Product Manual

ICC1-IRX

IR TV Controller, 1-way RF Coax Control

August 2018

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Overview

The ICC1-IRX TV Controllers deliver economical 1-way control for power, volume, channel and input commands, receiving iCC-Net network commands over the same broadband coax that carries the CATV channels. In addition to an IR emitter port, the ICC1-IRX has inputs for scanning and power sensors.

ICC1-IRX TV Controllers receive the ICC-Net data channel and pass analog and digital channels on to the TV. The commands are generic, as make/model specific IR commands, logic, and sensor responses are stored and sent directly from the TV Controller. In addition, the power state and current channel are saved in non-volatile memory, so the controllers can restore operation after a power failure, and return the TV to a previous state after an emergency broadcast.

Applications include sports and entertainment venues, commercial and civic facilities, airports, factories, schools, and houses of worship.

- Controls most brands of IR-controlled TVs
    — Delivers discrete power commands, with power sensing for IR TVs without discrete IR commands
    — Tunes analog or HDTV format channels
    — Intelligent volume level and mute operation
- Hosts make/model library of IR command sets, selectable from an ICC-Net command
- Receives 1-way individual and zone commands from the ICC-HE-DXL Display Control Center
- Provides LED feedback for network and control operation
- Restores all power and channel status after loss of power from data stored in non-volatile memory
- Mounts on the back of display for simplified control and RF installation
- Senses TV power status from USB to 3.5mm Power Sensor cable
- Operates with Display Express software, as well as custom control systems
- Includes IR emitter with 6' cable, RF loop cable, mounting Velcro, and 12VDC power supply

Specifications
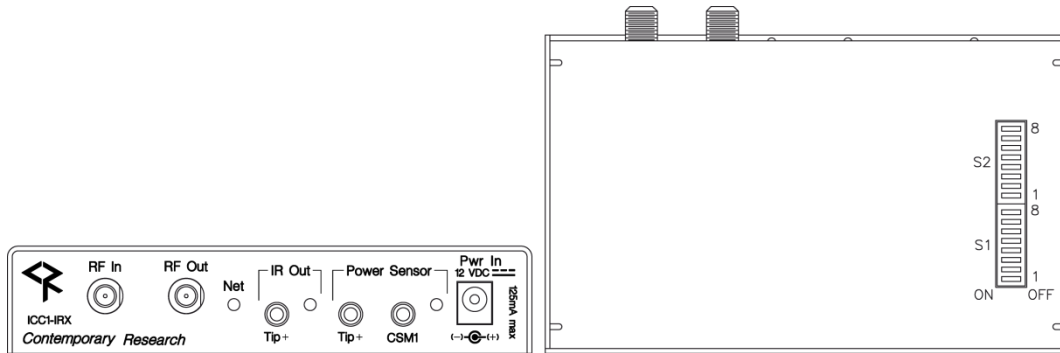
Physical
Size:	5.5" [140mm] wide x 1.1" [28mm] height x 3.4" [86mm] deep
Weight:	8 oz [226g]
Enclosure:	All aluminum with durable black powder coat paint
Mounting:	Mounts rear of TV

Rear Panel
RF In	'F', female, 75 ohm impedance, RF from CATV system, iCC-Net control
RF Out:	'F', female, 75 ohm impedance, RF to TV, less than -1.5 dBmV loss
Net LED:	Green LED for iC-Net bus and DC power, flashes once per second if active
IR Out:	3.5mm jack for CC-IRE IR Emitter cable or compatible CC-IRS serial cable
	Supports carrier frequencies up to 62 KHz
	Shipped with CC-IRE cable, 10 foot with stick-on IR emitter
IR Out LED:	Red LED lights when sending IR commands
Power Sensor:	TIP+: 3.5mm jack for optional CC-HSD scan sensor
	Also acts as logic level input, switch to GND to signal power on
	CSM1: 3.5mm jack for USB to 3.5mm Power Sensor cable, 5-12 VDC
Power Sensor LED:	Red LED lights when sensor indicates power on
Power In:	2.1mm coaxial jack (inside center conductor positive), 75 Ma maximum
	11.5 to 16.5 VDC, 12 VDC typical (may be unregulated)
	North American version includes UL/CSA listed wall power supply
DIP Switches:	S1 and S2, located on bottom of unit, sets IR code operation and device number

