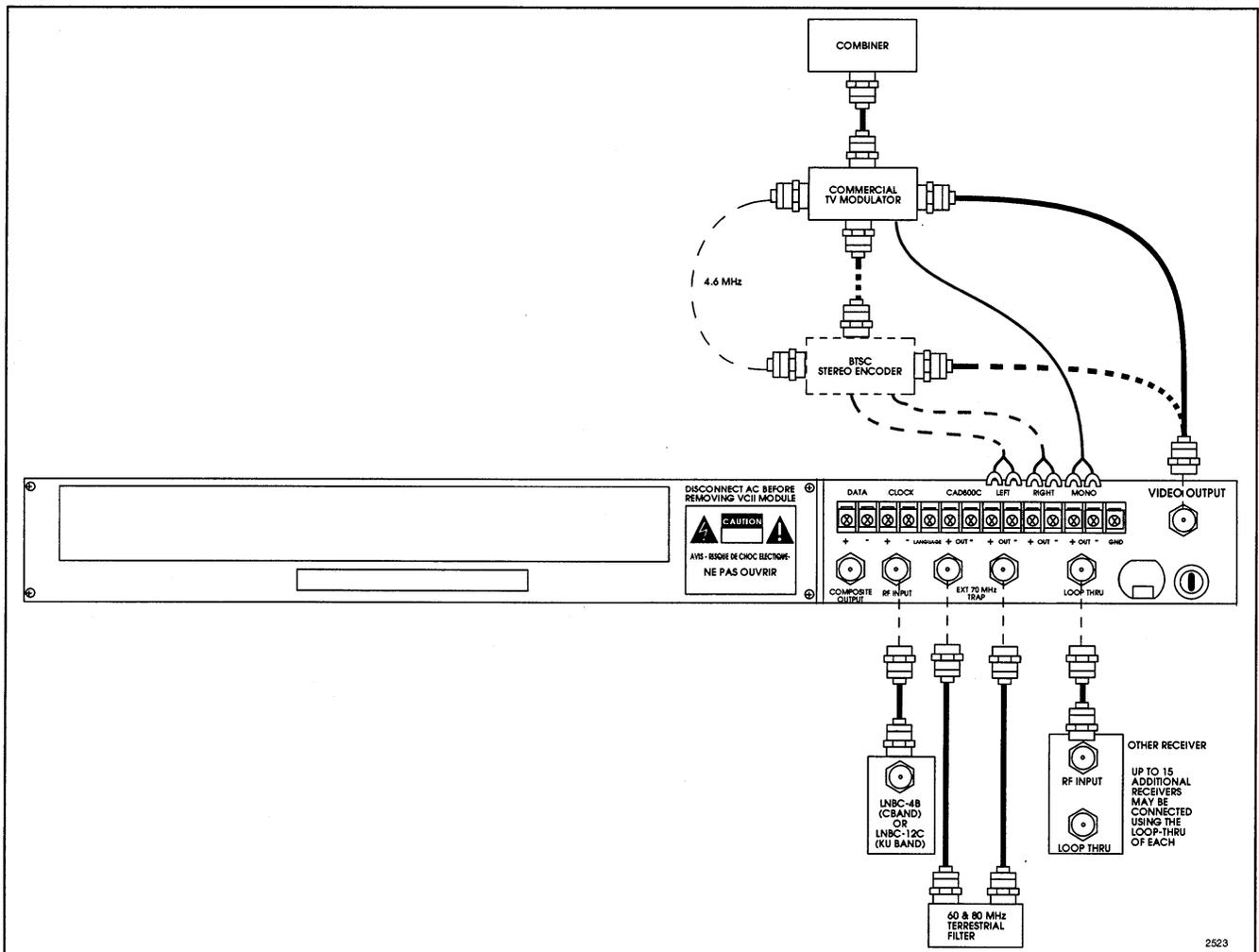

Figure 4-1. AGILE IRD-I In Typical TVRO Hookup

4.3 CAD800C INSTALLATION

1. Remove the 5 screws (2 on each side and 1 at the rear) securing the top cover; detach the top cover of the receiver. If a VideoCipher module cover is installed, remove the 4 screws on the rear panel and remove the cover.

2. Remove the blank plate on the receiver front panel. See Figure 4-2.
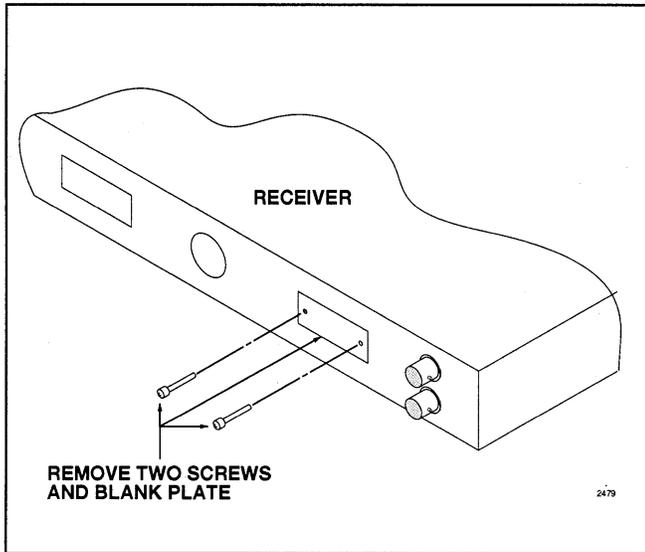
Figure 4-2. Blank Panel Removal

3. Install the CAD800C Control board as shown in Figure 4-3. Fasten with the two screws.

4. Slide the thumbdial into the CAD800C front plate from the front and push it in until it is snug tight.

5. Install the CAD800C front plate into the space where the blank plate was removed. Fasten the plate with the 2 screws.

6. Position the CAD800C board, with solder side up, in location and orientation shown in Figure 4-4.

7. Remove the screw fastening the PU01 board and fold back PU01 to gain access to component side.

8. Make the connections in Table 4-1. See Figure 4-4.

9. Bunch wires together neatly with tie wraps.

10. Slide the CAD800C board into the plastic holders on the side of the receiver. Fasten the CAD800C onto the screw posts with the screws provided.

