

Product Manual

ICC-STA/ICA-FT6

Entertainment Access System

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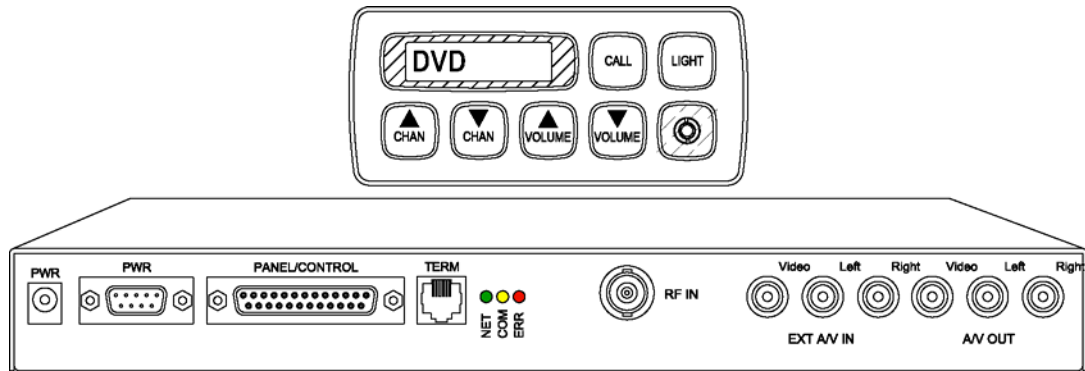


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Overview



The Contemporary Research ICC-STA Entertainment Controller is a versatile iCC-Net device featuring an onboard tuner for entertainment channels, stereo headphone/speaker audio, 125 channel access, switchable AV inputs, and interactive RS-232 operation with an ICA-FT6 6-button FeatherTouch panel. In addition the unit supports contact closure inputs and outputs to handle special needs and control applications. Fully programmable, the unit can restore all settings on power-up from non-volatile memory.

The ICA-FT6 FeatherTouch Panel simplifies access to entertainment media using six lighted control buttons, an 8-character LED text display, and stereo headphone output. The elegant, compact metal enclosure is available in a wide variety of custom finishes, and is easily surface-mounted in aircraft bulkheads, as well as wood and metal furniture and cabinets. Constant illumination of the six control buttons is provided by two dual-color LEDs that change the color of the button to show status. All buttons can be custom-engraved to suit the application.

High-speed 2-way control and feedback is carried over the same RF coax as the entertainment channels. For custom systems applications, all ICC-STA controllers, ICA-FT6 panels and other CR devices can be accessed from a single RS-232 port on an ICC-HE Head-End Network Controller.

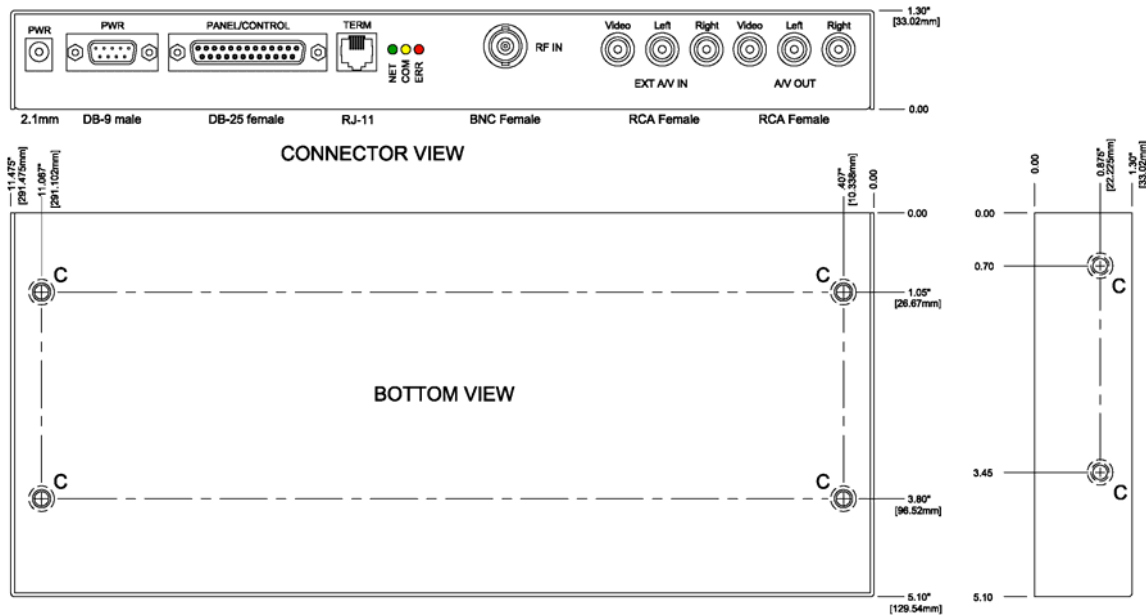
ICC-STA Entertainment Tuner

- Tunes up to 125 CATV, HRC, IRC or broadcast channels
- Delivers headphone/speaker level stereo audio with adjustable volume level
- Stores channel list in memory for simplified channel up/down access
- Networks through the CATV RF cable using an ICC-HE Head-End Network Controller
- Displays text channel labels on ICA-FT6 LED display when channels are changed
- Includes stereo A/V inputs to display video from PCs, video games, and other sources
- Restores all operation status after loss of power from data stored in non-volatile memory
- Attaches to flat surfaces

ICA-FT6 FeatherTouch 6-Button Panel

- Features machined aluminum enclosure, custom-plated in a variety of metals
- Snap-mounts into wood, metal and plastic surfaces
- Operates using six always-illuminated, custom-engraved buttons
- Shows current entertainment source text on 8-character LED display

ICC-STA Specifications



Physical

- Size: 11.475" [291.5mm] wide x 1.30" [33mm] height x 5.1" [129.5mm] deep
- Weight: 1.5 lbs [0.68kg]
- Enclosure: All aluminum with durable black powder coat paint
- Mounting: 8/32 self-clinching nuts are provided on the bottom and sides
Mounting bolts should not protrude into the enclosure more than ¼ inch

