FSR

TwisterPro

AUDIO / VIDEO / DATA / IR TWISTED PAIR

(COVERS ALL TPRO TRANSMITTER AND RECEIVER MODELS)

INSTALLATION AND OPERATING GUIDE

PROPRIETARY INFORMATION

Operators Safety Summary

The general safety information in this summary is for operating personnel.

Read Instructions Read and understand all safety and operating instructions before using this equipment. Keep the instructions handy.

Do Not Remove Covers or Panels There are no user-serviceable parts within the unit. Removal of the top cover will expose dangerous voltages. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.

Power Source This product is intended to operate from the specified wall plug-in transformer. Do not use any other power source.

Use the Proper Power Cord Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. Refer cord and connector changes to qualified service personnel.

Do Not Operate in Explosive Atmospheres To avoid explosion, do not operate this product in an explosive atmosphere.

INTRODUCTION

The TwisterPro™ UTP Transmitter / Receiver System allows video, stereo audio, RS-232 data and IR signal transmission over ordinary low cost CAT-5, 5e and 6 cable. This system offers the highest level of signal integrity. These high quality devices ensure reliable, error free transmission that is immune to interference from electrical noise. Cable runs of up to 1000 feet are within the capabilities of the system.

There are wall plate style transmitters (1 gang and 2 gang) and receivers (2 gang) offered in three colors; black, white, and ivory. Matching Decora™ trim rings are included for stand alone use or the units can be populated along with FSR's IPS component and plates for a complete interface solution. There are also "brick" style housing versions that can be used on any surface, or rack mounted using the accessory rack kits if preferred. (See TwisterPro™ accessories and ordering info).

TPRO receivers with skew compensation adjustments are optional and help adjust for mis-convergence of the red, green and blue video signals that can occur as a result of inherent delay caused by differences in cable twist lengths.

The system can be powered at either the transmitter or receiver end by the optional power supply(s). If a TPRO- HUB is used, the hub with it's included power supply, will power the other components in the system. This 1 in 8 out hub allows full expandability for demanding applications. Multiple hus can be cascaded to achieve a maximum of 512 outputs.

FEATURES

RGB Video Transmission

- HD-15 female connectors for video input and output
- CAT-5 connections are via RJ-45 Connectors (EIA/TIA-568B)
- Video resolutions up to 1920 x 1080 (1080p)
- Cable skew compensation adjustments on -S model receiver
- Adjustable gain control on front panel

RS-232 Data Transmission

- DB-9 female connectors (3 pin Phoenix on brick models) for the inputs and male for outputs (optional for TPRO-TX wallplate models)
- UTP connections are via RJ-45 Connectors (EIA/TIA-568B)
- Compatible with RS-232 standards
- UL and CSA approved external power source (wall plug-in)
- Simplex RS-232 up to 19.2k baud
- LED indication of RS232 data activity

IR Control Data Transmission

- Compatible with most IR devices
- Custom carrier frequencies are available per customer request
- Extends IR control up to 1000 feet
- Normal and high output emitter power level settings
- High output power level settings up to 60mW allows for multiple emitter connections.Emitters sold seperately
- Transmitters feature an integrated IR sensor in addition to hard-wired input option
- LED indication of IR data activity

General

- Units can be powered at either end or through optional hub
- Over-current sensing with LED indication
- Video, RS-232 and IR LED indicators
- Optional 1 in 8 out TPRO-HUB with power supply available