11. Reinstall the PU01 board and fasten with screw.

12. Replace the cover of the receiver.
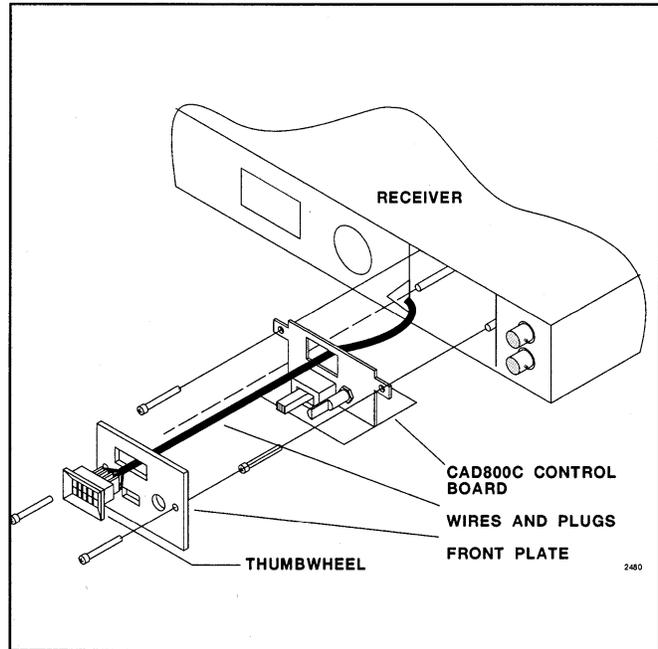
Figure 4-3. CAD800C Panel Installation

Table 4-1. Connections

CONNECTOR (WIRE)	FROM (CAD800C)	TO (RECEIVER)
Gray, Black *	JE06	JE01 of PZ01
Brown, Red, Orange	JE02	JU05 of PU01
Brown, Red, Orange (snap clip)	JE04	JE52 of PE50 (CAD800C control board)
Brown, Red, Orange, Yellow (snap clip)	JE03	JE51 of PE50 (CAD800C control board)
Gray, Gray, Gray, Brown **	JE07	J812 of P801
9-pin connector	Thumbdial	JU03 of PU01
6-pin connector	Thumbdial	JU04 of PU01
Gray coaxial cable	JE01	JK01 of PV01

*For CAD800C boards prior to serial number XXU390001, connector wire with SCC Part Number YB00470080 is needed to make this connection.

** For CAD800C boards prior to serial number XXU390001, connector wire with SCC Part Number YB00560170 is needed to make this connection.
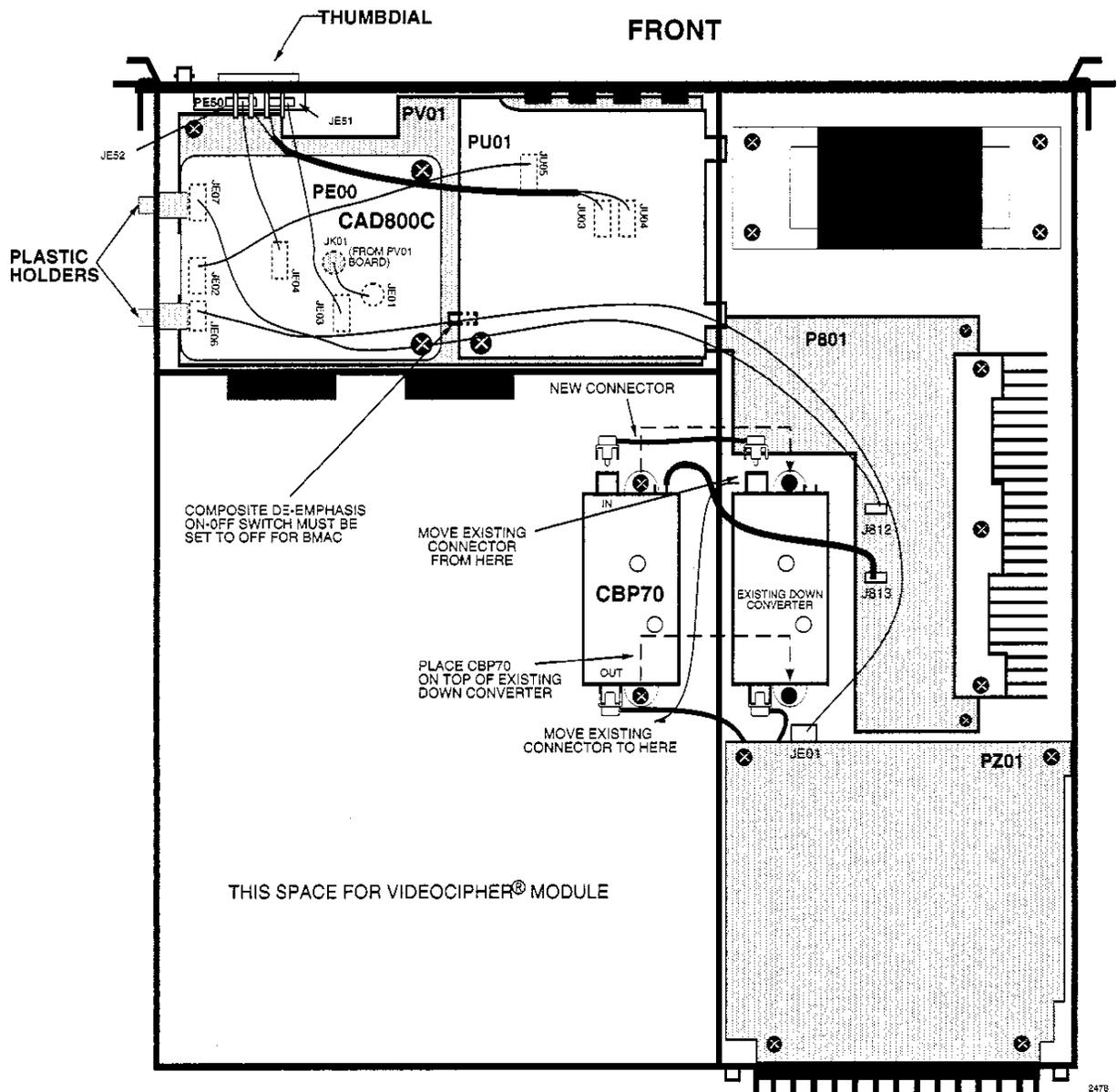
**Figure 4-4. AGILE IRD-I Top View (Cover Removed)**