Connections

- Power In: 2.1mm coaxial jack (inside center conductor PWR+)
 DB-9 male connector for locked power connection, identical to coaxial input
 Pin 4 = PWR+
 Pin 5 = GND
 15 to 30 VDC, 24 VDC typical (may be unregulated)
 130 mA @24 VDC (no load, audio muted)
 210 mA @24 VDC (full volume to headphone/speaker)
 300 mA @24 VDC (ICA-FT6 panel, full volume to headphone/speaker)
 North American version includes UL/CSA listed wall power supply
- Panel/Control: DB-25 female for panel and audio connections, includes RS-232, power and solid-state contact closure inputs and outputs.
- Indicators: LEDs indicate operation status
 - Net: Green LED for iCC-Net bus, flashes once per second if active
 - COM: Yellow LED stays on, flashes when receiving control data
 - ERR: Red LED indicates a problem within the unit
- Terminal: RJ-11 input for RS-232 control, 1200 baud, 8 data bits, no parity, and 1 stop bit
 Communication is linked with the Panel/Control RS-232 port so the Terminal port can be used to monitor and mimic control panel operation
 Pin 1 = TX
 Pin 2 = RX
 Pin 5 = GND
- RF In: BNC female, 75 ohm impedance
- External Inputs: Video - RCA female jack, NTSC composite
 Audio - 2 RCA female jacks, unbalanced stereo, 20K ohms impedance
- A/V Outputs: Video - RCA female jack, NTSC composite
 Audio - 2 RCA female jacks, unbalanced stereo, 1K ohms impedance

Audio

Response: BTSC Stereo Total Harmonic Distortion (THD): 1% maximum, 0.3% typical
BTSC Stereo Channel Separation: 25dB minimum, 30dB typical
BTSC Stereo Response: 50Hz to 12KHz
Mono Total Harmonic Distortion (THD): 0.5% maximum, 0.1% typical
Mono mode frequency response: 20Hz to 20KHz
Audio Level: 500mV RMS typical output level at max volume
Volume level 0dB to -62dB and mute in 64 steps

RF Tuner

Frequency Range: NTSC television 55.25 to 801.25 MHz, 62.5KHZ fine tune resolution
Maximum Input: +20dBmV
Video Gain: $\pm 5\%$ maximum, 2% typical
Video Phase: ± 3 degrees maximum, 2 degrees typical

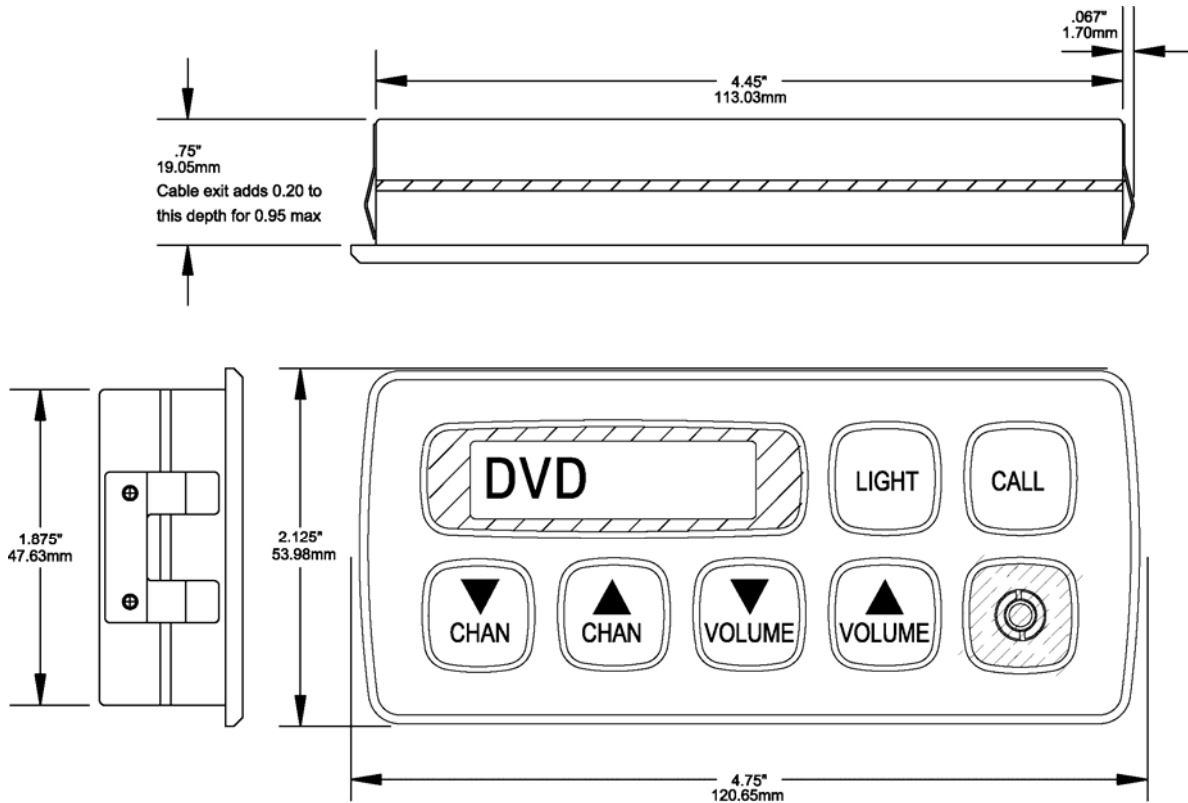
iCC-Net

Operation: Carried over the same RF coax connection as TV channels
Data Receive: Mid-band VHF, 74.7MHz, sent from IC Head-End Network Controller
-25 to +35 dBmV signal level
Data Transmit: Sub-band, 5.6MHz sent to Head-End Network Controller
 ± 80 KHz max carrier deviation
+49dBmV nominal

Options

24 VDC central power supply
ICA-FT6 6-Button Control Panel

ICA-FT6 Specifications



Physical

Size: 4.75" [120.65mm] wide x 2.125" [53.98mm] height x .75" [19.05mm] deep
 Weight: 6 oz [170 g]
 Enclosure: Machined aluminum enclosure, plated with custom finish
 Mounting: Surface mounted, friction-fit, spring clips included

Connections

Control/Power: DB-9 male connector, Positronic locking style, installed on 10" cable
 Power: 12-24 VDC, 135mA @ 11.2V, 75mA @ 24 VDC
 Pin 6 = PWR
 Pin 5 = GND
 RS-232: 1200 baud
 Pin 1 = GND
 Pin 2 = RXD
 Pin 3 = TXD
 Audio: Stereo headphone audio (optional 3.5mm jack)
 Pin 7 = COM
 Pin 8 = Right
 Pin 9 = Left