iCC-Net
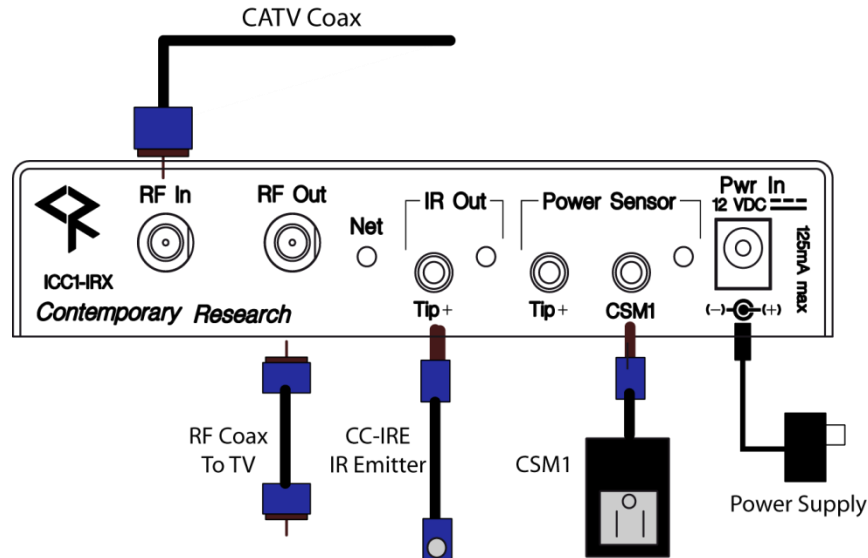|	
Operation:	1-way control, carried over the same RF coax connection as TV channels
Data Receive:	Mid-band VHF, 74.7MHz, sent from ICC-HE
	-25 to +35 dBmV signal level

Includes
CC-IRE IR Emitter
RF Loop cable, 18"
12 VDC power supply, 500 mA
Mounting Velcro for unit and CC-HSD

Options
USB to 3.5mm Power Sensor Cable

Installation

AC Power Test
1. Insert DC power supply plug into 12 VDC jack.
2. Plug power adaptor into AC wall outlet.
3. The Net LED should turn on and stay lit.

RF Coax and iCC-Net Operation
1. Connect the TV to CATV and observe quality of RF broadcasting. A low-quality CATV system can also affect performance of the iCC-Net commands. If needed, fix CATV problems before installing the system.
2. Connect the CATV RF Coax cable into the RF In input on the ICC1-IRX.
3. If the iCC-Net signal is operating, the Net LED will blink once per second.
4. Connect the RF loop cable from the RF Out jack to the TV's RF connector (you lose less than 1.5 dBmV going through the ICC1-IRX'S internal RF tap).

TV Power Sensing
1. To sense power on flat-panel TVs (those cheapies that don't have a discrete power on and off command), use the Xantech CSM1 power current sensor.
2. Insert CSM1 into the CSM1 input, sensor LED will light when the CSM senses power on status
3. You can also use a USB Sensor cable in the CSM port – the USB connector fits into the USB connection on the TV

Tip: *IR control test: When you install the IR cable, flip S2 Switch 6 ON. Then flip S2 Switch 1 ON to send an IR power command. Turn Switch 1 OFF, then turn Switch 2 on to send and Off IR command. After testing, turn S2 Switch 6 OFF.*

Installation

Setting IR Control Codes (IR Type Mode)

Turn enclosure so the DIP switches are on the bottom

In most cases, it's easier to use our Display Express software, the IC Send app, or your control system to change the IR code set you want to use. See the section on page 11 on using our software to set the IR code set that way.

You can change the IR code type by turning on S2 Switch 6 on the right, and setting a type number on S1 switches 1-6. There are also options you can add in as well to set special features, such as using the CSM1 Power Sensor.

1. Apply DC power to the ICC1-IRX.
2. If the unit's device number has already been set, note the current settings for S1 switches 1-8 and S2 switches 1-4 – you will reset those switches when you're done.
3. Set S2 Switch 6 to ON.
4. Look at the IR Control Code chart on next page and select the desired value.
5. The S1 switches enter a binary value, so S1 Switch 6 represents 32.
6. Set S1 Switches 1 – 6 to match the value. For example to select the Sharp type 46,
   turn on S1 switches 2, 3, 4, and 6, which adds 2+4+8+32 = 46
7. When you turn switch 6 off, your IRX will now output the latest Sharp codes.
8. You can add options to your basic code as well. For example, if you're not using a CSM1 for a Dynex TV, you need to turn that feature off. Adding S1 Switch 7 adds 64 to the value, and the IRX will ignore the input.
9. For that Dynex TV, S1 Switch 8 would be off, which means toggling power. Very few international TVs use the 1 Key to turn on the set, but the IRX will use that if you add the switch on to your code set.
10. You can usually ignore S2 Switch 5, which handles how the Enter code is after the channel #.
11. S2 Switch 7 only applies for the CC-HSD sensor for tube TVs, it does not affect the CSM1 input.
12. S2 Switch 8 can lower the IR emitter power, if the normal level is too high for that TV. This works independently from Type and Device settings.
13. If unit's device number had been set before, return S1 switches 1-8 and S2 switches 1-4 to previous positions.