4.4 CBP70 INSTALLATION

1. Remove the five screws (two on each side and one at the rear) securing the top cover; detach the top cover of the receiver. If a VideoCipher module cover is installed, remove the four screws on the rear panel and remove the cover.

2. Install the CBP70 on top of the second down converter (See Figure 4-4 for location) with the "OUT" jack towards the rear of the receiver. Fasten the CBP70 to the screw posts with the screws provided.

3. Unplug the gray cable from the second down converter jack located right below the CBP70 "IN" jack. Plug the gray cable to the CBP70 "OUT" jack.

4. Using one of the gray cables that come with the CBP70, connect one end to the CBP70 "IN" jack and the other end to the second down converter jack located right below the CBP70 "IN" jack.

5. Reinstall the top cover of the receiver.

4.5 OPERATION

4.5.1 Turn-On

The receiver is on when its AC power cord is connected to an AC power source. There is no on/off switch on the unit.

4.5.2 Frequency/Channel Selection

(See Tables 4-2 and 4-3) The front-panel thumbdial switch may be used to select:

a. C-Band channels 1 through 24 (0001–0024), or

b. C-Band frequencies 3,350 MHz through 4,250 MHz, or

c. Ku-Band frequencies 10,950 MHz through 12,750 MHz.

Table 4-2. C-Band Channel Number Selection

THUMBDIAL SWITCHES	SATELLITE FREQUENCY (MHz)	LOCAL OSCILLATOR (MHz)	RECEIVE FREQUENCY (MHz)
00001	3720	5150	1430
00002	3740	5150	1410
00003	3760	5150	1390
00004	3780	5150	1370
00005	3800	5150	1350
00006	3820	5150	1330
00007	3840	5150	1310
00008	3860	5150	1290
00009	3880	5150	1270
00010	3900	5150	1250
00011	3920	5150	1230
00012	3940	5150	1210
00013	3960	5150	1190
00014	3980	5150	1170
00015	4000	5150	1150
00016	4020	5150	1130
00017	4040	5150	1110
00018	4060	5150	1090
00019	4080	5150	1070
00020	4100	5150	1050
00021	4120	5150	1030
00022	4140	5150	1010
00023	4160	5150	990
00024	4180	5150	970

NOTE

The first thumbdial switch segment (the one on the left of the switch array) is not electrically connected. Therefore its position has no effect on frequency. However, if it is set manually to either 1 or 0 as shown in the tables, it may be used as a quick visual reference to the band setting: 0=C-Band;

Table 4-3. C- and Ku-Band Frequency Selection

THUMBDIAL SWITCHES*	SATELLITE FREQUENCY (MHz)**	LOCAL OSCILLATOR (MHz)**	RECEIVE FREQUENCY (MHz)**
03350 to 04250	03350 to 04250	5150	1800 to 900
10950 to 11700	10950 to 11700	10000	950 to 1700
11701 to 12500	11701 to 12500	10750	951 to 1750
12501 to 12750	12501 to 12750	11300	1201 to 1450

* Rows with a "0" in the first column = C-Band;
  Rows with a "1" in the first column = Ku-Band
** Smallest increment of change is 1 MHz

4.5.3 Frequency Range

Table 4-2 shows that the thumbdial switches can be set to frequencies outside the receiver's normal frequency range of 950 to 1450 MHz. For use outside this range, contact Standard Communications Corp. or an Authorized Dealer.