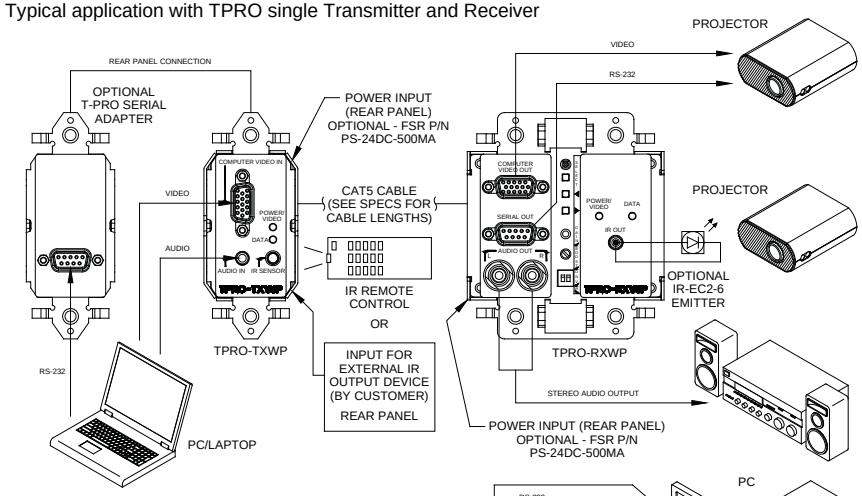
APPLICATIONS

- Boardrooms • Houses of Worship• Control Rooms
- Classrooms• Staging and Rental •Libraries

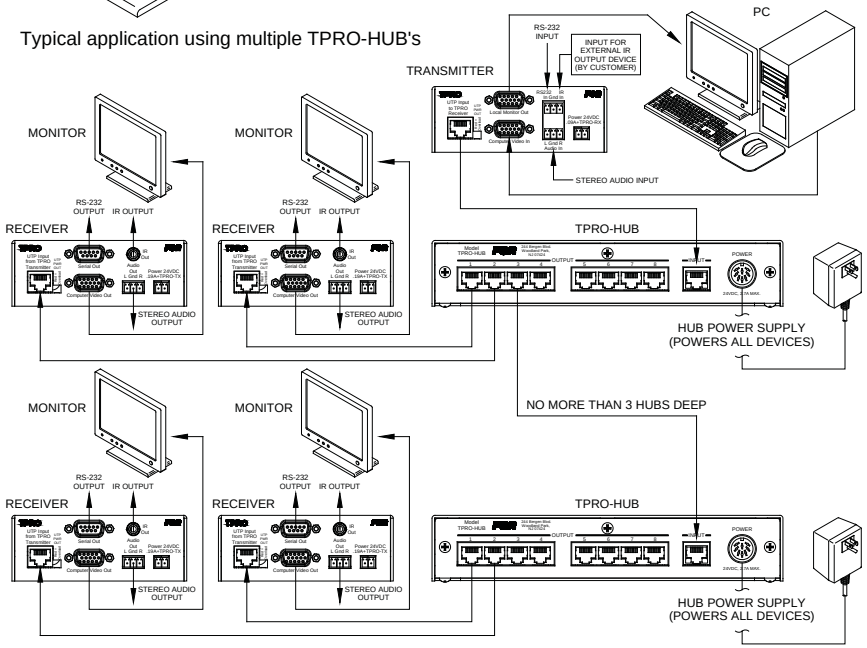
ACCESSORIES

- RK-1 Rack mounting kit
- RK-2 Rack mounting shelf

Typical application with TPRO single Transmitter and Receiver



Typical application using multiple TPRO-HUB's



Installation and Operation

Mount the units as appropriate for the particular installation.

TPRO Brick style models:
There are #6-32` tapped holes on the top and bottom of the TPRO for mounting. Use #6-32 screws that protrude through no longer than 1/2". There are also rack kits available from FSR for mounting in a standard 19" rack mount. See "accessories" section for FSR part numbers and ordering information.

TPRO Wallplate style models:
The TPRO resembles a decora style duplex outlet shape and will mount into a standard gang box. Connect the RJ-45 jack and power supply leads BEFORE mounting the unit in the gang box. Always check for cable clearance while mounting.

The input power connector is polarity sensitive and depending on the installation, should be connected to the transmitter, receiver or hub. Do not plug in the supplies until all cables are tested.
Cabling Installation details:

RECOMMENDED TRANSMISSION RANGE	0-1000 ft with a single power supply (Up to 600' when powered at transmitter. Up to 1000' when powered at receiver) When using a TPRO-HUB with included power supply: The maximum distance to a transmitter is 1000' The maximum distance to a receiver is 600' * * A distance of up to 1000' can be achieved by adding an additional power supply at the receiver

Install and terminate the UTP cable, taking note of the following:

The cable must be terminated using the EIA/TIA-568B standard pairing.

Where possible, the use of pre terminated, pretested cables is highly recommended. If field termination is required, be sure to use a commercially available cable tester to confirm the proper wiring.

