

The most important thing we build is trust.

ST SERIES TRANSMITTERS



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Revision History

Version	Date	Main Changes from Previous version	Created by
X1	04/25/05	Initial Release	TM
X2	02/24/10	Change doc format	RM

1. Introduction

1.1 About the Manual

The ST series transmitters are capable of transmitting analog FM microwave signals with one video channel and two audio subcarriers. They feature NTSC Video as standard with PAL and SECAM as factory options. Frequency, RF power output, and audio microphone or line level inputs are microprocessor controlled using the front panel push buttons. A one-line liquid crystal display (LCD) provides visual readouts of lock status, frequency, power output, and audio input level selection. As an additional feature, an RS-232 interface is provided for remote control of all transmitter functions. Connections to the transmitter are made through three standard connectors; a ten-pin PT0, a BNC, and an SMA.

2. Functional Description

2.1 Power

Power requirements are +11 to 15 VDC at between 1.0 A - 1.5 A typical; 3.5 A is typical for a 10 watt transmitter. Connection to the transmitter is made through the ten-pin PTO connector. An external fuse is recommended (see Section 4.0).

2.2 RF

The RF signal is supplied to the antenna through the SMA connector, (J3). GMS recommends a high frequency rated RF cable no longer than one meter (approx. three feet).

2.3 Audio

The ST series transmitters have two audio channels. Each channel is capable of being modulated by either a microphone input level (-54 dBm @ 600 ohms) or a line level input (0 dBm @ 600 ohms). Maximum input level is +9 dBm. Both audio channels are balanced inputs; although unbalanced inputs may be achieved by grounding the low side of the balanced input and applying the audio input signal to the high side of the balanced input. The audio inputs are accessible through the ten-pin PTO style connector (see Section 4.0). Microphone or line level for each audio channel is independently selectable via the front panel controls. In addition, the audio subcarriers can be turned off (usually used in repeaters).

2.4 Video

ST series transmitters have one video channel. The video input is 1 Vpp into 75 ohms. The video input is accessible through the BNC (J1) or the ten-pin PTO connector (see Section 4.0).

Composite video input is available on Pin k of the ten-pin PTO connector. This input bypasses the video pre-emphasis network and it is normally used in microwave repeater configurations.

2.5 RS-232

An RS-232 interface is provided on all ST series transmitters. All transmitter functions are controllable via this interface with the GMS Remote Control System. Access to this interface is provided through the ten-pin PTO connector (see Section 4.0). GMS recommends a cable no longer than one meter (approx. three feet).

2.6 Front Panel

The front panel consists of an LCD with four push-buttons; UP ↑, DOWN ↓, CTRL, and ENTER. The front panel controls the transmit frequency, RF power output and audio input level selection. The LCD displays the output frequency (or channel), RF power output and transmitter frequency lock status.

3. Front Panel Operation

3.1 Power-Up

On power-up, the unit will display a pre-coded customer name and serial number, then set the channel to the one in use at last power-down. The display will look like this:

TX	CH A	HI
----	------	----

Where:

TX = transmitter PLL locked

CH A = transmitter channel or frequency

HI = transmitter output power level; ST, LO, HI

3.2 Front Panel Controls and Displays

The CTRL key selects the applicable transmitter control. For example, for each press of the CTRL key the transmitter control functions are selected as shown:

<table border="1"><tr><td>TX</td><td>CH A</td><td>HI</td></tr></table>	TX	CH A	HI	CHANNEL DISPLAY
TX	CH A	HI		
CTRL pressed				
<table border="1"><tr><td>POWER</td><td><HIGH></td></tr></table>	POWER	<HIGH>	POWER OUTPUT	
POWER	<HIGH>			
CTRL pressed				
<table border="1"><tr><td>AUDIO 1</td><td><MIC></td></tr></table>	AUDIO 1	<MIC>	AUDIO 1 LEVEL SELECT	
AUDIO 1	<MIC>			
CTRL pressed				
<table border="1"><tr><td>AUDIO 2</td><td><LINE></td></tr></table>	AUDIO 2	<LINE>	AUDIO 2 LEVEL SELECT	
AUDIO 2	<LINE>			
CTRL pressed				
<table border="1"><tr><td>TX</td><td>CH A</td><td>HI</td></tr></table>	TX	CH A	HI	CHANNEL DISPLAY
TX	CH A	HI		

3.3 Channel Display

In this mode, when the UP ↑ or DOWN ↓ key is pressed, the transmitter will step through the channels. On key release the display will blink for ten seconds. If ENTER is pressed before ten seconds, the transmitter frequency will be changed and stored in nonvolatile memory. If ENTER is not pressed before ten seconds, the display will stop blinking and the transmitter will reset to the previous frequency. The channel display and control functions are shown below:

TX	CH A	HI
----	------	----

UP ↑ Increment channel.
DOWN ↓ Decrement channel.
ENTER Save channel.
CTRL Change to POWER OUTPUT mode.