4.5.4 BMAC Operation

For BMAC operation, the composite de-emphasis switch inside the receiver must be set to off. The receiver block diagram of Figure 4-3 shows the function of this switch. To set the receiver for BMAC operation, perform the following steps:

1. Remove power to the receiver.

2. Place the receiver on a flat work surface.

3. Remove two Phillips-head screws from the right side and two from the left side of the receiver.

4. Slide the top cover slightly towards the rear of the receiver, and then lift it clear.

5. Refer to Figure 4-2 for location of the composite de-emphasis switch. Slide the switch to the OFF position.
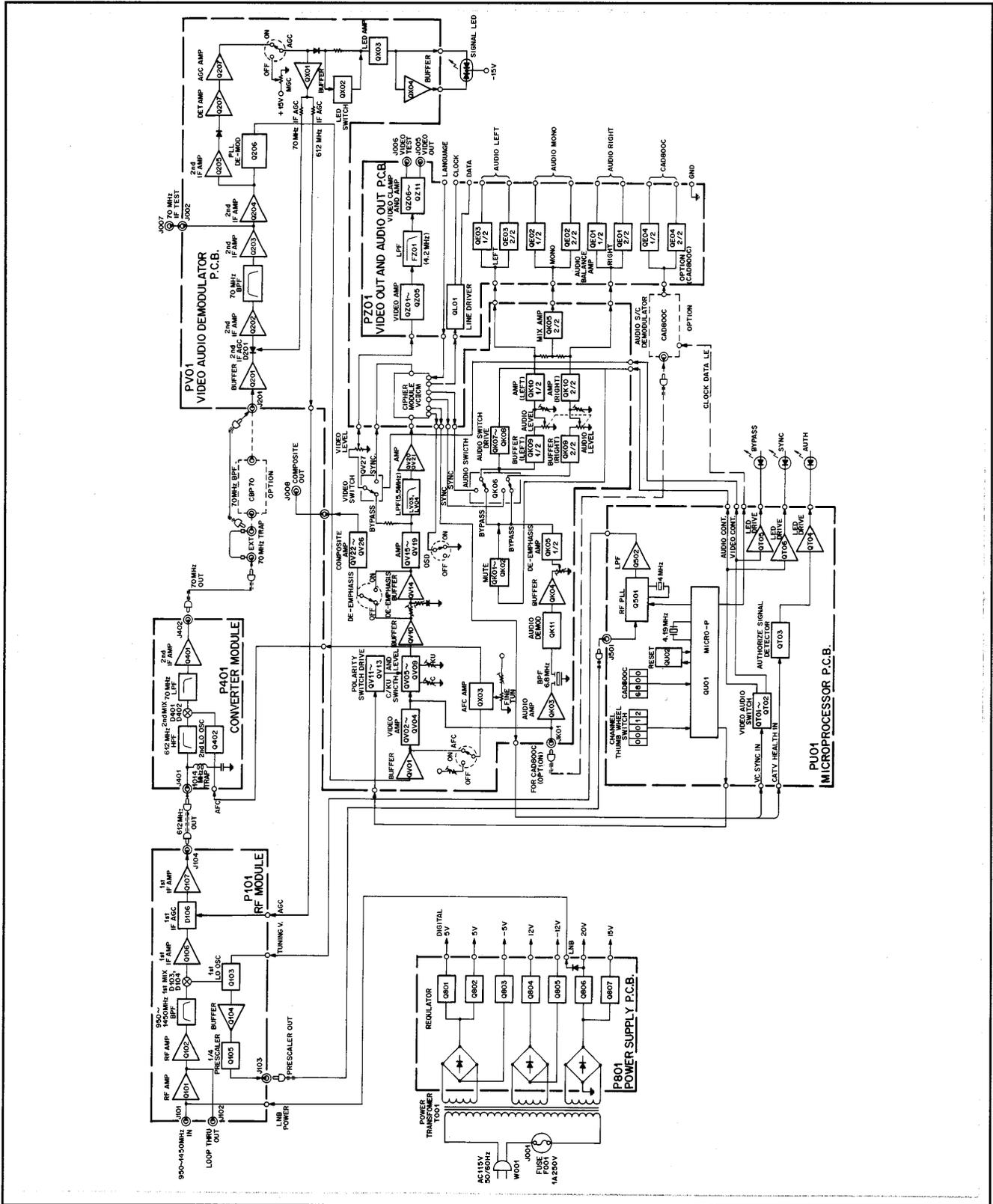
6. Reinstall the cover and the four screws.