While Cat 5/5E cables are the most commonly used with the system, other types of UTP cable can be used successfully. One of the most important cable parameters affecting the image quality of component video systems (RGB/RGBHV/YUV, etc.) transmitted over the Twister is delay skew. Delay skew in a cable will result in a loss of color convergence at the display.

The use of generic CAT 5/5E/6 cable will generally give acceptable results in short to medium length applications (up to 300'). For longer distances, or where the highest image quality is paramount, use the skew compensated model receivers. USE OF BELDEN NANOSKEW OR OTHER NON-CATEGORY CABLE IS NOT RECOMMENDED. The crosstalk on these types of cables is very high resulting in poor color isolation, and video noise from the audio transport channel.

Once the interconnect cables are tested, connect the system as per the diagram and perform the final operation check.

LED SIGNAL STATUS INDICATION (TRANSMITTERS AND RECEIVERS)	
POWER/VIDEO	GREEN: Unit receives power, on-board voltage regulator is operational, unit receives video signal. AMBER: Unit receives power, on-board voltage regulator is operational, no video source is connected or source is off. (RGBHV sources only))
DATA	GREEN: RS232 activity (blinking) YELLOW: IR activity (blinking)
POWER FAULT	OFF: Unit receives power from the remote source. GREEN: Unit receives power from the local source. RED: Power supply overload possibly due to the miswired UTP cable. Check and correct UTP connection.

RS-232 Installation
Connect the RS-232 output of the PC or control system to the TPRO transmitter module to the "SERIAL IN" port. Connect the peripheral to the TPRO "SERIAL OUT" DB-9 male port. (See pinout).

IR Control Installation
Confirm and observe polarity on all external devices before proceeding.
An integrated IR sensor is provided on all TPRO transmitter models. If an external IR input from a control system is required, connect the IR output device to the 3.5mm jack or 3 pin pluggable screw down terminal connector (depends on model) on the TPRO Transmitter using the wiring diagram provided.
Connect the IR emitter(s) to the 3.5mm jack or 3 pin pluggable screw down terminal connector (depends on model) on the TPRO Receiver using the wiring diagram provided. Emitters are available from FSR. (Use FSR IR-EC1-6 single or IR-EC2-6 dual emitter accessory.)
Once the interconnect cables are tested, power up the link and perform a final operation check.
Audio wiring:
See the pinouts for wiring details.
Connect the audio source to the TPRO Transmitter via the 3.5mm stereo audio jack or 3 pin pluggable screw down terminal (depends on model) on the face of the unit. Connect the TPRO Receiver's 3 pin pluggable screw down terminal or RCA jacks (depends on model) audio output to the house sound system.

System Calibration and Adjustments

Setting the Boost Switch:
The Boost" switch is located on the right front of the TPRO receiver unit. For Cat5 cable runs less than 200', leave the "Boost" dip switch in the OFF (UP) position. For 200-1000' runs place the "Boost" dip switch in the ON (DOWN) position.

System Calibration setup:
For best results the following test patterns will be required:

- A crosshatch pattern with one pixel wide vertical and one pixel

high horizontal lines.
•Standard SMPTE color bars.
•A full width one on/one off burst pattern.

These test patterns will need to be output from the source equipment (computer, DVD player, etc.) that you intend to connect to the TPRO Transmitter.

If possible, perform a display calibration without the TPRO by connecting the source directly to the display device using a short (less than 25 foot) video cable. Use the burst pattern to set the display size, phase and pitch as per the display manufacturers instructions. Most displays will have an "auto sync" function that will get you close, but might require some additional fine-tuning.

Once the display is set, connect the source and display to the TPRO system components.

GAIN adjustment:
Set the GAIN adjustment to the minimum (full CCW) setting. If using the TPRO skew compensated receiver, make sure the delay settings for R, G, and B are all at "0".

Using the crosshatch test pattern, slowly increase the GAIN setting until the vertical lines are nearly as bright as the horizontal lines. In general, you will have to set the vertical lines a little dimmer than the horizontal or you will have too much peaking.

You can check for over peaking by using the SMPTE color bars and looking for two or three overly bright vertical lines at the beginning of each color transition. If this occurs, back the GAIN pot off slightly.

Once you are happy with the EQ setting, set the delay skew if available.

SKEW adjustments (Skew models only):
The object of the delay skew adjustment is to merge the separate red, green, and blue vertical lines into a solid white line.