S1	Off Value	On Value
1	0	1
2	0	2
3	0	4
4	0	8
5	0	16
6	0	32
7	0 - Use Power Sensor	64 - Ignore Power Sensor
8	0 - Toggle power	128 - Key 1 = Power On
S2		
1		
2		
3		
4		
5	Channel Entry Off	Modify Channel Entry
6	**Device Number Mode**	**IR Type Mode**
7	CC-HSD Low	CC-HSD Hi
8	Low IR power	High IR power (Default)

Installation

IR Control Codes

Code	+CSM	MFG	Display	Power	Notes	Ver
1	65	Zenith	TV	CC-HSD	Use CC-HSD	1.2
2	66	Panasonic	TV	CC-HSD	Use CC-HSD	1.0
3	67	Toshiba	TV	CC-HSD	Use CC-HSD	1.5
4	68	Hitachi	TV	CC-HSD	Use CC-HSD	1.5
5	69	Sony/Westinghouse LCD	TV	CC-HSD	Use CC-HSD	1.5
6	70	Grundig	TV	CC-HSD	Use CC-HSD	1.6
7	71	Magnavox/Philips	TV	CC-HSD	Use CC-HSD	1.7
8	72	RCA	TV	CC-HSD	Use CC-HSD	1.7
9	73	Sony 2	TV	CC-HSD	Use CC-HSD	1.8
10	74	Panasonic 2	TV	CC-HSD	Use CC-HSD	1.9
11	75	Mitsubishi	TV	CC-HSD	Use CC-HSD	1.9
12	76	Finlux	TV	CC-HSD	Not in V 2.2-2.3	3.0
14	77	Panasonic 3	TV	CC-HSD	Use CC-HSD	2.0
15	78	Sharp	TV	CC-HSD	Use CC-HSD	2.0
19	83	JVC	TV	CC-HSD	Use CC-HSD	2.1
20	84	ViewSonic Tuner	Tuner	N/A		2.2
21		LG/Zenith_2	PDP/LCD	Discrete		5.6
22		Philips_	PDP/LCD/TV	CSM1		3.1
23		JVC_2	PDP/LCD/TV	CSM1		3.2
24		Sampo .NetTV, Gateway ViewSonic	PDP/LCD/TV	Discrete		3.2
25		Samsung	PDP/HD	Discrete	14-second delay	4.4
26	90	Gateway	LCD	CSM1		3.3
27	91	Viewsonic LCD	LCD	CSM1		3.4
28		JVC_3	TV	Discrete	1-Digit tuning, 1-9	3.5
29	93	LG/Zenith/Dell_3	PDP/LCD	CSM1		3.5
30		Sharp_2	PDP/LCD	Discrete		3.7
31	95	Daewoo	TV	CSM1		3.7
32	96	Viewsonic LCD 2	LCD	CSM1		3.8
33		H&B	PDP/LCD	Discrete	B Series	4.0
34		H&B	PDP/LCD	Discrete	V Series	4.0
35		Sony	PDP/LCD	Discrete		4.0
36	100	Dell W4201C (RC6)	LCD	CSM1		4.1
37	101	NEC LCD	LCD	Discrete		6.2
38	102	Olevia	LCD	CSM1	26-sec power on delay	4.2
39	103	Akai	LCD	CSM1	8-second delay	4.7
40	104	Sanyo	TV	CSM1	Use CC-HSD	4.3
41	105	ILO/Insignia/Dynex/Zenith	TV	CSM1	Use CC-HSD	4.3
42		Viewsonic LCD	LCD	Discrete	Input selects	5.0
43		Sony	LCD	Discrete	FWD-50PX2	5.2
44		Vizio	LCD	Discrete	Use N=2 setting	5.3
45		Panasonic	LCD	Discrete	Input selects	5.4
46		Sharp_3	LCD	Discrete	Fixes dash tuning	5.7
47	111	Sylvania	LCD	CSM1	SRT902A	6.0
48		Toshiba 3	LCD	Discrete		6.5
49		Philips RC6	LCD	Discrete		6.6
51	115	Scientific Atlanta	Cable Box	CSM1	8300HD	6.7
52		Insignia, Dynex	LCD	Discrete		6.8
53		Samsung 2	LCD	Discrete	On Off	7.1
55	119	Motorola STB	Cable Box	CSM1		7.5
56	120	DirecTV	Satellite Receiver	CSM1		7.6
57	121	Tote Vision	TV	CSM1		7.7
58	122	NEC	E556	CSM1		7.9
59	123	Sunbrite	Pre RS-232 model	CSM1		8.0

PC Sensor Setup: LCDs marked **CSM1** or **CC-HSD** do not have discrete IR power commands. The first Code number is set to look for the sensor to know if the TV is on or off. If you want to use unsensed toggling power instead, use the **–CSM** code. Instead, the ICC1-IRX will wait for an "OFF" signal from a power sensor before it sends an ON IR command. This adds 64 to the base code number.

