

Model EASy-PLUS®
Emergency Alert System
Encoder/Decoder
User's Manual

P/N 0010224001

Trilithic Incorporated's latest innovation for your Emergency Alert System is the **EASy-PLUS®** Encoder/Decoder. The fully featured E.A.S system, highlighted by the **EASy-PLUS®** Encoder/Decoder was designed with the smallest of cable systems in mind, and can handle a system serving 100 subscribers as well as systems handling over 2,000,000 subscribers. With Trilithic's embedded DSP technology and manufacturing, standard features such as FLASH BIOS will guarantee that your **EASy-PLUS®** platform will never go out of style. Periodic updates to the platform are handled with the ease of a simple download from our WEB site. No more disassembly just to change prompts or software. With Trilithic's **EASy-NET®** option, a simple phone call from your desktop PC to any one of your remote headends, allows you to retrieve the last 100 E.A.S. events from nonvolatile memory for logging and printing at your office. You'll never miss your FCC required logging because of printer failures, paper jams or lack of paper. Innovations such as built-in AM/FM/NOAA selectable tuners, automatically generated and programmable FCC weekly testing, remote hub-site transmitter, and complete Motorola® digital platform compliance, truly makes this your Emergency Alert System of choice.

The EASy-PLUS® has the following *standard and built-in*, features and benefits:

§ **EASy-PLUS® enables parsing of F.I.P.S. codes**

The new Trilithic **EASy-PLUS®** encoder/decoder distributes individual analog E.A.S. messages structured for, or earmarked for, one specific community or up to sixteen (16) communities located within multi-trunk output headends.

§ **Flash BIOS**

Trilithic's new **EASy-PLUS®** encoder/decoder eliminates the need to remove the unit from the rack, pull the cover or lid and change or upgrade chipsets and prompts. Government-regulation modifications or changes, new programming, additional advancements, and many other new features, can easily be handled through a simple upload via the WEB.

§ **Programmable RWT (Required Weekly Test) for Automatic Triggering**

This feature allows your E.A.S. system to automatically generate a random RWT event, once, within each seven (7) day window, satisfying the FCC requirement for cable systems generating and logging their own weekly test.

§ **Stores the most recent 100 emergency alerts**

A nonvolatile Emergency Alert Storage System eliminates the need for attaching a printer at the headends' encoder/decoder to view the most current alerts or events. A continuous update of the last 100 E.A.S. events triggered through Trilithic's **EASy-PLUS®** encoder/decoder can be downloaded via a PC at the headend, or through the *optional* **EASy-NET®** telephone interface anywhere in the country. E.A.S. events can easily be archived and/or printed on an external dot-matrix printer at the customer's convenience. Logfile is word-processor compatible.

§ **Two (2) internal radios that are each tunable as AM, FM, or NOAA radios**

This means you will not have to purchase any additional radios to meet the FCC requirement of LP-1 and LP-2 monitoring stations. Simply tune each of the two radio receivers to either AM or FM, to match the designated LP-1 and LP-2 stations assigned for your area, or the NOAA frequencies if so needed. Dual cards can be installed giving four (4) internal radio selections.

§ **Four (4) external radio inputs for added monitoring capabilities**

This feature allows you to meet the requirements dictated by some State Emergency Management Plans that may require a possible third, fourth or more monitoring selections.

§ **Remote hub-site insertion transmitter is included as standard equipment**

An internal AFSK TX transmitter is included as standard equipment in the new **EASy-PLUS®** encoder/decoder. This transmitter eliminates all external remote TX components of earlier E.A.S. systems.

The AFSK TX transmitter is self-contained, and includes audio switching capabilities for “tune-to” audio distribution and remote hub-site support via Trilithic’s Virtual Controller.

§ **Three (3) Programmable dry-contact-closure relays**

These programmable relays can be conveniently used for directly driving comb generators, Motorola® OM-1000(s) for digital E.A.S., and multi-vendors distribution switches.

§ **Audio D/A outputs**

Four (4) outputs are included on the **EASy-PLUS®** encoder/decoder allowing for simple audio distribution utilizing all technologies of switching.

§ **Latest DSP Technology**

Trilithic’s use of Digital Signal Processing provides the most current engineering and manufacturing processes available.

§ **EASy-Plus Setup Program**

The simple, user-friendly setup program walks you through the entire system setup easily, upon initialization. No guess work involved.

§ **EASy-Plus Standard Features**

The **EASy-PLUS®** encoder/decoder has a built-in Character Generator, a Microphone for generating your own messages, front-panel Speaker, TTL control lines, front panel Keypad entry, and an Audio Distribution Amplifier.

