Standard Communications
SATELLITE & BROADBAND
PRODUCTS DIVISION

AGILE OMNI GLOBAL VU

Multi-Format, Remote Control Satellite Receivers
Model: MT830BR with CAM830
Model: MT830IBR with CAM830I

SATELLITE BROADBAND

OWNER'S MANUAL

CONTENTS

AGILE OMNI

SATELLITE RECEIVER

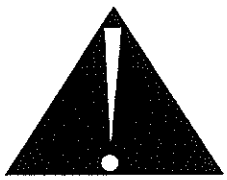
This manual is intended for use by the end user and qualified technicians. It includes all necessary information pertaining to the Agile Omni International and Domestic Satellite Receiver applications and installation. Changes that occur after date of printing will be incorporated through Owner's Manual inserts or in a later Owner's Manual printing.

Revised: 11/98

SAFETY CONSIDERATIONS

For user safety, the caution label shown above has been affixed to the rear panel of the Receiver. 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 serious 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 THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE!

See the IMPORTANT SAFEGUARDS on 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. Read Instructions - All safety and operating instructions should be read before operating this equipment.
2. Retain Instructions - 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 - Installation, operating and use instructions should be followed.
5. Cleaning - Unplug the equipment from the ac power outlet before cleaning. Do not use liquid cleaners or aerosol cleaners.
6. Attachments - Do not use accessories or attachments not recommended by SCC as they may cause hazards.
7. Water and Moisture - Do not operate in high-humidity areas.
8. 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.
9. 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.
10. Power Sources - Operate this equipment only from the type of power source indicated on the marking label.
11. 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.
12. 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.
13. 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 Section 820. See Figure A for typical grounding.
14. 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 power line surges.
15. Power Lines - The antenna subsystem should not be located in the vicinity of overhead 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.
16. Overloading - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
17. 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.
18. Servicing - Refer all servicing to qualified SCC personnel; opening or removing covers may expose dangerous voltages.

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

- Power supply cord or plug is damaged.
- Liquid has been spilled, or objects have fallen into the equipment.
- Equipment has been exposed to rain or water
- 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 require extensive work by a qualified technician to restore the equipment to its normal operation.
- Equipment has been dropped or the cabinet has been damaged.
- Equipment exhibits a distinct change in performance which is an indication of need for service.

20. 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.
21. 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 INSTALLER: Installer's orientation to Article 820-40 of the NEC that provides guidelines for proper grounding, and in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical. Refer to Chapter 4 and Figure A for installation instructions.

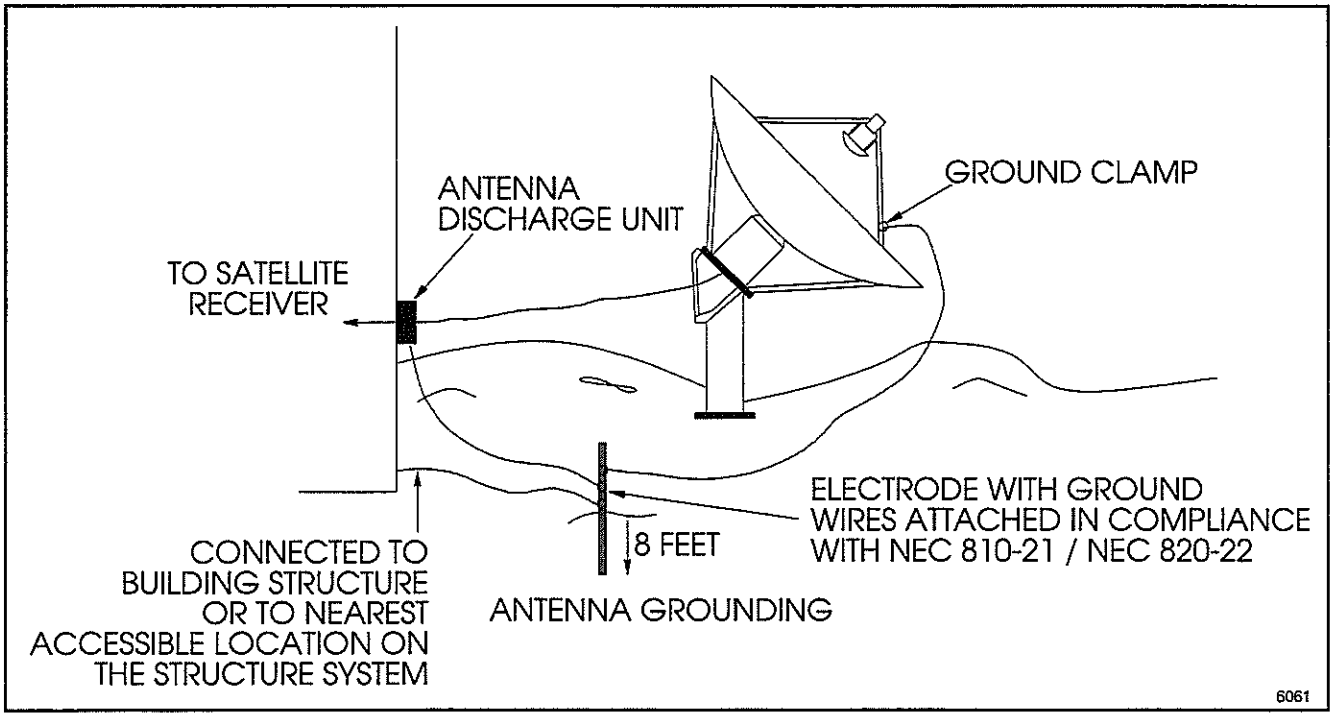


Figure A. Antenna Grounding and Discharge Unit

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FIGURES

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1 GENERAL INFORMATION

1.1 SCOPE

This document contains operation and installation information for the following two satellite receivers:

- MT830BR AGILE OMNI BROADCAST RECEIVER (DOMESTIC VERSION)
- MT830IBR AGILE OMNI BROADCAST RECEIVER (INTERNATIONAL VERSION)

1.2 DESCRIPTION

The Standard Communications Corp. Model MT830BR and Model MT830IBR Agile Omni Broadcast Satellite Receivers are television rebroadcast-quality C/Ku-band receivers. These receivers can process multiple video standards (NTSC/PAL & SECAM) and three channels of multiple audio standard subcarriers. Video and audio performance are unsurpassed with a built-in 70 MHz I.F. threshold extension demodulator that can conform to all applicable RS250, CCIR and Intelsat video and audio standards.

The MT830BR and MT830IBR have the new OMNI VU CAM830 (Control Access Module) installed. The OMNI VU is an upgrade for the Agile Omni (MT830 series) satellite receiver reception system. It bridges the gap between awkward multiple menu-driven receivers and simple rotating analog knob receivers.

With the CAM830 option installed, the receiver can be directly connected to four antenna inputs with its built-in switching capability. Satellite and format selections have been reduced to two controls: CHANNEL and FORMAT.

After the receiver has been set to a satellite format, the operator can then step through and view all of the programmed channels by rotating the channel selector. The receiver will remember all video/audio output level settings along with all required RF parameters for each channel programmed into the CAM830.

A rear panel connector on the receiver labeled Remote Control provides an RS232 or RS422 communication interface. This communication interface allows the receiver to be remotely controlled. The communication port is compatible with baud rates of 300 bps to 19.2 Kbps for full or half duplex modes.

1.3 GENERAL FEATURES

1. Automatic tuning using only two controls with a user-programmable satellite database.
2. Phase-locked-loop (PLL) control of RF center frequency (100 kHz steps) and all three audio circuits (5.0 kHz steps).
3. Front-panel indication of satellite format, channel number and all receiver settings for both manual and remote control operation.
4. Remote and local control capability for operating functions such as all RF parameters and video/audio settings.
5. Status monitoring capability for the real-time Carrier-To-Noise (C/N) meter and RF signal input level in both remote and local operation modes .
6. Real-time active C/N measurement that does not require pre-calibration.
7. Separate RF antenna inputs for C-band HOR/VER or RIGHT/LEFT polarized and Ku-band HOR/VER or RIGHT/LEFT polarized signals.
8. Remote RF spectrum analysis of the RF input and audio subcarriers.

2 SPECIFICATIONS

MT830BR/MT830IBR

GENERAL	
Primary Power MT830 and MT830BR	105 to 132 VAC, 50 to 60 Hz
Primary Power MT830I and MT830IBR	200 to 235 VAC, 50 to 60 Hz
Current Draw	60 W Maximum with options
Operating Temperature Range	14 to 122 °F (–10 to +50 °C)
Operating Humidity Range (Noncondensing)	0 to 90%
Operating Altitude Range	0 to 15,000 feet (0 to 4,572 meters)
Dimensions (HxWxD)	3.5 x 19 x 15 in. (89 x 482 x 381 mm)
Weight	16 lb (7.25 kg)
VIDEO CHARACTERISTICS	
Measured with video deviation of 10.75 MHz for C-band, 13.8 MHz for Ku-band, C/N ratio of 23.5, IF bandwidth 36 MHz, and –30 dBm RF input (NTSC transmission standard.)	
Video Level (Adjustable)	1.0 V p-p
Output Impedance	75 ohms
Gain Frequency Distortion 15 Hz to 4.2 MHz. Reference: 60 IRE	± 5.0 IRE
Dispersal Rejection	± 40 dB
Differential Gain (10–90% APL)	≤ 3.0%
Differential Phase (10–90% APL)	1.5 degrees
Distortion T-Step Rise Reference: 100 IRE	
Field-time	3.0 IRE
Line-time	≤ 1.0 IRE
Short-time	≤ 3.0 IRE
Chrominance-Luminance	
Gain Inequality (Reference 100 IRE)	≤ ± 3.0 IRE
Delay Inequality	≤ ± 15 ηsec
Intermodulation	≤ 2.0%
Luminance Nonlinearity (10–90 APL%)	≤ 6.0%
Chrominance	
Nonlinear Gain	≤ 2.0%
Nonlinear Phase	≤ 2.0 degrees
Nonlinear Intermodulation	≤ 2.0%
Vertical Interval Distortion	≤ 2.5 IRE
S/N at 21.5 MHz p-p Deviation (C/N = 25 dB)	≥ 63 dB
S/N at 21.5 MHz p-p Deviation (C/N = 15.5 dB)	≥ 55 dB
Frequency Response 50 Hz to 10 MHz	± 1.0 dB (MT830IBR can be tuned to pass up to 6.0 MHz)
Composite Output Level	≥ 0.8 V p-p
Composite Output Impedance	75 ohms
Composite Output Gain Frequency Distortion	
30 Hz to 3.58 MHz	± 3.5 IRE
3.58–6.3 MHz	± 6.5 IRE
Composite Output Chrominance-Luminance Delay	≤ ± 25 ηsec

MT830BR/MT830IBR (Continued)

AUDIO CHARACTERISTICS

NOTES: 1. Measured with 150 kHz audio deviation, C/N ratio of 23.5, IF bandwidth 36 MHz, and –30 dBm RF input. 2. When used with remote control options , Audio #1, #2, and #3 output levels can be preset for wide, medium or narrow bandwidths.	
Audio #1 Demodulator (Stock)	
Subcarrier Frequency	5.0 to 8.5 MHz
PLL Tuning Accuracy	Automatic or Remote (in 5 kHz steps)
Output Level	+18 dBm (Adjustable—see Note 2, above)
Impedance	600 ohms (Balanced)
Harmonic Distortion	1% Maximum
Bandwidths* at –3 dB / –25 dB	
Narrow 150 ± 40 kHz	≥ 400 kHz
Medium 330 ± 50 kHz	≥ 680 kHz
Wide 440 ± 50 kHz	≥ 850 kHz
De-emphasis*	50 µsec
	75 µsec
	J-17
	Flat
Frequency Response 50 Hz to 15 kHz	+1.0 dB
Hum and Noise	
Narrow 150 ± 40 kHz	≥ –50 dB
Medium 330 ± 50 kHz	≥ –57 dB
Wide 440 ± 50 kHz /	≥ –60 dB
Audio #2 Demodulator	
See OPTIONAL EQUIPMENT for CAD800C and CST875	
Audio #3 Demodulator	
See OPTIONAL EQUIPMENT for CAD800B and CST875	

RF CHARACTERISTICS

Input Frequency MT830BR in 100 kHz Steps	950 to 1450 MHz
Input Frequency MT830IBR in 100 kHz Steps	950 to 1750 MHz
Input Impedance	75 ohms
Input Level	–15 to –65 dBm
Input Return Loss	≥ 10 dB
Noise Figure	≤ 13.5 dB
Gain Variation	≤ 6.0 dB
Image Rejection (1st IF)	≥ 40 dB
Loop-Thru Output Level	+0.5 ± 1.0 dB
Loop-Thru Output Ripple w/Input Level –10 to –65 dBm	≤ 1.0 dB
Loop-Thru Noise Figure	≤ 18.0 dB
Loop-Thru Return Loss	≥ 10 dB

IF CHARACTERISTICS

IF Output Frequency	70 MHz
IF Bandwidth (Stock)	36 MHz
IF Bandwidth (With Options)	16, 18, 22, 25, 31, and 36 MHz
Dynamic Threshold	12 dB or less
Static Threshold	7.5 dB or less
Operating Voltage	12 to 20 VDC
Operating Current	100 mA

OPTIONAL EQUIPMENT

ODC4B AMPLIFIER/DOWNCONVERTER

The ODC4B is a C-band amplifier/downconverter for use with existing low-noise amplifiers (LNAs). It is designed for outdoor use, and is powered by the 20 VDC supplied by the receiver on the RF cable center conductor. The 20 VDC can be blocked by the ODC4B so that it does not affect an LNA when the LNA is powered by another source. The specifications follow:

Frequency In	3.7 to 4.2 MHz
Frequency Out	
MT830 and MT830BR	950 to 1450 MHz
MT830I and MT830IBR	950 to 1750 MHz
Local Oscillator Frequency	5150 MHz
Operating Voltage	12 to 20 VDC
Operating Current	100 mA
Connector Types	
IN	N
OUT	F
Gain	15 dB
Noise Figure	14 dB

MIFCK (MICROWAVE INTERFERENCE FILTER CONNECTOR KIT)

The MIFCK kit includes two F-connectors and cabling to break the 70 MHz IF signal path in the receiver and make it available at the receiver's rear panel. The added EXT 70 MHz TRAP connectors can then be used to attach commercially available trap filters. With the MIFCK installed but external filters not attached, the two connectors must be externally connected with the jumper cable supplied with the kit. There are no specifications for this kit.

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 (1-800-448-1666) 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 . Consult the manufacturer for specifications on these filters.

CBP70 IF BANDPASS FILTER

The CBP70 is a 2nd IF bandpass filter that can be installed internally in the receiver's 2nd IF signal line to replace the stock 30 MHz 2nd IF bandpass filter. The CBP70 allows this stock filter to be replaced with a 16, 18, 22, 25, or 31 MHz bandpass filter. The optional filter is installed inside the receiver. There are no external controls nor specifications related to its operation.

FX830 CUSTOM EPROM

The FX830 is a single EPROM (electrically programmable read-only memory) microchip containing a database that allows the receiver to automatically adjust its operating parameters to accommodate any of the satellite formats listed on the label next to the FORMAT switch. Any applications not covered by the stock EPROM can usually be accommodated by a custom-programmed EPROM from SCC. It should be noted that use of the remote-control options in this section bypasses the EPROM and allows any in-range values for the receiver's operating parameters to be selected and changed at will. All values may be saved in computer memory or on diskette. This option is not required for CAM830-equipped (including MT830BR and MT830IBR) receivers.

CAD800B AUDIO SUBCARRIER DEMODULATOR

The CAD800B is a synthesized Audio Subcarrier Demodulator that provides a #3 Audio. With the optional CRC850 Computer Remote Control module installed in the receiver, the CAD800B can be controlled remotely. Only the PC board for a CAD800C package can be installed on the MT830BR or MT830IBR models for this function (see below). Thumbdials are replaced by the CAM830 or CAM830I module. Specifications for this unit follow: This unit has been replaced by CAD800C Subcarrier Demodulator.

Subcarrier Frequency	5.0 to 8.5 MHz
Tuning Method	Thumbdial or Remote Control in 5 kHz steps
Frequency Response 1 dB	50 Hz to 15 kHz
De-emphasis	75 µsec (Optional: 50 µsec or J-17)
Output Level (Adjustable)	18 dBm at ± 150 kHz Deviation
Output Impedance	600 ohms (Balanced)
Bandwidth	
Wide	440 kHz
Medium	330 kHz
Narrow	150 kHz
Harmonic Distortion	1.0%

CAD800C AUDIO SUBCARRIER DEMODULATOR

The CAD800C is an Audio Subcarrier Demodulator that provides a #2 Audio. With the optional CRC850 Computer Remote Control module installed in the receiver, the CAD800C can be controlled remotely. Only the PC board(s) of this option package may be installed in an MT830BR or MT830IBR (the thumbdials are replaced by the CAM830 or CAM830I module). Specifications for this unit follow:

IF Frequency	10.7 MHz
Subcarrier Frequency	5.0 to 8.5 MHz
Tuning Method	Automatic* or Remote Control in 5 kHz steps
Frequency Response 50 Hz to 15 kHz	± 1 dB
De-emphasis	75 µsec (Optional: 50 µsec or J-17)
Output Level (Adjustable)	18 dBm at ± 150 kHz Deviation
Output Impedance	600 ohms (Balanced)
Bandwidth	
Wide	440 kHz
Medium	330 kHz
Narrow	150 kHz
Harmonic Distortion	≤ 1.0%

*Automatically selected by EPROM on MT830 and MT830I models.

CST875 DUAL-CHANNEL AUDIO SUBCARRIER DEMODULATOR

The CST875 (formerly CST810) is an FM^2, dual-channel audio subcarrier demodulator module for the international market. The MT830 and MT830I receivers can accommodate either the CAD800C(s) and CAD800B, or the CST875. The CST875 processes matrixed stereo and 15 kHz and 7.5 kHz companded, discrete, or stereo subcarriers. The tuning range covers the FM^2 format as well as video/audio subcarriers. The CST875 provides the correct sliding de-emphasis and dynamic expansion in 15 kHz and 7.5 kHz modes, to optimize the received signal-to-noise ratio. Specifications for this unit follow:

Subcarrier Frequency	50 kHz to 9.95 MHz
Tuning Method	Thumbdials—in 5 kHz steps
Frequency Response 1 dB	50 Hz to 15 kHz ± 0.5 dB
De-emphasis	Sliding
Output Level (Adjustable)	+15 dBm, Discrete, and Matrix
Output Impedance	600 ohms (Balanced)
Bandwidth	
Matrix	440 kHz
Medium Discrete	120 kHz
Narrow Discrete	55 kHz
Harmonic Distortion	
Matrix	0.4%
Medium Discrete	0.2%
Narrow Discrete	0.2%
Stereo Separation (20 Hz to 15 kHz)	
Matrix	–48 dB
Medium Discrete	–65 dB
Narrow Discrete	–61 dB
Hum and Noise	
Matrix	–81 dB
Medium Discrete	–75 dB
Narrow Discrete	–60 dB

CPL840 SECOND VIDEO FORMAT PC BOARD

This PC board option allows operation of NTSC and PAL/SECAM scrambling—for the MT830 and MT830I only. This board converts a 525-line format to a 625-line format. Specifications for this unit follow:

Luminance Bar Amplification	673 to 728 mV
Line-Time Distortion	≤ 0.5% Bar
Chrominance-Luminance Delay Inequality	± 25 ηsec
Chrominance-Luminance Gain Error (Modulated Pulse)	± 5% Bar
Peak-to-Peak- Differential Gain	≤ 0.5%
Peak-to-Peak- Differential Phase	≤ 2 degrees
Isolation	55 dB
Return Loss	10 dB
Connector Types	F

CBP70/(*x*) BANDPASS FILTER

The CBP70/(*x*) is a 70 MHz bandpass filter that can be switched into the 70 MHz video IF signal path in lieu of the receiver's stock bandpass filter. It is installed inside the receiver, and is offered in the following bandwidths: 16, 18, 25, and 31 MHz. There are no specifications for this filter.