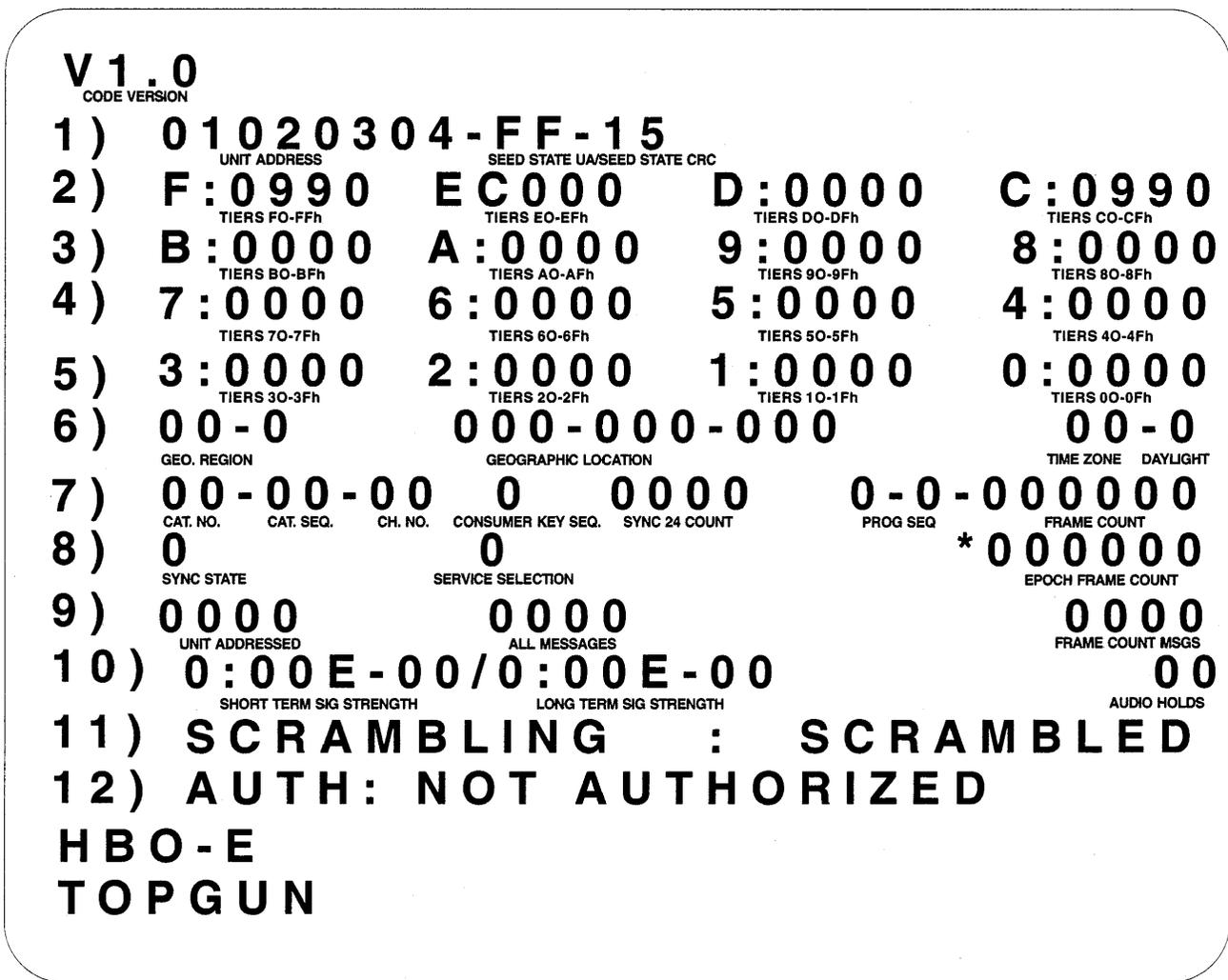**Figure 4-5. AGILE IRD-II Block Diagram**

5.1 ON-SCREEN DISPLAY (OSD)

The OSD is available only if the VideoCipher II Plus/RS module is installed in the receiver, and then only if the OSD ON/OFF switch is ON. Figure 5-1 shows the OSD format. All data of the display refers to information about or detected by the VideoCipher II Plus/RS Module, and does not consider any functions or operation of the rest of the receiver. The following paragraphs describe the displayed data:

The first data on the display is un-numbered and is the software code version (V1.0 in the example of Figure 5-1).

```
V 1 . 0
CODE VERSION

1)  0 1 0 2 0 3 0 4 - F F - 1 5
      UNIT ADDRESS              SEED STATE UA/SEED STATE CRC
2)  F : 0 9 9 0    E C 0 0 0       D : 0 0 0 0        C : 0 9 9 0
      TIERS F0-FFh        TIERS E0-EFh           TIERS D0-DFh          TIERS C0-CFh
3)  B : 0 0 0 0    A : 0 0 0 0    9 : 0 0 0 0    8 : 0 0 0 0
      TIERS B0-BFh       TIERS A0-AFh        TIERS 90-9Fh        TIERS 80-8Fh
4)  7 : 0 0 0 0    6 : 0 0 0 0    5 : 0 0 0 0    4 : 0 0 0 0
      TIERS 70-7Fh       TIERS 60-6Fh        TIERS 50-5Fh        TIERS 40-4Fh
5)  3 : 0 0 0 0    2 : 0 0 0 0    1 : 0 0 0 0    0 : 0 0 0 0
      TIERS 30-3Fh       TIERS 20-2Fh        TIERS 10-1Fh        TIERS 00-0Fh
6)  0 0 - 0        0 0 0 - 0 0 0 - 0 0 0             0 0 - 0
      GEO. REGION        GEOGRAPHIC LOCATION                 TIME ZONE  DAYLIGHT
7)  0 0 - 0 0 - 0 0    0      0 0 0 0    0 - 0 - 0 0 0 0 0 0
      CAT. NO.  CAT. SEQ.  CH. NO.  CONSUMER KEY SEQ.  SYNC 24 COUNT    PROG SEQ     FRAME COUNT
8)  0                0                           * 0 0 0 0 0 0
      SYNC STATE         SERVICE SELECTION                EPOCH FRAME COUNT
9)  0 0 0 0           0 0 0 0                    0 0 0 0
      UNIT ADDRESSED     ALL MESSAGES                    FRAME COUNT MSGS
10) 0 : 0 0 E - 0 0 / 0 : 0 0 E - 0 0              0 0
      SHORT TERM SIG STRENGTH   LONG TERM SIG STRENGTH        AUDIO HOLDS
11) S C R A M B L I N G    :    S C R A M B L E D
12) A U T H :  N O T  A U T H O R I Z E D
H B O - E
T O P G U N
```

NOTE: THE SMALL LETTERS ARE EXPLANATIONS; THEY DO NOT APPEAR ON THE DISPLAY

2524

Figure 5-1. On-Screen Display (OSD)

LINE 1. The first eight digits are the unit address of the VideoCipher II Plus/RS module installed in the receiver. Format is hexadecimal with a range of 02003000-02390FFF.

