Model SST-1
Sega Channel
Digital Transcoder
Installation and
Operations Manual
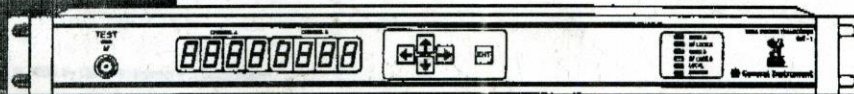
GI General Instrument

Contents

List of Figures

The Sega Channel[SM/TM] delivery system is comprised of three major components:

- The SSR-1 Sega Channel satellite receiver, described in the *Sega Channel Satellite Receiver Installation and Operations Manual*, which receives the Sega Channel signal from satellite

- The SST-1 Sega Channel digital transcoder, which receives the Sega Channel data as output from the SSR-1 and modulates the data for transmission to the subscriber's home

- The Sega Channel adapter, which interfaces with the subscriber's own Sega Genesis™ or Sega CDX™ game players

This manual describes the General Instrument SST-1 Sega Channel transcoder, which transmits the Sega Channel signal to the subscriber's home for reception by the Sega Channel adapter.

The SST-1 offers the following features:

- Performs forward error correction

- Lets you select between National and Local data stream

- Provides T1 data loop-throughs for easy transport over T1 circuit

The following figures illustrate the front and back appearance of the SST-1.

Figure 1
Front view of the SST-1 digital transcoder

Figure 2
Back view of the SST-1 digital transcoder
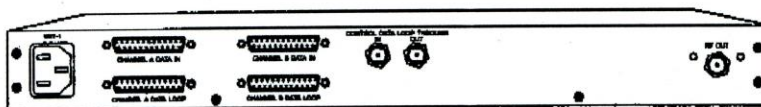
Using This Manual

This manual includes the information and instructions required to install and operate the SST-1.

Section 1	Includes a brief description of the product, lists related documentation, gives the helpline number and information about repair.
Section 2	Describes the SST-1, identifies the front panel displays and controls, and displays the rear panel connectors.
Section 3	Gives instructions on how to install and operate the SST-1.
Appendix A	Provides the technical specifications of the SST-1.

Related Documentation

The *Model SSR-1 Sega Channel Satellite Receiver Installation and Operations Manual*, part number 436-881-200, provides information that may be of interest and use to you. However, the manual for the SSR-1 is not necessary to install or operate the SST-1.

If You Need Help

If you need assistance while working with the SST-1, call the General Instrument Technical Response Center at **1-800-537-7653**. The Technical Response Center is open 8:00 am to 6:00 pm Eastern Standard Time, Monday through Friday. When the Technical Response Center is closed, emergency service *only* is available on a call-back basis.

When contacting the Technical Response Center from outside the United States, please use our main switchboard number, **1-215-674-4800**. After business hours, please use **1-215-581-9637**.

Calling for Repairs

If repair is necessary, call the General Instrument Repair Facility at **1-800-227-0450** for a Return for Service Authorization (RSA) number before sending the unit. The RSA number must be prominently displayed on all equipment cartons. The Repair Facility is open 8:00 am to 6:00 pm Central Standard Time, Monday through Friday.

If calling from outside the United States, dial your appropriate international access code, then dial **52-891-40739**, to contact the Repair Facility.

When shipping equipment for repair, please follow these steps:

1   Pack the unit securely.

2   Enclose a note describing the exact problem.

3   Enclose a copy of the invoice that verifies the warranty status.

4   Ship the unit **PRE-PAID** to the following address:

   GI Communications
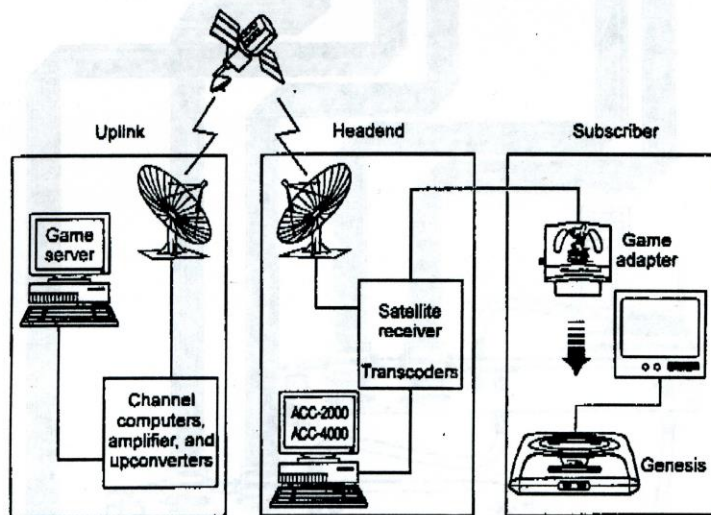   1330 Capitol Parkway
   Carrollton, TX 75006
   Attn: RSA #_____

The General Instrument Sega Channel System provides subscribers with unlimited access to a menu of as many as 50 video games per month. The video games are available 24 hours a day, seven days a week.

The following figure illustrates the delivery system overview.

Figure 3
System overview

SST-1 Operation

The GI Sega Channel System is subdivided into three sections. The satellite uplink transmits the Sega Channel signal Galaxy 7 transponder 1.

At the uplink, all game data is multiplexed together. Reed Solomon and Viterbi forward error correction are inserted along with control information and encryption of data stream.

At the Headend, the signal is received using the SSR-1 satellite receiver. The data stream is demultiplexed and satellite forward error correction is removed. At this point, there are up to six T1 data signals available on the rear of the SSR-1 for connection to the SST-1 transcoder, as illustrated in Figure 4.

Figure 4
**Connection of SST-1 to SSR-1**
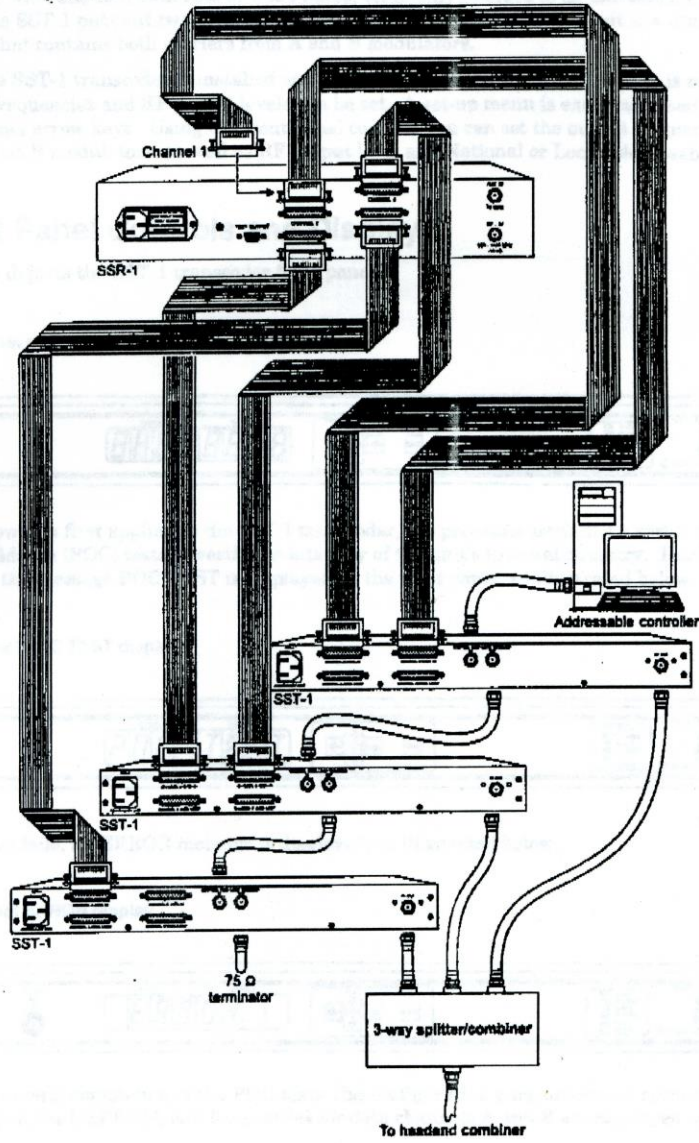
The Sega Channel transcoder is a single-rack-space unit that contains two independent QPSK (Quadrature Phase Shift Key) modulators. Both modulators are fully frequency agile from 48 to 860 MHz. Each SST-1 transcoder is capable of producing two QPSK carriers, each carrier being 1.2 MHz wide and at a data rate of 1.536 Mbps, commonly referred to as unframed T1 data. Since the SST-1 puts out two independent carriers, the RF output of the unit is a combined RF output that contains both carriers from A and B modulators.