The MT830 receivers can include either the CBP70 filter or the CMF70 filter, but not both. Because the satellite formats programmed into the receiver's EPROM include bandwidths of 18, 22, 25, 31, and 36 MHz, only the CMF70 (see below) can take advantage of all formats. The receiver automatically selects the stock 36 MHz filter when a wide IF bandpass is required (full-transponder operation) and the CBP70 filter when a narrow bandpass is required (half-transponder operation).

CMF70 MULTIPLE BANDPASS FILTER

The CMF70 is a multiple-bandwidth filter module that allows a selection of bandpass filters to be inserted in the 70 MHz video IF signal path. There are front panel settings for filters for each of the five bandwidths listed for the CBP70: 16, 18, 22, 25, and 31 MHz. There are no specifications for this filter.

Filters may be selected manually by the CMF70's control knob, automatically by the receiver's preprogrammed instructions (in the receiver's EPROM), or remotely with one of the appropriate remote control options. For remote or automatic selection, the IF BAND WIDTH control on the CMF70 must be set to AUTO. Although the label "36 MHz" appears on the front panel of the CMF70, along with the other five frequencies, the 36 MHz filter is not physically inside the CMF70 but is the receiver's stock filter.

CRL810 RF RELAY

The CRL810 is a coaxial RF relay used to select a 950 to 1450 MHz signal (950 to 1750 MHz for MT830I and MT830IBR) from either of two input ports, and to provide it at an output port. The stock receiver includes one of these relays to select either a horizontally or vertically polarized C-band input signal from a dual-polarity antenna subsystem. Installing two optional CRL810 relays in the receiver allows: (a) selection of Ku-band horizontally or vertically polarized signals; and (b) selection between polarized C-band and Ku-band relay output as the signal input to the receiver. Relay specifications follow:

Operating Voltage	12 VDC
Frequency	750 to 1800 MHz
Insertion Loss	≤ 1.5 dB
Isolation	≥ 53 dB
Return Loss	≥ 8 dB
Connector Type	F

REMOTE CONTROL OPTIONS

There are five types of remote control equipment that can be used with MT830 receivers:

- CRC810
- CRC850
- CRC860
- CAM830 (Domestic models)
- CAM830I (International models)

All remote control packages require a user-supplied IBM®-compatible personal computer and monitor. Some require Microsoft Windows®. Use of a modem is optional. A major feature of remote control operation is that the receiver's preprogrammed instruction set (in its EPROM) can be bypassed, using menus in the appropriate software, to allow all receiver characteristics, frequencies, and levels to be set and changed at will. A return to local control and a receiver's preprogrammed instruction set (channel plan) is made by changing either the CHANNEL or FORMAT control on the receiver.

An additional feature of remote control operation is the ability to set a future date and time at which any of the receivers will go on, or change operating parameters such as channel, polarities, bandpass characteristics, audio subcarrier frequencies, etc.

Early MT830 receivers are often equipped with CRC810 remote control. Some later versions used its replacement, the CRC850 option, that offered either DOS or Windows software versions.

The CRC810 consisted of a remote control PC board that could support up to 32 MT810 or MT830 receivers. Software was DOS-compatible.

The CRC850 package contained a remote control PC board, cabling, and connectors. It increased receiver controllability, and software added a Windows version.

The CRC860 remote control package can control up to 40 receivers with an IBM-compatible personal computer. Selection of eight satellite formats and many other functions are controllable.

The latest MT830 receivers (MT830BR and MT830IBR) come equipped with the CAM830 (domestic) or CAM830I (international) modules and software. CAM830 and CAM830I conversion kits are available for non-CAM830-equipped MT830 models. The CAM830 and CAM830I consist of a module and PC board package, complete with front panel, and are DOD-compatible.

See the CRC810 or CRC850 Service guides or the CAM830 Installation Instructions and CAM830IB Software User's Guide for full details on specifications, operation, and servicing of the various remote control equipment.

Descriptions of the various remote control packages, along with attachments and software packages follow:

CRC810 REMOTE CONTROL

The CRC810 (replaced by either the CRC850 [IBM] or CRC860 [Windows] option) remote control PC board has a nonvolatile memory, which means that data cannot be lost when a power failure occurs. There are no specifications for this package. With the CRC800CI computer interface and CRC8101B software, the CRC810 uses an ASCII format to allow control of the following nine functions:

- Receiver ID
- RF input frequency
- IF bandwidth (up to six with later software)
- Video polarity
- Antenna polarity
- Audio bandwidth
- Audio subcarrier
- Frequency band
- Audio de-emphasis

CRC800CI COMPUTER INTERFACE

This device converts CRC810 and CRC875 TTL logic levels to RS232-C levels. This allows interface with a computer ASCII terminal. The CRC800CI has its own modular power supply. There are no specifications for this interface.

CRC800IB and CRC810IB SOFTWARE

The initial software package, CRC800IB, allows remote control of up to 32 satellite receivers with an IBM-compatible personal computer equipped with a serial data card. It was replaced by a new version, CRC810IB, that has the added ability of being able to select audio de-emphasis and up to six bandwidths. CRC8101B is reverse compatible with CRC800IB software. Specifications for this package follow:

Local Oscillator Frequency	5150 MHz
Gain	15 dB Minimum
Noise Figure	14 dB Maximum

CRC850 REMOTE CONTROL	
The CRC850 package contains a printed-circuit board, to be installed in the receiver, that allows the receiver to be remotely controlled by an IBM-compatible computer. Also included are sufficient cables and connectors to complete installation. The CRC850 is normally used with the CRC800CI or later CRC850CI interface adaptor and CRC800IB, CRC810IB, CRC850IB (DOS), or CRC860IB (Windows) software. The following 23 receiver functions can be controlled by the CRC850:	
Receiver frequency	3.7 to 4.2 GHz; 10.5 to 12.8 GHz
#1 Audio subcarrier frequency	5.0 to 8.5 MHz in 0.005 MHz steps
#2 Audio subcarrier frequency	
#3 Audio subcarrier frequency	
Satellite band	C/Ku
Antenna polarity	Vertical/Horizontal
CMF70 Video IF bandpass filter	16, 18, 22, 25, or 31 MHz
CBP70 second 70 MHz IF	Wide/Narrow
Video polarity	Normal/Inverted
Video level	00 to 99
#1 Audio de-emphasis	50 µsec
	75 µsec
	J-17
	Flat
#1 Audio filter	Wide/Medium/Narrow at 440/330/150 kHz
#2 Audio filter	
#3 Audio filter	
#1 Audio level	00 to 99
#2 Audio level	
#3 Audio level	
Video alarm	On/Off
#1 Audio alarm	
#2 Audio alarm	
#3 Audio alarm	
Auxiliary alarm	
C-contact relay	

CRC850IB SOFTWARE	
The CRC850IB software controls CRC850 remote control operation of the MT810, MT830 and MT830I receivers in a DOS environment. There are no other specifications for this package.	

CRC860 REMOTE CONTROL

The CRC860 package contains a printed-circuit board, to be installed in the receiver, that allows the receiver to be remotely controlled by an IBM-compatible computer. Also included are sufficient cables and connectors to complete the installation. The CRC860 is basically the same as the CRC850 package, but it must run under Windows. In this environment, menus make operation easy and painless. As with the CRC850, the following 23 receiver functions can be controlled by the CRC860:

Receiver frequency	3.7 to 4.2 GHz; 10.5 to 12.8 GHz
#1 Audio subcarrier frequency	5.0 to 8.5 MHz in 0.005 MHz steps
#2 Audio subcarrier frequency	
#3 Audio subcarrier frequency	
Satellite band	C/Ku
Antenna polarity	Vertical/Horizontal
CMF70 Video IF bandpass filter	16, 18, 22, 25, or 31 MHz
CBP70 second 70 MHz IF	Wide/Narrow
Video polarity	Normal/Inverted
Video level	00 to 99
#1 Audio de-emphasis	50 µsec
	75 µsec
	J-17
	Flat
#1 Audio filter	Wide/Medium/Narrow at 440/330/150 kHz
#2 Audio filter	
#3 Audio filter	
#1 Audio level	00 to 99
#2 Audio level	
#3 Audio level	
Video alarm	On/Off
#1 Audio alarm	
#2 Audio alarm	
#3 Audio alarm	
Auxiliary alarm	
C-contact relay	

CRC860IB SOFTWARE

The CRC860IB software controls CRC860 remote control operation of the MT830 and MT830I receivers in a Windows environment. There are no other specifications for this package.

CAM830 REMOTE CONTROL

Although standard equipment in the MT830BR or MT830IBR, the CAM830 (domestic) or CAM830I (international) Control Access modules are available as options for all other MT830 models. With these remote control modules, a receiver can be directly connected to four antenna inputs with their built-in switching capability. Satellite and format selections are reduced to just two controls.

The CAM830 is a computer interface device, with cables, for use between the receiver's REMOTE CONTROL connector and a serial communications port of an IBM-compatible computer. It is standard equipment in the MT830BR and MT830IBR. In addition to handling RS-232-C communications, communication through RS-422 is possible.

CAM830I REMOTE CONTROL

The CAM830I, for international receivers, functions in the same way as the CAM830. However, it adds the following features for international units:

- Companded audio
- Sound-and-sync video clamping
- PAL/Scrambler video switching

The power supply has an integral AC connector that plugs into a 200 to 230 VAC utility outlet, depending on the unit's rating.

CAM830IB WINDOWS-COMPATIBLE SOFTWARE

The CAM830IB is a Microsoft Windows-compatible software package containing a program capable of managing up to 99 CAM830/CAM830I-equipped receivers. However, at the time of publication, because of hardware limitations, roughly 32 receivers are the Maximum that can be controlled.

The program diskette is intended for use in a Windows-equipped IBM personal computer. The software contains easy-to-use menus and a default database that contains the same types of data as the fixed instruction set in the receiver's EPROM.

This package allows the remote computer to operate in the background in the Windows environment. Thus, other computer operations may be run simultaneously. See the CAM830IB Software User's Manual for complete specifications and operating instructions.

3 CONTROLS AND CONNECTIONS

NOTE

Users who do not have the OMNI VU CAM830 installed in the receiver are to bypass items followed by an * .

3.1 FRONT PANEL (See Figure 3-1)

1. ***POWER Switch** – Activates the receiver, lights the C/N-TUNE-SIGNAL meter (2), turns on the CHANNEL display (6), lights appropriate LED (light-emitting diode) indicators (3, 4, 5, and 7) associated with the selected channel and format and lights the CAM830 front panel display (24).

2. **METER** – A three-function meter with functions selected by the METER SELECT switch (13). In the SIGNAL position, indicates RF signal strength from -20 to -60 dBm. In the TUNE position, indicates the relative difference between the center frequency that was pre-programmed into the receiver for the selected transponder and the signal to which the receiver is manually tuned or is tracking with automatic frequency control (AFC). In the C/N position, indicates the carrier-to-noise ratio from noise zero to approximately 15 dB.

3. ***HOR/VER Polarity Indicators** – LED-type indicators that show the signal polarity to which the receiver's polarity-select relays are set. The polarity data is user programmed into the CAM830's RAM within the selected satellite format and transponder section. However, the receiver's polarity-select relays can be set to the opposite polarity and programmed into the CAM830 by the ANT POLARITY reverse switch (9). When the polarity is reversed, the front panel LED indicators will change and an audible click will be heard from the polarity relays. The front-panel LED indicators are also active in the remote mode.

4. **C- and Ku-band Indicators** – LED-type indicators that light to indicate the programmed band automatically set as a result of the format selected, or selected via remote control. The same signal line that drives these indicators also drives the C-band and Ku-band relays; an audible click will be heard from the relays when the indicators change.

5. ***REMOTE CONT Indicator** – LED-type indicator that lights and stays lit when an external command is received via the REMOTE CONTROL input (45). The indicator goes off when the CHANNEL control is manually changed. The CHANNEL, C and Ku-Band Indicators (4) and HOR/VER polarity indicators (3) remain active in remote mode. (Note: The Remote Control LED indicator will blink once on every receiver connected to the CAM830 data bus whenever there is data traffic, and three times on the selected receiver being controlled by the computer.)

6. **CHANNEL Display** – Two-digit, seven-segment LED display of active channel selected.

7. **UPPER/CENTER/LOWER Indicators** – Three LED-type indicators that light to indicate selection of an upper or lower frequency for half-transponder formats, or center frequency for a full-transponder format. When the selected format includes transponders with upper, center, and lower frequencies, these indicators will alternate within the channel as the CHANNEL control is changed. For example, 1 upper/ lower/ center, 2 upper/lower/center, etc. For full-transponder channels that have no half-transponder formats, only the CENTER indicator will light.

8. ***CHANNEL Select** – Continuously rotatable control knob used to manually select channels within the format indicated by the CAM830 in the satellite format mode. The number of channels depends on the specific format. For example, there are typically 24 channels for C-band, and 16 channels split upper, lower and center for domestic Ku-band satellites. For formats that have 3-frequency capability, either the CENTER, UPPER or LOWER indicator (7) will light and the knob can be used to select the alternate frequencies without changing the number on the CHANNEL display (6). For channels without upper/lower/center capability, only CENTER will be selected. Note: When the receiver is in the remote mode, moving this control will put the receiver into local or manual mode.

9. ***ANT POLARITY** – A two-position slide switch with NOR (normal) and REV (reverse) positions.

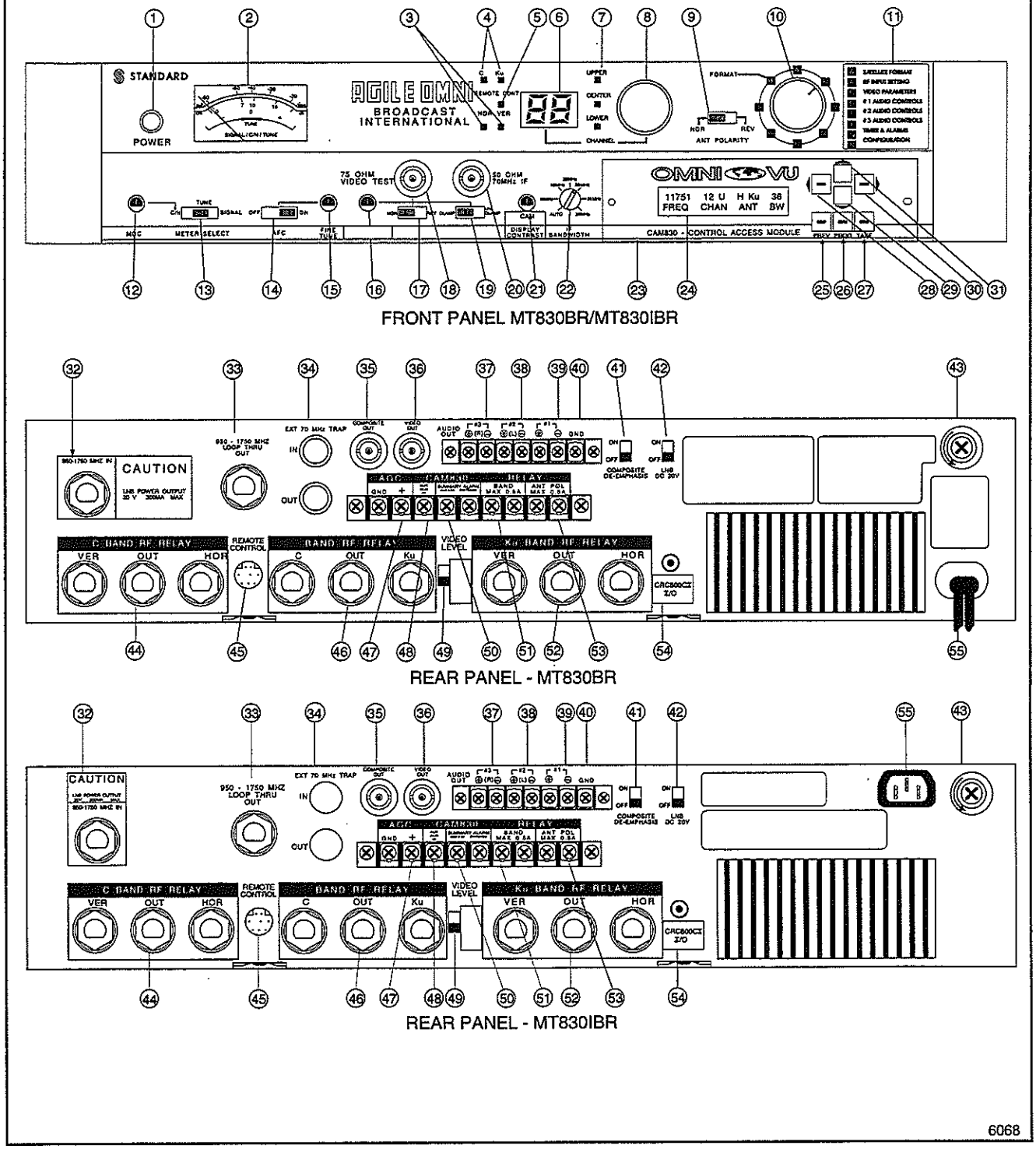


Figure 3-1. Controls and Connections

In the NOR position, pre-programmed satellite formats are contained in the CAM830 RAM. These pre-programmed formats automatically select the antenna polarities for the receiver's polarity-select relays (44 and 52) and may be either horizontal or vertical, depending on the channel and format. The polarity to which the relays are set is indicated by the HOR and VER indicators (3) regardless of how selected. Also, in the NOR position, the rear-panel ANT POL RELAY terminals (53) provide dry contacts for external switching use. In the REV position, this logic is reversed. This switch is also active in remote mode.

10. ***CAM830 Mode Selector Switch** – A continuously rotatable, 8-position switch that selects one of the eight display modes of the CAM830. The eight modes are:

    A. Satellite Format

    B. RF Parameters

    C. Video Settings

    D. Audio #1

    E. Audio #2

    F. Audio #3

    G. Timer & Alarms

    H. Configuration Menu

11. ***Label.** – Indicates the eight display modes for the CAM830.

12. ***MGC Level** – A recessed, slotted adjustment for manual gain control (MGC). The control is active only when the METER SELECT switch (13) is in C/N position. Rotation right or left increases or decreases IF gain. Also used to adjust C/N noise floor zero for the manual C/N measurement system. (Note: This is not related to the CAM830s real time C/N meter.)

13. **METER SELECT** – A three-position sliding switch that selects either C/N, TUNE, or SIGNAL functions for display on the analog meter (2) immediately above the switch.

14. **AFC** – A two-position ON-OFF slide switch. In the ON position, AFC circuitry will "lock on" to incoming RF signals up to approximately ± 6 MHz of the frequency programmed into the receiver as the correct frequency for the format and channel selected. In the OFF position, automatic frequency control is disabled, and the receiver remains tuned to the programmed RF frequency, but can be offset from this frequency approximately ± 5 MHz by the FINE TUNE control (15). Relative variation from programmed center-frequency is indicated by the TUNE function of METER (2), whether the AFC switch is ON or OFF.

15. **FINE TUNE** – A recessed, slotted adjustment for fine tuning the offset from programmed RF center frequency. Range is approximately ± 5 MHz. Results of adjustment of this control can be monitored on the METER (2) when the METER SELECT switch (13) is in the TUNE position. The adjustment is functional in both the ON and OFF positions of the AFC switch (14).

16. ***VIDEO LEVEL WIDE** – Not active.

17. ***NOR/REV** – Two-position slide switch. Accepts (in the NOR position) or reverses (in the REV position) the video polarity specified in the CAM830's Video Settings mode for the satellite format and channel selected. This switch affects the signal at the front-panel VIDEO TEST connector (18), and rear-panel COMPOSITE OUT (35) and VIDEO OUT (36) connectors by causing either normal or inverted video. This allows compensation for non-standard downconverter local oscillator frequencies.