The second group (two digits) on line 1 is the "seed state" of the cryptographic processor. The format is hexadecimal. Any value other than FF indicates a defective or compromised cryptographic processor.

The last group on line 1 is the "unit address/seed state cyclic redundancy check (CRC)". The format is hexadecimal and can be any value 00-FF.

LINES 2 THROUGH 5. Lines 2 through 5 contain the tiers assigned to the unit. The tiers are displayed in hexadecimal notation, for example:

2) 3:1000 2:0000 1:0000 0:00FE

This example shows that tiers 1-7 and 60 are assigned to this module. Each group of numbers displays the status of 16 tiers:

0:xxxx displays tiers 0-15

1:xxxx displays tiers 16-31

2:xxxx displays tiers 32-47

3:xxxx displays tiers 48-63

4:xxxx displays tiers 64-79

5:xxxx displays tiers 80-95

6:xxxx displays tiers 96-111

7:xxxx displays tiers 112-127

8:xxxx displays tiers 128-143

9:xxxx displays tiers 144-159

A:xxxx displays tiers 160-175

B:xxxx displays tiers 176-191

C:xxxx displays tiers 191-207

D:xxxx displays tiers 208-223

E:xxxx displays tiers 224-239

F:xxxx displays tiers 240-255

LINE 6. Line 6 displays the following information (set when a module receives its initial authorization):

- Geographic Region (not currently supported)
  A value of 00 should be displayed.

- Geographic Location
  This is a 36-bit number representing the location of the descrambler in three coordinates: x,y,z. Each point on the earth can be given a location in this way, accurate to approximately two miles. This information is used for circular blackouts. The format is three groups of hexadecimal numbers, range 000-000-000 to FFF-FFF-FFF.

- Time Zone
  This is a hexadecimal number with a range of 0-2F (0-47 decimal). Values and their representations are:

  04 = Hawaii

  08 = Pacific Standard Time (PST)

  0A = Mountain Standard Time (MST)

  0C = Central Standard Time (CST)

  0E = Eastern Standard Time (EST)

  10 = Atlantic Standard Time (AST)

- Daylight Savings Enable
  Indicates whether the module is to implement daylight savings time. The format is binary, as follows:

  1 = The module is to implement daylight savings time.

  0 = The module is not to implement daylight savings time.

LINE 7. Line 7 displays the following information:

- Current Category Number
  All descramblers are placed in groups called categories. Some authorization numbers are addressed to <u>categories</u> of descramblers instead of individual descramblers. The category number informs the descrambler which group of descramblers it belongs to. The format is hexadecimal and the range is 00-FF.

- Current Category Sequence Number
  This number increments by one each month. Since the number is derived from a decryption, it will be incorrect if the seeds in the unit are lost. The format is hexadecimal and the range is 00-FF.

- Channel Number
  This is the VideoCipher channel number, formerly known as "Provider ID."

- Sync-24 Detection Counter
  This number is the count of the sync-24 detectors. Approximately 28 should be detected every second. The format is decimal and the range is 0000-9999.
- Sync Type
  This number identifies the kind of sync-24 being detected. The format is decimal and the values are 0 = no sync-24s detected; 4 = VideoCipher sync-24 detected.
- Program Sequence
  This number increments after each program. The format is modulo 4 (0-3).
- Current Frame Count
  This number is incremented by 15 every two seconds. The format is hexadecimal with a range of 000000-FFFFFF.

LINE 8. This line contains the following information:

- Current Sync State
  The range is 0 through 4, representing the following:

  0 = Non-VideoCipher channel;

  1 = VideoCipher sync-24 seen, waiting for messages;

  2 = Fade has occurred. Will either recover (go to 3) or drop to 0;

  3 = Fully acquired, awaiting authorization or not authorized;

  4 = Fully authorized, subject to circular blackout.
- Service Selection
  Indicates which service is currently selected and is being output. Utility data is available simultaneously with the VideoCipher Video/Audio service. 0 = VideoCipher Video/Audio
- Epoch Frame Count
  This number represents the frame count at which the current program ends. An asterisk prior to the number means that free preview is in effect. The format is hexadecimal with a range of 000000-FFFFFF.

LINE 9. This line contains the following information:

- Number of good Unit Addressed CATEGORY RE-KEY (authorization) messages received. The format is decimal with a range of 0000-9999.

- Number of all non-frame count messages (all messages) received by the unit. The format is decimal with a range of 0000-9999.
- Number of frame count messages received by the unit.
  This counter is a good indicator of the VideoCipher signal quality. If the number is increasing rapidly, then signal quality is good. If the number is increasing slowly or sporadically, then the signal quality is poor. It should be incremented by 15 every two seconds. The format is decimal with a range of 0000-9999.

LINE 10. This line contains the following information:

- Short-term signal strength or bit error rate (BER). This is a count of the number of detected bit errors in exponential notation over the last four to five seconds. A perfect BER value is 0.00E-0.
- Long-term signal strength or bit error rate (BER). This is a count of the number of detected bit errors in exponential notation over the last 45 seconds. A perfect BER value is 0.00E-0.
- Audio Holds
  This number represents the ability of the module to successfully descramble the scrambled input signal. Video and audio are muted when the value exceeds 90. Format is hexadecimal and the range is 0-FF.