Once the SST-1 transcoder is installed and interconnection to the SSR-1 receiver is made, the output frequencies and RF output levels can be set. A set-up menu is easily accessed using the front panel arrow keys. Using the front panel controls you can set the output frequencies of both A and B modulators, as well as RF output level and National or Local addressable control.

Front Panel Controls and Displays

Figure 5 depicts the SST-1 transcoder front panel.

Figure 5
Front panel controls
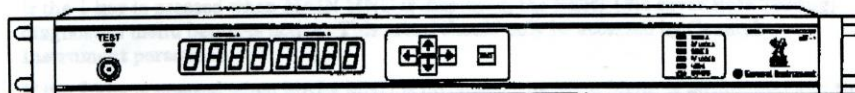
When power is first applied to the SST-1 transcoder, the processor performs a series of Power On Confidence (POC) tests to verify the integrity of the unit's internal circuitry. During this process, the message POC TEST is displayed on the front panel, as illustrated below.

Figure 6
Front panel POC TEST display
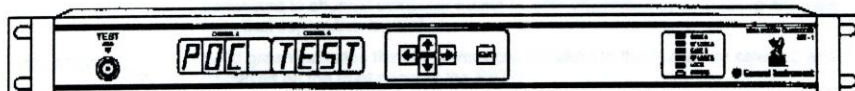
If any test fails, an ERROR message is displayed, as illustrated below.

Figure 7
Front panel ERROR display

After successful completion of the POC tests, the configuration parameters are retrieved and loaded from the EEPROM, and frequencies for data channels A and B are displayed on the front panel.

Please note that the very first time the unit is powered on, the EEPROM does not contain any system pertinent configuration parameters, so default values are loaded. However, as soon as the parameters are modified by the operator, they will be stored in the EEPROM for future use. Configuration parameters may be changed at any time during normal operation by simply pressing the ENT key while in the Main Menu.

During normal operation, the frequencies for both channels are displayed and the transcoder is capable of receiving and transmitting data streams on both channel carriers. Pressing the ↓ key during normal operation of the unit activates the Main Menu, and MAIN MNU is displayed on the front panel, as illustrated below.

Figure 8
Front panel MAIN MNU display
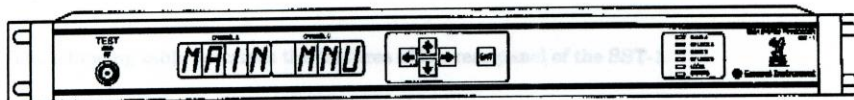
- If the ↓ key is pressed when MAIN MNU is displayed, the BERT (Bit Error Rate Testing) diagnostics menu becomes active. This menu should only be accessed by General Instrument personnel.

- If the ↑ key is pressed when MAIN MNU is displayed, the Main Menu is terminated and the SST-1 returns to the normal operation menu.