§ **Trilithic, Inc. is an ISO-9001 Certified company.**

§ **Trilithic, Inc., has a dedicated Marketing, Sales and Engineering in Indiana, New York and North Carolina committed solely to *YOUR current E.A.S. needs and your future E.A.S. support.***

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SECTION 1

GENERAL INFORMATION

1.1 INTRODUCTION

The EASy-PLUS® encoder/decoder is a third generation product from Trilithic, Inc. The encoder/decoder is a fully self-contained system, which includes a NTSC video character generator output, multiple balanced audio outputs, audio and video switching, 100 message queue, speaker and microphone, two internal AM/FM/NOAA radios and four program-mable contact closures used for such things as OM-1000 digital switching.

The EASy-PLUS® E.A.S. Encoder/Decoder is a two-U rack mounted control center capable of performing manual or automated EAS messaging for cable Headends and Hub sites, in accordance with CFR 47 part 11 FCC regulations, and the EAS Cable Handbook.

The EASy-PLUS® receives E.A.S. messages from up to six audio sources (internal or external), decodes the message, and operates Cable System equipment to replay the message for subscribers. In addition, messages can be originated by the user via local or remote control of the EASy-PLUS®. The E.A.S. audio sources for the EASy-PLUS® include internal AM/FM/NOAA radios and external audio inputs that can be connected to any known E.A.S. audio source. E.A.S. audio is decoded by the internal AFSK circuitry, sorted, and then interpreted to determine the type of emergency or test. The locations codes for which the emergency applies, and other information supplied in the E.A.S. header are also decoded. If a voice message is contained in the E.A.S. message, it is recorded for playback to subscribers. E.A.S. messages then pass through a series of tests to determine if the message matches predefined, user configurable filters and parameters for your location. E.A.S. activation of the cable system then automatically occurs. To play an E.A.S. message to your subscribers, the EASy-PLUS® activates TTL drivers and Contact Closures, as well as sending commands via RS-485 and High Data Rate AFSK. The EASy-PLUS® also supplies pertinent video and re-encodes and plays the E.A.S. FSK header and recorded audio. The TTL drivers, Contact Closures, and RS-485 commands activate your interface equipment (i.e. I.F. switching, comb generator, baseband character generators) throughout the headend to provide the emergency audio and video to all channels of the cable system. In addition to the E.A.S. messaging capabilities, the EASy-PLUS® logs all received and transmitted messages to a printer, the LCD display, and it's internal log storage area.

The EASy-PLUS® has an optional dial-in telephone interface and a unique remote feature using EASy-NET® optional software for remote control of the entire system. Using the EASy-NET® software, the operator can generate any event code and header by simply clicking on the list of events. Prerecorded, or live audio can also be added to the event.

FLASH-BIOS is used to update the EASy-PLUS® nonvolatile memory, programming, and FCC event codes list.

The EASy-PLUS® encoder/decoder has the ability to parse FIPS codes out to individual counties or areas in conjunction with the appropriate wiring architecture of the cable headend. This keeps the interruptions to a minimum for customers not affected by the alerted area.

Trilithic's unique AFSK transmitter card comes standard in the system. The AFSK signal alerts Trilithic's downstream Virtual Controllers to perform channel insertions at remote hubs, OTNs, and headends for channels not originating at the master headend.

The EASy-PLUS® encoder/decoder can handle cross-county applications as well as cross-state-line scenarios. Multiple states and counties can easily be added with a click-of-the-mouse.

1.2 UNPACKING AND INSPECTION

When your system arrives, immediately inspect its shipping container and contents for visible damage. Keep all packing materials until equipment performance has been confirmed. If any of the equipment is damaged or fails to operate properly due to transportation damage, file an immediate claim with the transportation company or, if insured separately, with the insurance company.

The EASy-PLUS® encoder/decoder may, or may not, arrive in a single shipping container. If it arrives in its own container, the EASy-PLUS® is a completely self contained system. However, the following is a list of components associated with the EASy-PLUS® that will ship in the same container:

- One (1) 3 1/2" diskette or a CD which contains the Windows based software setup program
- One (1) null-modem 9-pin serial data cable
- One (1) AC power cord

1.3 SPECIFICATIONS Front Panel

Protocol	FCC EAS codes, baud rate of 520.83 bits per second, 2083.3 Hz and 1562.5 Hz mark and space frequencies, respectively.
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Attention Signal	Dual tone, 853 Hz and 960 Hz. Programmable between 8 and 25 seconds.
Password Protected	Menus and tests are enable using a programmable 4 digital front panel code.
Front panel menu	Used for localized setup and enabling a Required Weekly Test.
Front panel display	Indicates user activity Message display for active messages Radio signal input actives.