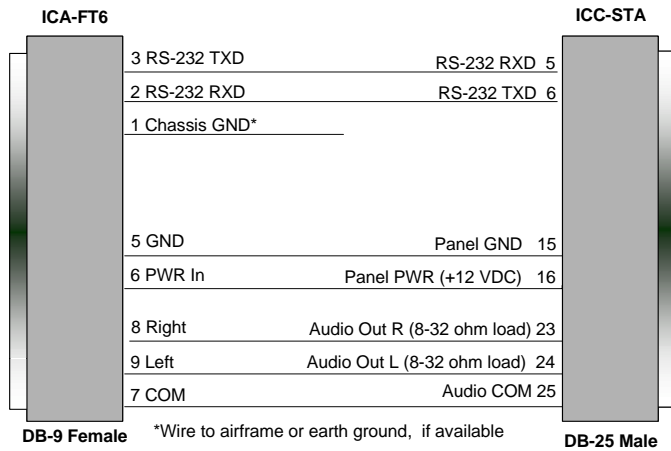
User Interface

Buttons: Six, backlit by two dual-color LEDs, color indicates status
 Options include amber/green or red/green LEDs
 Custom-engraved keycaps
 LED Display: 8-character alphanumeric amber LED display

Panel Wiring

ICA-FT6 Panel Wiring

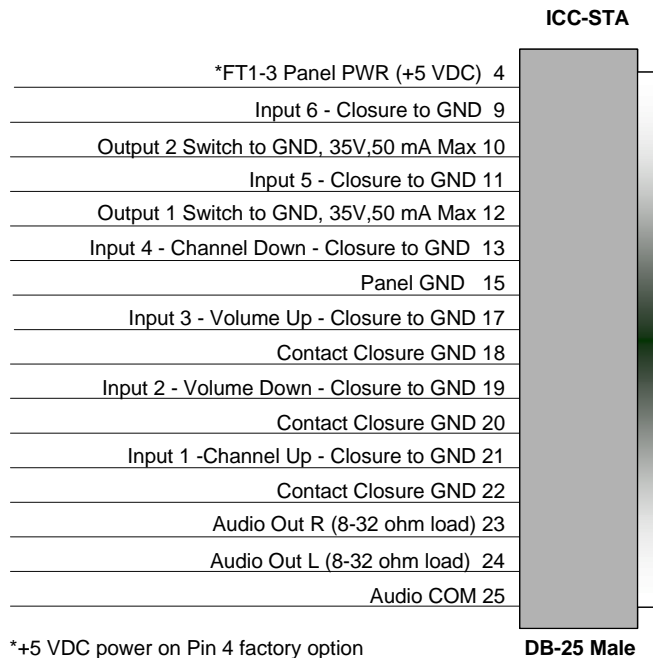
The connection cable for the ICA-FT6 includes RS-232, DC power, and stereo headphone audio (optional).



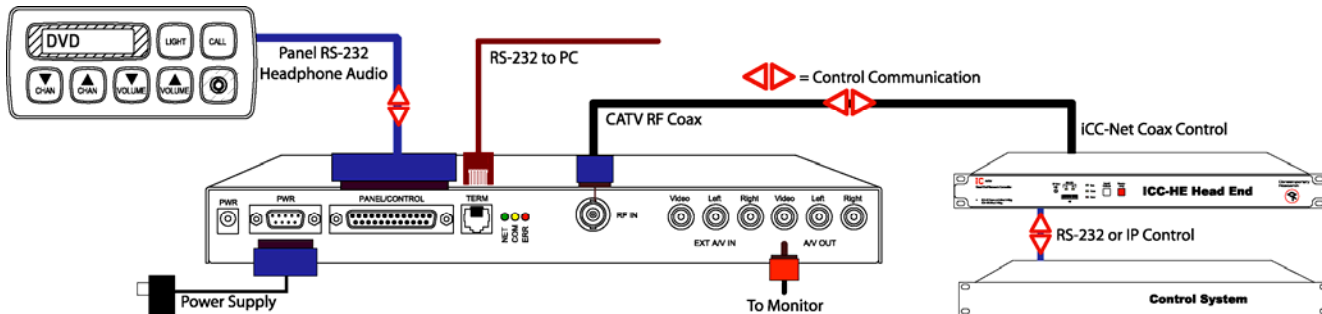
Pin 1 Chassis GND is connected to the metal bezel of the FT6 and should be tied to Earth or Airframe GND, or left unconnected.

ICC-STA Control Wiring

Some applications may require special features, such as ICA-FT1, 2 or 3 panels or other types of contact closure switches, as well as devices activated by a low-voltage closure. The following diagram illustrates the optional control features included on the ICC-STA.



Installation



Overview

The ICC-STA architecture provides a common link for 2-way RS-232 control with an ICA-FT6 panel, and 2-way system control over RF coax to a control system. To simplify system programming, the STA and FT6 manage volume up/down, channel up/down and text display by themselves. The control system handles special and system-wide functions such as audio paging, attendant/concierge call, light on/off or other custom applications. In typical installations, the flow of communication is as follows:

1. Pressing Volume or Channel buttons on the ICA-FT6 send an RS-232 command to the ICC-STA.
2. The ICC-STA responds, sending a channel label to the ICA-FT6 LED display when a channel changes.
3. Pressing a special button, such as LIGHT, sends a command (KK) to the ICC-STA, and the ICC-STA passes the command (K response) to the ICC-HE Head End.
4. The ICC-HE passes the command to the control system, which will turn on the light and send a UX command back through the ICC-HE/ICC-STA/ICA-FT6 data path that changes the status of the LIGHT button LED.
5. Note that each ICA-FT6 control button is constantly backlit by two dual-color LEDs, usually yellow/green or red/green. The on and off state is indicated by the LED color.

Panel Connection and Power

1. Install ICC-STA into surface.
2. Connect the ICC-STA to the ICC-STA. In most cases, you'll simply connect the custom DB-9 female-to-DB-25 male cable between the panel's DB-9 and the ICC-STA's DB-25 connector.
3. Connect DC power to ICC-STA.
4. Connect Video Out to display device
5. The Net LED should turn on and stay lit (indicates power on, no network communication)
6. At this point, if units have been pre-programmed, you should be able to operate channel and volume functions, with channel text displaying on ICA-FT6 display, and the COM light will flash to indicate data activity.