If you use the DIP switches, turn DIP S1, Switch 7 ON when you set the IR code with the DIP switches. If you are using IC-Send or Display Express Special Command feature, send the command T1, with the IR code value + 64. For example, to set Olevia controllers to toggling power, send the command T1, 102 (38+64).

Installation

Setting Device Number and Parameters (Device Mode)

ON – S1

1	2	4	8	16	32	64	128
1	2	3	4	5	6	7	8

ON – S2

256	512	1024	2048				
1	2	3	4	5	6	7	8
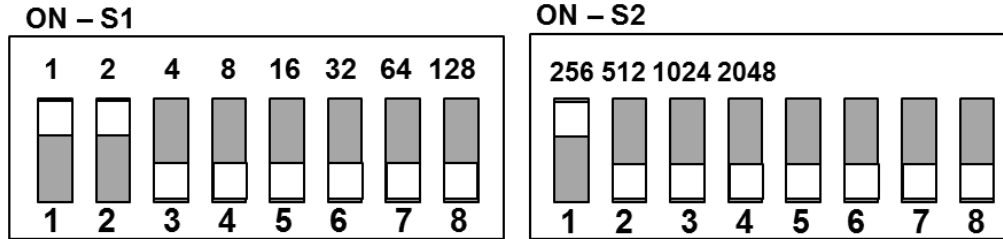
Turn enclosure so the DIP switches are on the bottom

In the next step, you'll need to set up the device number and operation parameters for the ICC1-IRX. Notice that the functions of the S1 and S2 switches change when you set the unit in Device mode.

1. Make sure S2 Switch 6 is OFF (unit in Device mode).
2. Set the **Device number** by turning on the switches that add up to the desired device number. For example, for Device #259, turn on S1 switches 1 and 2 (3), S2 switch 1 (256)

Zone Switch Settings (S2 – right side)

To define the controller's Zone, use the following pattern of switches ON for the S2 DIP.

Zone	Value	1	2	3	4
		256	512	1024	2048
1	256	X			
2	512		X		
3	768	X	X		
4	1024			X	
5	1280	X		X	
6	1536		X	X	
7	1792	X	X	X	
8	2048				X
9	2304	X			X
10	2560		X		X
11	2816	X	X		X
12	3072			X	X
13	3328	X		X	X
14	3584		X	X	X
15	3840	X	X	X	X

Unit Address Settings

The unique address of the controller is the combination of the values of the Zone (S2) and Unit (S1) switches. For example, the first controller in Zone 1 would be set to Zone 1 (256) in S2 and 1 (1) on S2, or 257. To control all the displays in Zone one, Display Express sends a command to device 256. To control just the first unit, create a Preset addressed to 257.

Installation Process and Documentation

Most dealers will pre-configure the controller's address before hanging displays. After setting the address, use a label that states the unit's address and location. Some use this method:

Room 305 - 515 - 12/2

The first identifies the location/name of the display. The second shows the specific address. The last set shows the switches in S1/S2 that are set to ON.

It's a good idea to define all this first in a spreadsheet, with the columns defining the name, address, S1 and S2 ON settings. Then, one person can set up all the controllers and label them.

Once the controller is configured and labeled, it's easier for less-trained installers to Velcro the controller on the back of the display, provide power, and hang the displays.

It's much easier to pre-configure ahead of time than perform the task once the displays are installed.

IR Control Wiring

1. Connect the CC-IRE IR Emitter plug into the IR Out jack.
2. Mount the emitter cube to the TV case where the TV receives IR commands.
3. Mount the ICC1-IRX to the TV using included Velcro tape.
4. Connect DC power to unit.

