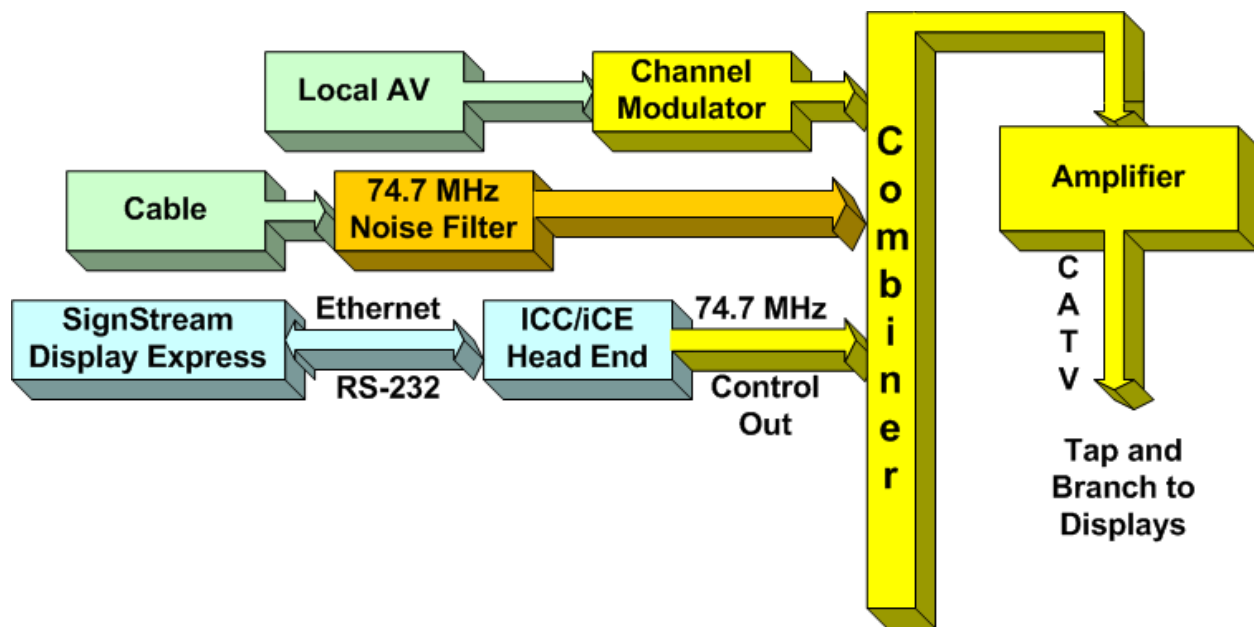


Display Express Installation Tips

RF Design and Installation



The architecture of a Contemporary Research SignStream Media Express or Display Express display control system follows the same design as a standard RF local insertion system. A key aspect of the system is that the underlying iC-Net technology is compatible with most existing RF systems, and control channels used for display operation will not conflict with current TV channels or sub-channels.

- Local AV, including:
 - AV sources, digital cable or satellite receivers feeding analog modulators
 - Off-air HDTV channels inserted as digital QAM channels
 - HD sources feeding HD cable modulators
 - SignStream HDTV channels
- Cable Feed, using a noise filter, if needed
- SignStream or Display Express control, inserted as micro control channel

Local Sources

Each local AV source feeds an RF modulator. Analog video sources, such as DVD players, or a PC that runs standard 4:3 digital media such as digital videos or a PowerPoint information channel, feed the AV output of the source to an analog channel modulator. CR QMOD HD Modulators can be used to distribute HD sources as digital QAM cable channels.

There are many ways to balance the channels, depending on the design of the system. Obviously, the output of some channels will be reduced, while others are amplified.

Display Control Software

There are several ways that CR display networks can be controlled:

- Display Express software connected to an ICC-HE Head End. The Web-based control software can be accessed anywhere on a network, usually located adjacent to Head End.
- SignStream Media Player connected to the ICC-HE Head End via RS-232 (It's usually in the same rack as the Head End)
- Custom software, running on an AMX, Crestron, or other control system, often connected to an ICE-HE Ethernet Head End over a network.

Installation Process

In most systems, one group of installers will integrate the displays, then another tech comes in after that to install and test Display Express software or a custom control system. The following installation process will allow the first team to correctly install the displays and verify the install long before the control software is integrated.

Step One – Pre-Plan Controller Network.

Display Controllers are identified on the RF network by unique addresses. There are 4,000 possible addresses, divided into 15 zones. All the controllers within the same zone respond immediately to a single zone command. Some systems use a simple architecture, using the same address for all controllers in the same zone. As control for specific controllers may be needed in the future, it's usually a good practice to assign each a unique address.