RF Coax and iCC-Net Operation

1. Connect the RF Coax cable into the RF In input on the STA.
2. If the iCC-Net signal is operating, the Net LED will blink once per second.
3. Now you can use iC Toolkit software at the iCC-HE Head End Controller to check and change device numbers, and to display the current ICC-STA firmware or device number on the ICA-FT6 panel. You can also load in tuning rings and channel labels using the same tool.

Control System Update

The best practice for this type of installation is to include a list of initialization commands within the system programming. These commands will "teach" the controllers and panels all the tuning rings, channel labels, RS-232 strings, and any other parameters needed for operation, then forcing the panels to show the ICC-STA device number. The commands can be programmed to be sent when the Reset button on the ICC-HE Head End Controller is pressed for 5 seconds. Since a single command can be sent to a group or all devices, this process usually takes less than a minute.

RS-232 Device Control Protocol

Overview

The ICC-STA full duplex RS-232 scheme enables a system programmer to control ICC-STA and ICA-FT6 functions. All commands are sent as ASCII strings. No delays between characters or commands are required, as data is interrupt driven and buffered.

The 2 status groups are: Channel/Source Select and Audio Levels/Mode. Each of the groups has one ASCII status response string containing all of the status data for that group. The current status string of a group is sent from the ICC-STA whenever a valid command for that group is received from the iC-Net bus, the RS-232 ports (Terminal or Control port), or the ICA-FT6 panel. In addition, both strings are sent when the units power up.

In most installations, the installer will connect the ICA-FT6 to the ICC-STA Panel port, apply power to the ICC-STA, and then communicate to both via the ICC-STA Terminal port. Communication is linked between the Panel/Control RS-232 port and the Terminal port so that both send and receive the same data. This allows the Terminal port to be used while an ICA-FT6 control panel is installed, providing the ability to monitor and mimic control panel operation, as well as to setup and control both devices from a single RS-232 port.

Communications settings are fixed at 1200 baud, 8 data bits, no parity, and 1 stop bit.

General protocol specifications

Characters in command strings to the ICC-STA and ICA-FT6 are common ASCII keyboard characters.

Command strings begin with the ASCII > (greater than symbol) as an 'Attention' character and end with carriage return - ASCII CR, Hex \$0D, or keyboard Enter - as an 'End-of-command' character.

Responses begin with the ASCII < (less than symbol) as an 'Attention' character and end with a carriage return followed by line feed an ASCII LF or Hex \$0A as 'End-of-command' characters.

A carriage return is required at the end of each command and is assumed in all examples.

Command String Structure

[Attention] [Command] (Parameters) [Return]

Attention	Single character (>) starts the string
Command	A two-character command
Parameters	Added attributes to some commands
Return	A carriage return ends the command string, you may use ASCII CR, Hex \$0D, or keyboard 'Enter' in programming. For simplicity, the programming examples in the manual will not show the 'CR' – so remember, you'll need to add it in your control code.

RS-232 ICC-STA Commands

CMD	Function	Description
EN	Echo Enable	>EN Enables character echo so you can see typed characters on screen.
EF	Echo Disable	>EF Disables terminal character display (default).
TT=	Select tuned channel (2-126)	126=External AV inputs Selects channel 28 only if 28 is present in current TR Ex: >TT=28
TC=	Force tuned channel (2-126)	126=External AV inputs Selects channel 39 regardless of current TR Ex: >TC=39 or >TC39
TU	Tune channel up	Selects next higher channel in stored Tune Ring
TD	Tune channel down	Selects next lower channel in stored Tune Ring
VU	Ramp volume up	Starts volume ramping up
VD	Ramp volume down	Starts volume ramping down
VL	Ramps volume to level (0 – 63)	Sets volume to specific level
VM	Volume Mute on	Mutes audio
VX	Volume Mute off	Restores audio volume to previous level
VT	Toggle Volume Mute	Alternates audio mute on and off
VV	Stop volume ramp	Stops volume ramping
VW	Save volume level	Save current volume level, default when unit powers up To power-up to last level, set volume to zero (VL) and save.
KK=	Send Key Response	Instructs ICC-STA to send an iC-Net "K" response string with the included value to the ICC-HE.
ST	Request Channel/Source status	Returns Channel/Source status response string Ex: >ST
SV	Request Audio status	Unit sends Audio status string
DV#	View device number	>DV — Shows STA device number in Terminal.
DV#n	Change device number	>DV#nnn Changes current device number to specified number Ex: >DV#306 sets device number to 306
ID	Show STA Version	>ID — Shows STA ID and firmware version on Terminal
Z]	Reset units	>Z] Reset FT6 and STA

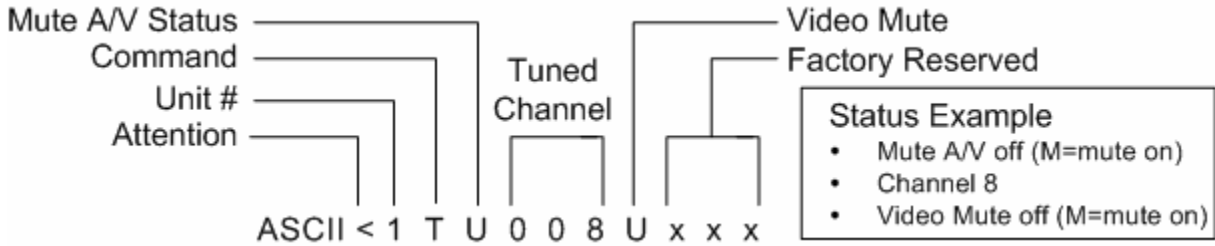
A carriage return is required at the end of each command use ASCII CR, Hex \$0D, or keyboard 'Enter'. The '=' sign for parameters may be omitted if desired, though it is helpful for clarity in checking programming. Leading zeros may be included or omitted from command parameters.