Using the crosshatch test image, identify the left most color in each vertical line of the image.

Select the "Next" push buttons on the TPRO to "toggle" to this color. The LED for the selected color will light.

Now use the "Left" and "Right" push buttons as needed to merge this color with the right most vertical line in the image. The color LED will begin to flash when the left or right push button reaches the end of it's range. Setting are automatically stored after 5 seconds of no changes.

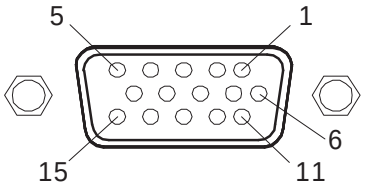
Then adjust the remaining color line to merge with the first two lines.

Once you have adjusted the skew, use the burst pattern to fine-tune the display's phase adjustment.

These last two steps may be repeated to optimize the image quality.

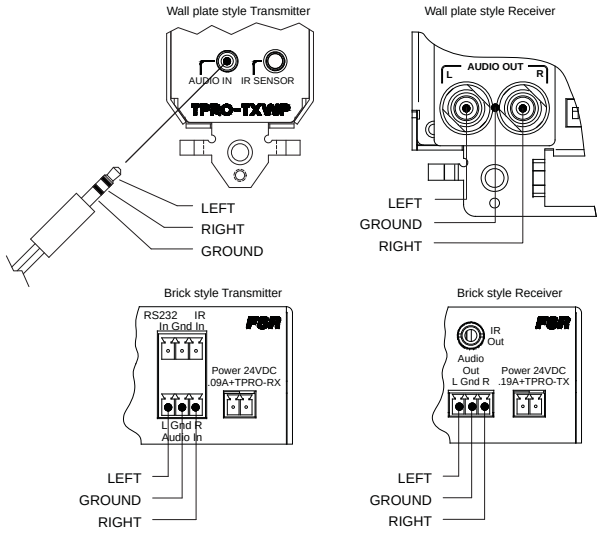
HD-15 Connector Pinout

HD15 connector
1.Red / Pr / R-Y
2.Green / Y
3.Blue / Pb / B-Y
4.ID2 (Grounded)
5.NC
6.GND (Red)
7.GND (Green)
8.GND (Blue)
9.NC
10.GND
11.GND
12.NC
13.H sync (or composite sync for RGBS)
14.V sync
15.NC



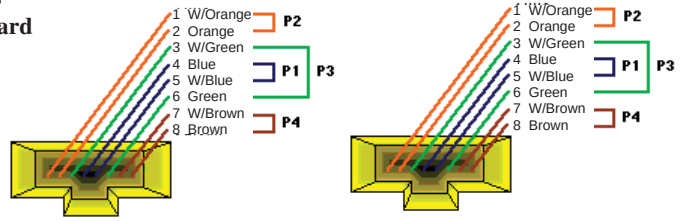
HD-15 Input Connector Pinout
(as viewed from rear of unit)