Zones

| Zone | Address | Zone | Address | Zone | Address |
|------|---------|------|---------|------|---------|
| 1 | 256 | 6 | 1536 | 11 | 2816 |
| 2 | 512 | 7 | 1792 | 12 | 3072 |
| 3 | 768 | 8 | 2048 | 13 | 3328 |
| 4 | 1024 | 9 | 2304 | 14 | 3584 |
| 5 | 1280 | 10 | 2560 | 15 | 3840 |
| All | 4095 | | | | |

- In most systems, try to arrange the addresses to fit into the natural Zones in the network. This way, most commands affect all displays in each Zone with a single command.
- The new Display Express software, versions 4.3 and above, can also create free-form Groups. This is useful for controlling a set of displays that don't fit the normal Zone structure.
- Set up a spreadsheet that defines all the displays in the system, include the name, location and network address. This becomes a "roadmap" for the team that installs the displays.

From the Roadmap, go ahead and set the addresses and label the display controllers. This simplifies the job for the team that installs the displays, and reduces system installation errors.

Step Two – Install ICC Head End

The ICC-HE or ICE-HE Head End will receive the RS-232 or Telnet commands from the software and translate them to a small RF channel that runs between channels 4 and 5. It also sends out a test command every second. The display installers can use this “pulse” feature to confirm that the controller is “on the network”.

A common error for first-time installers is to attach the main cable feed to the RF In on the Head End and attach the other end of the feed into RF Out. Nope. The RF In is for special 2-way control signals. You use an external combiner to mix the control channel with the other channels.

The key step in this part is to insert the RF Out of the Head End into the RF cable system. Generally, you’ll use a combiner or splitter to combine the control channel with the main RF feed. To do so, you want the control channel set to about the same strength as the RF system. The Head End broadcasts at 50 dB, and includes a couple filters to knock that down when needed.

The best technique is to use an RF meter to measure the main feed’s level, then match the output of the Head End. The blunt approach would be to combine the Head End, then look at how it affects other channels. If the other channels are affected, drop in a 20 dB attenuator.

In other sites, you’ll be mixing the output of the Head End with other sources into an RF Combiner, then amplifying the total output to the main system. Again, all the sources need to be combined at approximately the same RF level. The best way is to use an RF meter to measure all the sources to match. Generally, digital channels are set about 6 dB less than analog channels. Measure the control channel as an analog channel.

Typical outputs are

- RF Modulator – 45-55 dBmV
- Cable Feed – 15 dBmV
- Head End – 50 dBmV
- QMOD Modulator – 29 dBmV

Step Three – Pre-Set Display Controllers

Ideally, you've already labeled the controllers and pre-set the addresses at the shop, so the installers can just hang and bang.

Setting DIP Switches

Most display control systems employ the ICC1-232 or ICC1-IR for display control. There are two sets of DIP switches on the bottom of each controller. They are used to set the device number (network address) or control code type. In most cases, CR has already set the control code type, or you can define through Display/Media Express software – so most installers will use the switches for setting the address only.

Generally speaking, the second set of switches (S2) set the Zone address for zones 1-15. The top switches (S1) set the unique address of the controller. If the system will always use Zone commands for displays, you may never need to set the individual address.

| 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 | 64 |
| 8 | 0 | 128 |
| S2 | | |
| 1 | 0 | 256 |
| 2 | 0 | 512 |
| 3 | 0 | 1024 |
| 4 | 0 | 2048 |
| 5 | | |
| 6 | Device Mode | |
| 7 | | |
| 8 | | |

Device Number Setting

Zone Switch Settings

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 |

Controller Switch 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.

Display Controllers

After the RF amplifier, the RF coax system branches out to the displays in the facility. Most RF systems are designed so that each TV receives an RF level of about 10-12 dBmV for proper channel tuning. Because the control signal is a micro-channel with far less information than a TV channel, the controllers often work even if the display can't effectively tune channels.

Plan your address scheme and set controller numbers before installation. Use a label to mark the location and address of the controller. It's also a good idea to test a sample display/controller combination to cross-check settings and cable wiring.

Step Four – Install Displays and Controllers\

Now that you have the system ready for installation, the process is fairly foolproof.

Network Test

One the installer connects the RF feed to the controller and plugs in the power supply, they should set the NET LED flash once per second. As that is a result from an actual command, that tells the installer that the controller is on the network and receiving commands. If they don't see the flash, someone needs to check RF setup with the Head End – or if the RF feed in the room is connected to the central system.

IR Control Test

The ICC1-IR controller has a library of codes inside. In most installs, CR has already pre-set the control code on the unit. This can be changed with the switches, or through IC Send or Display Express software. As a rule, the dealer should pre-set this at the shop (or with CR). As the switches are also used to set the controller's address, this shouldn't be done in the field with your level one Hang and Bang installers.