RS-232 ICC-STA Response Strings

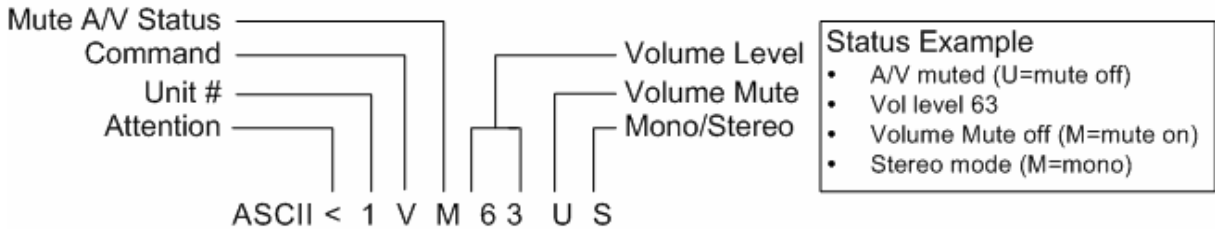
Typical: [Attention] [Unit#] [data ...data] [cr] [lf]

ICC-STA status response strings contain ASCII characters similar to those used for the same functions in command strings. An ASCII 'carriage return' and 'line feed' follow each response string.

Channel/Source Status Response String (ST command):

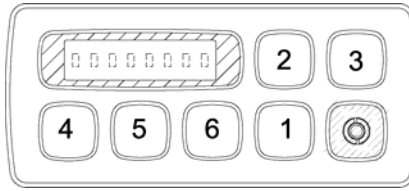


Audio Status Response String (SV command):



RS-232 ICA-FT6 Commands

The following commands apply to the ICA-FT6.



CMD	Function	Description
		Note that FT6 buttons are always backlit—the button state sets color of LED. Typically, a green LED indicates on, while yellow is used for off. Other colors are available, and the color “polarity” can be switched via programming.
L0=	Turn Off	>LOn Turns off a specific button LED, 1-6
L1=	Turn On	>L1n Turns on a specific button LED, 1-6
L2=	On/Off Pattern	>L2dd Turn all buttons on and off by sending a decimal representation of the on buttons. Ex: >L2=12 — Turns on buttons 3 and 4, others are off 1 On = 1 4 On = 8 2 On = 2 5 On = 16 3 On = 4 6 On = 32
L3=	LED Polarity	>L3dd Set the polarity (color of LED when on and off) by sending a decimal “map” of the buttons. Off sets the normal mode, On switches on/off colors.
L4=	Group Off	>L4dd Turns off specified button LEDs. Similar to L2, but turns off specified buttons only, leaving others alone. Ex: >L424 — turns off buttons 4 and 5.
L5=	Group On	>L5dd Turns on specified button LEDs. Similar to L2, but turns on specified buttons only, leaving others alone. Ex: >L524— turns on buttons 4 and 5.
L9=	Brightness	>L9n Sets LED brightness of all buttons. 1 = 13% 5 = 53% 2 = 20% 6 = 80% 3 = 27% 7 = 100% 4 = 40%
K	Press String	>Kn(string)(\r) [use \r in place of \$0D] Set button press string (0-32 characters) for specified button, sending no characters clears display. Ex: >K1>VU — starts STA volume ramp up
K0	Press Clear	>K0 — Clears all button press strings
KZ	Start String	>KZ(string)(\r) [use \r in place of \$0D] —Send string on power-up or reset
J	Release String	>Jn(string) (\r) [use \r in place of \$0D] Set button release string (0-32 characters) for specified button, sending no characters clears display. Ex: >J1>VV — stops STA volume ramp
J0	Release Clear	>J0 — Clears all button release strings
DM	Display String	>DMttttttt Sends string to LED display, 8 characters maximum. Note that the ICC-STA will automatically send channel label text to the FT6 upon channel change.
V6	Show Version	>V6 — Shows FT6 and version on FT6 display

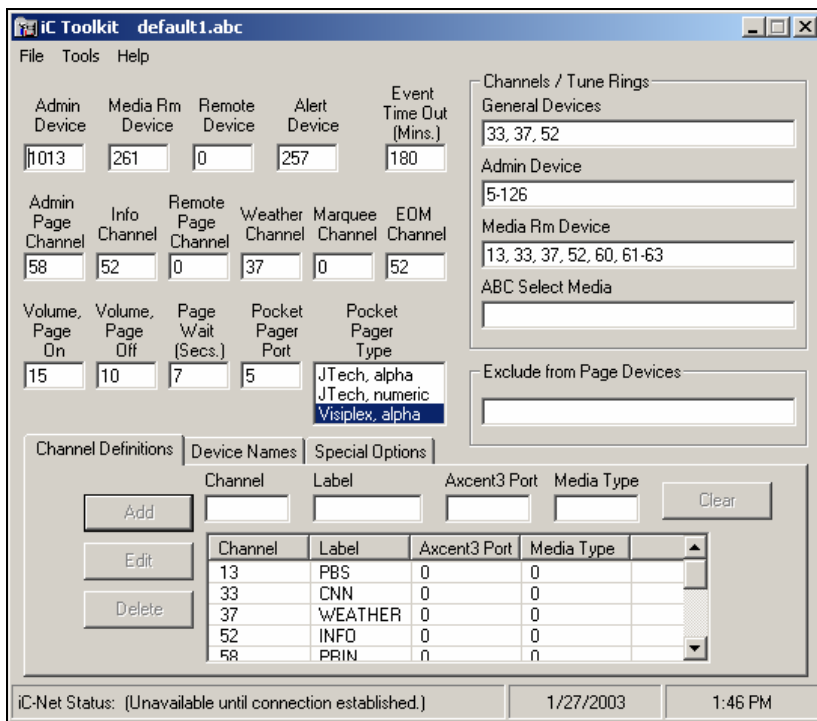
iC-Net Setup and Control

RS-232 Terminal

Employ standard Windows Terminal program through the ICC-HE Program port, set to appropriate COM port and RS-232 parameters, default is, 8 data bits, no parity, 1 stop bit.

Command	Code	Description
		Commands shown in ASCII and end with carriage return (Decimal 13, Hex \$0D, or Enter key). Response displays * character to signify end of characters, or times out if no characters are received after 2 seconds. Tip: Just hit Enter to repeat any Terminal command.
Echo Enable	EN	>EN — Enables character echo so you can see typed characters on screen.
Echo Disable	EF	>EF — Disables terminal character display (default).
Version	VE	>VE — Displays HE software version.
Reset	Z!	>Z! — Performs system reset.

iC Toolkit Software



Most of the general setup and testing operations can be performed through iC Toolkit, including setting the system Tune Rings, entering Channel Labels, changing device numbers, commanding all devices to show STA and FTA ID, and system troubleshooting.