Audio Pinout



RJ-45 JACK FRONT VIEWS

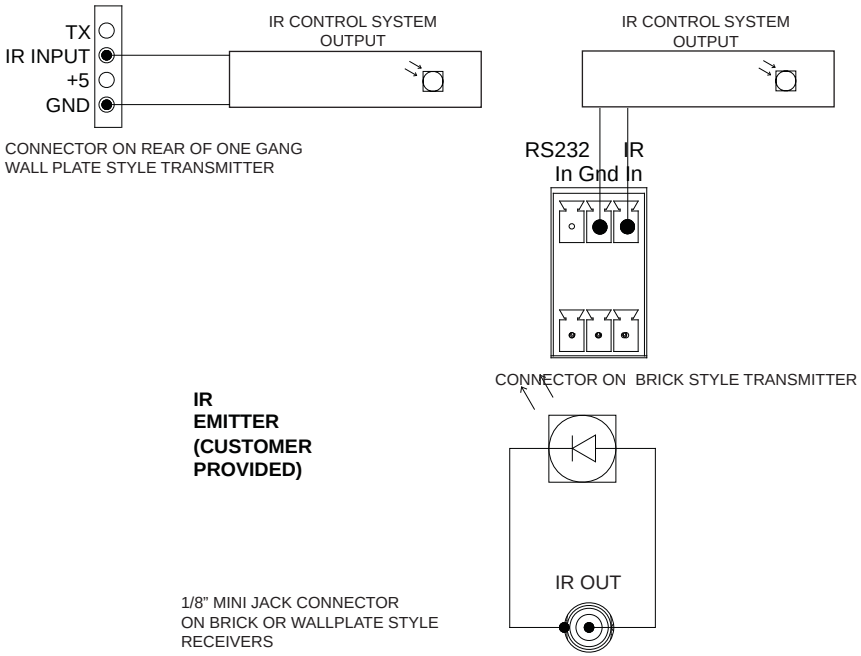
EIA/TIA568B
Wiring Standard



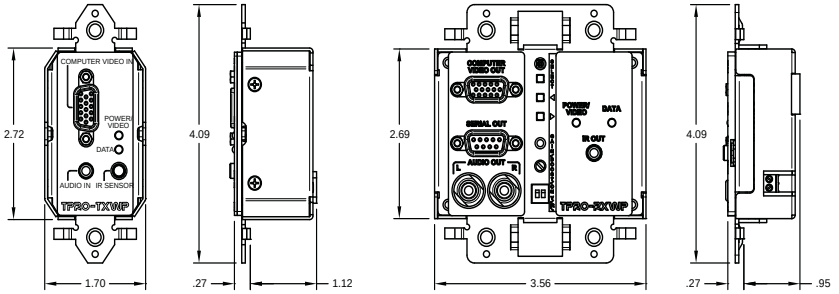
Use the EIA / TIA 568B wiring standard only. Do not use a cross-over type cable. A mis-wired cable could destroy the unit and void the warranty.

External IR Sensor and Emitter Pinout

IR
CONTROL SYSTEM
(CUSTOMER PROVIDED)