GENERAL SPECIFICATIONS

	E.A.S. Encoder/Decoder compliant with all requirements defined in Part 11 of the FCC rules.
	E.A.S. Encoder supports NWS SAME protocol decoding, including 1050 Hz tone detection.
Operating Temperature:	0 to +50 C
Max. Operating Humidity:	95%
Supply Voltage:	117 VAC +/- 15%

MECHANICAL SPECIFICATIONS

Chassis:	2U x 19" x 11" Rackmount Enclosure
Back Panel:	Two RS-232C Serial ports available on DB-9 connectors RS-485 Serial port available on a RJ-12 connector Parallel port available on a DB-25 connector I/O and Audio ports are available on modular terminal blocks Video ports are available on 75 ohm BNC connectors Antenna inputs are available on 75 ohm "F" connectors
Display:	20 characters by 4 row alphanumeric LCD matrix LED Back lighted Super-twist LCD
Controls:	4 x 4 Keypad (16 keys) Conductive Rubber, Tactile Keys Numbers 0-9 (and letters A—Z) X (cancel) key Checkmark (enter) key Up, Down, Left, and Right arrows Serial Interface: RS-232C compliant interface to standard PC or Laptop PC running Trilithic Setup/control software (<i>in window's</i>)
E.A.S. Monitoring:	Monitors up to 6 inputs simultaneously, including; Two Internal Programmable radios (on internal expansion port #1) Two Receivers per Radio Board each receiver is selectable as AM, FM, or NOAA Band, frequency, and amplitude of each receiver is configurable from the Front Panel. 75 ohm "F" connectors for the antenna inputs. Two External Audio inputs (600 Ohm Balanced) External input 2 can be configured for an external microphone Two optional radios or audio inputs on internal expansion port #2
Audio inputs:	Inputs described in E.A.S. Monitoring Section Internal Microphone (available on Front Panel) Telephone Input (optional) Note: All Inputs have Automatic Gain Control (AGC)
Audio Outputs:	All digital audio generation/recording from codes operating at 48 Khz Four Monaural, Balanced Audio Outputs Internal Speaker Telephone Audio Output to the Telephone Access Board (<i>optional</i>) FSK Audio Switch: Stereo, Balanced Audio Switch to insert FSK onto Audio Channel Volume Control provided for each Output (Balanced Outputs, Speaker, Telephone, AFSK) Virtual Controller AFSK Generator Internal AFSK Encoder for Communicating with Virtual Controllers Internal stereo balanced audio switch is provided to insert AFSK onto an Audio Channel

CONTROL AND COMMUNICATION INPUTS/OUTPUTS:

Ten TTL Output Ports
Each output can drive a minimum of 2 loads
Two TTL's Dedicated to E.A.S. Channel, Eight TTL's are User Programmable
Four Contact Closures
Each relay is capable of switching 2A @ 12 Vdc

All Contact Closures are User Programmable
Two RS-232C Serial Ports (input and output communications)
One RS-485 Serial Port for communications with Trilithic Devices (CG's, Hubs, etc.)
One Standard Parallel Port for Printing ASCII text (IEEE1284 compliant)

INTERNAL CHARACTER GENERATOR:

Includes a stereo audio switch to replace Program audio with the E.A.S. Audio Message
Gen-locks to a video source or creates stand-alone video (RS-170 NTSC)
Capable of providing a Full-Page replacement, static text, and crawls
Initial Release includes a Mini-Messenger, Color CC Option that will be available in the future

MEMORY AND CONTROLLER:

Firmware upgrades are accomplished via a Serial Port (*from a Windows PC*)
Up to 64 Event Records and 64 FIPS Codes can be programmed
Maintains a Log of the last 100 E.A.S. Alerts or Messages
Two Minutes, nonvolatile audio storage for E.A.S. audio messages
One Minute, nonvolatile audio storage for a Tune-To (prerecorded) message

EXPANSION PORTS:

One TTL Expansion port allows up to 48 additional TTL's or Contact Closures to be added
Additional IO can be configured for Location Routing or Headend Equipment
One Audio Expansion port allows two additional internal radio receivers or two audio ports
One Bus Expansion port provides the ability to add one of the following optional devices:
Telephone Access Board
MODEM Board (with voice - for Telephone Access capability)
COM Expander (additional RS-232, RS-485, or Parallel COM Ports)
Note: Unit comes with two radios on one of two audio expansion ports. These can be removed to allow an additional expansion port.

1.4 FCC CERTIFICATION

The Trilithic EASyPlus (model EASyPLUS-1) is certified to comply with part 11 of the FCC rules for EAS Encoders and Decoders and is registered with the FCC under Identification number P4V-EASYPLUS-1.

Changes or modifications to the EASyPLUS not expressly approved by Trilithic Inc. may void the users authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1.5 WARRANTY INFORMATION

Following is the Warranty and limitations to Warranty policy of the emergency alert systems equipment manufactured by Trilithic, Inc.