RS-232 Control System Protocol

The remaining setup and control operations can be performed through the control system itself. By creating commands sent on power-up (see iC-Net Zones and System Map) the control system can define basic system operation, including Channel Labels (TN command), Operating Parameters (TM), Tuning Rings (TR), and ICA-FT6 setup using the UX command. By addressing commands to the global device number, 4095, all devices can be updated and reset at the same time.

iC-Net Control Protocol

Overview

RS-232 control for up to 4000 Tuners, TV Controllers, and Display Controllers is provided through an iC-series Head-End Network Controller. The ICC-HE Head-End manages iC-Net communication over RF Coax to ICC2-format controllers as well as ICW-format controllers over twisted-pair Cat3/5 wiring.

Each unit is assigned a unique device number from 1 to 4000 to which control commands are addressed. The devices are organized into 16 zones of 255 devices. All the devices in each zone will respond to a single “virtual device number” — one device number that represents all devices in each zone. There is also a global device number, 4095, that will command all devices in the system. This feature dramatically speeds up system operation and programming, because one command can affect an entire group of devices—or all. To take advantages of this feature, review the section **iC-Net Zones** in this manual.

In most applications, we reserve the first group of devices, 1-255, for components operating on a connected control system. Zones 1-16 are used for CR TV Controllers, Video Display Controllers and Tuners. As it's unlikely any system will use all 4000 devices, this may be a good device standard for your system as well.

The Remote RS-232 port on the Head-End Network Controller can communicate from 1200 to 38.4K baud. The factory default setting is 19.2K baud, 8 data bits, No parity, and 1 stop bit.

Command String Structure

Characters in command strings are expressed in a combination of hex and ASCII characters. For clarity, the following protocol examples use the following conventions:

- Single-byte hex numbers are preceded by the '\$' symbol
- ASCII characters or strings are enclosed in single quotes
- Numbers not marked as hex or ASCII are a single decimal byte
- Parameters shown in < > brackets are single byte
- A series of multiple commands or parameters are set apart by [] brackets
- Commas separate the bytes, but are not part of the protocol
- Double quotes enclose the command string, but are not part of the protocol

Command format:

"\$A5,<dh>,<dl>,<ncb>,<cmd1>,<para> [<cmdN>]"

\$A5	Starts the command
<dh>	The zone or high order byte of the device
<dl>	The unit or low order byte of the device (0 for global zone)
<ncb>	The number of command bytes to follow
<cmd1>	The first command byte
<para>	Command parameters (not used by all commands)
[<cmdN>]	Multiple commands can be concatenated, with byte count added to <ncb>

iC-Net STA Commands

Command	Code	Description
Operating Parameters	TM	<p>"\$A5,<dh>,<dl>,3,'TM',<setting>" (7 bytes)</p> <p>Sets up key functions in the unit</p> <p>bit 7 – 3 = 0</p> <p>bit 2 – Channel up/down operation, 0=Tune Ring, 1=Send Key response</p> <p>bit 1 – Numeric channel labels, 0=num labels off, 1=num labels on)</p> <p>bit 0 – Alpha channel labels, 0=alpha labels off, 1=alpha labels on</p> <p>Tip: In most ICC-STA entertainment systems, Channel up/down should be set to 0, Numeric channel labels to 0, and Alpha labels to 1. When Alpha labels are active, the ICC-STA will automatically send the label text string to the ICA-FT6 display whenever a channel is changed. No control system programming needed. Is that cool or what?</p>
Volume	VL	<p>"\$A5,<dh>,<dl>,3,'VL',<vol level>" (7 bytes)</p> <p>Sets volume level</p> <p>0 = Mute</p> <p>1 – 63 = Minimum level (1) to maximum volume (63)</p>
Set Volume	VW	<p>"\$A5,<dh>,<dl>,2,'VW' " (6 bytes)</p> <p>Saves current volume level in memory, default when unit powers up</p> <p>To power-up to last level, set volume to zero (VL) and save.</p>
Marquee Chan	T2	<p>"\$A5,<dh>,<dl>,3,'T2'<channel> " (7 bytes) – Sets default power-up channel</p> <p>Sets default channel selected when unit powers up</p>
T Channel Up	TU	<p>"\$A5,<dh>,<dl>,2,'TU' " (6 bytes) – Tunes to next channel up in Tune Ring</p>
T Channel Dwn	TD	<p>"\$A5,<dh>,<dl>,2,'TD' " (6 bytes) – Tunes to next channel down in Tune Ring</p>
Force T Channel	TC	<p>"\$A5,<dh>,<dl>,3,'TC', <channel>" (7 bytes) – Tunes to a specific channel</p> <p>126 = Select STA external A/V input</p>
Select T Channel	TT	<p>"\$A5,<dh>,<dl>,2,'TT' <channel>" (7 bytes) – Tunes channel if included in Tune Ring</p>
Closures	Y-	<p>"\$A5,<dh>,<dl>,3, 'Y' <l/O Port>' " (7 bytes)</p> <p>Turns the two internal closures on and off. Closure 1 is typically used to control the optional buzzer, Closure 2 typically used to control an external camera power relay.</p> <p>"\$A5,<dh>,<dl>,3, 'Y10'" turns Closure 1 off</p> <p>"\$A5,<dh>,<dl>,3, 'Y11'" turns Closure 1 on</p> <p>"\$A5,<dh>,<dl>,3, 'Y20'" turns Closure 2 off</p> <p>"\$A5,<dh>,<dl>,3, 'Y21'" turns Closure 2 on</p>
Channel Labels	TN	<p>"\$A5,<dh>,<dl>,<ncb>,'TN',<channel>,<label>" (variable bytes)</p> <p>Stores an ASCII string as the channel label. The text will display on the ICA-FT6 if the feature has been activated by the TM command.</p> <p>Ex1: "\$A5,<dh>,<dl>,3,'TN', '7', 'PBS' " STA sends PBS display text to ICC-FT6 when 7 is selected</p> <p>Ex2: "\$A5,<dh>,<dl>,3,'TN', '7' " Clears alpha label for channel 7</p> <p>Ex3: "\$A5,<dh>,<dl>,3,'TN',0,0" Clears all alpha labels</p>