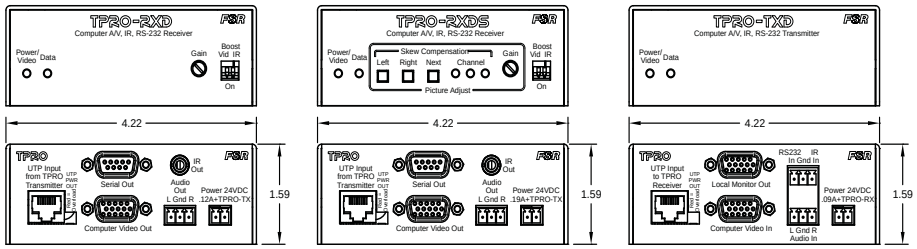


DIMENSIONS



TPRO-TXWP

TPRO-RXWPD/TPRO-RXWPDS



TPRO-RXD

TPRO-RXDS

TPRO-TXD

TECHNICAL SPECIFICATIONS

RGB VIDEO INPUT		
Connector	1-HD-15 female connector	
Signal Type	1 RGBHV, RGBS, RGsB, RsGsBs,Component, S-video or Composite	
Maximum Resolution	1920 X 1080 (1080P)	
Impedance	75Ω	
Level (nominal)	Analog 0.7V p-p	
Level (maximum)	+-1.0 V	
RGB VIDEO OUTPUT		
Connector	1-HD-15 female connector (Brick models have an additional HD-15 loopback connector)	
Signal Type	Same as input	
Gain	Unity	
Impedance	75Ω	
Sync output	5V into Hi Z, 2.2V into 75Ω	
AUDIO INPUT		
Connector	1-3.5 mm stereo mini jack (wallplates), 3 pin Phoenix plug (bricks)	
Signal type	Stereo unbalanced	
Level (nominal)	0.25V RMS -10dBm	
Level (maximum)	1.1V RMS, +3dBm	
Impedance	50 kΩ	
Encoding	Full stereo 24 bit, 96kHz sample rate	
Frequency response	20Hz-15kHz +-0.5dB	
AUDIO OUTPUT		
Connector	Wallplate model receivers	2 RCA jack connectors
	Brick model receivers	3 pin pluggable screw terminals
Signal type	Stereo unbalanced	
Impedance	50Ω (Intended to drive a 600Ω or greater load)	
Gain	Unity +- 1.5dB	
CONTROL ADJUSTMENTS		
Delay Adjust	Independent for R, G and B delay (Skew models only)	
Delay range	0-62 ns (Skew models only)	
Video Boost Switch	Dip switch (OFF 0-800'/ON 200-1000')	
Gain control	Manual combined control for RGB	
RS-232 DATA INPUT		
Number/Type	One DB-9 female connector. (3 pin Phoenix plug on brick models) DCE type connection for direct connection to a PC serial port included on two gang transmitters only. Must order TPRO-Serial DB-9 accessory harness for one gang transmitters.	
Handshaking	Local loopback only (Models with DB-9 connectors only)	
RS-232 type	Unidirectional (data transmission from transmitter to receiver only)	
RS-232 DATA OUTPUT		
Number/Type	One DB-9 male connector. DTE type connection for direct connection to peripheral.	
Data Rate	0-19.2k baud	
INFRARED INPUT		
Number/Type	Both models have internal sensor logically OR'd with hardwired input.	
	T-PRO TX brick models	One 3 pin pluggable Phoenix connector
	T-PRO-TX wallplate models	One C-grid SL 5-pin connector on the back of the unit.
Compatibility	Compatible with most IR outputs designed to drive an IR emitter LED.	
INFRARED OUTPUT		
Number/Type	One3.5 mm mini jack, center positive. All TPRO-RX models (Use FSR IR-EC1-6 single or IR-EC2-6 dual emitter accessory)	
Output Switch	Dip switch (Normal 12 mW/High 60mW)	
Carrier Range	40 kHz, custom frequencies available per request.	
POWER REQUIREMENTS		
TPRO-RX Receivers	24VDC@0.12A (Skew models are 24VDC@0.19A)	
TPRO-TX Transmitters	24VDC@0.09A	
	Power supplies are optional. Use FSR PS-24DC-500MA	
MECHANICAL	Model	Dimensions (inches) Shipping weight lbs.
Transmitter enclosure	Brick	4.22 X 1.59 X 4.10
	Wall plate	1.70 X 4.09 X 1.46
Receiver enclosure	Brick	4.22 X 1.59 X 4.10
	Wall plate	3.56 X 4.09 X 1.29
GENERAL		
UTP cable wiring standard/ type	EIA / TIA-568B CAT5, 5E, 6	
Recommended transmission range	0-1000 ft with a single power supply (Up to 600' when powered at transmitter. Up to 1000' when powered at receiver. When using a TPRO-HUB with included power supply: The maximum distance to a transmitter is 1000'. The maximum distance to a receiver is 600' * * A distance of up to 1000' can be achieved by adding an additional power supply at the receiver	

REGULATORY COMPLIANCE

The Power Adapter has been tested for compliance with: UL, CSA and CE.

WARRANTY POLICY

This product is warranted against failures due to defective parts or faulty workmanship for a period of one year after delivery to the original owner. During this period, FSR will make any necessary repairs or replace the unit without charge for parts or labor. Shipping charges to the factory or repair station must be prepaid by the owner, return-shipping charges, via UPS / FedEx ground, will be paid by FSR.

This warranty applies only to the original owner and is not transferable. In addition, it does not apply to repairs done by other than the FSR factory or Authorized Repair Stations.

This warranty shall be cancelable by FSR at its sole discretion if the unit has been subjected to physical abuse or has been modified in any way without written authorization from FSR. FSR's liability under this warranty is limited to repair or replacement of the defective unit.

FSR will not be responsible for incidental or consequential damages resulting from the use or misuse of its products. Some states do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Warranty claims should be accompanied by a copy of the original purchase invoice showing the purchase date (if a Warranty Registration Card was mailed in at the time of purchase, this is not necessary). Before returning any equipment for repair, please read the important information on service below.

SERVICE

Before returning any equipment for repair, please be sure that it is adequately packed and cushioned against damage in shipment, and that it is insured. We suggest that you save the original packaging and use it to ship the product for servicing. Also, please enclose a note giving your name, address, phone number and a description of the problem.

NOTE: All equipment being returned for repair must have a Return Authorization (RMA) Number. To get a RMA Number, please call:

FSR Service Department (973-785-4347).

Please display your RMA Number prominently on the front of all packages.

Contact Information:

FSR Inc.

244 Bergen Boulevard,

Woodland Park, NJ 07424

Tel: (973) 785-4347 · Fax: (973) 785-4207

E-Mail: sales@fsrinc.com · Web: http://www.fsrinc.com