18. ***VIDEO TEST Connector** – BNC test connector for video baseband output. If the video signal is inverted, it may be set to normal by the NOR/REV switch (17). The connector does not require termination when not in use. (Note: The Video Test will track the NTSC or PAL settings of the CAM830I.)

19. ***CLAMP/UNCLAMP** – Two-position slide switch. Enables (CLAMP) or disables (UNCLAMP) the circuit that removes the energy dispersal waveform present in some signals. Normal position is CLAMP. In this position, the signal at the rear-panel VIDEO OUT connector (36) has the energy dispersal waveform removed. In the UNCLAMP position, the signal at the VIDEO OUT connector (36) includes the energy dispersal waveform if it was part of the downlinked signal. The signal at the rear-panel COMPOSITE OUT connector (35)

is always unclamped. The energy dispersal waveform is normally present only in C-band in North America, but in Europe and Australia may be present in Ku band as well. The switch is active in local and remote modes. (Note: The clamp mode can be switched from standard sync-tip clamping to back-porch clamping via the CAM830I's Video Setting menu.)

20. ***70 MHz IF Connector** – BNC connector for front-panel access to the 70 MHz IF signal. This connector does not require termination when not in use.

21. ***CAM830 Display Contrast** – A recessed, slotted adjustment for setting the contrast of the CAM830 display.

22. **IF BANDWIDTH** – Eight-position rotary switch for the optional CMF70 Multiple-Bandpass Filter. Provides manual or automatic selection of 70 MHz IF bandpass filters: 16, 18, 22, 25, and 31 MHz. For automatic or remote operation selection of the correct bandwidth, the switch must be in AUTO. If the receiver is not equipped with a CMF70, this control is not functional.

23. ***CAM830** – OMNI VU Control Access Module.

NOTE

Items 24 through 31 pertain to the CAM830 module.

24. ***DISPLAY Window** – 16 character, two-line liquid-crystal display (LCD).

25. ***PREV Button** – Pre-selects a satellite format and transponder.

26. ***PROG Button** – Used for real-time programming and changing of the receiver settings. (Note: A red LED is lights when this function is active.)

27. ***TAKE Button** – Loads the PREVIEW or PROGRAM settings into the receivers memory. (Note: A red LED lights when this function is active.)

28. ***LEFT Button** – Cursor left control. (Note: A red LED lights when this function can be selected.)

29. ***DOWN Button** – Increment down control.

30. ***RIGHT Button** – Cursor right control. (Note: A red LED lights when this function can be selected.)

31. ***UP Button** – Increment UP button control.

3.2 REAR PANEL (See Figure 3-1)

32. **950-1450 MHz IN (950-1750 MHz for MT830I)** – An F-type connector that receives the RF signal from the antenna subsystem. A -65 to -15 dBm signal is required for correct receiver operation. The connector also provides a 20 VDC, 300 mA output on the center conductor to power external amplifiers. The 20 VDC output can be disabled by the rear-panel LNB 20 V ON/OFF control (42).

33. **950–1450 MHz LOOP THRU OUT (950–1750 MHz for MT830IBR)** An F-type connector for providing a unity gain output to allow serial connection of up to 15 additional receivers using the same signal polarity. This connection is DC-blocked and requires a 75-ohm termination when not used. Connector and cable losses will add approximately ± 0.5 dB per receiver.

34. **EXT 70-MHz TRAP** – F-type connectors, part of the optional MIFCK wiring kit. These connectors are used to install commercially available external notch filters in the 70 MHz IF signal path in order to reduce terrestrial interference (TI). If the MIFCK kit is installed but filters are not attached, a jumper (supplied with the kit) must be installed between the connectors.

35. ***COMPOSITE OUT** – Type BNC output connector that provides 30 Hz to 10 MHz, NTSC (or PAL with CAM830I) unclamped composite video for use with a video descrambler or an audio subcarrier demodulator. The signal is adjustable from 0.5 to 1.5 V p-p by the front-panel CAM830 Video Settings menu. If the video signal is inverted, it may be set to normal by the front-panel NOR/REV switch (17) or the CAM830 Video Settings Menu. De-emphasis normally present in the composite signal can be removed by the COMPOSITE DE-EMPHASIS ON/OFF switch (41). (Note: The connector must be terminated in 75 ohms when not in use.)

36. ***VIDEO OUT** – Type BNC output connector that provides NTSC (or PAL with CAM830I) filtered baseband video for use by a monitor or RF modulator. The output level is adjustable from 0.5 to 1.5 V p-p by the front-panel CAM830 Video Settings mode. The energy dispersal injection signal is normally not present with the video signal at this output, but if it is part of the downlinked signal, it can be included by setting the front-panel

CLAMP/UNCLAMP switch (19) to UNCLAMP or the CAM830's Video Setting Menu. (NOTE: The connector must be terminated in 75 ohms when not in use.)

37. ***AUDIO OUT #3** – Two screw terminals that provide the #3 subcarrier 600-ohm balanced audio output when using the optional #3 CAD800C Subcarrier Demodulator.

38. ***AUDIO OUT #2** – Two screw terminals that provides the #2 subcarrier 600-ohm balanced audio output when using the optional #2 CAD800C Subcarrier Demodulator.

39. **AUDIO OUT #1** – Two screw terminals that provides the #1 subcarrier 600-ohm balanced audio output.

40. **GND** – A screw terminal that provides an equipment ground for general use.

41. **COMPOSITE DE-EMPHASIS** – A two-position ON/OFF switch that controls insertion of video de-emphasis to the signal present at the COMPOSITE OUT (35) connector. (Note: This switch does not affect the signal at the VIDEO OUT connector (36).)

42. **LNB DC 20V** – A two-position ON/OFF switch. In the ON position 20 VDC is available at the center conductor of the 950-1450 MHz IN (950-1750 MHz for MT830IBR) connector (32). In the OFF position, the 20 VDC is removed. The current-limited 20 VDC is for external use by downconverters or amplifiers on the incoming signal cable.

43. **FUSE** – Line voltage fuse.

44. **C-BAND RF RELAY** – Stock relay with three F-type connectors, allows switching between horizontal and vertical C-band input lines from the antenna. The selected output is cabled to the 950-1450 (950-1750 for MT830IBR) MHz IN connector (32) or, to the optional BAND RF RELAY (46). Although marked C-BAND, this relay may be used for Ku-Band, if the Ku-BAND is the only input to the receiver.

45. ***REMOTE CONTROL** – 8-pin DIN remote control connector for use with the supplied DB9 male/female pigtail connector that daisy-chains RS232C or RS422 computer remote control signals for the CAM830 module.

46. **BAND RF RELAY** – This RF Band Relay (46) allows selection, via external cables, of either the C-band polarities of the C-Band RF Relay (44) or the Ku-band polarities of the Ku-band RF Relay (52).

47. **AUXILIARY AGC OUTPUT** – A screw terminal that provides an automatic gain control (AGC) output for test purposes or remote monitoring of signal level. The AGC is a positive DC voltage directly proportional to the RF input signal amplitude.

48. **AUX ALM IN** –A screw terminal that provides an external alarm input for remote monitoring via the remote control.

49. ***AUTO SW WIDE** – Not active in the MT830BR/MT830IBR series.

50. **ALARM SIGNALS** – Two screw terminals that provide a dry contact when the CAM830's internal or external alarm has been tripped or if set to the TIMER function it provides a dry contact for general use.

51. ***BAND RELAY** – Two screw terminals that provide dry contact when the receiver is tuned to C-band or an open dry contact when tuned to Ku-Band.

52. ***Ku BAND RF RELAY** – Optional CRL810 relay with three F-type connectors, used for automatic switching between horizontal and vertical Ku-band inputs. The OUT connector is externally cabled to the Ku-Band input connector of the optional BAND RF RELAY (46).

53. ***ANT POL RELAY** – Screw terminals. Provide dry contact when the receiver's polarity-selection relays are set to accept antenna signals received in the vertical polarization mode, and an open dry contact when set for horizontal polarity. This logic may be reversed by the front-panel ANT POLARITY switch (9) or the CAM830 RF Parameters Menu.

54. ***CRC850/CRC800CI Remote Control Input** – Used for connecting to older CRC850/CRC800CI systems. Provides the receiver's RCA terminal port with full compatibility to interface with older systems (Note: To activate the TTL input, use the configuration menu H to turn the TTL function to ON.)

55. **POWER CORD** – Connects the receiver to primary AC power.

4 INSTALLATION AND SETUP

4.1 INSTALLATION

Refer to Figure 4-1.

4.2 ANTENNA GROUNDING

Ensure that the antenna cable system used with the unit is grounded to provide protection against surges and build up of static charges. Article 820-22 of the National Electric Code (NEC) provides guidelines for proper grounding and specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical. NEC Section 810 Code ANSI/NFA # 70-1981 sets the following grounding requirements:

1. Use one of the following wire types to connect the antenna to ground:

   a. Copper – 10 AWG (5.3 mm2) or larger.

   b. Aluminum – 8 AWG (8.4 mm2) or larger.

   c. Copper clad steel or bronze – 17 AWG (1.0 mm2) or larger.

2. If the antenna is mounted on a building, or other structure, use standoff insulators to secure the antenna feed line and ground wire above the building or structure. The insulators should be spaced four to six feet apart.

4.3 ANTENNA DISCHARGE UNIT

Refer to NEC Article 810-21/820-22 when installing the antenna discharge unit. The cable ground from the antenna must be connected to the grounding system of the building, as close as possible to the point where the feed line enters the building.

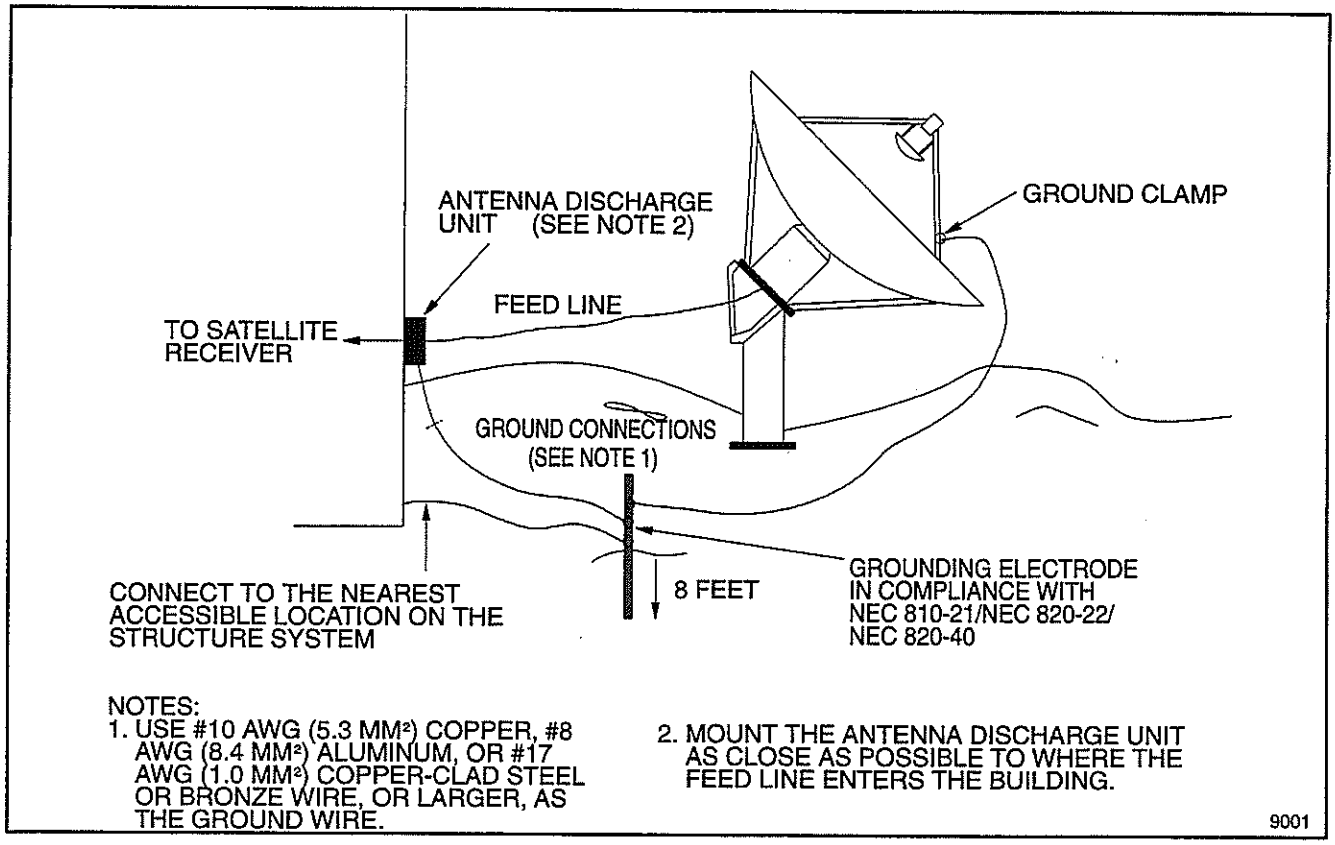


Figure 4-1. Antenna Grounding

4.4 WEATHERPROOFING CONNECTIONS

To prevent poor electrical contact due to corrosion of the connectors within the unit, weatherproof boots should be installed on all connectors that will be exposed to the outdoors.

Refer to Figure 4-2 and the following procedure to weatherproof all outdoor connections.

1. Liberally apply silicone grease to the threads and base of the female connector.
2. Mate the female connector to the male connector.
3. Liberally apply silicone grease to the outside of the male connector.
4. Slide the boot over the connectors.

4.5 INTERCONNECTING THE SYSTEM

4.5.1 Required Equipment

The following system components, or equivalent, are required to complete the installation and must be supplied by the user:

1. RG6/U or RG11 coaxial cable.
2. Weatherproof boots.
3. C-Band Low-Noise Amplifier/Block Downconverter (LNB) - Amplifies the satellite transmissions received in the 3.3 to 4.2 GHz range, then converts it to the 950 to 1750 MHz range required by the receiver. Use the applicable LNB for the input frequency range that corresponds to the spectrum utilized by the satellite.
4. Ku-Band Low-Noise Amplifier/Block Downconverter (LNB) - Amplifies the satellite transmissions received in the 11 to 13 GHz range, then converts it to the 950 to 1750 MHz range required by the receiver. Use the applicable LNB for the input frequency range that corresponds to the spectrum utilized by the satellite.
5. ODC4B or equivalent - A low noise outdoor C-Band down converter. Used in systems where an LNA amplified signal from the antenna is available, but first must be down converted. An ODC4B can supply the 950 to 1450 MHz input required by the receiver. It is powered by the 20 VDC supplied on the cable center conductor by the receiver. The 20 VDC can be blocked so that it does not affect any other DC voltage that may be on the cable for powering the LNA. Internal circuits protect the ODC4B from any DC voltage from another source used to power the LNA.

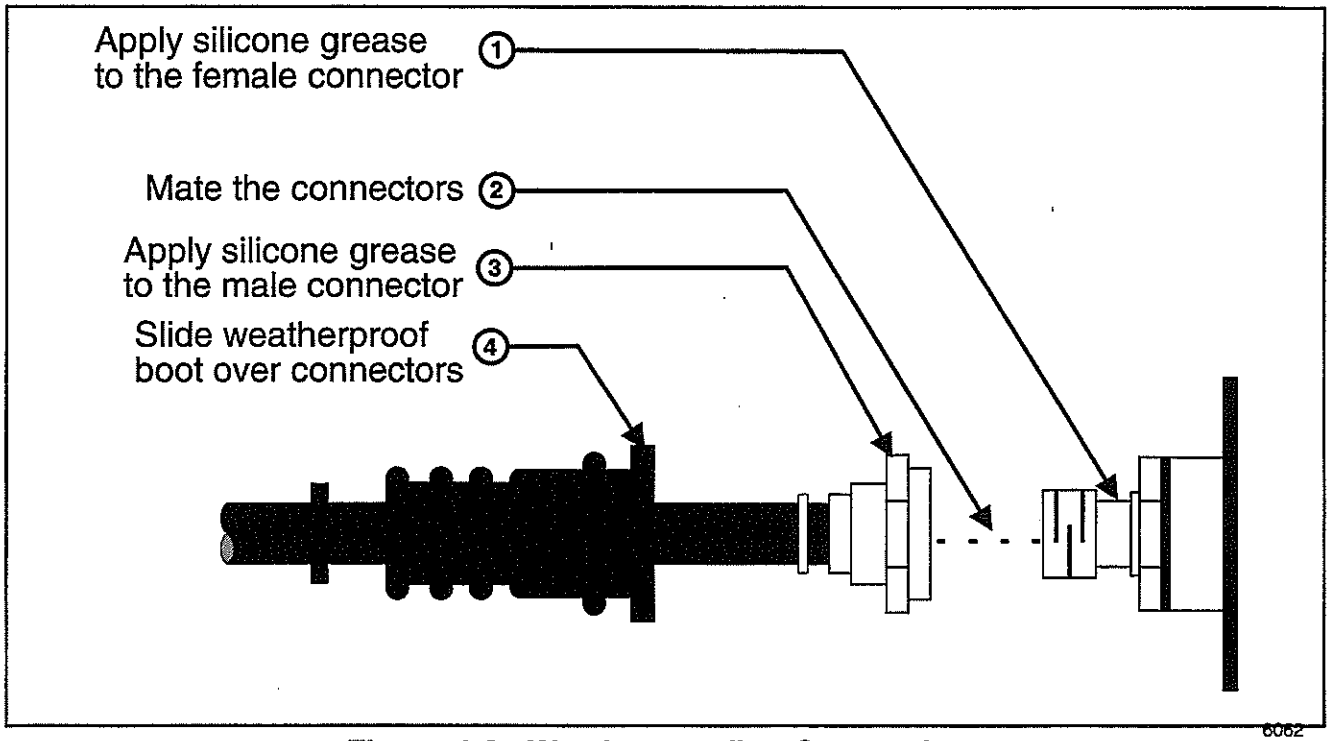


Figure 4-2. Weatherproofing Connections

6. LA1450, or equivalent, Line Amplifier. Used to compensate for attenuation introduced by the coaxial cable between the LNB and the receiver. A line amplifier is required 200 feet from the LNB and at 100 foot intervals thereafter.

7. Standard EIA 19 inch equipment rack.

4.5.2 Receiver Mounting

Use four bolts to mount the front of the receiver in a standard 19 inch equipment rack.

4.5.3 LNB Installation

An LNB must be installed at the antenna feedpoint to provide the receiver with the proper input. The LNB comes with a gasket for sealing its waveguide flange. To install the LNB perform the following procedure:

1. Place the gasket into the groove of the LNB waveguide flange. Refer to Figure 4-3.

2. Connect the LNB waveguide flange to the feed point.

3. Orientation of an LNB determines the polarity to which it is sensitive. Mount the LNB vertically to receive vertically polarized signals and horizontally to receive horizontally polarized signals.

   a. An electromechanical device such as a Polarotor may be used to position a pickup probe to either a horizontal or vertical position and provide the output signal to an LNB.

   b. Dual polarity feedhorns or orthomode couplers can simultaneously receive horizontal and vertical polarizations. Separate outputs are provided for attachment of the LNB.

   c. Certain configurations of coaxial dual band feedhorns can simultaneously receive both C and Ku-band horizontally and vertically polarized signals. Four flanged waveguide ports allow for the mounting of the appropriate LNB.

4. The A&B RF inputs allow either of the two LNBs to be selected automatically. One for horizontal reception, and one for vertical reception. These inputs can be used for connecting either the C-band or Ku-band input signals.