Trilithic, Inc. warrants the EASy-PLUS® encoder/decoder to meet or exceed all published specifications set forth in this document and will be free from defects in material and workmanship for a period of two years from date of shipment of unit. Trilithic, Inc. will repair or replace, at its expense, all parts which are defective from faulty material or workmanship. This Warranty does not cover equipment which has been misused and/or altered by the user. Units which become defective during the Warranty period shall be returned to Trilithic, Inc. with shipping charges prepaid by the USER/BUYER. Replacement or repair shall be the sole remedy of the SELLER with respect to any nonconforming equipment and/or parts, and shall be in lieu of any other remedy available by applicable law. All returns to the factory must be authorized by Trilithic, Inc. and in advance of the shipment. Shipping charges for the EASy-PLUS® unit found to be defective within the first thirty days of the Warranty period will be paid both ways by Trilithic, inc. **NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. TRILITHIC, INC. IS NOT LIABLE FOR ANY CONSEQUENTIAL DAMAGES THROUGH THE USE OF THIS EQUIPMENT.**

1.6 CLAIMS FOR DAMAGE IN SHIPMENT

Claims for shipping damage should be directed towards the shipping and/or freight delivery service used. Claims should be made within seven (7) days to insure prompt handling of the claim.

1.7 TECHNICAL SUPPORT

Technical support is handled first, through the supplier of your equipment. If your supplier does not meet your service or repair needs, you may contact the manufacturer directly.

Before any Trilithic Emergency Alert System equipment is returned for repair, the supplier, and/or Trilithic will issue an RMA# (Return Material Authorization). **NO EQUIPMENT WILL BE ACCEPTED THAT DOES NOT HAVE THIS RMA NUMBER PROMINENTLY DISPLAYED ON THE OUTSIDE SHIPPING CARTON AND ON THE LABEL.** A complete and full description, in writing, regarding the service issues with the equipment must be supplied inside the shipping container with each piece of equipment for which an RMA# has been issued.

The supplier of the EASy-PLUS® system is:

TVCommunications
800 Airport Road
Annville, PA 17003
Contact: Ron Mountain
Technical Support Manager
Ph (800) 233-7600 extension 134

The manufacturer and design group is:

Trilithic, Inc.
9710 Park Davis Drive
Indianapolis, IN 46235

SECTION 2

UNDERSTANDING THE EASY-PLUS® SYSTEM

2.1 INTRODUCTION

This section includes an overview and description of the EASY-PLUS® equipment including front and rear panel controls, connectors and displays. The EASY-PLUS® encoder/decoder is the device which, when radio station signals are supplied to its internal radios, decodes Emergency Alert System header information when monitoring your (local primary) LP-1 and LP-2 stations, and optionally, your National Weather Service radio signals (on NOAA frequencies 162.400 MHz (WX2), 162.425 (WX4), 162.450 (WX5), 162.475 (WX3), 162.500 (WX6), 162.525 (WX7), 162.550 (WX1). Your LP-1 (local primary one) and your LP-2 (local primary two) radios are usually an FM and AM radio station, respectively. These radio stations are assigned in your state emergency plans, usually available on the home WEB site for your state. Your state plan should detail how your entire state emergency alerting system functions, including your assigned (SP) state primary frequencies and transmitter locations. Your LP-1 and LP-2 broadcasters typically have the obligation to pass through to your encoder/decoder the EAN (that's the Emergency Action Notification-the presidential message) and the RMT (the Required Monthly Test). You will also receive RWT (Required Weekly Tests), which you may, or may not, be required to pass on to your cable system headend. You are required to perform your own locally generated RWT, which can be done from the front keypad, remotely via a telephone, or by using the random RWT generator built into your EASY-PLUS® system.

Your EASY-PLUS® encoder/decoder is the first piece of equipment to receive the alert from your monitoring stations. It will decode the signal, format the message into an NTSC video signal (standard analog format) and present this video to its output port (CG VIDEO OUT). Depending on whether you've looped your "designated E.A.S. channel" video through the CG VIDEO IN, your E.A.S. will either crawl over incoming video, or crawl over an internally generated full-screen E.A.S. page.

The E.A.S. alert audio associated with the message is also available at the rear connector and is distributed to either your I.F. switching interface or your comb generator, just as the video output is distributed to these same interfaces. For remote hub site channel insertions downstream, your EASY-PLUS® has a built-in AFSK in-band data generator for signally Trilithic's remote headend/hub site Virtual Controller. The V.C. is used for multiple applications at remote hub sites for performing channel insertions, remote OM-1000 control for force-tuning Motorola settops during an E.A.S. alert as well as many other off-site applications.