Using Display Express or IC Send Software

IC Send
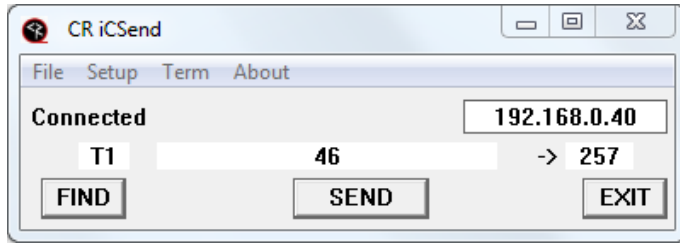
Once you've installed the ICC1 controllers, you can test the operation of the system using our IC Send software. For more detailed information, go to Products/Software Tools/IC Send and download the ZIP file for the app and manual. This easy-to-use tool can send commands to an IC-HE Head End RS-232 or Ethernet port. As you test your code, the program will come in handy to prove the system is operating properly, or reset things you've changed.

For example, to change the IR code set for a controller, enter T1 in the first field, the code # listed on page 7, then the device # of the controller. For example, to set the controller to Sharp, use T1 and 46.

Command		Description
Basic		
Power Off	P0	
Power On	P1	
Tune Analog	TC,	2-127 Example: TC,33
Volume	VL,	Sets TV volume level 0 = Mute 1 – 63 = Minimum level (1) to maximum volume (63)
HD Channel		
Tuning Style ICC1-232	H1=	1 = 5-digit CableCard style tuning (1-9999) 2 = Virtual HD Major-Minor tuning (tunes to virtual channel ID in display) 3 = Physical HD Major-Minor tuning (physical channel, minor digital)
HD Tuning	TH,	<H1 Style><Major>,<Minor> Example: TH,2,15,1 tunes channel 15-1
IR		
IR Code	T1,	Sets IR control code. T1,46 sets controller to Sharp
N1	N1=	Adjust length of IR pulse - use N1=2 for Vizio TVs

Display Express

You can use the Preset Edit page to send the same command. Select the TV (s) you want to change, check **Use Commands** and **Command String**, then enter "T1,code #" (example, T1,46 for Sharp TVs). Click **Send** to send the command. If you haven't defined a Display database in DX yet, manually enter the device # as shown.

RS-232 Control Protocol

Overview

RS-232 control for up to 4000 TV Controllers is provided through an iC-series Head-End Network Controller. The ICC-HE Head-End manages iC-Net communication over RF Coax to ICC1 (1-way) and ICC2 (2-Way) TV Controllers as well as ICW TV Controllers over twisted-pair Cat3/5 wiring. The ICW-HE Head-End operates on the twisted-pair network only.

Each TV Controller 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 Display Express System, 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 address 4095 triggers all devices.

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>,<parameter> [<cmdN>]"

$A5	Starts the command
<dh>	The zone or high order byte of the device [hex]
<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
<parameter>	Command parameters (not used by all commands)
[<cmdN>]	Multiple commands can be concatenated, with byte count added to <ncb>

Writing Your Own Control Code

While most IC systems use our Display Express software to control displays, a growing number of integrators are writing their own control applications, using AMX, Crestron, RTI, or other platforms. We encourage creative solutions, and are happy to support those who take advantage of our protocol.

From our history of support activity, we are providing a few tips to help you on your way.

Device Numbers
iC-Net devices are arranged with a zone structure, arranged in 15 groups of 256 devices. The first address in the group represents the entire zone. For example, Zone 2's group address is 512 (2*256). When a command is sent to 256, all controllers in that group will respond as one. An ALL command is 4095 (15,255, F FF in Hex) – all controllers will respond.

All commands follow the same structure of:
- Attn = Hex A5
- Zone = 1-15 (hex 1-F)
- Unit = 1-255 (hex 1-FF)
- Bytes = Number of bytes that follow
- Command = 1 byte
- Parameters = 1 to 4 bytes

String Format
Every software application has a different denotation for handling hex, ASCII, and decimal formats. The examples in this manual are in AMX format, which is understood by many in the control industry:

- Hex values begin with a dollar ($) symbol
- ASCII values are enclosed in single quotes
- Decimal values are shown as normal

If you plan on using a mixed-format structure for commands, convert the symbols to the types required by your software application. For example, a **Tune Channel 2-3** command to device 260 could be shown several ways:

- AMX Mixed Format = "$A5,1,4,5,'TH',2,2,3"
- AMX Hex Format "$A5 $01 $04 $05 $54 $48 $02 $02 $03"
- Standard Hex (no denotation) = A5 01 04 05 54 48 02 02 03
- Crestron Hex Format = \0xA5\0x01\0x04\0x05\0x54\0x48\0x02\0x02\x03
- RTI = Select port, Hex mode, enter A5 01 04 05 54 48 02 02 03 - note that when you go back to normal editing mode, the app inserts an \x before each Hex character

Go to www.asciitable.com for a handy Decimal/ASCII/Hex conversion chart.