4.5.4 LNB Enclosure

Enclose the LNB in an appropriate weatherproof housing of the type provided with the antenna dish. Cover the connectors with weatherproofing boots. Reference section 4-4.

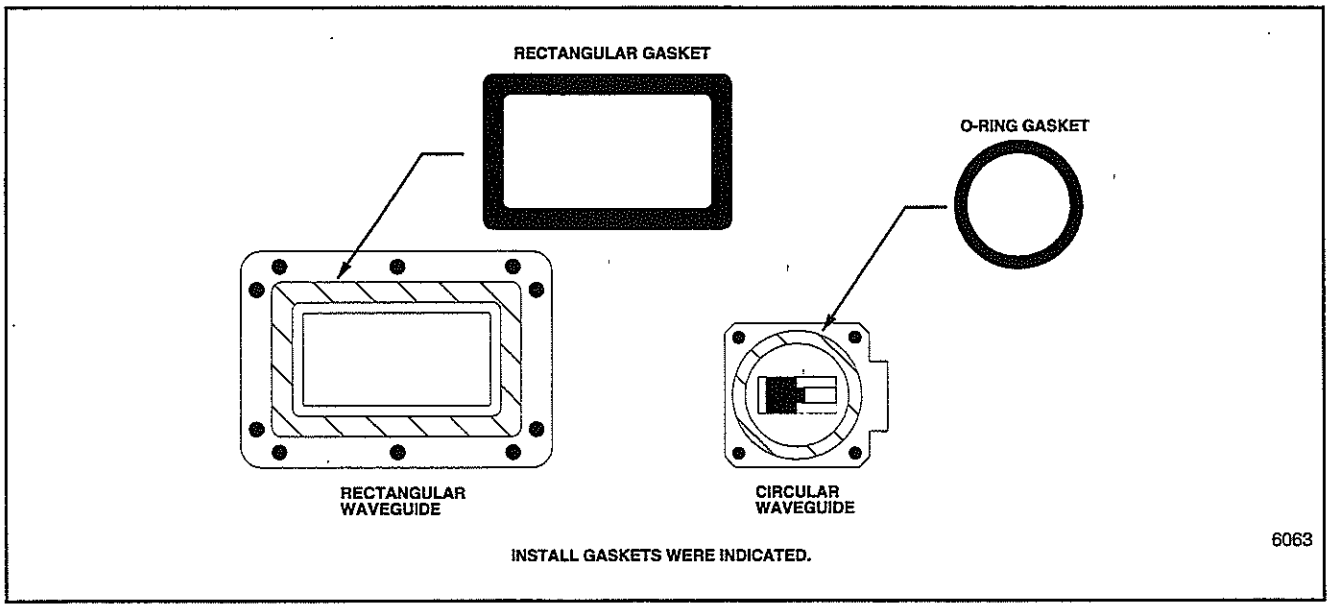


Figure 4-3. LNBC Gasket Installation

4.5.5 Cable Lengths

1. When the distance from the LNB to the receiver is less than 200 feet, perform the following:

   a. Cut the cable to the required length, and install the appropriate connectors.

   b. Connect the cable(s) between the LNB(s) and the receiver.

2. When the distance is between 200 and 500 feet, perform the following:

   a. Cut 200 feet of RG6/U or RG11 cable and install the appropriate connectors. Use this cable to connect a LA1450 to the LNB.

   b. Make as many 100 foot lengths of RG6/U or RG11 cable as necessary to connect the remaining LA1450.

4.6 GENERAL SETUP

4.6.1 Terrestrial Interference

For mild TI, one side only, rotate fine tune control to the right or to the left, adjusting for the best picture. When TI becomes too strong the AFC will try to tune to the TI. If this occurs, switch the AFC to Off. The rear panel 70 MHz trap connectors allow for the insertion of notch filters at 60 MHz and 80 MHz.

4.6.2 Poor Carrier-To-Noise Ratio

A dynamic carrier to noise (C/N) ratio of approximately $\leq$ 12 dB must be provided at the RF input to the receiver. At this level impulse noise (sparkles) will start to appear in the picture, usually in the reds and in the character generated letters.

4.6.3 Cable Connections To The Receiver

The output signal from the antenna is received at the rear panel receiver connector labeled 950-1450 MHz IN (950-1750 MHz for the MT830IBR). Signals may arrive at this connector via a single cable directly from the antenna subsystem, or from the output of one of the receiver's input-selection relays. Three cable configurations are shown in Figures 4-4, 4-5, 4-6.

   a. Single-cable input to the receiver: Install a single cable of either band and either polarity directly from the LNBC (or ODC4B) to the 950 to 1450 MHz (950 to 1750 MHz for the MT830IBR) IN connector of the receiver.

   b. Two-cable input to the receiver: Install one cable with horizontally received signals to the HOR input of the C-BAND RF RELAY or the Ku-BAND RELAY; and one cable with vertically received signals to the VER input of the same relay. The OUT connector of the relay connects to the receiver's 950 to 1450 MHz (950 to 1750 MHz for the MT830IBR) IN connector.

   c. Four-cable input to the receiver: Install one cable with horizontally received C-band signals to the HOR input of the C-BAND RF RELAY, one cable with vertically received C-band signals to the VER input of the same relay, one cable with horizontally received Ku-band signal to the HOR input of the Ku-BAND RF RELAY, and one cable with vertically received Ku-band signals to the VER input of the same relay. With the C-BAND RF RELAY used for C-band and the optional Ku-BAND RELAY used for Ku-band, the receiver uses the RF BAND RELAY for selection between the two. In this case, the OUT connector of the Ku-BAND RF RELAY must be connected to the Ku input connector of the RF BAND RELAY, and the OUT connector of the C-BAND RF RELAY connected to the C input connector of the RF BAND RELAY. Finally, the OUT connector of the RF BAND RELAY must be connected to the receiver's 950 to 1450 MHz (950 to 1750 MHz for the MT830IBR) IN connector. The receiver will automatically select the correct polarity and band input port based on the channel and format selected. The receiver will also place 20 VDC on the center conductor of the selected input cable for powering external amplifiers. For systems with an ODC4B installed, the 20 VDC can be blocked from leaving the antenna side of the ODC4B by disconnecting an internal jumper.

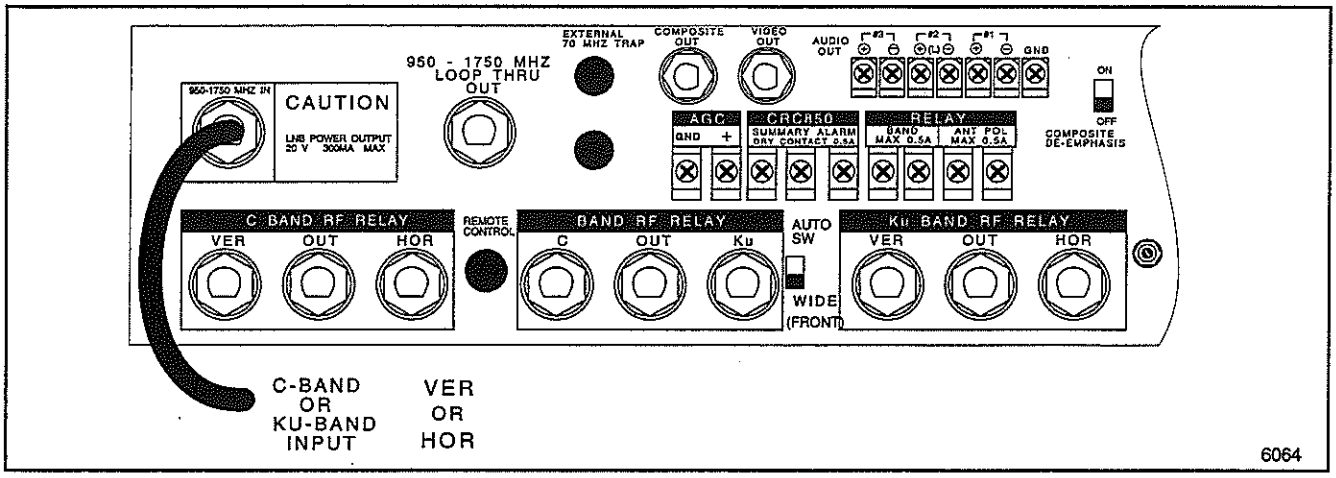


Figure 4-4. Single Cable Antenna Input

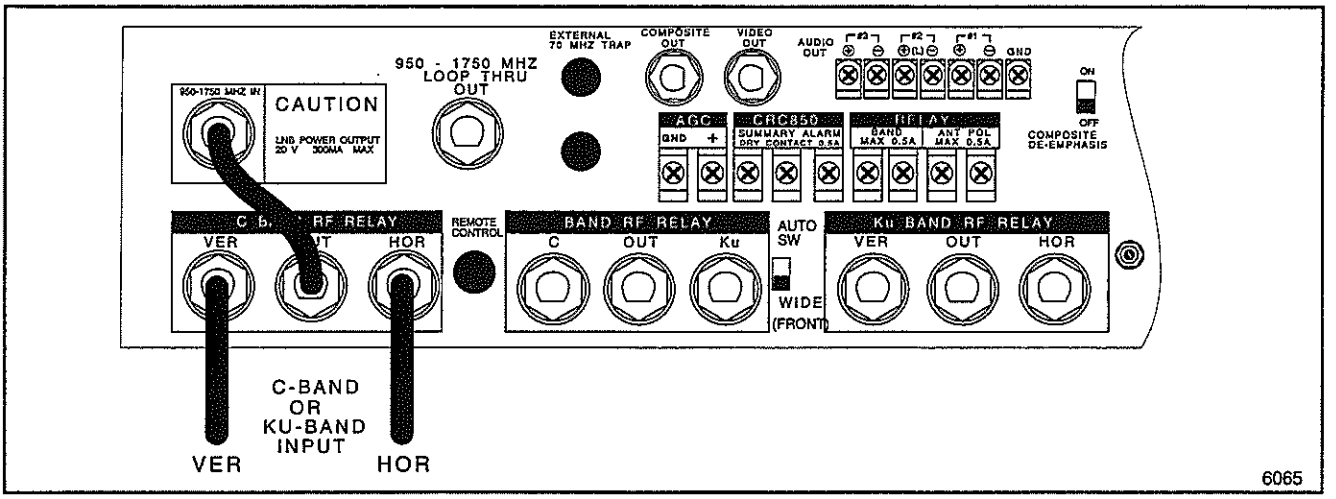


Figure 4-5. Two Cable Antenna Input

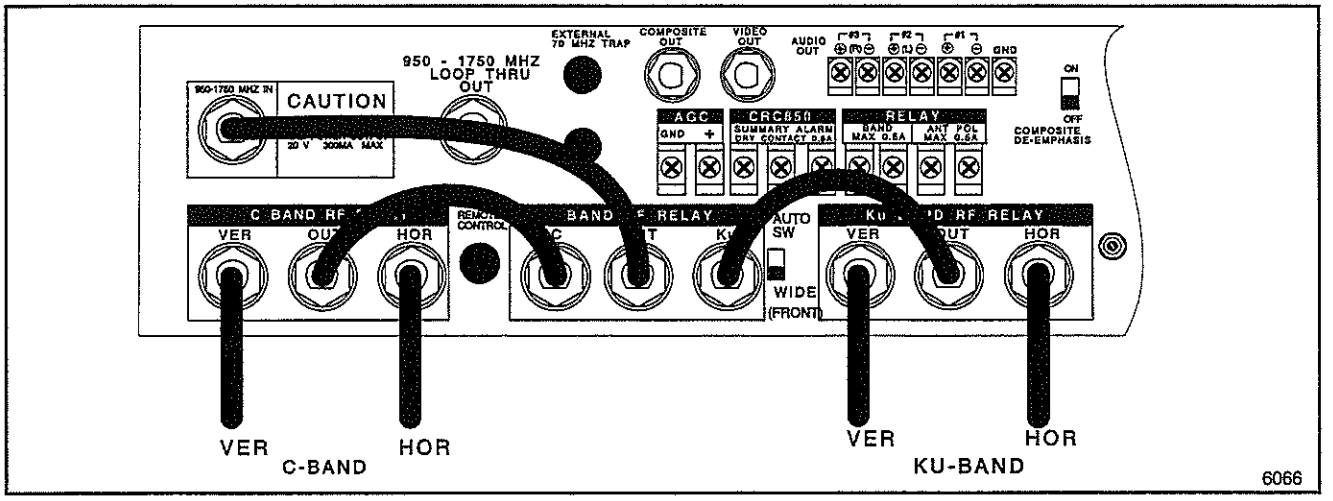


Figure 4-6. Four Cable Antenna Input

4.6.4 Multiple Receiver Installation

Up to 16 receivers may operate simultaneously from the 950 to 1450 MHz (950 to 1750 MHz for the MT830IBR) signal supplied to the first receiver. To do this, the receivers are "daisy-chained" using the loop-through feature. Each receiver may be set to a different channel. To "daisy-chain" up to 16 receivers, perform the following:

1. To provide the proper signal to the rear-panel 950 to 1450 MHz (950 to 1750 MHz for the MT830IBR) IN connector of the first receiver, connect the cable(s) from the antenna subsystem as referenced in Figure 4-7.

2. Connect a cable between the first receiver's LOOPTHRU OUT connector and the 950 to 1450 MHz (950 to 1750 MHz for the MT830IBR) IN connector of the next receiver. Continue this process to interconnect up to sixteen receivers. Cable and connector losses will be approximately 0.5 dB per receiver. The 20 VDC used by external amplifiers on the first receiver's incoming signal line is not present at the LOOPTHRU OUT connectors.

3. Set the FORMAT control on all receivers to the same format.

4. Set each receiver to the desired channel. Each receiver may be set to a separate channel. All receivers will operate on the band and polarity present at the first receiver's 950 to 1450 MHz (950 to 1750 MHz for the MT830IBR) IN connector.

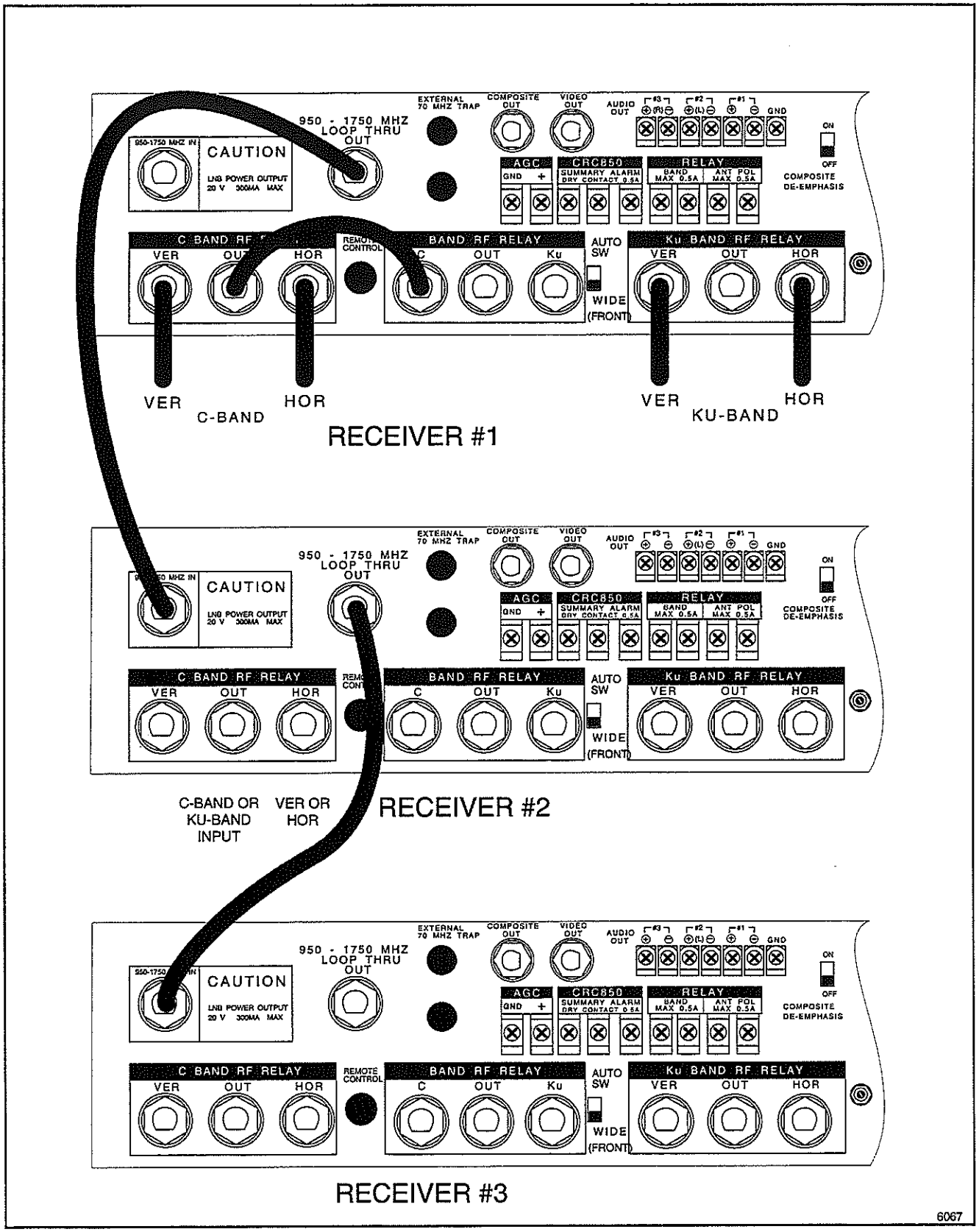


Figure 4-7. Multiple Receiver Connections

5 OPERATION

5.1 SCOPE

This chapter contains operating instructions for the MT830BR (Domestic version) and the MT830IBR (International version) AGILE OMNI Broadcast Receivers.

5.2 DESCRIPTION

The MT830BR and MT830IBR Agile Omni Broadcast Receivers are television rebroadcast quality C/Ku-band receivers that reduce satellite tuning to two controls, CHANNEL and FORMAT. When these two rotating dials have been set, an internal microprocessor accesses the CAM830 user-defined pre-programmed database and automatically brings the receiver on-line without further operator intervention.

Each receiver's database varies, depending on user requirements. The following list shows a typical selection:

- MANUAL
- C-BAND
- G-STAR Ku
- GE KU
- SBS Ku
- SPACENET C/Ku
- PANAMSAT C/Ku
- ANIK Ku
- GENERIC Ku

5.3 RECEIVER CONTROLS AND FUNCTIONS

The following operating control features will be described in this section:

- Front panel indication of satellite format, channel number, upper/center/lower transponder channel, antenna polarity, audio subcarrier frequencies, IF bandwidth, signal strength, and C/N ratio
- Alarm output for loss of video/audio
- Bandpass filter selections
- Audio subcarrier de-emphasis values
- Audio subcarrier center frequency
- LNBC LO (local oscillator) selections
- Antenna input selections
- Alarm timer/relay operation
- CAL C/N and Signal threshold settings
- CAL audio threshold settings
- Copying and deleting formats
- Changing and copying indicated channel number
- Deleting indicated channel number
- Event pre-warning message

5.4 RECEIVER SETUP

The CAM830 and CAM830I have two modes of operation, manual single channel operation and multiple automatic pre-programmed satellite formats. This section describes how to operate the receiver in the manual, single channel mode. Set the receiver controls in accordance with Table 5-1 and Table 5-2.

NOTE

The numbers in parentheses identify reference designators illustrated and described in Chapter 3 of this manual.