The FCC requires logging of all incoming E.A.S. events and tests. This is accomplished by applying a customer-supplied parallel printer (non-Windows driver based) to the DB-25 parallel printer port at the rear of the EASY-PLUS® system.

Visit WWW.TRILITHIC.COM and click on EAS DIVISION to view or download manuals on all of Trilithic's E.A.S. products.

2.2 FRONT PANEL

The EASY-PLUS® front panel contains four items.

- Perforated holes for the internal microphone.
- Perforated area for the internal speaker.
- LCD display
- 16 button keypad

The keypad is used for rudimentary setup at the cable headend and for initiating the Required Weekly Test. Most setup features are programmed using the SETUP program provided with each EASY-PLUS® encoder/decoder.

ENCODER

Initiating E.A.S. events (other than the RMT and RWT) is accomplished using the SETUP software. Activation of events will be covered in the software setup section of this manual.

DECODER

The decoder is an automated mechanism used to decode incoming E.A.S. messages via the baseband radio input signals to the microprocessor.

2.3 BACK PANEL

RS-232	COM1	Used for uploading setup data from PC or Laptop.
	COM2	Future Use.

PARALLEL PORT: Used for connecting a standard (EPSON emulation) parallel printer for FCC mandatory logging of all incoming E.A.S. events and tests.

CG VIDEO: IN: Connect "designated E.A.S. channel" video, (your tune-to channel), to CG VIDEO IN, if and only

if, you plan to use a video distribution amplifier at the CG VIDEO OUT to distribute the video back to your tune-to modulator as well as to your comb generator. **NOTE:** This is done only if you plan to use a "tune-to" video and audio message supplied to your comb generator prior to running the alert on your "designated E.A.S. channel". This will be explained further in the applications section of this manual.

OUT: Connect CG VIDEO OUT to the input of your I.F. source modulator or to your comb generator. If you are using an external video D/A, connect to input of D/A and then connect one output to your comb generator and one output to your "designated E.A.S. channel" video input.

AUDIO EXPANSION 1:

Ch 1: AM or FM or NOAA radio antenna input.
Ch 2: AM or FM or NOAA radio antenna input.

AUDIO EXPANSION 2:

Ch 3: AM or FM or NOAA radio antenna input.
Ch 4: AM or FM or NOAA radio antenna input.

RS-485: For use with Trilithic external character generators, remote Virtual Controllers.

2.4 TERMINAL CONNECTOR:

TTL OUTPUTS: The individual programmable outputs which switch between TTL levels of 0 and 5 vdc. Each output is programmable for switching with full system substitution timing, "designated E.A.S. channel" substitution timing or "designated E.A.S. channel" audio-only switch timing. These outputs are generally attached to the I.F. switching component (the LS-16P) or the baseband switching component (the SW-8). This will be explained in more detail in the headend applications section.

CONTACT CLOSURES:

Used to connect such devices as a comb generator activation and Motorola OM-1000 Red/Black terminals for digital settop force-tuning.

AUDIO OUTPUTS: E.A.S. alert audio is presented at all four audio outputs. Use these outputs to connect to E.A.S. distribution equipment such as I.F. source modulator or comb generator.

AUDIO INPUTS: One extra set of baseband audio inputs used as audio input source #5 & #6 for monitoring stations.

AFSK SWITCH: Loop through baseband audio path from a modulator (usually your "designated E.A.S. channel") to send AFSK tones downstream to the remote hub site Virtual Controllers.

AUDIO SWITCH: Input - Route the "designated E.A.S. channel" audio through for baseband control of "tune-to" channel. Used usually in conjunction with an external video D/A. See applications section for further information.

Output - Route the "designated E.A.S. channel" audio through for baseband control of "tune-to" channel. Used usually in conjunction with an external video D/A. See applications section for further information.

The INPUT/OUTPUT switch timing correlates to the E.A.S. channel substitution.

SECTION 3

PRE-INSTALLATION SYSTEM CHECK

3.1 INITIAL POWER APPLICATION

When 120 VAC power is applied to encoder/decoder, the system will perform an internal self-check. If the system suffers from any internal failures, an error message or code will most likely be displayed on the LCD readout.

3.2 SELF-TESTING THE ENCODER/DECODER

Press the button labeled with a .

Scroll down to Required Weekly Test (RWT) and initiate.

You should hear the header tones and the Required Weekly Test video should appear at the CG OUTPUT. To verify, connect VIDEO OUT to a monitory source or to the input of a modulator and view the television screen for confirmation.

3.3 TESTING THE PARALLEL PRINTER PORT

Attach a standard parallel printer, either dot-matrix, laserjet, or inkjet printer. Make sure the printer does not require a Microsoft Windows® print-driver. The printer should emulate the standard EPSON® mode for parallel printers.