LINE 11. This line indicates the scrambling mode in text characters as one of the following messages:

SCRAMBLING: SCRAMBLED

SCRAMBLING: UNSCRAMBLED

SCRAMBLING: FIXED KEY

LINE 12. This line indicates the authorization state as one of the following messages:

AUTH: NOT AUTHORIZED (not subscribed or blacked out)

AUTH: AUTHORIZED (subscribed)

MISSING PROGRAM INFO (missing program rekey information)

NEEDS INSTANT TRIP (module needs full CATEGORY REKEY message)

REMAINING 2 LINES (not numbered)

The last two lines on the display are reserved for the program or service name currently selected.

VideoCipher® IICM Commercial Module

Service and Repair Procedures for Licensees

General Instrument has established certain policies and procedures for the service and repair of VideoCipher®
IICM commercial descrambler modules contained in Integrated Receiver/Descrambler (IRD) products sold by
properly licensed Original Equipment Manufacturers (OEM). Modules must be returned to the General Instrument
Repair Center by the Commercial System Operator ("Operator") in accordance with the procedure outlined below.

A   Shipping Modules to General Instrument for Repair

1. The Operator must obtain a Return Material Authorization (RMA) prior to the return of modules to General
    Instrument. Technical assistance and/or RMA numbers may be obtained from the VideoCipher hotline at
    800-845-2748. Current hotline hours of operation are 8:30 a.m. to 9:00 p.m. EST, Monday through Friday.

2. The Operator will be advised of the RMA Number to be used. The Operator must affix a label with the RMA#
    to each module being returned. The Operator will also prepare a cover letter containing a brief description
    of the failure.

3. Modules and cover letters shall be returned to the following address:

    General Instrument Corporation

    VideoCipher Division

    11801 Miriam Avenue, Suite B1

    El Paso TX 79936

    Reference: RMA#(s) nnnnnn, nnnnnn

4. Prior to return, modules must be packed individually in electrostatic discharge (ESD) bags provided with
    original purchase or an equivalent ESD bag and packed in the original packing box or an equivalent padded
    container. A $2.00 charge will apply for all modules not returned in ESD bags.

5. Multiple modules covered by the same RMA number must be shipped at the same time.

6. Incoming modules must be returned, shipping costs prepaid by sender. C.O.D. shipments will be refused.

7. Modules received without a Return Material Authorization and/or cover letter may be delayed from repair or
    replacement.

B   Receipt and Processing of Returned Modules

1. Repaired or replaced modules will be returned to the Operator referencing the original RMA with a copy of
    the packing slip included. Return shipping costs will be prepaid by General Instrument on warranty returns
    to Operator. Return freight charges on non-warranty repairs will be charged COD. The packing slip will include
    information with regard to the old and new module address code and repair determination.

2. A purchase order will be required in order to process all non-warranty modules returned for repair work. The Operator contact named on the RMA will be notified of replacement or repair charges. Charges will be invoiced per the then-current VideoCipher IICM Commercial Descrambler Module Price List for the following:

   a. All module non-warranty repairs.

   b. Modules returned with failures that General Instrument cannot duplicate (CND).

   c. Replacement or repair of modules, that in General Instrument's sole discretion, are determined to have been tampered with (voided warranty).

   d. All modules returned without ESD bags.

   Invoicing will occur at the time of shipment of modules back to the Operator. Prices for repair services are subject to change without notice.

3. Modules returned during the original warranty period that are repaired or replacedl carry either a ninety (90) day warranty or the remaining period of the original warranty, whichever is longer.

   Non-warranty repaired or replacement modules carry a ninety (90) day warranty.

4. Any module returned for repair (warranty or non-warranty) which is determined in General Instrument's sole discretion to have been tampered with will be replaced at the full module price and carry a ninety (90) day warranty.

THIS DOCUMENT SETS FORTH REPAIR PROCEDURES ONLY. THE TERMS OF THE GENERAL INSTRUMENT WARRANTY ARE LIMITED TO THOSE SET FORTH IN THE APPROPRIATE CONTRACT BETWEEN GENERAL INSTRUMENT AND THE OEM.

VideoCipher IICM MODULE

RETURN AUTHORIZATION FORM

RETURN ALL MODULES TO:
General Instrument Corporation
VideoCipher Division
10120 Pacific Heights Boulevard
San Diego, CA 92121

Date: _____

Company Name: _____

Shipping Address: _____

_____

| City | State | Zip |

Contact Name: _____

Phone Number:(   ) _____

Purchase Order No: _____ Authorized By: _____

Billing Address: _____

_____

| City | State | Zip |

NOTE: Call first for RMA #

Telephone 800-845-2748

For General Instrument Use

Reference RMA# _____

Authorized By: _____

ADDRESS	DEFECT CODE
1A	
2A	
3A	
4A	
5A	
6A	
7A	
8A	
9A	
10A	
11A	
12A	
13A	
14A	
15A	
16A	
17A	
18A	
19A	
20A	
21A	
22A	
23A	
24A	
25A	

MODULE DEFECT CODES		
CODE	PROBLEM	DESCRIPTION
C-1	Unit will not authorize	Unit has VC light but will not authorize
C-2	Intermittent authorization	Unit has VC light but VC video/audio pops in and out
C-3	Excessive authorization time required	Unit takes abnormal time to authorize on power up, or initial service set
C-4	No VC signal	VC light will not light
C-5	VC light on for all channels	VC light lit on non-VC channels
C-6	No VC video	Clamped or non-VC video OK
C-7	No VC audio	Unscrambeled audio OK
C-8	Bad VC audio	VC audio unscrambled but poor quality
C-9	Bad VC video	VC video unscrambled but poor quality
C-10	Audio lost when switching off VC channels	
C-11	BAD VC audio and video	Both VC audio & video unscrambled but poor quality
C-17	Module seal broken	
C-18	Customer-induced malfunction (tampering)	
C-19	Malfunctioning automatic gain control (AGC)	
C-21	Module affects VHF and Satellite channels	
C-22	Module overloads/shorts power supply	
C-23	Corrosion on module pins (potting contamination)	

Standard Communications Corp.