3.4 Power Output Display

The RF power output is selectable between three discrete levels, Standby (ST), Low (LO), or High (HI).

Nominal Power Output in Watts

	ST	LO	HI
STL-3000	0	0.4	3
STS-3000	0	0.4	3
STS-10000	0	3	10
STC-2000	0	0.4	2
STX-1000	0	0.1	1

The power output display and control functions are shown below:

POWER	<HIGH>	HI
-------	--------	----

UP ↑ Toggle output level.
DOWN ↓ Toggle output level.
ENTER Save power level.
CTRL Change to AUDIO LEVEL ADJUST mode.

3.5 Audio Source Level Select

The audio source level is also selected from the front panel with the UP ↑ and DOWN ↓ keys. This control adjusts each input independently. When adjusting the level, the AUDIO 1/AUDIO 2 on the left of the display will blink indicating that a change in level is in progress. If ENTER is pressed, the new level will be stored. If CTRL is pressed before ENTER, the audio will be reset to the previous level. The audio source level is selectable from three discrete levels, OFF (no audio subcarrier), MIC (microphone audio source) or LINE (line level audio source). Audio level displays and control functions are shown below:

AUDIO 1 <MIC>

UP ↑ Toggle audio 1 level.
DOWN ↓ Toggle audio 1 level.
ENTER Save audio 1 level.
CTRL Change to AUDIO LEVEL 2 ADJUST mode and cancel audio level changes if A1 flashing.

AUDIO 2 <LINE>

UP ↑ Toggle audio 2 level.
DOWN ↓ Toggle audio 2 level.
ENTER Save audio 2 level.
CTRL Change to CHANNEL DISPLAY mode and cancel audio level changes if A2 flashing.

4. Specifications for ST Series Transmitter

4.1 RF

Frequency Range:	1.7 – 8.25 GHz standard consult factory for additional frequencies
Frequency Stability	0.005%
Power Output	0.4 W (Low); 3 W (High); L, S, C 0.1 W (Low); 1 W (High); X
Spurious/Harmonic Output	-60 dBc
Modulation Sensitivity	±4 MHz/Volt

4.2 Power

Voltage	+11 to 15 VDC
Current	1 A typical L/S Band 1.5 A typical C-Band 1.8 A typical X-band 3.5 A typical for STS-10K

4.3 Video

Input Impedence	75 ohm
Input Level	1 Volt (peak to peak)
Pre-Emphasis	Per CCIR 525/625 line
Frequency Response	10 Hz – 10 MHz composite

4.4 Audio

Subcarriers available (any two)	4.83, 5.8, 6.0, 6.2, 6.5, 6.8, 7.02, 7.5, 8.3 8.5, 8.59 MHz
Input impedance	600 ohm balanced
Input level	-50 dBm (mic); 0 dBm (line)

4.5 Environment

Temperature range	-20°C to +70°C
Humidity	0 to 100% non-condensing

4.6 Mechanical

Size	3.3" x 4.3" x 1.4"
Weight	10 oz/284 grams
RF Output (J3)	Female SMA
Power/RS232/Audio (J2)	PTO2H-12-10P
Video (J1)	Female BNC

The following details the pin-out of the ten-pin PTO connector, J2:

PIN #	DESCRIPTION
A	+11 to +15 VDC
B	Ground
C	Audio 1 High input
D	Audio 2 High input
E	Audio 1 Low input
F	Audio 2 Low input
G	RS-232 Transmit
H	RS-232 Receive
J	No connection
K	Composite Out

Following is pin-out information for RS-232 connections:

PIN #	DESCRIPTION	DB-25F (computer)	DB-9F (computer)	COLOR
B	Ground	7	5	Black
G	TX (radio out)	3	2	Green
H	RX (radio in)	2	3	White
		4 - Request to send 5 - Clear to send	7 - Request to send 8 - Clear to send	Jump
		6 - Data set ready 8 - Rx signal detector 20 - Data term ready	6 - Data set ready 1 - Rx signal detector 4 - Data term ready	Jump