Table 5-1. Front Panel Control Settings

CONTROL	SETTING
MGC (12)	ON
METER (2)	ILLUMINATES
METER SELECT (13)	SIGNAL
ANT POLARITY (9)	NOR POSITION
AFC (14)	ON
FINE TUNE (15)	CENTER INDENT
VIDEO NOR/REV (17)	NOR
CLAMP/UNCLAMP (19)	CLAMP
CMF70 IF BANDWIDTH (22)	AUTO
Power (1)	ON

Table 5-2. Rear Panel Control Settings and Connections

CONTROL	SETTING
Composite De-emphasis (34)	ON
LNB DC 20 (42)	ON= 20 VDC Output, OFF= 20 VDC is removed from the center conductor of the 950-1450 MHz input
Video Out	Connect to a video monitor 75 ohm input
AC line input	MT830= 120 VAC MT830I= 230 VAC
950-1450/1750 Input	Connect to Antenna Output
EXT. 70 MHz Trap	If installed, confirm IN to OUT via "F" to "F" coax jumper.
#1 Audio Out	Connect to a monitor with a balanced audio input.

5.5 CAM830 AND CAM830I MANUAL OPERATION INSTRUCTIONS

Each receiver is pre-programmed with a user-defined satellite format database. A single channel satellite format called MANUAL has been saved into the #1 format position of the receiver. The intent of the MANUAL format is to allow the user to add new satellite formats to the receiver's database.

The single-channel MANUAL format can be used over and over again for all satellite reception parameters, for both C or Ku-band operation. Usually the only major changes from transponder to transponder are the RF center frequency, antenna input and video polarity.

NOTE

Read the following sections carefully before operating the CAM830.

5.5.1 Satellite Format

5.5.1.1 Satellite Format Selection

1. Rotate the FORMAT dial on the MT830 to position A, SATELLITE FORMAT. See Figure 5-1.

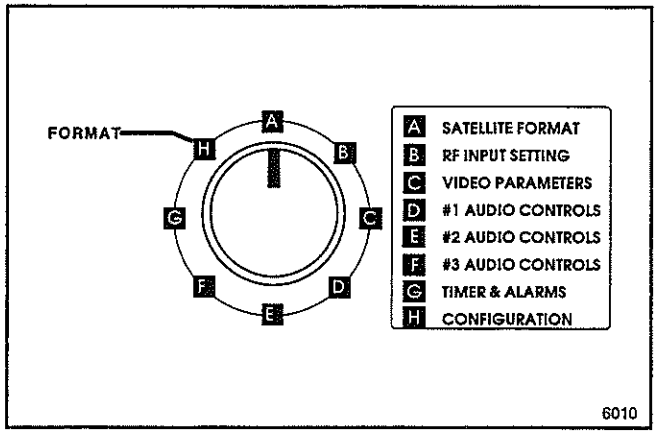


Figure 5-1. Satellite Format

2. On the CAM830 press the PROG button once. Observe that the PROG button LED is ON. To view the list of pre-programmed satellite formats, press the ▲ or ▼ button.

3. Select the the MANUAL format. Observe that both the PROG and TAKE button LEDs are ON. See Figure 5-2.

4. To edit any of the pre-programmed satellite formats, press the lit ▶ button. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.

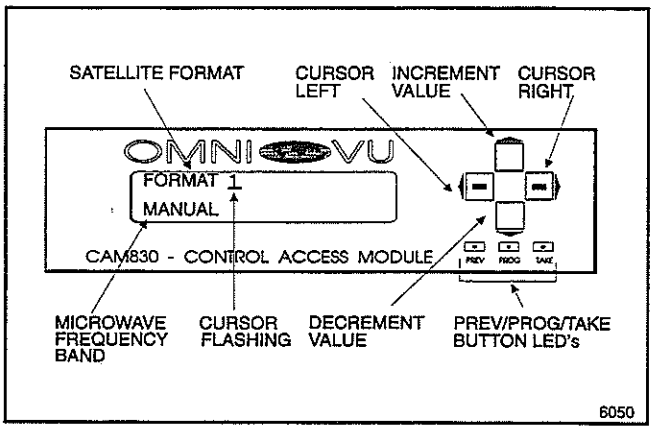


Figure 5-2. Satellite Format Display

5. To scroll through the list of alpha selections, use the ▲ or ▼ buttons. Use the ◀ or ▶ buttons to move the cursor to the desired position (left or right). Edit or rename the current satellite format as required.

NOTE

Pressing the PROG button at this time will restore the receiver's old settings and cancel the new settings.

6. If the desired satellite formats are acceptable, press the TAKE button on the CAM830, and load the displayed satellite format settings into the receiver memory.

7. Observe that both the PROG and TAKE button LEDs are OFF.

5.5.1.2 LNBC Local Oscillator Confirmation and Selection

1. Press the lit ▶ button once to confirm that the selected local oscillators for the C-band horizontal/vertical or RHC/LHC polarizations match the installed LNBCs on the satellite dish.

2. Observe that the current C-band LNBC LO setting is displayed on the OMNI VU CAM830. See Figure 5-3.

3. Press the lit ▶ button one more time to confirm that the selected local oscillators for the Ku-band horizontal/vertical and RHC/LHC polarizations match the installed LNBCs on the satellite dish.

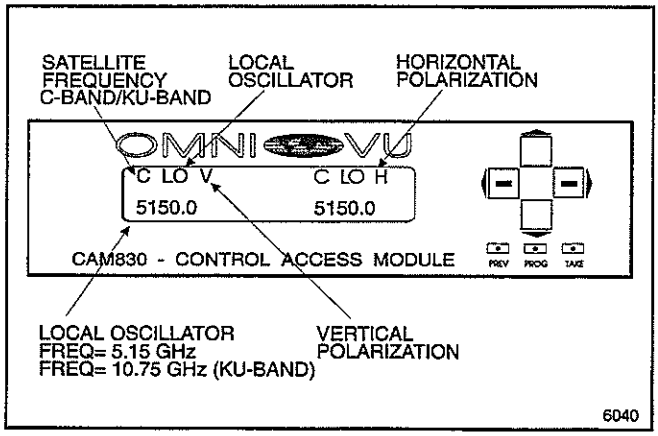


Figure 5-3. LNBC LO Display

4. The ◄ or ► button LED will turn ON and OFF to indicate if there is, or is not, additional information to the right or left of the current display.
5. If one of the local oscillators does not match the installed LNBC, press the PROG button once. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.
6. To change the displayed LNBC LO setting, use the ◄ or ► buttons to place the cursor at the appropriate position. Use the ▲ or ▼ buttons to scroll through the numeric selections.
7. Select the new LNBC LO as required. Observe that both the PROG and TAKE button LEDs are ON.
8. Press the PROG button to load the new LNBC LO into the receiver memory.

NOTE

Any of the antenna inputs on the rear panel of the receiver can be configured to have identical LNBC LOs or completely different types of LNBC LOs. However, use caution to ensure that the final RF input signal from the LNBC LO falls within the receiver's acceptable frequency range of 950 to 1450/1750 MHz.

9. Observe that both the PROG and TAKE button LEDs are OFF, then press the lit ◄ button until its LED turns OFF and the display indicates FORMAT 1.

5.5.2 RF Input Setting

5.5.2.1 RF Center Frequency

1. Rotate the FORMAT dial to position B, RF INPUT SETTINGS. Observe that the CH FREQ C/N message is displayed on the OMNI VU CAM830. See Figure 5-4.

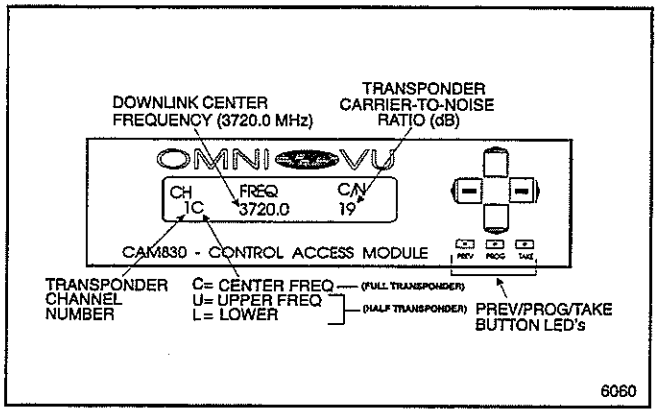


Figure 5-4. RF Input Settings

2. Press the PROG button once. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline. Use the ▲ or ▼ buttons to scroll through the list of transponder center frequencies settings.
3. To change the displayed center frequency setting for a transponder, use the ◄ or ► buttons to place the cursor below the FREQ selection.
4. Press the ▲ or ▼ buttons to scroll through the numeric selections. Set the receiver to the desired center frequency.
5. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the new transponder center frequency into the receiver memory.
6. Observe that both the PROG and TAKE button LEDs are OFF.

NOTE

The center frequency can be set to any frequency between 0.0 to 99999.9 MHz provided the LNBC LO for the selected antenna input will down-convert the selected frequency to the 950 to 1450/1750 MHz range.

5.5.2.2 Antenna Input Selection

1. On the CAM830, press the ◄ or ► buttons until the ANT BW SIG message is displayed. See Figure 5-5

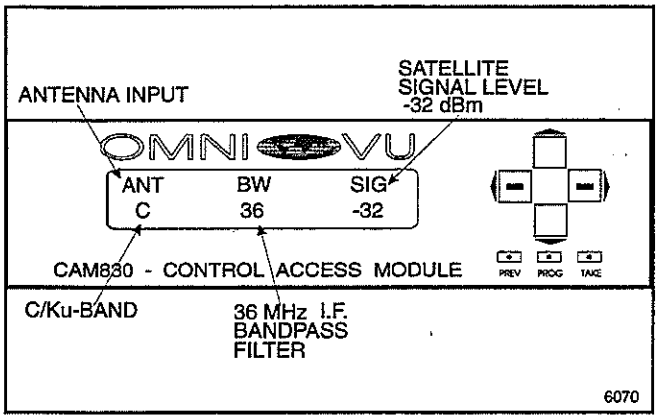


Figure 5-5. Antenna Input Selection

2. To select the desired C/Ku-band and associated horizontal/vertical antenna inputs at the rear of the receiver, press the PROG button once. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.

3. Use the ▲ or ▼ buttons to select either C or K (C-/Ku-band). Press the ► button, and observe that the cursor is flashing underneath the H or V (horizontal/vertical) selection. Use the ▲ or ▼ buttons, and set the receiver to the desired polarity.

NOTE

The antenna input selections can be verified by monitoring the C, KU, HOR and VER receiver front panel LEDs, which are located next to the CHANNEL select dial.

5.5.2.3 70 MHz IF. Bandwidth Selection

1. Press the lit ► button one more time, and observe that the cursor is flashing underneath the BW selection. Use the ▲ or ▼ buttons to select the desired bandwidth.

2. Observe that both the PROG and TAKE button LEDs are ON

NOTE

The BW selection allows the user to scroll through all of the available 70 MHz IF bandpass filters.

3. Press the TAKE button to load the previously selected antenna input and IF bandwidth settings into the receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

5. Press the lit ◄ button and scroll left to the FREQ selection to confirm that the satellite frequency is not out-of-range for the selected antenna input.

NOTE

If the selected satellite frequency is out-of-range, an ^{0}R symbol will be displayed at the end of the satellite center frequency, under the FREQ selection. The ^{0}R symbol indicates that the LNBC LO that was selected for the antenna input will not downconvert the current frequency correctly. Either select the correct antenna input for that satellite frequency or pick a valid frequency within the LNBCs range.

5.5.3 Video Parameters

5.5.3.1 Video/Composite Output Level

1. Rotate the FORMAT dial to position C, VIDEO PARAMETERS, and press the PROG button once.

2. Use the ◄ or ► buttons to place the cursor below the LEVEL selection. Use the ▲ or ▼ buttons to select the desired video output level. See Figure 5-6.

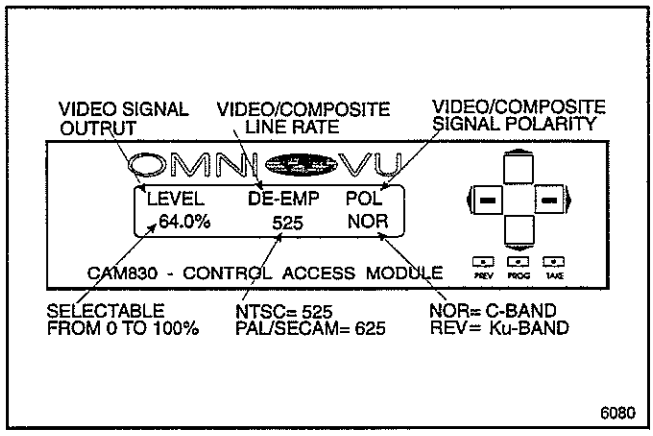


Figure 5-6. Video Parameters

5.5.3.2 Video/Composite De-emphasis Line Rate (NTSC or PAL/SECAM)

Press the lit ◄ or ► buttons to place the cursor below the DE-EMP selection. Use the ▲ or ▼ buttons to select the desired line rate de-emphasis: 525 for NTSC or 625 for PAL/SECAM.

NOTE

If the dual video option is not installed, the receiver will remain at one fixed setting of either 525 for NTSC or 625 for PAL/SECAM.

5.5.3.3 Video/Composite Polarity

1. Use the ◄ or ► buttons to place the cursor below the POL selection. Use the ▲ or ▼ buttons to select the desired video/composite polarity: NOR for C-band or REV for Ku-band operation. Observe that both the PROG and TAKE button LEDs are ON.
2. Press the TAKE button to load the previously selected output level, de-emphasis line rate and polarity into the receiver memory.
3. Observe that both the PROG and TAKE button LEDs are OFF.

5.5.3.4 Clamping Method

The MT830 clamping circuit can remove the energy dispersal waveform present in some signals. The energy dispersal waveform is normally only present in C-band in North America, but it may also be present in Ku-band in Europe and Australia. The user can select either standard sync tip or back-porch, as applicable.

NOTE

In the MT830IBR (International version) receiver, there are two methods of signal clamping: SYNC TIP or BACK-PORCH. Press the TAKE button to load the option.

1. Press the lit ► button. Observe that the SYNC TIP message is displayed. This message indicates the type of signal clamping method employed.
2. Press the lit ► button again. Observe that the CLAMPING METHOD message is displayed.

   If the S015A board is installed, the second line of the display reads SOUND IN SYNC/BP. If the S015 board is installed, the second line of the display reads BACK PORCH. The difference is that the S015A board provides sound in sync and back porch clamping, but the S015 board only provides back porch clamping on a non-sound in sync video.

5.5.4 #1 Audio Control

5.5.4.1 Audio Subcarrier Center Frequency

1. Rotate the FORMAT dial to position D, #1 AUDIO CONTROLS. Observe that the SUB1 FREQ LEVEL message is displayed on the CAM830. See Figure 5-7.

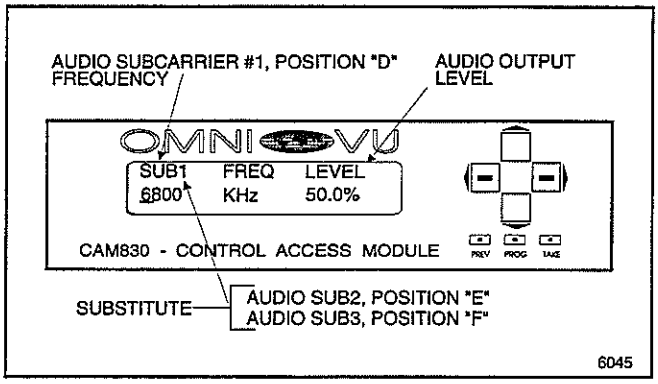


Figure 5-7. #1 Audio Control

2. Press the PROG button once. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline. Use the ◄ or ► buttons to place the cursor below the SUB1 FREQ selection.
3. Use the ▲ or ▼ buttons to scroll through the list of frequency values, then set the desired #1 audio subcarrier center frequency.
4. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the previously selected #1 audio subcarrier frequency into the receiver memory.
5. Observe that both the PROG and TAKE button LEDs are OFF.

NOTE

The audio subcarrier demodulator will only accept center frequencies in the range from 5000 to 8500 kHz.

5.5.4.2 #1 Audio Subcarrier Output Level

1. Press the PROG button once. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline. Use the ◄ or ► buttons to move the editing cursor underneath the the LEVEL selection. See Figure 5-7.

2. Press the ▲ or ▼ buttons to scroll through the available list of numeric level values, then set the receiver to the desired #1 audio subcarrier output level.

3. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the previously selected #1 audio subcarrier output level into the receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

5.5.4.3 #1 Audio Subcarrier Bandwidth

1. Press the lit ► button. Observe that the SUB1 BW DE-EMP message is displayed.

2. Press the PROG button once and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline located below the SUB1 BW selection. See Figure 5-8.

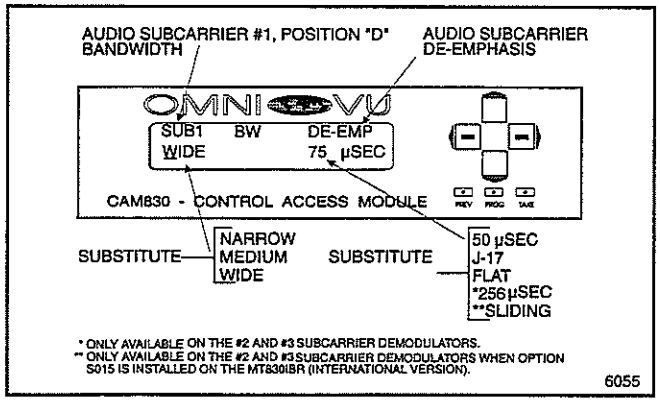


Figure 5-8. Audio Subcarrier Bandwidth

3. Use the ▲ or ▼ buttons to select either NARROW, MEDIUM or WIDE audio subcarrier bandwidth.

   Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the #1 audio subcarrier bandwidth into the receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

NOTE

Narrow bandwidth is 150 kHz, Medium is 330 kHz and Wide is 440 kHz.

5.5.4.4 #1 Audio Subcarrier De-emphasis

1. Press the PROG button once. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline. Use the ◄ or ► buttons to place the cursor underneath the DE-EMP selection.

2. Use the ▲ or ▼ buttons to select either 75 µsec 50 µsec, FLAT or J17 de-emphasis. Observe that both the PROG and TAKE button LEDs are ON.

NOTE

256 µsec de-emphasis is only available on the #2 and #3 subcarrier demodulators. Sliding de-emphasis is only available on the #2 and #3 subcarrier demodulator when option S015 is installed on the MT830IBR (International version).

3. Press the TAKE button to load the selected #1 audio subcarrier de-emphasis setting into the receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

NOTE

#2 and #3 Audio Controls, format dial positions E and F, respectively, are accessed in the same manner as #1 Audio Control, dial position D.

5.5.5 Timer Functions

5.5.5.1 Timer Control Functions

The TIMER option allows the receiver to work with scheduled events. When the timer function is activated, the receiver can be set up to perform specific tasks at specific times on specific days or dates. There are 10 individual timers (TMR0-TMR9) associated with the CAM830. When used, the timer option has two modes of operation: single and multiple event.

Single event mode operation allows the user to program the receiver's timer to respond to only one event. After this single event has occurred, the timer option must be re-programmed before it can be used again. In the multiple event mode, the receiver can be programmed to respond to a maximum of seven events per day or seven events per week.

1. Rotate the FORMAT dial to position G,Timer & Alarms. Observe that the TMR DAYS/DATE TIME message is displayed. See Figure 5-9.

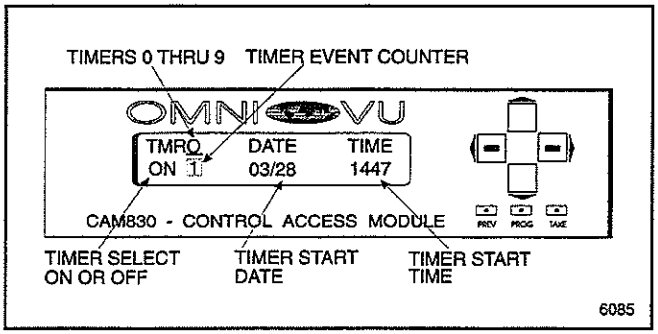


Figure 5-9. Timer Setup

2. Press the PROG button once. Observe that the cursor is flashing next to the TMR selection, use the ▲ or ▼ button to scroll through timer settings TMR0-TMR9.