Command	Code	Description
Tuner Mode	SO	"\$A5,<dh>,<dl>,3,'S0',<tune mode>" (7 bytes) Sets tuner mode to CATV or Broadcast/Antenna 0 = CATV 1 = Broadcast/Antenna 2 = HRC
Tune Ring	TR	"\$A5,<dh>,<dl>,<ncb>,'TR', [<chan 1>, <chan N>]" (variable bytes) This command stores a Tune Ring, a series of preset channels accessed by channel up/down commands. Ex1: "\$A5,<dh>,<dl>,6,'TR', 5,4,8,11" sets ring to channels 5, 4, 8 and 11 Tip: The ring follows the stored order, channels do not have to be in ascending order Ex2: "\$A5,<dh>,<dl>,2,'TR' " clears the Tune Ring, locks unit to current channel Tip: In the above mode, the channel up/down response is sent to the Head-End, so the system will know the user is trying to change channels. In response, the system could change channels on a media sources, like a VCR or satellite. Ex3: "\$A5,<dh>,<dl>,8,'TR', \$82,5,\$87,11" sets channels 2-5 and 7-11. You can specify a range using MSB bit for the first channel; the next byte is the last.
Control String	UX	"\$A5,<dh>,<dl>,2+string length>,'UX'<string>" (variable bytes) Sends an RS-232 string (ASCII, decimal, or hex) directly to the TV display. Ex: "\$A5,15,255,6,'UX','>V6',13" Displays FT6 rev on FT6 display on all units (3840+255=device 4095 – global device)
Show Firmware	V6	"\$A5,<dh>,<dl>,2,'V6' " (6 bytes) Shows STA firmware version on FT6 display (STA Vn.n) See UX above for how to send the equivalent command to the FT6.
Show Device	V2	"\$A5,<dh>,<dl>,2,'V2' " (6 bytes) Shows STA device number on FT6 display (DV=nnnn) Ex: "\$A5,15,255,2,'V2" Displays STA device number on all units online (3840+255=device 4095 – global device)
Channel Status	ST	"\$A5,0,0,3,'ST'" (6 bytes) Requests channel status
Volume Status	SV	"\$A5,0,0,3,'SV'" (6 bytes) Requests volume status
Device Status	SP	"\$A5,0,0,3,'SP'" (6 bytes) Queries the Head-End for the number of devices present on the network and the number of devices expected.
Channel ?	T?	"\$A5,<dh>,<dl>,2,'T?' " (6 bytes) – Request response for current channel (Ver 4.3)

iC-Net Responses

The ICC-STA will send a response over the network whenever there is there is a change in status or command from a panel.

Response String Structure

Characters in response strings are expressed in a combination of hex and ASCII characters. For clarity, the following protocol examples use the following conventions:

- ASCII characters or strings are shown enclosed in single quotes
- Numbers shown that are not in single quotes are a single decimal byte
- Parameters shown in < > brackets are single byte
- A series of multiple commands or parameters are set apart by [] brackets
- Commas separate the bytes, but are not part of the protocol
- Double quotes enclose the command string, but are not part of the protocol

Command format:

" '<',<dh>,<dl>,<nrb>,<rb1>, <para1> [<rbN>]"

'>' Starts the response
 <dh> The zone or high order byte of the device
 <dl> The unit or low order byte of the device (0 for global zone)
 <nrb> The number of response bytes to follow
 <rb1> The first response byte
 <para1> Associated parameters, if any
 [<rbN>] Multiple responses may be included

Response	Code	Description
New Channel	T	" '<',<dh>,<dl>,2,'T',<new channel>" (6 bytes) Sent in response to T? command.
Key	K	" '<',<dh>,<dl>,2,'K',<Key>" (6 bytes) Sent when unit receives a KK command from the ICA-FT6. In ICC-STA applications, the Key character will be sent from the Head End Controller to the control system, triggering a programmed activity. The Channel Up/Down functions (22 = Channel Up, 23 = Channel Down) are sent only if enabled in the TM command (Bit 2 = 1). The Channel Up/Down responses will also be sent if the Tune Ring contains no channels – see Ex2 in the Tune Ring command section. In most case, you'll want to turn the Channel Up/Down Key operation off. Tip: In our ICC-STA applications, we send Key characters 1-128 to trigger various control functions in a control system, such as attendant call or light on/off. We'll use characters 129-134 to indicate a release of a specific button. For example, a "130" indicates the release of button 2 (130-128=2).

iC-Net Zones

To simplify controlling groups of devices, iC-Net is divided into 16 zones of 255 devices. All the devices within each zone can be controlled simultaneously by sending a command to a single “virtual device number”.

For example, noting the zone chart below, if we send a Channel 32 command to device #256, all controllers numbered between 257 and 511 will instantly switch to that channel. If we send a Tune Ring list to device #4095, all devices in the system will be updated.

This is an immensely powerful feature, because most systems can only address one device at time. So if you need to turn off all 50 TV in a zone, you would need to send 50 commands. In addition to the hassles of creating multiple commands, there would be a long delay between the first and last command. One command, instant response is easier.

As we noted before, we reserve Zone 0 for devices used in the central control system, then use 1 -15 for iC-Net devices. This structure may be useful for your application, or you could use Zone 0 just like any other iC-Net zone.

Zone	First Device	Last Device	Virtual Device
0	1	255	0
1	257	511	256
2	513	767	512
3	769	1023	768
4	1025	1279	1024
5	1281	1535	1280
6	1537	1791	1536
7	1793	2047	1792
8	2049	2303	2048
9	2305	2559	2304
10	2561	2815	2560
11	2817	3071	2816
12	3073	3327	3072
13	3329	3583	3328
14	3585	3839	3584
15	3841	4000	3840
All Zones			4095

Tip: You've probably figured out that you never want to assign a **virtual device** number to an **actual device** in the system. If you assigned #1536 to a device, all the TV controllers in Zone 6 would respond every time you sent a command to that one device.