THE EASy-PLUS® ENCODER/DECODER **CANNOT** LOAD A WINDOWS PRINT-DRIVER. USE ONLY AN EPSON EMULATION (or equivalent) PARALLEL PRINTER.

To test the printer, move through the front panel MENU using the check key and the UP/DOWN ARROWS and move to the PRINT MEMORY CONTENTS section. Press (Print Function) to see if printer works.

3.4 TESTING THE DIGITAL VOICE RECORDER

Record audio using the front panel microphone.

Playback audio using the menu item for audio playback.

3.5 TESTING THE INTERNAL CHARACTER GENERATOR

Initiate a RWT test and view CG OUTPUT at rear of EASy-PLUS® unit.

3.6 WIRING RECOMMENDATIONS DURING INSTALLATION.

Shielded audio wires for all TTL and audio connections.

Shielded RS-232 and Printer cables.

Shielded (coaxial) video cables.

Shielded RS-485 data cable connected to the EASyPLUS.

SECTION 4

BASIC PROGRAMMING OF THE EASy-PLUS® ENCODER/DECODER

4.1 INTRODUCTION

You may skip the BASIC PROGRAMMING in Section 4 and proceed directly to Section 5 to program the entire EASy-PLUS® encoder/decoder's nonvolatile memory and storage. The following procedure will require a PC or Laptop computer running Microsoft Windows 95 or later.

The encoder/decoder does not need its setup software to be programmed. The basic functionality of the system can be programmed from the front panel keypad to make the system functional for your headend. Basic functions include setup items such as radio station channels to monitor, record and playback of "tune-to" audio track, selecting manual or automatic mode, two-tone duration, time and date, selection of county/FIPS code, and sending an RWT message and EOM.

4.2 ACCESSING FRONT PANEL SETUP MENU

To access the menuing system, press the button labeled with the (☞) check mark and then enter the factory default passcode of 2179. The letters EASy = 2179 for the passcode.

Using the UP/DOWN ARROWS to navigate you will have access to the following menu items:

4.3 FRONT PANEL MENU ITEMS

SETUP MONITORING

Select which channels are to be monitored (channels 1-6 at the rear panel inputs)

Select which channel is assigned to LP-1, and LP-2 respectively

Select which channel is assigned the NOAA frequency (WX1 - WX7) (Optional)

TONE CALIBRATION

Setup the 853 Hz, 960 Hz dual tone amplitudes and setup the 1560 Hz and 2083 Hz mark and space amplitudes.

Select frequency, the tone is played on the speaker and audio outputs

AUDIO VOLUMES

Select speaker or master audio output levels

Select to play an attention tone or route a channel to the speaker/audio output

Allow user to change speaker/audio output volume

PLAYBACK AUDIO

Play recorded E.A.S. message or prerecorded (tune-to) audio track

SETUP AUDIO SOURCE

Select speaker or audio output

Select channels one through six, or NONE

SETUP MANUAL OR AUTOMATIC MODE

Messages are automatically forwarded or require a user to manually resend messages.

SETUP ATTENTION TONE DURATION

Duration of tone specified between 8 and 25 seconds.

SETUP TIME AND DATE

Enter HH:MM:SS for Time

Enter MM/DD/YY for Date

Encoder Message

Select to send a RWT, EOM, or allow PC to upload a message to encode

After selection, will send RWT/EOM or will wait for E.A.S. header from serial port

SECTION 5

ADVANCED PROGRAMMING OF THE EASy-PLUS® ENCODER/DECODER

5.1 INTRODUCTION

A null-modem serial cable supplied with the EASy-PLUS unit should be connected between a serial port on the PC or Laptop and COM1 at the rear of the EASy-PLUS unit. **NOTE:** Use only the serial cable supplied with the system.

The advance setup software has been included in the shipping carton with the EASy-PLUS® encoder/decoder. It will be either a diskette or a CD. The setup software allows you to setup the encoder/decoder for your headend for functions such as remote hub site management and channel insertions, FIPS code parsing for segmented I.F. switching or comb generators, when using a local Virtual Controller and SM-16 Trunk Multiplexor (optional), standalone character generators, and much more.