SATCOM Division Products Limited Warranty

Standard Communications Corp. (SCC) warrants, to the original purchaser (the "Purchaser") only, that each new SATCOM product will be free from defects in materials and workmanship under conditions of normal use and service for a period of (1) year from the date of delivery to the Purchaser. SCC's liability under this warranty shall be limited to repair or replacement of the defective product, at SCC's option, and under no circumstances shall SCC be liable for consequential, incidental or other damages arising out of or in any way connected with a failure of the product to perform as set forth herein.

THIS LIMITED WARRANTY EXTENDS ONLY TO SCC-MANUFACTURED/LABELED EQUIPMENT AND TO THE PURCHASER AND IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

In the event of a defect, malfunction, or failure of the product to conform to specifications during the one-year warranty period, SCC will repair or replace, at its option and without charge to the Purchaser, the product which upon examination by SCC shall appear to be defective or not up to factory specifications. SCC will pay all labor charges incurred in providing such warranty service. To obtain warranty service, the Purchaser must first obtain a repair order (R.O.) number from SCC. The defective product must then be returned to SCC freight prepaid. SCC will examine the product and respond to the Purchaser in approximately four (4) weeks from the date of receipt of the product claimed to be defective. VideoCipher® descrambler modules must be returned directly to General Instruments Inc.

This limited warranty does not extend to any product which has been subjected to misuse, neglect, accident, improper installation, or subject to use in violation of the maintenance or operating instructions, if any, furnished by SCC; nor does this warranty extend to products on which the serial number has been removed, defaced or changed. SCC reserves the right to make changes or improvements to its products, during subsequent production, without incurring the obligation to install such changes or improvements on previously manufactured or sold products.

Some states do not allow limitations on the duration of the warranty or exclusions or limitations of incidental or consequential damages, so these limitations or exclusions may not apply to you. This warranty gives you specified legal rights which vary from state to state.

GOLD STANDARD SUPPORT PROGRAM

The Gold Standard Support Program is designed to supplement our warranty policy and to give domestic users of our commercial systems the best possible support and service available. Here is how the program works:

• SEVEN YEAR GUARANTEE

In the event of technical problems requiring SCC factory repair during the first 12 months from purchase date, SCC will warranty the cost, including parts and labor, as specified in SCC's SATCOM Products Limited Warranty Policy. Whenever possible, SCC will attempt to upgrade performance to the latest improved specification while remaining under the maximum service charge. The maximum service charge will be $150.00 and recertification of units at time of repair will be an additional $150.00 charge. Qualifying merchandise must be assigned a SAR (Satcom Advance Repair) number by SCC's Customer Service Administrator. The equipment can then be shipped to SCC freight prepaid. SCC will return the equipment freight prepaid by FedEx Standard Air, unless otherwise specified at customer's expense. Repair charges will be applied at the out-of-warranty rate in the event of physical or electrical abuse to in-warranty equipment.

• LIFETIME LOANER PROGRAM

This program has been established to minimize downtime resulting from SCC equipment failure in critical service situations. The program is provided FREE (excluding freight) for the life of qualifying SCC manufactured equipment (VideoCipher® descrambler modules must be returned directly to General Instruments). In the event that any SCC manufactured equipment covered under the loaner program fails during normal operation, SCC will provide a compatible piece of SCC loaner equipment to sustain present operations for the duration of time it takes SCC to repair and return the unit. To qualify for this program the customer must have a current open terms account In good standing with SCC, and provide a purchase order for the estimated shipping costs. A special 24-hour shipping program has been arranged with FedEx.* All shipping arrangements are taken care of by the SCC Customer Service Administrator. The customer will receive a shipping package consisting of: (a) A special shipping case; (b) SCC-specified loaner equipment; and (c) shipping and agreement documents.

 A purchase order number must be provided for the estimated shipping cost before the loaner equipment is delivered (customer pays shipping). The customer must return the defective equipment to SCC freight prepaid in the supplied case within 48 hours of receiving the loaner equipment. SCC will return the repaired equipment freight prepaid. The customer must then return the loaner equipment to SCC freight prepaid in the supplied case within 72 hours of receiving the repaired equipment. If the loaner equipment is not shipped within 72 hours, a daily rental fee, not to exceed 5% of the net cost of the unit, will be charged to the customer's account until SCC's loaner equipment is returned. Please call Satcom Customer Service Administrator for additional information on qualifying equipment and procedures.

• CLAIMS

Claims for shortages, erroneous charges or price correction must be presented within 30 days of date of invoice. Freight damage claims should be filed directly with the delivering carrier within 7 days.

NEW AND UNOPENED EQUIPMENT may be returned with prior approval from SCC within 30 days of invoice date for credit. A 20% processing and handling charge will be assessed on returned items. Please call Satcom Sales Administrator at Extension 316 for further information.

---

*SCC will use its best effort to ship a compatible unit within 24 hours. In the event of power failure, natural disaster or any other circumstances beyond SCC's or FedEx's control, the lifetime Loaner Program could be voided. The Gold Standard Service Program is subject to change or modification without notice.

⑤ **Standard**
Communications