However, they can test operation very simply.

| S2 | OFF | ON |
|----|-----|--------------|
| 1 | | Power On |
| 2 | | Power Off |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | Test Mode On |
| 7 | | |
| 8 | | |

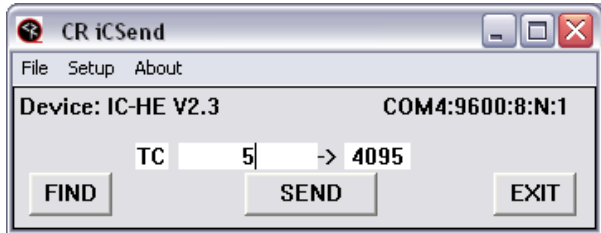
- Turn S2 Switch 6 ON
- Flip S2 Switch 1 On – this will send an IR Power On command to the display, then turn the switch off
- Flip S2 Switch 1 On – this will send an IR Power Off command to the display, then turn the switch off
- Turn S2 Switch 6 OFF

RS-232 Control

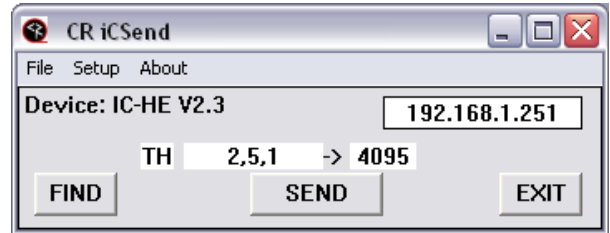
This step isn't required, as we always install just one code series into the ICC1-232 controller at CR. We find that this dramatically reduces installer error. Most integrators test one of the controllers at the shop to cross-check operation before installation.

Step Five – IC-Send Testing

Very often, an integrator will send over a higher-level tech to test operation after the displays are installed. At this point, there may not be a Display Express PC or software installed as yet, or the control system code isn't finalized. However, you can take a laptop with free IC Send software to test the system.



Com Setting



IP Setting

IC Send is a Windows application for testing iC-Net communication and control. Setup just takes a few steps:

- Connect a Female to Female null model cable (TX and RX swapped at one end) between a PC and a CR iC-Net Head End. **Connect the cable to the Program Port, not the iC-Net port.**
- Check to make sure the DIP switches on the front of the Head End is set to 19.2 Kb. Switch 6 set to Off, Switches 7 and 8 On.
- Launch iC Send – no installation is needed.
- Click **Setup** to choose RS-232 port or IP port.
- For IP Port, enter the IP address of the Head End.
- Click **FIND** to connect to the IC Head End, then IC Send will display "Seeking Device".
- If IC-Send connects to the Head End, the firmware version of the HE will appear at the top left below the menus.
- If you change the cable or DIP switch settings on the HE, click **FIND** to re-connect.

Entering Commands

- **Command:** Enter the command code in the first field.
- **Parameter:** Enter the parameter, if needed, in the second
- **Device:** Enter the device or Zone number for the controller(s)

Click **SEND** to send the command.

Devices and Zones

To send a command to an individual controller, enter its unique address. To send a command to an entire Zone (up to 255 controllers) or all controllers use a Zone address (see page 5).

Typical Commands

| Command | Description | |
|-----------------------------------|-------------|---|
| All Controllers | | |
| Power Off | P0 | P (Zero) |
| Power On | P1 | P (One) |
| Tune Analog | TC | 2-127 |
| HD Tuning | TH | <Major>,<Minor> Example: TH then 15,1 tunes channel 15-1 |
| Volume | VL | Sets TV volume level 0 = Mute 1 – 63 = Minimum level (1) to maximum volume (63) |
| Tuning | | ICC1-232, ICC1-IR |
| Tuning Style | 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) |
| RS-232 | | ICC1-232, ICC2-ATSC, ICC2-VDC |
| RS-232 Control | T0 | Selects control make and model for RS-232 control. Check Manual or www.crwww.com product Install page for codes |
| Tuning Format ATSC,VDC,IRC | S0 | 0=CATV 1=Off-Air 2=IRC 3=HRC 4=Auto |
| Direct | UX | Sends an RS-232 command directly to a display or projector through the controller's RS-232 port. Example: UX 'mc 00 39',13 [Device #] sends a toggling Captions On/Off command to an LG display. ASCII character strings can be denoted by enclosing in single quotes (or double quotes if you actually needed the single quote character in the string). Hex bytes are denoted with a \$ symbol. Decimal characters are without quotes. |
| Scan | | ICC2-ATSC |
| Scan Mode | D0 | Sets scan mode for digital and analog channels from the T^ or front panel scan command. 0= Scans for analog and digital channels scan (default) 1= Scans for digital only, deletes analog channels 2= Scans for digital only, keeps analog channels 3= Scans for analog only, deletes digital channels 4= Scans for analog only, keeps digital channels |
| Channel Scan | T^ | Initiates channel scan |
| IR | | ICC1-IR, ICC2-IRC |
| IR Code | T1= | Sets IR control code. Check Manual or www.crwww.com Install page for codes |