NOTE

The event timer counter will appear as a number just below the TMR number. This number indicates the number of times the timer has been activated.

5.5.5.2 Single Mode Operation

1. Press the ▶ button. Observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline. To activate the desired timer, use the ▲ or ▼ buttons, and then select the ON function.

2. Press the ▶ button again. Observe that the cursor appears on the first line as a flashing underline, underneath the DATE or DAYS selection. Use the ▲ or ▼ buttons to select either DATE or DAYS.

3. Press the ▶ button, and observe that the cursor appears on the second line as a flashing underline, underneath the DAYS or DATE selection. See Figure 5-10.

4. To set the timer DAY/DATE, press the ▲ or ▼ buttons to scroll through the list of numeric values.

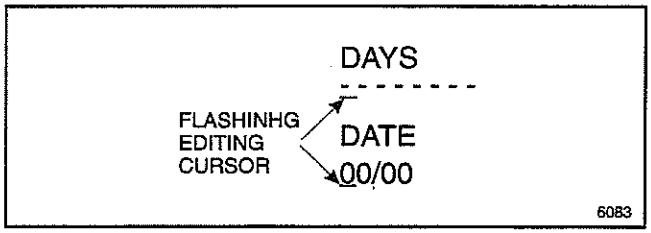


Figure 5-10. Timer Days/Date

To move the cursor left or right, use the ◀ or ▶ buttons. Set the DAY/DATE as required. This selection identifies the day or date that the timer will activate.

5. Press the ▶ button. Observe that the flashing cursor is underneath the TIME selection. Use the ▲ or ▼ buttons to scroll through the list of numeric values. To move the cursor left or right, use the ◀ or ▶ buttons. Set the timer to the desired TURN-ON TIME.

NOTE

Time entries must be in a 2400 hour military format, e.g. 3:00 p.m. = 1500.

6. Observe that both the TAKE and PROG button LEDs are ON. Press the TAKE button to load the timer ON/OFF, DAY/DATE and TURN ON settings into the receiver memory.

5.5.5.3 Pre-Warning Time Message

The Pre-Warning Time message is an indication that an event is about to occur. The user can configure the warning message to be displayed on the CAM830 from one to 99 minutes before an event.

1. Press the ▶ button until the PRE-WARNING TIME OFF message is displayed. If the PREV button LED is ON, press once and observe that the PREV button LED is OFF.

2. Observe that the cursor is flashing underneath the the OFF selection. Use the ▲ or ▼ buttons to scroll the list of time settings.

3. Set the event PRE-WARNING TIME as desired. Observe that both the PROG and TAKE button LEDs are ON.

4. Press the TAKE button to load the PRE-WARNING message start time into the receiver memory.

5.5.6 Alarm Functions

5.5.6.1 Alarm Relay Control Functions

The MT830 is supplied with a general-purpose ALARM relay. When programmed via the CAM830, this relay will provide a dry contact output. This relay is typically used as a status indicator. When activated, the alarm relay will inform the user of scheduled events. Switch SW4 on the CAM830 board is used to set the alarm relay for either a normally closed or normally open condition. The ALARM relay is identified by the two terminal screws on the rear panel of the MT830 labeled SUMMARY ALARMS.

1. Rotate the FORMAT dial to position G, Timer & Alarms. Press the ▶ button until the CH RELAY OFF/ON message is displayed. See Figure 5-11.

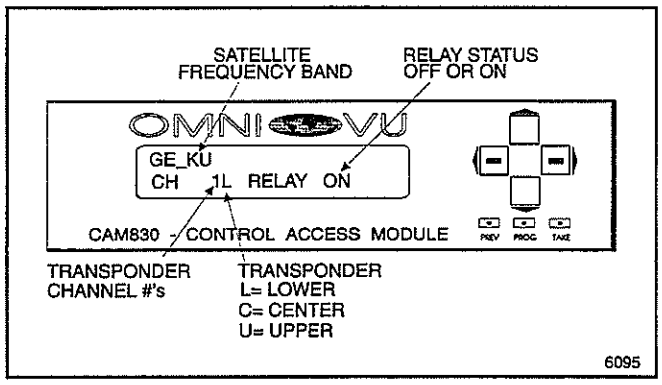


Figure 5-11. Alarm Relay Status

NOTE

The flashing PREV button LED allows the user to preview the displayed selections. If the displayed selections are not acceptable, they can be changed by pressing the PROG button.

2. Press the PROG button once and observe that the cursor appears on the far left-hand side, first line of the display. Use the ▲ or ▼ buttons to select the desired satellite.

3. Continue pressing the ▶ button. Observe that the cursor is flashing underneath the transponder format selection (lower, center and upper). Press the ▲ or ▼ buttons, and scroll through the transponder channel settings for the selected satellite.

4. Press the ▶ button again and observe that the flashing cursor is beneath the relay ON/OFF selection. Use the ▲ or ▼ buttons to select either ON or OFF for the desired satellite transponder channel. If the ON function is selected, the alarm relay will activate at the specified time and an external output will be provided at the two rear-panel terminal screws labeled SUMMARY ALARMS.

5. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the alarm relay status (ON/OFF) setting into the receiver memory.

6. Observe that both the PROG and TAKE button LEDs are OFF. If the PREV button LED is flashing, press it once to stop flashing.

5.5.6.2 Relay Function

The CAM830 Relay Function can be configured for either the TIMER or ALARM mode. In the TIMER mode, the relay will be activated when a specified event has occurred. In the ALARM mode, the relay will be activated when the threshold value of a specific signal or C/N has been exceeded.

1. Press the ▶ button. Observe that the RELAY FUNCTION message is displayed, then press the PROG button once. Observe that the cursor appears in the far left-hand side, second line of the display as a flashing underline.

2. Observe that both the PROG and TAKE button LEDs are ON. Then press the ▲ or ▼ buttons and select the desired relay function: TIMER or ALARM.

3. After the desired selection has been made, press the TAKE button to load the selected relay function into the receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

5.5.6.3 ALARM SIG C/N Functions

The ALARM, SIG and C/N functions allow the user to activate the ALARM relay and set the desired threshold levels for both the incoming signal and the associated carrier-to-noise level (C/N).

1. Press the ▶ button, and observe that the ALARM SIG C/N message is displayed. Then press the PROG button and observe that the cursor appears

on the far left hand side, second line of the display as a flashing underline.

2. Use the ▲ or ▼ buttons to select either the alarm OFF, INT+AUX, AUX or INT function. After the desired alarm function has been made, press the ▶ button. Observe that the cursor is flashing underneath the SIG selection.

3. Press the ▲ or ▼ buttons to scroll through the list of signal level values. Select the desired signal level threshold value.

4. Press the ▶ button, and observe that the flashing cursor is underneath the C/N selection. Use the ▲ or ▼ buttons to scroll the list of C/N values. Select the the desired C/N threshold value.

5. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the ALARM, SIG and C/N threshold levels into the receiver memory.

6. Observe that both the PROG and TAKE button LEDs are OFF.

5.5.6.4 Aux Alarm Logic

The Auxiliary Alarm Logic function allows the receiver to be programmed via the CAM830 to accept an external input on the AUX ALM IN terminal. This input will inform the user if any external devices have malfunctioned or gone off line.

1. Press the ▶ button and observe that the AUX ALARM LOGIC message is displayed. Press the PROG button, and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.

2. Use the ▲ or ▼ button to scroll through the AUX ALARM selections. Select either the normally open or normally ground condition.

3. Observe that both the PROG and TAKE button LEDs are ON. Press the the TAKE button to load the AUX ALARM selection into the receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

5.6 C/N, SIGNAL AND AUX WARNINGS

In the event of signal loss, low carrier-to-noise or external equipment malfunction, the seven-segment display on the receiver will indicate the following warning symbols:

- Sn – incoming input signal is out of range.
- Cn – carrier-to-noise for the associated signal is out of range.
- Au – external device has malfunctioned.

NOTE

The Au warning symbol has the highest priority and overrides both Cn and Sn warnings. The Cn warning would have the second-highest priority and would override the Sn warning.

5.6.1 Configuration

5.6.1.1 Receiver Configuration Setup Selection.

1. Rotate the FORMAT dial to position H, CONFIGURATION. Observe that the TIME DAY DATE message is displayed on the CAM830.

2. Press the PROG button, and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.

3. Use the ▲ or ▼ buttons to scroll through the list of values. Press the ▶ button to move the cursor to the right. Set the TIME, DAY and DATE as desired.

4. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the receiver TIME DAY DATE settings into the receiver memory.

5. Observe that both the PROG and TAKE button LEDs are OFF.

5.6.1.2 Address, Baud and TTL

Press the ▶ button once and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.

NOTE

In MANUAL mode, the address, baud rate and TTL settings can be bypassed. These settings are required only when the receiver is to be connected to a PC.

5.6.1.3 Receiver Memory

Press the ▶ button until the EMULATE MEM FREE message is displayed. This status message informs the user on the available receiver memory.

5.6.1.4 Alarm Delay Time

The alarm delay time can be set between 0.1 and 25.5 seconds. The purpose of this alarm delay feature is to prevent the alarm relay from false triggering due to noise, glitches and spikes.

1. Press the ▶ button until the ALARM DELAY TIME message is displayed. Use the ▲ or ▼ buttons to scroll through the list of time delay values. Set the ALARM DELAY TIME as desired.
2. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the ALARM DELAY TIME setting into the receiver memory.
3. Observe that both the PROG and TAKE button LEDs are OFF.

5.6.1.5 Relay Time-Out

The alarm relay time-out can be set anywhere between 1 and 255 seconds. The purpose of the alarm relay time-out feature is to RESET the ALARM RELAY to its original state after a specified time has elapsed.

1. Press the ▶ button until the RELAY TIME-OUT message is displayed. Press the PROG button once and observe that the cursor appears on the left hand side, second line of the display as a flashing underline.
2. Use the ▲ or ▼ buttons to scroll through the list of time-out values, then set the ALARM RELAY TIME-OUT as desired.
3. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the ALARM RELAY TIME-OUT setting into the receiver memory.
4. Observe that both the PROG and TAKE button LEDs are OFF.

5.6.1.6 Bandpass Filter

Press the ▶ button until THE CMF70 IS INSTALLED message is displayed. This status message informs the user that multiple bandpass filters have been installed,

NOTE

If multiple bandpass filters are not installed in the receiver, the message will read: THE CMF70 IS NOT INSTALLED.

5.6.1.7 Maximum Video Frequency

1. Press the ▶ button until the MAX VIDEO FREQ message is displayed. Press the PROG button, and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.
2. Use the ▲ or ▼ buttons to scroll through the list of video frequencies. Select either 1450 MHz or 1750 MHz.

NOTE

Select 1450 MHz for the MT830BR (Domestic) and 1750 MHz for the MT830IBR (International) Satellite Receiver.

3. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the MAX VIDEO FREQUENCY setting into the receiver memory.
4. Observe that both the PROG and TAKE button LEDs are OFF.

5.6.1.8 C/N & Signal Calibration Settings

This selection allows the receiver input signal to be set to a pre-calibrated level. This is extremely useful when the C/N and the signal strength of a signal are known and the user wishes to change the current settings.

1. Press the ▶ button until the C/N CAL SIG message is displayed. Press the PROG button once, and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.
2. Use the ▲ or ▼ buttons to scroll through the list of C/N values. Select the desired C/N setting.
3. Press the ▶ button, and observe that the cursor is flashing underneath the SIG selection. Use the ▲ or ▼ buttons to scroll through the list of signal level values. Set the receiver to the desired signal level.

4. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the C/N and SIG settings into the receiver memory.

5. Observe that both the PROG and TAKE button LEDs are OFF.

5.6.1.9 CAL Video Level

The CAL Video Level selection allows the user to either decrease or increase the current receiver video output level. If the desired video output level is too large, simply enter the appropriate number underneath the CAL selection to decrease the output. Conversely, if the video output signal is too small, enter the appropriate number underneath the CAL selection to increase the output.

NOTE

The CAL Video function should only be used as an "offset adjustment" when matching the video outputs of multiple receivers.

1. Press the ▶ button until the CAL VIDEO LEVEL message is displayed. Press the PROG button once, and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.

2. Use the ▲ or ▼ button to scroll through the list of video level values. Set the receiver to the desired video output level.

3. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the video output level into receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

5.6.1.10 CAL Audio Level

The CAL Audio Level selection allows the user to either decrease or increase the current receiver audio output level. If the desired #1 audio output level is too large, simply enter the appropriate number underneath the CAL selection to decrease the output. Conversely, if the #1 audio level is too small, enter the appropriate number underneath the CAL selection to increase the the #1 audio output level.

NOTE

The CAL Audio function should only be used as an "offset adjustment" when matching the audio outputs of multiple receivers is required.

1. Press the ▶ button until the CAL AUDIO LEVEL message is displayed. Press the PROG button once. Observe that the cursor appears on the left-hand side, second line of the display as a flashing underline.

2. Use the ▲ or ▼ buttons to scroll through the list of audio level values. Set the receiver to the desired #1 audio output level.

3. Observe that both the PROG and button LEDs are OFF. Press the TAKE button to load the #1 Audio Output Level into the receiver memory.

4. Observe that both the PROG and TAKE button LEDs are OFF.

NOTE

CAL #2 and #3 Audio Levels are set in the same manner as the CAL #1 Audio Level

5.6.1.11 International Board

Press the ▶ button until the INTERNATIONAL BD message is displayed. This message informs you whether the S015 board is installed.

If the board is installed, the message reads INTERNATIONAL BD S015. If the board is not installed, the message reads INTERNATIONAL BD ABSENT. Note that the board may have been installed incorrectly if the message indicates that the board is absent.

5.7 COPY / DELETE AND RENAMING

The CAM830 can hold up to 99 favorite satellite formats similar to the presets on a car radio. These formats are stored as number 1 to 99. The supplied formats can be renamed with labels that the user is more familiar with.

The CAM830 LCD display can accept a maximum of 8 characters for the FORMAT name. The name can be comprised of any combination of alphanumeric characters. Alpha characters span the range of A through Z, while the numeric characters span the range of 0 through 9. The hyphen and underline symbols are also used. No other character symbols are allowed.

For instance, the C-BAND format could be renamed as K2-NEWS and a group of up to 99 unique NEWS feed channels could be saved within the K2-NEWS satellite format.

NOTE

To conserve memory and make scrolling through channels quick, the channel groups should be kept to approximately 10 channels per satellite format.

5.7.1 Satellite Format (Copy and Renaming)

5.7.1.1 COPY FORMAT AFTER/BEFORE

1. Rotate the FORMAT dial on the MT830 to position A, SATELLITE FORMAT, and observe that the FORMAT message is displayed.

2. Press the PROG button LED and observe that the cursor appears on the left-hand side, first line of the display. Use the ▲ or ▼ buttons to scroll through the list of satellite formats. Select the desired satellite format to be copied.

3. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to confirm the desired satellite format to be copied.

4. Observe that the PREV, PROG and TAKE button LEDs are OFF.

5. Press and hold the TAKE button, then press the ▲ button. Observe that the COPY FMT AFTER or BEFORE message appears on the first line of the display.

6. The COPY FMT AFTER or BEFORE message is asking the user where the new copied FORMAT is to be placed. Use the ▲ or ▼ buttons to scroll through the available satellite formats. Continue scrolling until the new format has been placed in the desired location.

7. Once the desired location of the new copied format has been determined, press the TAKE button to load the new copied format into the receiver memory. Remember that the new copied format will have the same name as the selected format, but with one major difference: it will have a new format number.

8. Press the PROG button once, and observe that the cursor appears on the right-hand side, first line of the display. Use the ▲ or ▼ button until the new copied format is displayed.

9. Press the ▶ button, and observe that the cursor appears on the far left-hand side, second line of the display as a flashing underline.

10. The cursor should now be flashing underneath the first character of the new copied format. Use the ▲ or ▼ buttons to scroll through the list of alpha/numeric selections. Then use the ◀ or ▶ buttons to move the cursor left or right.

11. Edit the new copied format as desired. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the new name selection into receiver memory.

12. Observe that both the PROG and TAKE button LEDs are OFF.

13. Press the PROG button, and observe that the cursor appears on the right-hand side, first line of the display. Use the ▲ or ▼ buttons to scroll through the list of satellite formats. Verify that the previously selected satellite format has been added to the database.

5.7.2 Satellite Format (Deleting)

1. Rotate the FORMAT dial to position A, SATELLITE FORMAT, and observe that the FORMAT message is displayed.

2. Press and hold the TAKE button, then press the ▼ button. Observe that the DELETE FORMAT message appears on the first line of the display.

3. Use the ▲ or ▼ buttons to scroll through the list of satellite formats. Select the desired satellite format to be deleted

4. Confirm that the satellite format to be deleted is displayed. Press the TAKE button to remove the displayed satellite format from the receiver memory.

5. Observe that both the PROG and TAKE button LEDs are OFF.

6. Press the PROG button, and observe that the cursor appears on the right-hand side, first line of the display.

7. Use the ▲ or ▼ buttons to scroll through the list of satellite formats. Verify that the previously selected satellite format has been deleted from the satellite database.

5.7.3 Changing the Indicated Channel Number

1. Rotate the FORMAT dial on the MT830 to position B, RF INPUT SETTINGS. Observe that the CH FREQ C/N message is displayed.

2. Press the PROG button, then press the ◁ button, and observe that the OLD CH ID: NEW CH ID: message appears on the the display. Use the ▲ or ▼ buttons to scroll through the list of transponder channels. Select the desired ID number for the new transponder channel.

3. Use the ▷ button to move the cursor underneath the lower/center/upper frequency selection. Use the ▲ or ▼ buttons to scroll through the list of transponder frequency selections. Select the desired L, C or U transponder frequency value.

4. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the new transponder channel ID into the receiver memory.

5. Observe that the PREV, PROG and TAKE button LEDs are OFF.

6. Press the PROG button, and observe that the cursor appears on the left-hand side, second line of the display. Use the ▲ or ▼ buttons to scroll through the list of transponder channels and frequencies.

7. Verify that the previously selected transponder channel and frequency have been added to the database.

5.7.4 Copying the Indicated Channel Number

1. Rotate the FORMAT dial on the MT830 to position B, RF INPUT SETTINGS. Observe that the CH FREQ C/N message is displayed.

2. Press and hold the TAKE button, then press the ▲ button. Observe that the COPY CHANNEL AFTER or BEFORE message appears on the first line of the display.

3. The COPY CHANNEL AFTER or BEFORE message is asking the user where the new copied CHANNEL is to be placed . Use the ▲ or ▼ buttons to scroll through the available channels. Continue scrolling until the new channel has been placed in the desired location.

4. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to load the new copied channel into the receiver memory.

5. Observe that the PREV, PROG and TAKE button LEDs are OFF.

6. Press the PROG button and observe that the cursor appears on the left-hand side, second line of the display. Use the ▲ or ▼ buttons to scroll through the list of transponder channels. Verify that the previously selected channel has been placed in the desired location.

NOTE

The first line will indicate the current channel number to be copied, and the second line will indicate the channel position to insert the copied channel.

5.7.5 Deleting the Indicated Channel Number

1. Rotate the FORMAT dial on the MT830 to position B, RF INPUT SETTINGS, and observe that the CH FREQ C/N message is displayed

2. Press and hold the TAKE button LED, then press the ▼ button. Observe that the DELETE CHANNEL: message appears on the first line of the display.

3. Use the ▲ or ▼ buttons to scroll through the list of transponder channels. Select the desired transponder channel to be deleted.

4. Observe that both the PROG and TAKE button LEDs are ON. Press the TAKE button to delete the previously selected transponder channel.