System Map

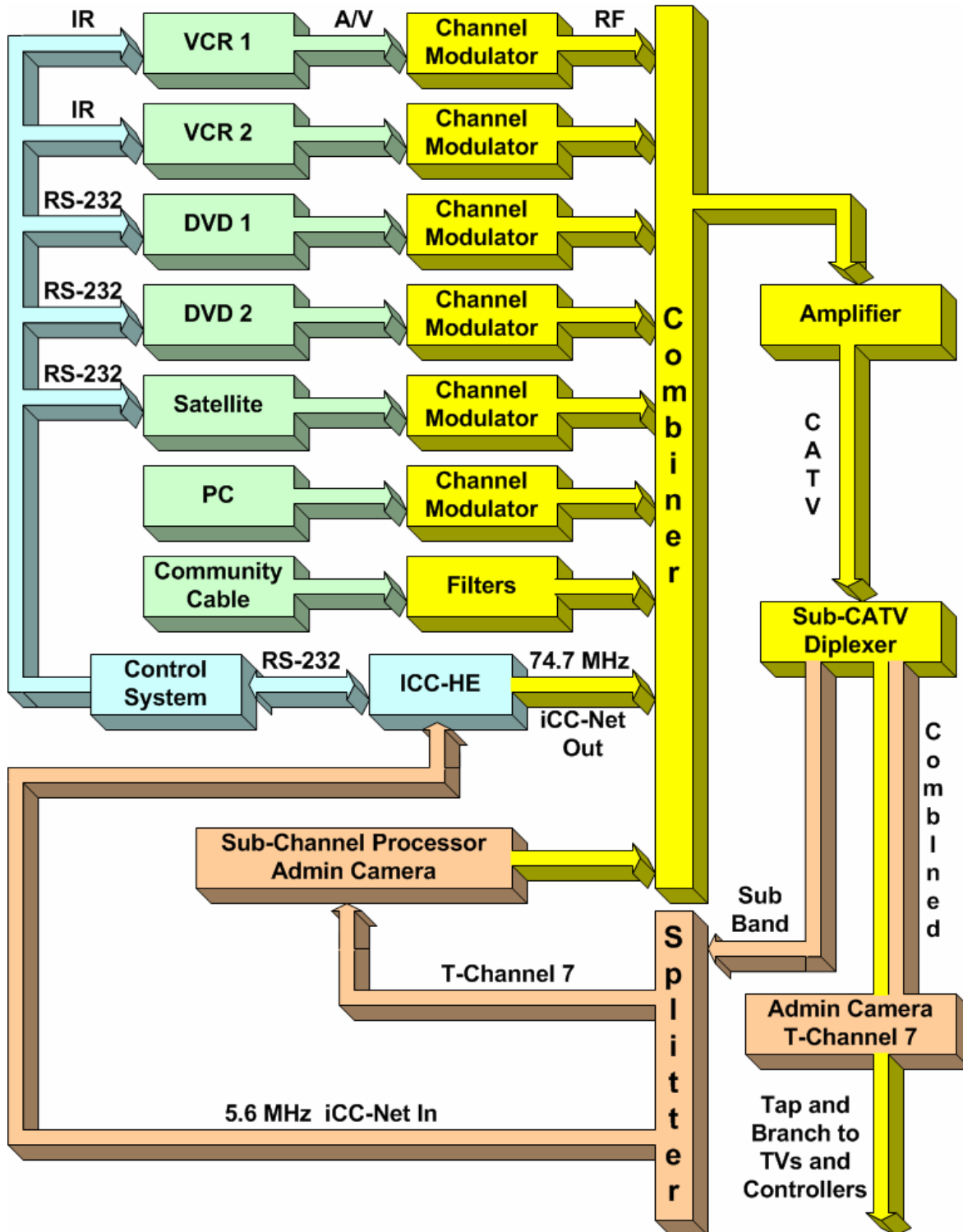
One of the key tasks for iC-Net integrators is to create logical **System Map**, assigning device numbers to controllers so they fall into physical zones useful to the client (or the programmer). The device mapping could be sorted by type or location; whichever suits the application.

In several applications, we grouped the devices by panel type, panels that share identical button layouts and features. Typically, we program the control system to set iCC-Net device operation whenever the system resets (see *RS-232 Control System Protocol* on page 13). Using the Zone commands we can send set-up commands to all the devices in the group by using the Virtual Device number.

iC-Net Zone	Zone	Device
1	Panel Type 1	256
		260
		261
		262
		263
2	Panel Type 2	512
		560
		561
		562
		563
3	Panel Type 3	768
		860
		861
		862
		863
All Zones	All	4095

Typical RF and ICC-Net Signal Flow

The diagram below shows the structure of a typical Contemporary Research media retrieval system. One of the key aspects for iCC-Net communication is to provide a forward and return (sub-channel) path for data.



Safety Instructions

Read before operating equipment.

1. **Cleaning** - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
2. **Power Sources** - Use supplied or equivalent UL/CSA approved low voltage DC plug-in transformer.
3. **Outdoor Antenna Grounding** - If you connect an outside antenna or cable system to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
4. **Lightning** - Avoid installation or reconfiguration of wiring during lightning activity.
5. **Power Lines** - Do not locate an outside antenna system near overhead power lines or other electric light or power circuits or where it can fall into such power lines or circuits. When installing an outside antenna system, refrain from touching such power lines or circuits, as contact with them might be fatal.
6. **Overloading** - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
7. **Object and Liquid Entry** - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts, resulting in a fire or electric shock. Never spill liquid of any kind on the product.
8. **Servicing** - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
9. **Damage Requiring Service** - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - When the power supply cord or plug is damaged.
 - If liquid spills or objects fall into the product.
 - If the product is exposed to rain or water.
 - If the product 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 product to its normal operation.
 - If the video product is dropped or the cabinet is damaged.
 - When the video product exhibits a distinct change in performance, this indicates a need for service.

***Note to CATV system installer:** This reminder is provided to call CATV system installer's attention to Article 820-40 of the National Electrical Code (Section 54 of Canadian Electrical Code, Part I), 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 possible.

Limited Warranty and Disclaimer

Contemporary Research Corporation (CR) warrants this product to be free from defects in material and workmanship under normal use for a period of two years from the date of purchase from CR. Should such a defect occur CR will repair or replace, at their option, the defective product at no cost for parts or labor.

This warranty extends to product purchased directly from CR or an Authorized CR Dealer. Consumers should inquire from selling dealer as to the nature and extent of the dealer's warranty, if any.

All warranty claims must be shipped pre-paid to the factory. Call or fax to obtain a Return Material Authorization (RMA) number.

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