- If the ENT key is pressed when MAIN MNU is displayed, the Configuration Menu becomes active and configuration parameters can be set as described in *Section 3, Installation.*
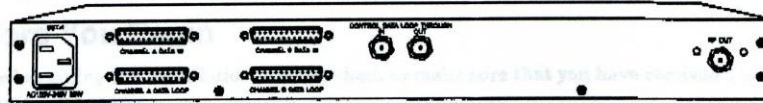
The following is a description of the LEDs found on the front panel:

▭ GAME A	Solid green when CHANNEL A DATA IN is connected to any of the game output channels on the rear of the SSR-1, labeled CHANNEL 1 through CHANNEL 6, or when connected to channel computer output in local origination system setup and data from that connection is valid.
▭ RF LOCK A	Solid green indicates that the transcoder is locked to the frequency selected and displayed on the front panel of the SST-1.
▭ GAME B	Solid green when CHANNEL B DATA IN is connected to any of the game output channels on the rear of the SSR-1, labeled CHANNEL 1 through CHANNEL 6, or when connected to channel computer output in local origination system setup and data from that connection is valid.
▭ RF LOCK B	Solid green indicates that the transcoder is locked to the frequency selected and displayed on the front panel of the SST-1.
▭ LOCAL	Solid green only when Local addressable mode has been selected and bi-phase data is present at the rear of the SST-1. This LED will be off when National addressable mode has been selected
▭ ERRORS	This LED is normally off. It will flash red when indicating there is a problem with the control data stream, or Local addressable mode has been selected and no bi-phase data is present at the rear of the SST-1. This LED is only active when Local addressable mode has been selected.

Rear Panel Controls

The rear panel of the transcoder, illustrated in Figure 9, contains both data inputs and data loop-throughs.

Figure 9
Rear panel controls

The following table describes the features of the rear panel of the SST-1.

 Data input received from the SSR-1 satellite receiver.

 Data loop-throughs provided for transport to remote locations via a T1 transport system.

This data loop-through capability allows an operator to support both local transcoders as well as transcoders at a remote location via a T1 transport system.

 Allows for insertion of local control data in bi-phase format from ACC-2000 or ACC-4000 platforms only.

If the control data input is used but the control data output is not used, the output must be terminated using 75-Ohm terminators. If neither is used, termination is not necessary. These terminators are not provided with the SST-1.

 Provides a combined RF output of both Channel A and Channel B data carriers.

Before You Begin

Before beginning the installation process, check to make sure that you have received the following components:

- SST-1 digital transcoder
- AC power cord

If any part is missing or damaged, contact General Instrument's repair facility according to the instructions provided in *Section 1, Introduction*.

Connecting to Power

The SST-1 transcoder is equipped with a switching power supply, capable of operating at 50 to 60 Hz and from 115 Vac to 240 Vac. There is no internal or external switch settings required.

Placement of Sega Channel Carriers

There are certain rules for determining where the Sega Channel carriers can be placed within your spectrum. On the following page is a chart that depicts distances from adjacent carriers for proper placement of the Sega Channel carriers in your system.

Figure 10
Sega carrier spacing
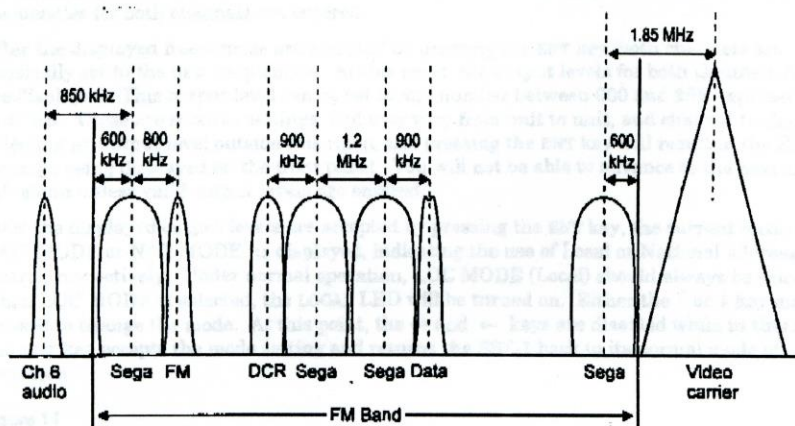
Setting Desired Frequencies, RF Output Levels, and Operation Mode

The chart above displays how to select the available spectrum for placement of the Sega Channel carriers. Once you have decided where to place the carriers, you will set the frequencies in the SST-1 transcoder. Valid frequencies for the transcoder are between 48 and 860 MHz.