5. Press the PROG button and observe that the cursor appears on the left-hand side, second line of the display. Use the ▲ or ▼ buttons to scroll through the list of transponder channels. Verify that the previously selected channel has been deleted from the database.

6 FIRMWARE LOADING

6.1 GENERAL

This section contains instructions on how to reprogram an MT830BR/MT830IBR AGILE OMNI BROADCAST RECEIVER using a personal computer (PC). This re-programming capability is accomplished by the OMNI VU CAM830 (Control Access Module) that is part of the of the MT830 receiver.

6.2 SYSTEM REQUIREMENTS

An IBM 386 or compatible personal computer with DOS 6.0 or higher installed is required.

- 1 MEG of RAM.
- 3-1/2-inch floppy disk drive, dual sided, double density.
- Asynchronous RS232 communications port.
- Optional RS422 communications port.
- Monochrome or Color Monitor.

6.3 CABLE CONNECTIONS

The MT830 receiver is supplied with a DB9 pigtail cable. Connect the 8-pin female DIN connector of the cable to the receiver jack labeled REMOTE CONTROL. Connect the other end of this cable to the COM1 or COM2 connector on the PC. See Figure 6-1.

NOTE

The receiver is initially configured for an RS232 communication interface. To change the factory configuration from RS232 to RS422, refer to section 6-11, Communication Configuration.

6.4 RECEIVER/OMNI VU SETUP

1. Press the power ON pushbutton switch on the MT830. Observe that both the receiver channel and OMNI VU displays are lit. If either display is not lit, refer to the MT830BR/MT830IBR Service Manual.

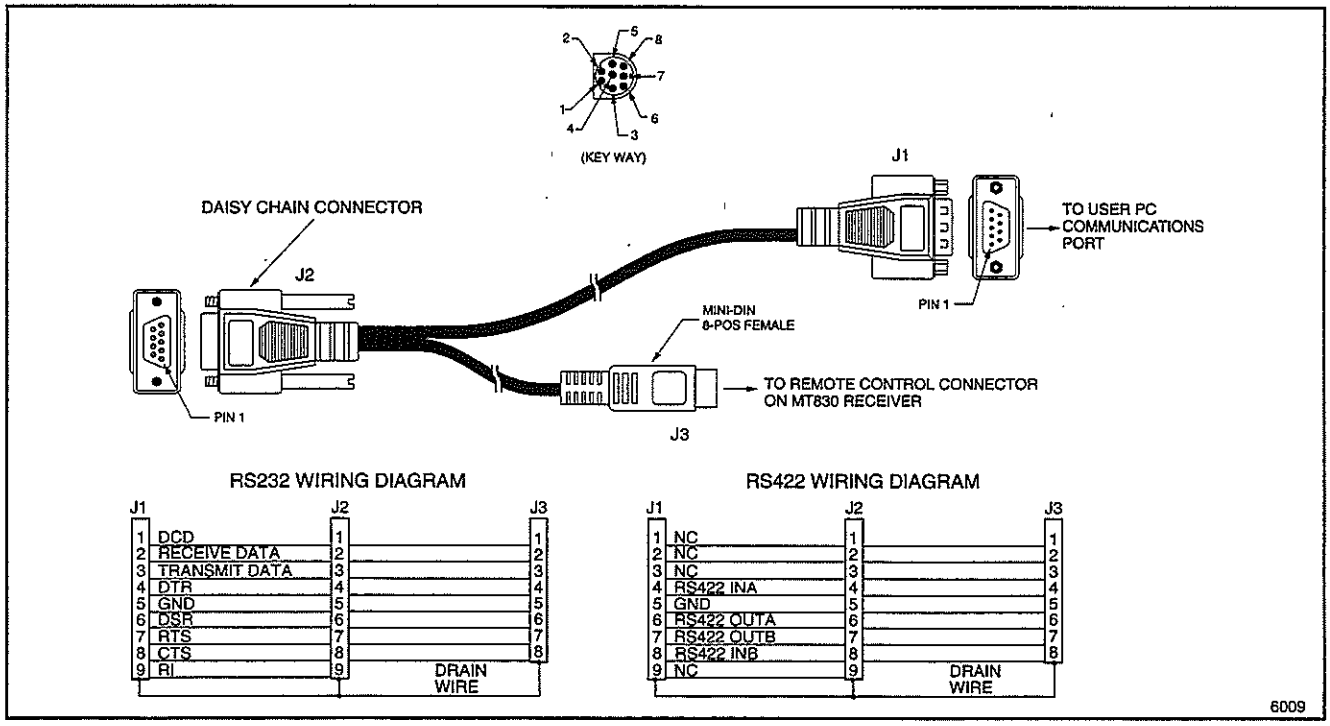


Figure 6-1. RS232 and RS422 Signal Flow

2. Set the FORMAT CONTROL KNOB on the receiver to position H, FORMAT.

3. Press the PROG button LED on the CAM830 OMNI VU once. Observe that the cursor appears on the left-hand side, second line of the display as a flashing underline.

4. Press the lit ▶ button LED until the ADDR BAUD TTL message is displayed. See Figure 6-2.

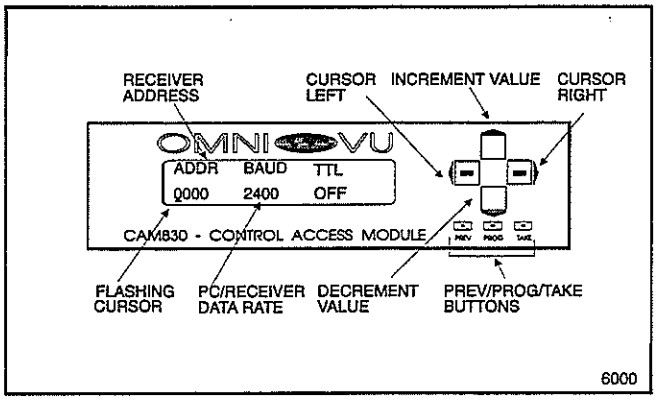


Figure 6-2. OMNI VU CAM830

5. Press the ▲ or ▼ buttons on the OMNI VU to increment or decrement values. To move the cursor left or right, use the ◀ or ▶ buttons.

6. Set the receiver address as required.

7. Set the receiver baud rate as required.

8. Set the TTL ON/OFF function to OFF.

NOTE

The TTL ON/OFF function is normally OFF except when the receiver is interfacing with older CRC850/CRC800CI systems.

9. Press the TAKE button LED and load the ADDRESS, BAUD RATE and TTL ON/OFF settings into the receiver memory.

6.5 OMNI VU KEYPAD FUNCTIONS

1. PREV Button – Pre-selects a satellite format and transponder.

2. PROG BUTTON – Used for real time programming and changing of the receiver settings. (Note: A red LED lights when this function is active.)

3. TAKE BUTTON – Loads the PREVIEW or PROGRAM settings into the receiver memory. (Note: A red LED lights when this function is active.)

6.6 COMPUTER POWER TURN ON

Turn the PC ON. After the PC has been initialized, observe that the C:\ > prompt is displayed on the monitor.

6.7 INITIALIZATION

1. Insert the supplied CAM830 Load Software diskette into a 3-1/2 inch disk drive.

2. Configure the PC to access the CAM830 Load Software diskette. To run the Load Software program from either drive A:or B: (no hard drive) refer to step 6.8d.

NOTE

To run the Load Software program from the PC hard drive, refer to steps 6.8a through 6.8d.

6.8 HARD DRIVE INSTALLATION

1. Type MD LOAD, and observe that the monitor displays the C:\ > prompt, then type CD LOAD. Observe that the C:\ LOAD > prompt is displayed.

2. Type COPY A: or B: *.*, whichever disk drive is being accessed, and observe that the monitor screen displays the files that have been copied from the A: or B: disk drive to the C disk (hard drive).

3. After all files have been copied, observe that the C:\ Load > prompt is displayed. Remove the diskette.

4. Type LOAD and press RETURN, observe that the OPTIONS ABOUT screen is displayed on the monitor.

NOTE

To access the CAM830 Load Software without the diskette installed (program installed on hard drive), type CD LOAD. Press ENTER, and type LOAD again. Observe that the OPTIONS ABOUT screen is displayed.

6.9 OPTIONS

The CAM830 Load Software consists of seven programs. These programs allow the user to configure the receiver's communication port, reload firmware, update existing programs, load databases to and from the receiver and create new databases.

6.9.1 Setup (F2)

1. Press the F10 function key, then press ENTER on the keyboard and observe that the OPTIONS menu screen is displayed on the monitor. See Figure 6-3.
2. Select the Setup program by pressing F2 or use the keyboard ▲ or ▼ buttons, and press ENTER.
3. Observe that the communication setup configuration screen is displayed on the monitor. See Figure 6-4.
   - COM1 or COM2 – establishes communication link between the computer and receiver.
   - BAUD RATE – user-selectable baud rates of 300, 1200, 2400, 4800, 9600 and 19200.
   - ADDRESS – receiver addresses are user assigned.
4. To make selections using the Setup Configuration menu, use the TAB and the up or down arrow keys on the computer keyboard. Select the desired COM port, baud rate and receiver address. Press ENTER to confirm selections.

6.9.2 Reload Firmware (Alt F3)

The Reload Firmware program is used when the receiver has been placed in an inoperative status.

NOTE

When using the Reload Firmware program the receiver address will automatically default to 0000, and the baud rate will be set to 2400.

1. From the OPTIONS menu, Select RELOAD FIRMWARE.
2. Observe that the .FRM load file screen is displayed on the monitor.

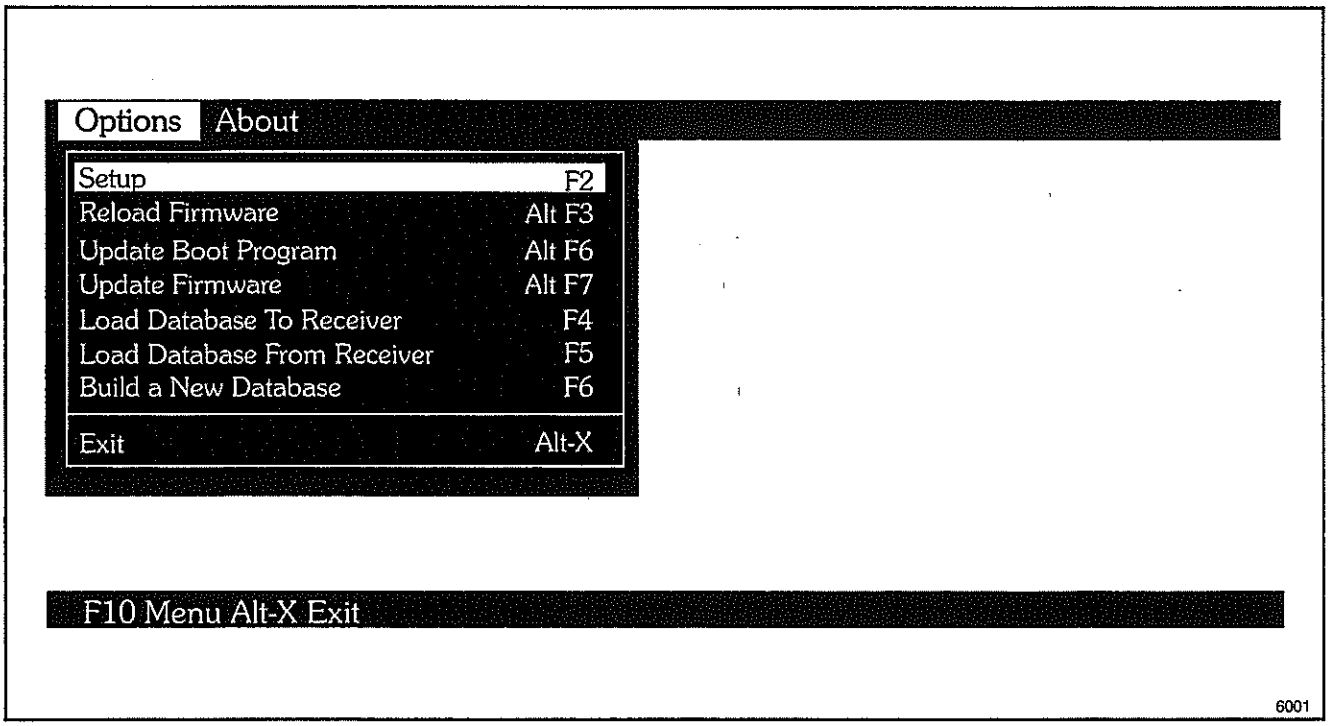


Figure 6-3. Options Menu

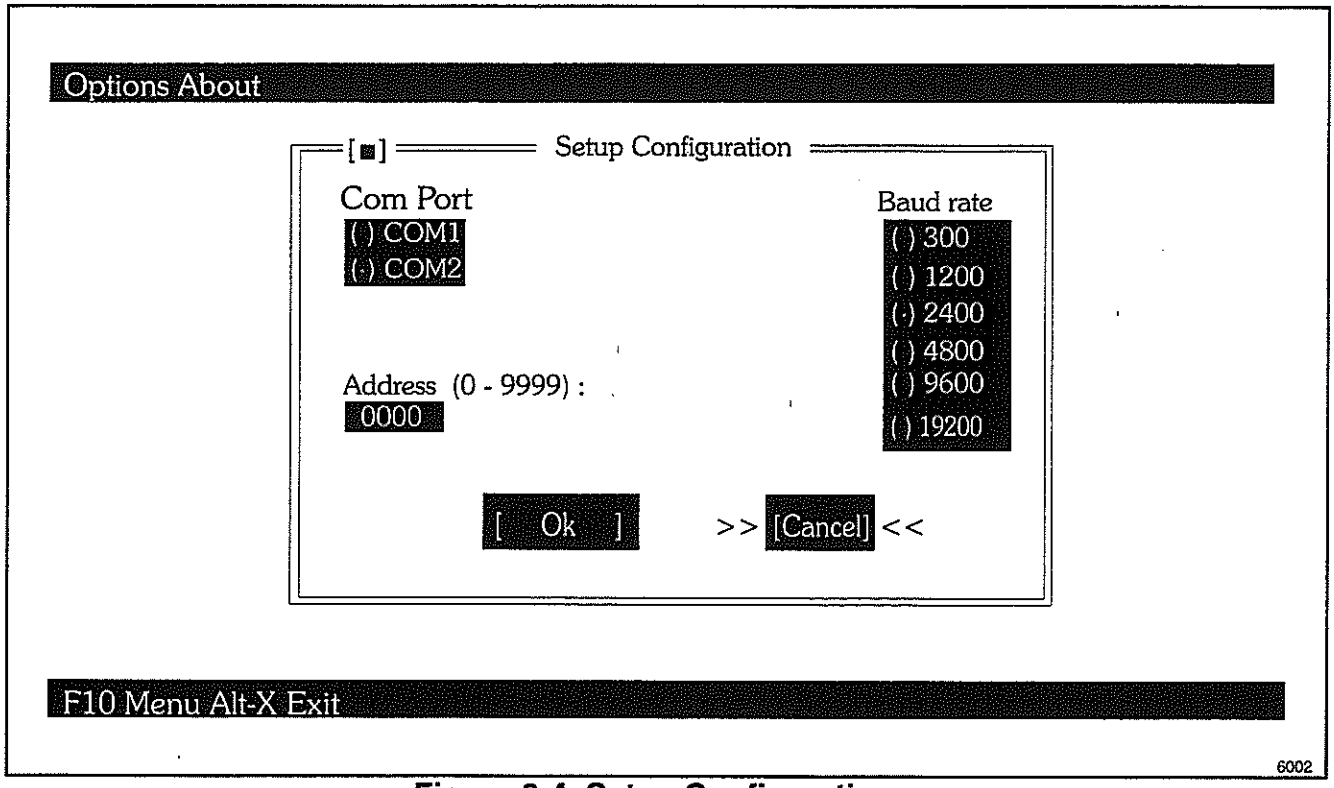


Figure 6-4. Setup Configuration

3. Using the PC TAB key and the ▲ or ▼ buttons on the keyboard, select the appropriate reload firmware file. The selected file should be similar to the one shown in Figure 6-5.

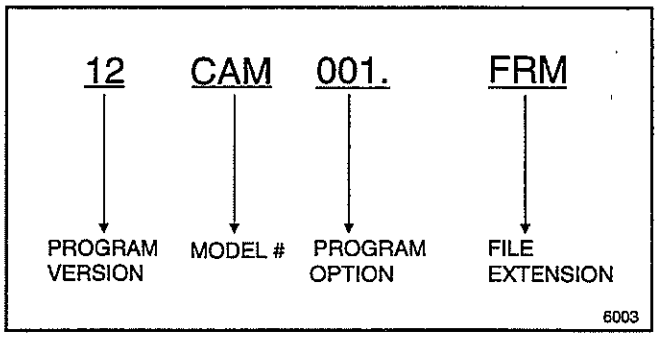


Figure 6-5. Firmware File Definition

4. After the appropriate file has been selected. Press ENTER and observe that the FIRMWARE LOAD screen is displayed. See Figure 6-6.

5. Observe that the CONFIRM message appears on the monitor. Using the keyboard TAB button, select YES, then press ENTER.

6. Observe that the IMPORTANT MESSAGE screen is displayed on the monitor. Using the keyboard TAB button, select YES and press ENTER.

7. Turn the receiver OFF.

8. On the receiver, press and hold the PROG button LED. Turn the receiver ON, then release the PROG button LED.

9. If the firmware reloading steps have been done correctly, the REMOTE LED indicator on the receiver should be ON and the PROG button LED should be flashing.

10. Observe that the RELOADING FIRMWARE message is displayed on the monitor.

11. After downloading firmware to the receiver, observe that the .DB LOAD FILE screen is displayed on the monitor.

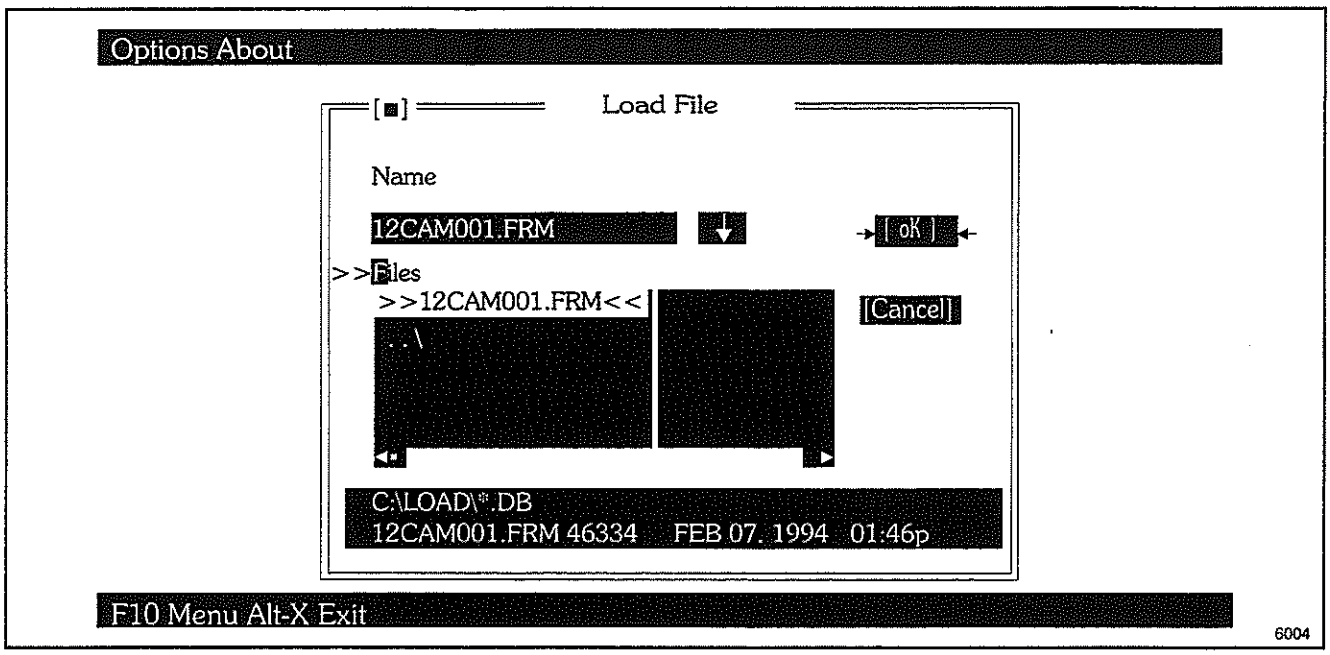


Figure 6-6. Firmware Load Screen

12. Using the TAB and ▲ or ▼ buttons on the keyboard, select a database file. The selected database file should be similar to the one shown in Figure 6-7.