RS-232 Commands

Command		Description
Power		This series of commands uses the sensed power capability of the ICC1-IRX.
Power Off	P0	"$A5,<dh>,<dl>,2,'P0' " (6 bytes)
Power On	P1	"$A5,<dh>,<dl>,2,'P1' " (6 bytes)
Power Toggle	PT	"$A5,<dh>,<dl>,2,'PT' " (6 bytes)
Volume	VL	"$A5,<dh>,<dl>,3,'VL',<vol level>" (7 bytes) Sets TV volume level 0 = Mute 1 – 63 = Minimum level (1) to maximum volume (63)
IR Type	T1	"$A5,<dh>,<dl>,3,'T1',<type> " (7 bytes) – Sets IR device type Identical to using DIP switch to set IR control codes. Specify value to match IR code type. Add 64 to the IR code to set the ICC1-IRX to ignore the power sensor – if the type is specified as Sensor – discrete types always ignore the sensor input.

Channel Entry	T3	"$A5,<dh>,<dl>,3,'T3', <format>" (7 bytes) – Modifies entry format for channels
		Zero (0) value uses format defined by IR Type.
		
		Add the total value for the formats below:
		
		  128 = Add Enter after channel number (105 + Enter)
		    64 = Add +100 to channel number (105 = +100, 05 – use 3 digit tuning)
		     3 = 3 digits (Ex: 007, 032, 105 – ICC1-IRX inserts leading zeros, if needed)
		     2 = 2 digits (Ex: 07, 32 – ICC1-IRX inserts leading zero, if needed)
		     1 = 1 digit (Ex: 7)
		
		Ex: "$A5,<dh>,<dl>,3,'T3', 131" Adds Enter, uses 3 digits for channel entry
		
		Tips on using Channel Entry:
		The IR Type setting includes a channel entry format normally used by the displays in that control group. However, sometimes a manufacturer changes the entry format for some models. Using the Channel Entry command, you can adapt to a different entry format without changing your system programming. For example, in the +100 Channel Entry mode, the ICC1-IRX will receive a command for Channel 122 and translate that to a +100 command, followed by 22.
		
		Note that the IR Type command sets a pre-defined Channel Entry format. If you change or re-send an IR Type command to the ICC1-IRX (or change with DIP switches), you'll need to send a Channel Entry again to add the modifications.

Save	ZW	"$A5,<dh>,<dl>,2,'ZW' " (6 bytes) Saves current channel and power status in NV RAM
Restore	ZR	"$A5,<dh>,<dl>,2,'ZR' " (6 bytes) Restores control to saved channel and power status

RS-232 Commands

Ts & Qs		*The ICC1-IRX responds to Q-series tuning commands as well*
Channel Up	**TU**	"$A5,<dh>,<dl>,2,'TU' " (6 bytes) – Tunes to next channel up in Tune Ring
Channel Dwn	**TD**	"$A5,<dh>,<dl>,2,'TD' " (6 bytes) – Tunes to next channel down in Tune Ring TU and TD control analog channels stored in the TR command – designed for legacy Smart TV installs, not contemporary HDTV applications
T Channel Prev	**TP**	"$A5,<dh>,<dl>,2,'TP' " (6 bytes) – Tunes to previous channel in Tune Ring
Force Channel	**TC**	"$A5,<dh>,<dl>,3,'TC', <channel>" (7 bytes) – Tunes to a specific channel
Select Channel	**TT**	"$A5,<dh>,<dl>,2,'QT',<channel>" (7 bytes) – Tunes channel if included in TR
Tune Ring	**TR**	"$A5,<dh>,<dl>,<ncb>,'TR', [<chan 1>, <chan N>]" (variable bytes) This command stores a Tune Ring, ***Analog channels only***, 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>,8,'TR', $82,5,$87,11" sets channels 2-5 and 7-11. You can specify a range using MSB bit for the first channel; the next byte is the last.
Control Lock	**LM**	"$A5,<dh>,<dl>,3,'LM',<control>" (7 bytes) Locks power operation – only functional with display with power current sensor. When the control is locked, the display is locked to the power state of the ICC1-IRX. For example, if the ICC1-IRX power state is off, the display can't be turned on from the IR remote or TV front panel. The controller will sense the change from the power sensor and turn the set off. 0 = Unlock, 128 = Lock
Tuning Style	**H1=**	"$A5,<dh>,<dl>,3,'H1',<style>" (7 bytes) 1 = 5-digit CableCard style tuning (1-9999) 2 = Virtual HD Major-Minor tuning (tunes to virtual channel ID in display) 3 = Physical HD Major-Minor tuning (physical channel, minor digital)
TC Response	**H2=**	"$A5,<dh>,<dl>,3,'H2',<response>" (7 bytes) This pre-sets how the ICC1-IRX will respond to TC tuning commands. 0= Ignore, use current settings 1= Analog Only (XX-0) 2= Digital (XX-1)
Tune HD	**TH**	"$A5,<dh>,<dl>,5,'TH',<H1>,<Major>,<Minor>" (9 bytes) – Digital Tuning Normally, the H1 parameter is 0, allowing the ICC1-232 to use the current H1 tuning format, but it could be used to force a different tuning option. When the display is set to the H1=1 mode, 1-part digital channel, the first byte is (x*256), and the last byte is the value you add to state the channel number. In H1=2 or 3 modes, the bytes represent the Major and Minor channel numbers.
	Ex:	This command is designed for compatibility with other ICC controllers. In reality, H1 modes 2 and 3 are the same for IR control. "$A5,1,4,5,'TH',1,2,3" Device 260, channel 515 "$A5,1,4,5,'TH',2,2,3" Device 260, virtual channel 2-3 "$A5,1,4,5,'TH',3,2,3" Device 260, physical channel 2, minor 3