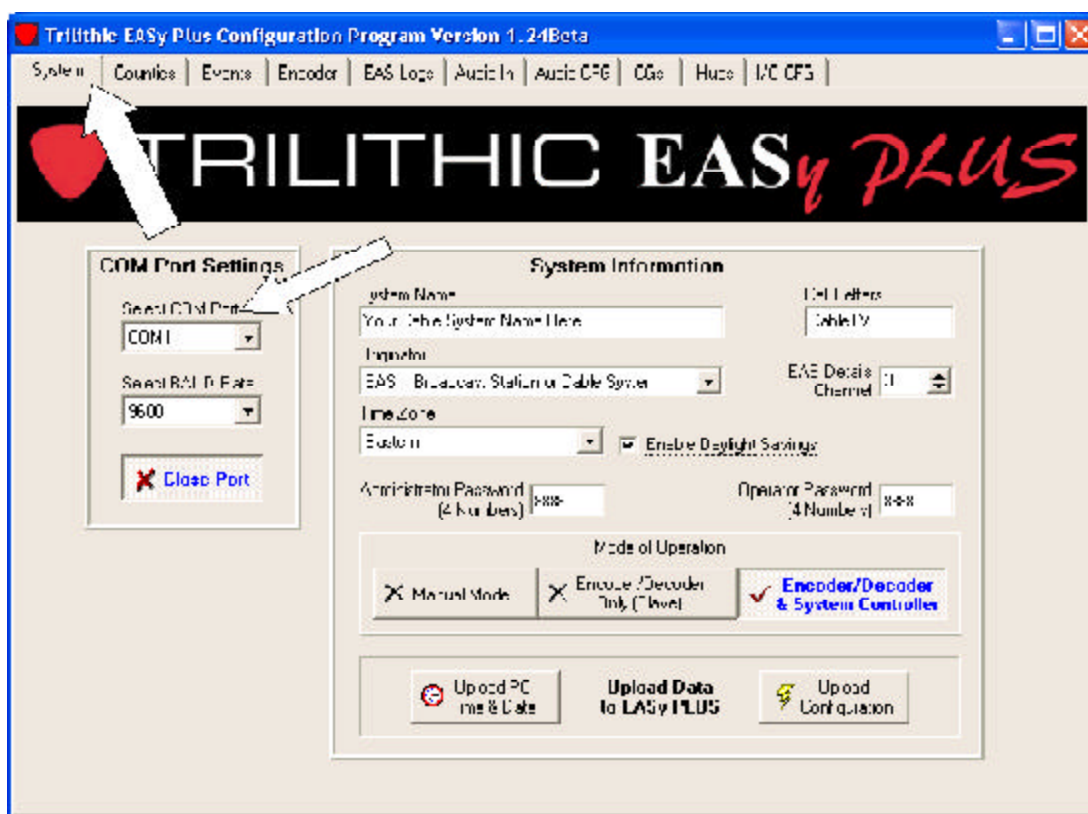
5.2 LOADING SETUP PROGRAM ONTO YOUR PC OR LAPTOP

Load the EASy-PLUS® SETUP program diskette onto your PC or Laptop, using the standard Windows-based loading procedure for software, and then run SETUP.EXE for the EASy-PLUS® system.

5.3 EASy-PLUS® SOFTWARE SETUP PROGRAM

SYSTEM tab

Double-click on your EASy-PLUS® desktop ICON or start EASy-PLUS® using the START/PROGRAMS button from Windows. The program will open with the SYSTEM tab pre-selected. From the SYSTEM tab, select the appropriate COM port you are using to connect with the EASy-PLUS system. The default is COM1 and this is normally the port you will be need. Select 9600 BAUD rate (factory default).



The following listed steps are the only ones needed to bring the EASy-PLUS encoder/decoder on-line and with its proper identity for you headend:

1. Select all pertinent information on SYSTEM tab.
2. Select STATE/COUNTIES/ADD DELETE on COUNTIES tab.
3. Select the EVENTS you would like to pass-through to the cable system on the EVENTS tab.
4. Go back to SYSTEM tab and select UPLOAD CONFIGURATION.

ENTERING SYSTEM INFORMATION

From the SYSTEM tab, make the appropriate selections for the following:

SYSTEM NAME

Enter your cable system name.

CALL LETTERS

Enter up to an eight character abbreviation for your cable system name in the CALL LETTERS box.

ORIGINATOR

Select *EAS Broadcast Station or Cable System*

TIME ZONE

Select the time zone which your headend resides in.

ENABLE DAYLIGHT SAVINGS

Select if your system headend is in a county/parish which adheres to Daylight Savings Time in April.

MANUAL MODE/SLAVE MODE/SYSTEM CONTROLLER MODE

Select *Encoder/Decoder and System Controller* button by left-clicking on it.

Slave mode enables the EASy-PLUS® system to be a slave tied directly to Trilithic's PSC-901A or PSC-902 rackmount computer. Currently, the only way to interface with Scientific-Atlanta's DNCS server to run digital EAS on Explorer or Voyager settops is through the use of the PSC-902 networkable controller.

UPLOAD PC TIME AND DATE (to EASy-PLUS memory)

To set time and date on the EASy-PLUS® system, check for correct DATE, TIME, and TIMEZONE on PC, then click on the *Upload PC Time And Date* button.