Pressing the ↓ key during normal operation of the unit activates the Main Menu. The display will change to MAIN MNU. After pressing the ENT key from the Main Menu, the present settings for both A and B modulator frequencies are displayed using the left-most and right-most four digits of display, respectively.

It is at this point that the left-most digit for channel A will start blinking, indicating that the value is available for modification. Using the ↑ or ↓ keys will change the current digit being displayed.

- The ↑ key increments the selected digit. It will return to "0" after incrementing past "9".

- The ↓ key decrements the selected digit. It will return to "9" after decrementing past "0".

- The ← key moves to and selects the digit immediately to the left of the current digit. If the current digit is the left-most digit of the display, the right-most digit of the display will be selected.

- The → key moves to and selects the digit immediately to the right of the current digit. If the current digit is the right-most digit of the display, the left-most digit of the display will be selected.

- The ENT key accepts the current setting of both A and B modulators and advances to the next sub-menu.

Because the valid frequency tuning range for the SST-1 is 48 to 860 MHz, selecting a frequency outside this range and pressing the ENT key will result in the ERROR message being displayed on the front panel. You will not be able to advance to the next entry or sub-menu unless valid frequencies for both channels are entered.

After the displayed frequencies are accepted by pressing the ENT key, both channels are physically set to the new frequencies. At this point, the output levels for both channels A and B are displayed. This output level can be set to any number between 000 and 255, representing 0 to 47 dB. These are relative settings, and may vary from unit to unit, and channel to channel. Selecting an output level outside this range and pressing the ENT key will result in the ERROR message being displayed on the front panel. You will not be able to advance to the next entry or sub-menu unless valid output levels are entered.

After the displayed output levels are accepted by pressing the ENT key, the current mode setting (LOC MODE or NAT MODE) is displayed, indicating the use of Local or National addressable control, respectively. Under normal operation, LOC MODE (Local) should always be selected. When LOC MODE is selected, the LOCAL LED will be turned on. Either the ↑ or ↓ key may be pressed to change the mode. At this point, the → and ← keys are disabled while in this menu. The ENT key accepts the mode setting and returns the SST-1 back to its normal mode of operation.

Figure 11
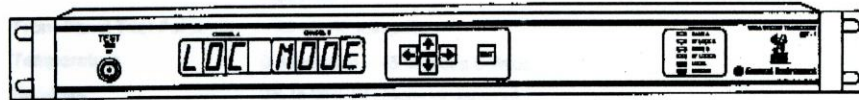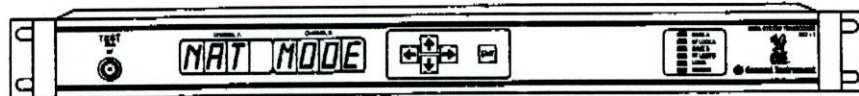**Front panel LOC MODE display**

Figure 12
Front panel NAT MODE display

Please note the Sega Channel carriers are typically carried at 15 to 20 dB below system video carriers. They are usually referenced to the audio carriers. A spectrum analyzer must be used for setting all system carrier levels.

SST-1 Product Specifications

Physical	1.75" H x 19" W x 18" D
Power	45 Watts @ 115 Vac
Main Input	Two Baseband serial data streams @ T1 data rates from SSR-1 receiver
Input Connectors	Two 25-pin "D" Female (RS-530)
Loop Thru Connectors	Two 25-pin "D" Female (RS-530)
Control Data Inputs	13.98 kbps Bi-Phase data input @ 75 Ohms
Main Outputs	Two combined 1.536 Mbps QPSK modulated RF outputs agile from 48 to 860.0 MHz
Carrier Bandwidth	1.2 MHz wide
RF Output Level	+ 47 dBmV maximum
RF Output Connector	75-Ohm "F" type
Front Panel Controls	Menu driven set-up of frequency selections and RF levels for A and B modulators
Front Panel Test Point	– 20 dB RF test point
Temperature	0 degrees to + 45 degrees Celsius
Humidity	0% to 95% RH (non-condensing)