Special		Special commands for displays
Send IR	LQ=	"$A5,<dh>,<dl>,3,'LQ',<IR Code>" (7 bytes) Sends an IR pulse for special commands to the display. In Display Express the code can be triggered by sending an HD channel command of 0-xxx (O-211 selects the HDMI 1 input, 0-200 would return the TV to TV channel mode). 115=Captions　　　　New codes added in v8.1 200=TV/Tuner　　　　 63=Guide 201=Video1　　　　106=Right 202=Video2　　　　107=Left 203=Video3　　　　108=Up 204=S-Video1　　　　109=Down 205=S-Video2　　　　110=Select 206=Component1　　111=Exit 207=Component2　　113=Back 208=RGB1 209=RGB2 210=RGB3 211=HDMI1 212=HDMI2 213=HDMI3 214=HDMI4 215=HDMI5 LQ has other uses as well; it can trigger any IR code in the library. It's similar to the KK command in the 232-ATSC+1 manual. Refer to the code numbers on page 21 in the 232-ATSC+1 manual. For example, sending LQ,25 will pulse a Volume Up command, and LQ,25 is Volume down. If you're using a custom control system, repeat the command as long as the button is held down. The pulse itself will take 275ms. Note: Not all commands are supported in different code sets, check with CR Support to confirm operation. We will add codes as needed. Presently, the LG code set 21 includes all the above commands.
IR Pulse	N1=	"$A5,<dh>,<dl>,3,'N1',<Time>" (7 bytes) Value 1-6 Sets pulse length in 100 millisecond time period. Typically, IR commands are sent in a repeating pattern. A few TVs, such as some Visio models, will respond to every repeat, so that channel 3-1 appears as 3311. Making the pulse shorter, typically N1,2, fixes the problem. Sending an N1,0 command resets the controller to the default pulse length.
Pulse Off	N0= N6=	"$A5,<dh>,<dl>,3,'N0',<Time>" (7 bytes) Use where device does not perceive repeated identical numbers, such as channel 111 is received as 1. N0= Sets pulse off time cmd (in 0.1 secs), default is 3 (0.3 secs) N6= Sets pulse off time cmd (in 0.05 secs), default is 6 (0.3 secs)

iC-Net Zones

To simplify controlling groups of devices, iC-Net is divided into 15 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 Power On command to device #256, any TV controller numbered between 257 and 511 will instantly turn on. If we send a Power Off command to device #4095, all devices in the system will turn off.

The ICC1-IRX and ICC1-232 controllers typical for many SignStream display control systems are designed to follow a Zone address format. You can use the 4 top switches in the second DIP switch (S2) to define the controller's Zone. You could stop at that point, or use the upper switches (S1) to define the controller's address within the Zone. For example, setting S2/1 On and S1/2 On defines that the controller is part of Zone 1 (256), and is the second unit in the Zone (2). The unique address of the controller would be 258 (256 + 2)

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

Tip: While many applications can use just the Zone number, it's a good practice to assign a unique Unit number to each controller in the zone. This allows the system software to address individual controllers if necessary.