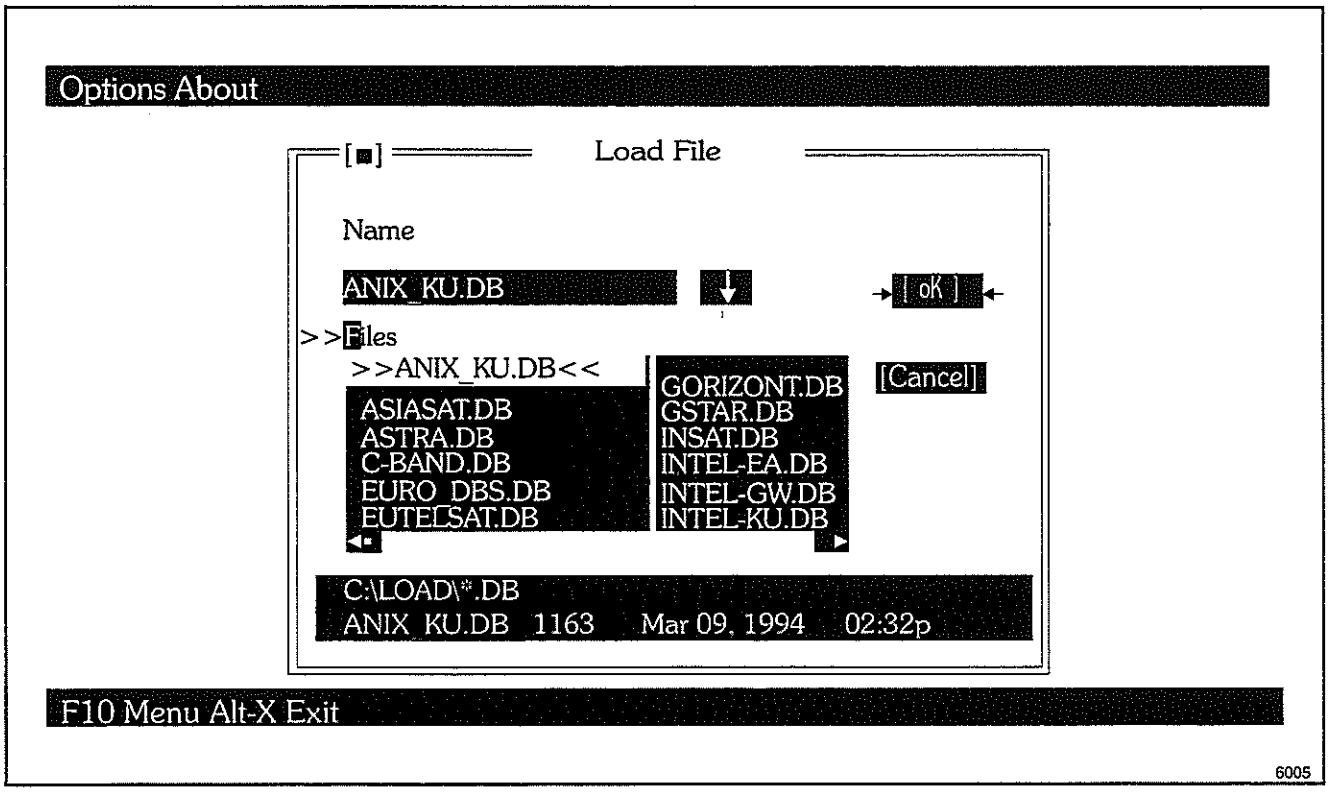


Figure 6-7. Load File Database Screen

13. After a database file has been selected, press ENTER.

14. Observe that the CONFIRM message appears on the monitor. Using the keyboard TAB button, select YES, then press ENTER.

15. Observe that the SENDING DATABASE FILE message appears on the monitor.

16. After downloading the database file to the receiver, observe that the STATUS SUCCESS message appears on the monitor.

17. Press the ENTER button, then press the ALT O keys to return to the main menu.

18. To exit the program, press ALT X or select EXIT.

19. Observe that the C:\ > prompt is displayed on the monitor.

NOTE

The Update Boot Program, Update Firmware, Load Database To Receiver, Load Data Base From Receiver and Build a New Database programs are run in the same manner as the Reload Firmware Program.

6.9.3 Update Boot Program

The update boot program is used only to update the receiver with the latest version of the firmware.

1. Disconnect the receiver's AC power.

2. Remove the 7 screws that secure the bottom cover, and remove cover.

3. Locate the MT830 Main Circuit Board. In the area underneath the OMNI VU keypad, locate switch SW1. See Figure 6-8.

NOTE

Record the current settings of DIP switch SW1 before changing.

4. On the CAM830 main circuit board assembly, set SW1 to the position indicated in Figure 6-9 to update the boot program.

5. Set switch SW1 as in Figure 9 when you are instructed to turn the memory-write switch OFF

6. Connect the receiver to AC power.

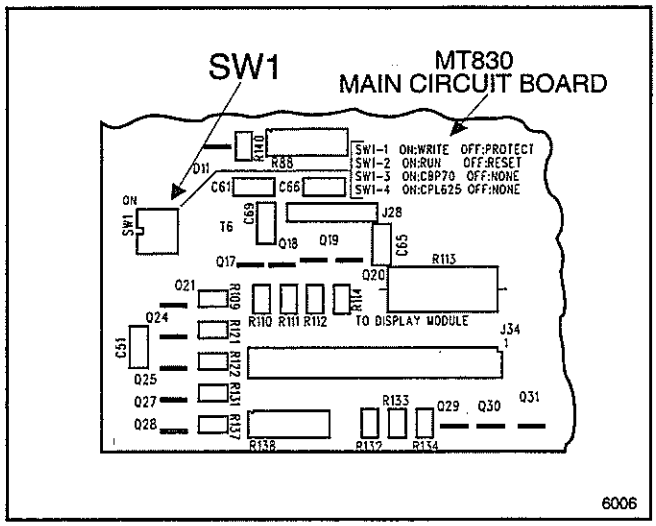


Figure 6-8. Location Of SW1

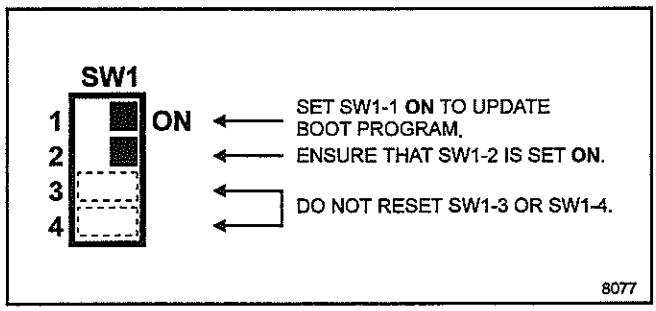


Figure 6-9. Switch SW1 Detail 1

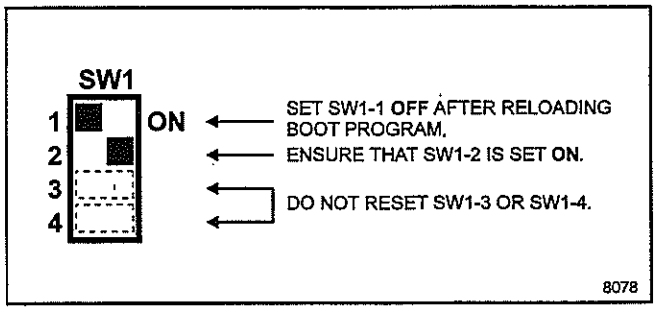


Figure 6-10. Switch SW1 Detail 2

7. Put the CAM830 firmware update diskette into the appropriate disk drive.

8. Follow the instructions outlined in the initialization section of this procedure.

9. Once the PC and the receiver have been properly initialized, select the UPDATE BOOT PROGRAM from the OPTIONS menu.

10. The UPDATE BOOT program and all other programs displayed on the OPTIONS menu run in the same manner as the RELOAD FIRMWARE program.

11. When the UPDATE BOOT program is installed, turn the receiver OFF.

12. Disconnect the receiver's AC power.

13. Set switch SW1 back to its original setting.

14. Reinstall the bottom cover on the receiver.

15. Connect the receiver to AC power.

6.9.4 Update Firmware (Alt F7)

The Update Firmware program is used when new software/firmware is developed and is ready for customer use. This firmware will be sent to the customer on diskettes. The latest revision number will be printed on the diskette label. Install the new firmware diskette according to the instructions in sections 6.7 and 6.8.

6.9.5 Load Database To Receiver (F4)

The Load Database To Receiver program is used to update satellite formats. The database typically contains selection of C or Ku bandwidths, transponder/channel frequencies, audio subcarrier frequencies and audio/video levels.

6.9.6 Load Database From Receiver (F5)

The Load Database From Receiver program is used as a backup database. If a database has been corrupted or destroyed within the CAM830, the receiver 's database can then be reloaded from the PC using the LOAD DATABASE TO RECEIVER program.

6.9.7 Build A New Database (F6)

The Build A New Database program allows new information to be added to the database file.

6.10 OPTIONS EXIT (ALT X)

The EXIT option returns the C:\ > prompt to the monitor.

6.11 RS422 COMMUNICATION CONFIGURATION

1. Disconnect the receiver's AC power.

2. Remove the seven screws that secure the bottom cover, remove cover.

3. Place the receiver so that the bottom side is facing upwards and locate the MT830 main circuit board.

4. Follow the group of eight wires leaving the receiver's REMOTE CONTROL connector. This group of eight wires should be connected to J10 (RS232) on the MT830's main circuit board. See Figure 6-11.

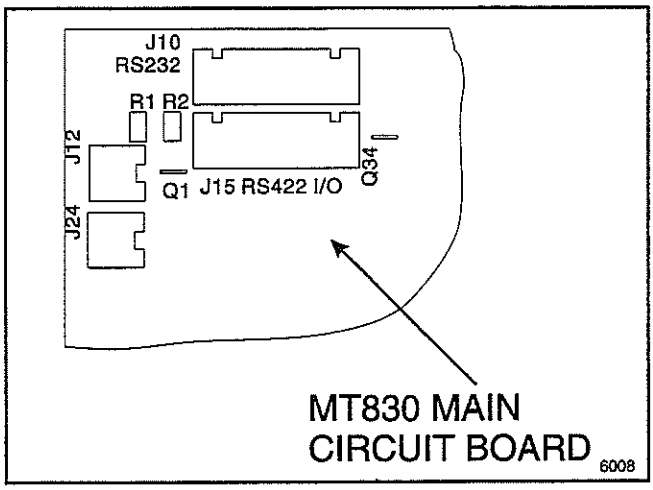


Figure 6-11. RS232 and RS422 Connector Locations

5. To configure the receiver for an RS422 communication interface, remove the eight-wire cable from the J10 connector and connect it to J15 (RS422). See Figure 6-11.

6. Reinstall the bottom cover on the receiver.

7. Connect the receiver to AC power.

Standard Communications

Owner's Manual Insert

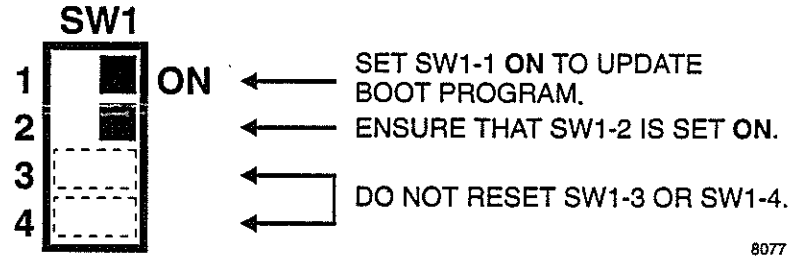
MT830BR/MT830IBR

This Insert sheet amends the instructions on pages 6-1, 6-6, and 6-7 of your Owner's Manual. Please insert these instructions in your copy of the Owner's Manual.

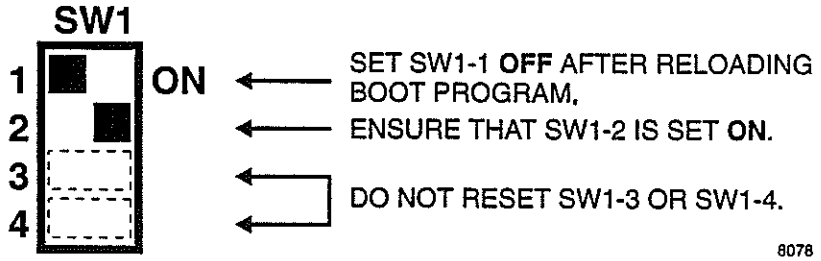
Update Boot Program

See pages 6-6 and 6-7. When you run the LOAD utility to update the CAM830 boot program, the utility prompts you when to turn the memory-write switch on and off. The memory-write switch is switch SW1-1 on the receiver's main circuit board.

Set switch SW1 as follows when you are instructed to turn the memory-write switch ON:



Set switch SW1 as follows when you are instructed to turn the memory-write switch OFF:



Cable Connections

See page 6-1. Please use the signal flow diagram on the opposite side of this sheet instead of Figure 6-1 in your Owner's Manual.

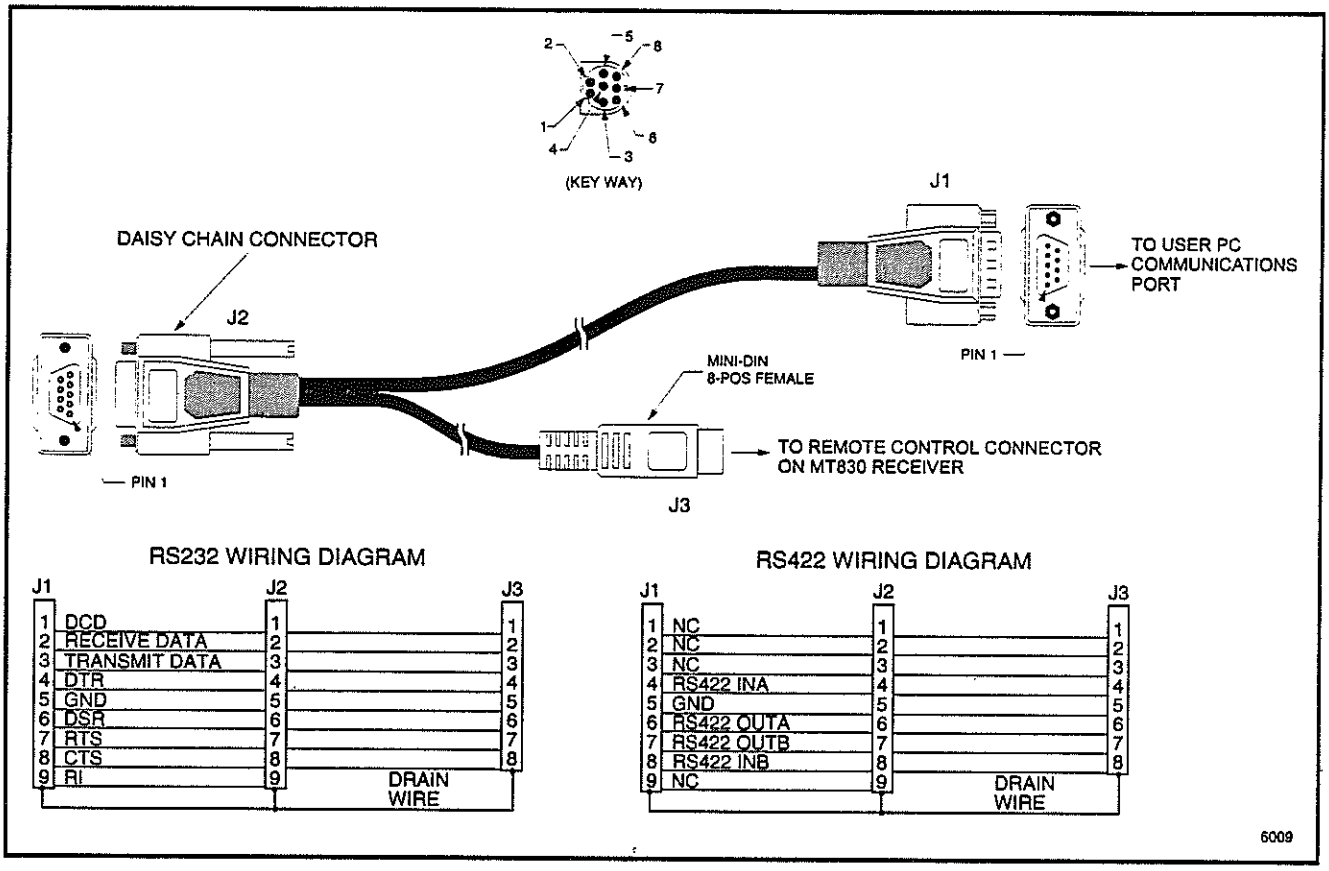


Figure 6-1. RS232 and RS422 Signal Flow

Standard Communications Corp.

Satellite/Broadband Products

Division Limited Warranty

Standard Communications Corp. (SCC) warrants, to the original purchaser (the "Purchaser") only, that each new Satellite/Broadband product will be free from defects in materials and workmanship under conditions of normal use and service for a period of one (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 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 SAR (Satellite/Broadband Advance Repair) 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.

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 specific legal rights which vary from state to state.

DOMESTIC GOLD STANDARD SUPPORT PROGRAM

The Gold Standard Support Program is designed 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 Satellite/Broadband Products Division 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 RS250C units at time of repair will be an additional $150.00 charge. Qualifying merchandise must be assigned a SAR (Satellite/Broadband 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 Federal Express 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. 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 Federal Express*. 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 Satellite/Broadband ProductsCustomer 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 Satellite/Broadband Products 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 Federal Express' control, the lifetime Loaner Program could be voided. The Gold Standard Service Program is subject to change or modification without notice.

INTERNATIONAL
GOLD STANDARD SUPPORT PROGRAM

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

• WARRANTY AND SERVICE PROGRAM

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 Satellite/Broadband Products Limited Warranty and Service Program Policy*. SCC-manufactured equipment in use from year two through seven will be repaired by SCC factory-trained technicians to ensure exacting performance and specifications while remaining under the maximum service charge. The maximum service charge will be $150.00. Qualifying merchandise must be assigned a SAR (Satellite/Broadband 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. Repair charges will be applied at the out-of-warranty rate in the event of physical or electrical abuse to in-warranty equipment. If SCC, in its sole discretion, determines that a major engineering design change is required, SCC will supply free parts, service information and technical personnel to assist the customer.

• SERVICE INFORMATION

On request by a customer, applicable service information will be furnished for each of SCC's International Satellite/Broadband products at no charge.

• PARTS AND PRICING

All items not considered to be receivers, LNBs and accessories shall be considered as parts and will be available at the dealer's current applicable catalogue price.

• RETURNED MERCHANDISE

Without the prior consent of SCC, no item purchased by customers hereunder may be returned to SCC for refund or credit for any reason whatsoever.

• LITERATURE

A reasonable quantity of English-language, international literature will be made available.

*Warranty and Service Program is subject to change or modifications without notice.