System Map

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

iC-Net Zone	Zone	Room	Device	S1	S2
1	W 1st Floor		*256*		
		W151	257	1	1
		W152	258	2	1
		W153	259	1+2	1
		W154	260	3	1
2	W 2nd Floor		*512*		
		W251	513	1	2
		W252	514	2	2
		W253	515	1+2	2
		W254	516	3	2
3	E 1st Floor		*768*		
		E151	769	1	1+2
		E152	770	2	1+2
		E153	771	1+2	1+2
		E154	772	3	1+2
4	E 2nd Floor		*1024*		
		E251	1025	1	3
		E252	1024	2	3
		E253	1025	1+2	3
		E254	1026	3	3
5	Coffee Areas		*1280*		
		G100	1281	1	1+3
		G150	1282	2	1+3
		G151	1283	3	1+3
6	Day Care		*1536*		
		TV 1	1537	1	2+3
		TV 2	1538	2	2+3
7	Hallways		*1792*		
		W1	1793	1	3+3
		W2	1794	2	3+3
		E1	1795	1+2	3+3
		E2	1796	3	3+3
8	Office		*2048*		
		Admin	2049	1	4
		A/V Center	2050	2	4
All Zones	All		*4095*		

Safety Instructions and Warranty

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.

Warranty: Three (3) year limited warranty on all parts and labor for Contemporary Research manufactured products. Contemporary Research warrants its manufactured products against defects in materials and workmanship for a period of three years from the day of purchase by authorized dealer. If Contemporary Research receives notice of such defects during the warranty period; Contemporary Research, at its option, will repair or replace products that prove to be defective.

Exclusions: The above warranty shall not apply to defects resulting from improper or inadequate maintenance by the customer, customers applied software or interfacing, unauthorized modifications or misuse, mishandling, operation outside the normal environmental specifications for the product, use of the incorrect, modified or extended power supply, acts of God, weather, or improper site operation and maintenance. *Please note Contemporary Research SSV-DX Display Express PC product carries a six month limited warranty.*

Product Service: Contemporary Research will test, repair, or replace the product or products without charge if the unit is under warranty. If the product is out of warranty, Contemporary Research will test, and then repair the product or products. The parts and labor charge will be estimated by a technician and confirmed by the customer prior to repair. All components must be returned for testing as a complete unit. Contemporary Research will not accept responsibility for shipment after it has left the premises.

Technical Support: Contemporary Research technicians will determine and discuss with the customer the criteria for repair and/or replacement. Contemporary Research Technical Support can be contacted through one of the following resources: e-mail support at support@crwww.com or phone at: 972-931-2728

Return Material Authorization (RMA) Number: Before returning a product for repair or replacement, request an RMA from Contemporary Research's technical support. Provide tech support with a return phone number, e-mail address, shipping address, product serial numbers and original purchase order number. Describe the reason for repairs or returns as well as the date of purchase. See the General RMA Terms and Procedures section for more information. RMA's are valid for 30 days and will be issued to authorized Contemporary Research dealers only. End users must return products through authorized Contemporary Research dealers. Include the assigned RMA number in all correspondence with Contemporary Research. Write the assigned RMA number clearly on the shipping label of the box when returning the product. All products returned for credit are subject to a restocking charge without exception.

Voided Warranty: The warranty does not apply if the original serial number has been removed or if the product has been disassembled or damaged through misuse, accident, acts of God, weather, modifications, use of incorrect, modified or extended power supply, or unauthorized repair.

Shipping and Handling: Contemporary Research will not pay for inbound shipping transportation or insurance charges or accept any responsibility for laws and ordinances from inbound transit. Contemporary Research will pay for outbound shipping, transportation, and insurance charges for all items under warranty, but will not assume responsibility for loss and/or damage by the outbound freight carrier. If the return shipment appears damaged, retain the original boxes and packing material for inspection by the carrier. *Contact your carrier immediately.*

Products not under Warranty: Payment arrangements are required before outbound shipment for all out of warranty products.
General RMA Terms and Procedures: RMA's are valid for 30 days and will be issued only to authorized active Contemporary Research dealers only.

- End users must return products through authorized Contemporary Research dealers. End users may be eligible for a RMA at the discretion of CR Technical Support.
- Before a defective product can be authorized to send in for repair, it must first go through the troubleshooting process with a member of the Contemporary Research Technical Support team.
- Products authorized for repair must have a valid RMA (Return Material Authorization) number.
- Contemporary Research Technical Support will approve the issue of an RMA number.
- An RMA number is to be included in all correspondence with Contemporary Research.
- The RMA number must appear clearly on the shipping label when the product is returned.
- A packing slip must be included on the inside of the box with the RMA number listed and reason for RMA return.
- Products received at Contemporary Research that do not have a valid RMA number clearly marked on the outside of the shipping container may be refused and returned to sender.
- Boxes showing external damage will be refused and sent back to the sender regardless of the clearly marked RMA number and will remain the responsibility of the sender.

Advanced Replacement Policies:
For Contemporary Research manufactured products, advance replacement will be provided for "out-of-the-box" failures up to thirty (30) days after the initial shipment of products.

Shipments of equipment that are refused upon attempted delivery, for any reason, are subject to restocking charges.