UPLOAD CONFIGURATION (to EASy-PLUS memory)

After all data selections are made and all fields are filled in using the EASy-PLUS® setup software, come back to the SYSTEM tab press left-click on the *Upload Configuration* button.

The screenshot shows the 'Trilithic EASy Plus Configuration Program Version 1.24Beta' window. The 'System' tab is active, displaying the 'System Information' section. The 'System Name' field contains 'Your Cable System Name Here', and the 'Call Letters' field contains 'CableTV'. The 'Originator' dropdown is set to 'EAS Broadcast Station or Cable System'. The 'Time Zone' dropdown is set to 'Eastern'. The 'EAS Delay' field is set to '3'. The 'Enable Daylight Savings' checkbox is checked. The 'Mode of Operation' section has three buttons: 'Manual Mode', 'Encoder/Decoder Only (Slave)', and 'Encoder/Decoder & System Controller' (selected). At the bottom are buttons for 'Upload PC Time & Date', 'Upload Data to EASy PLUS', and 'Upload Configuration'. A 'COM Port Settings' dialog box is also visible on the left, showing 'COM1' selected for the 'Select COM Port' and '9600' for the 'Select Baud Rate'.

SELECTING COUNTIES

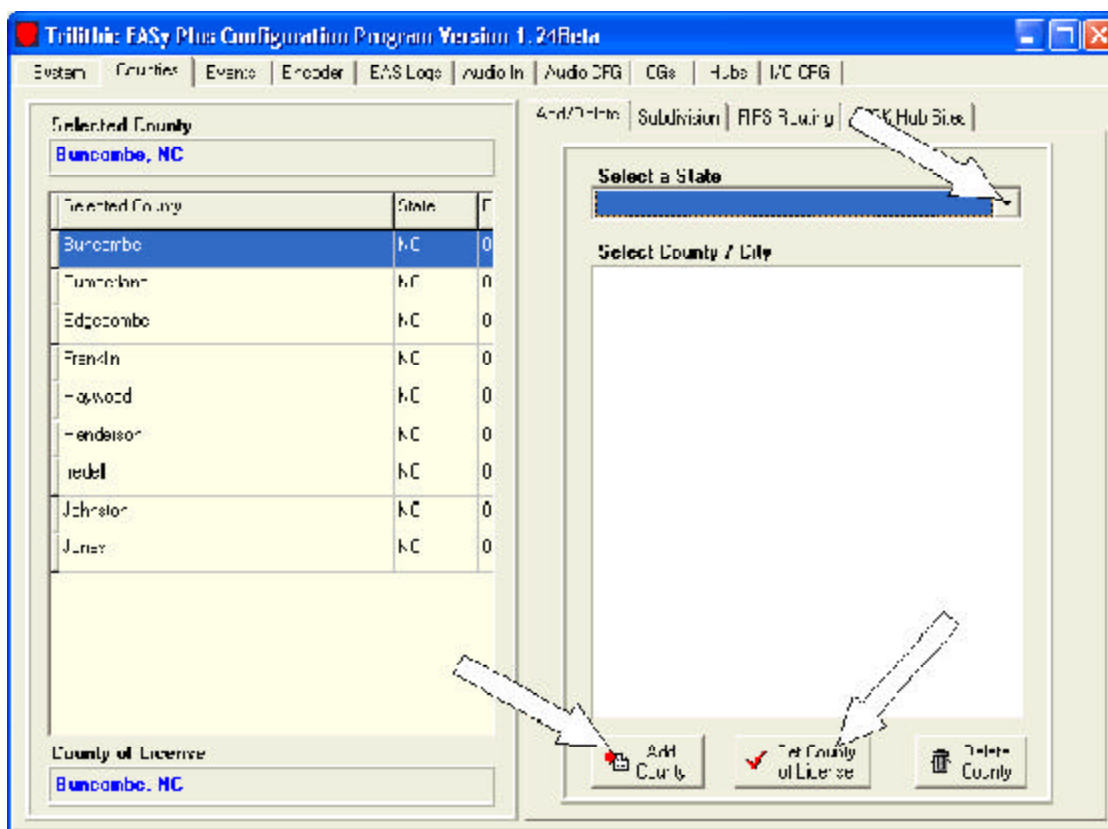
COUNTIES tab

Select the state your headend is in by pulling down the *Select a State* menu and then left-clicking on the appropriate states. You may select more than one state.

Scrolling down the list of counties, first select your county that the E.A.S. headend system is located. Click on the *County of Licence* button.

Then select the rest of the counties with which you feed cable or fiber to or which you have subscribers currently residing.

You may select outlying counties which you do not have subscribers in so that TORNADO WARNINGS will alert your subscriber base ahead of time on severe weather activities in adjacent counties.



SELECTING EVENTS

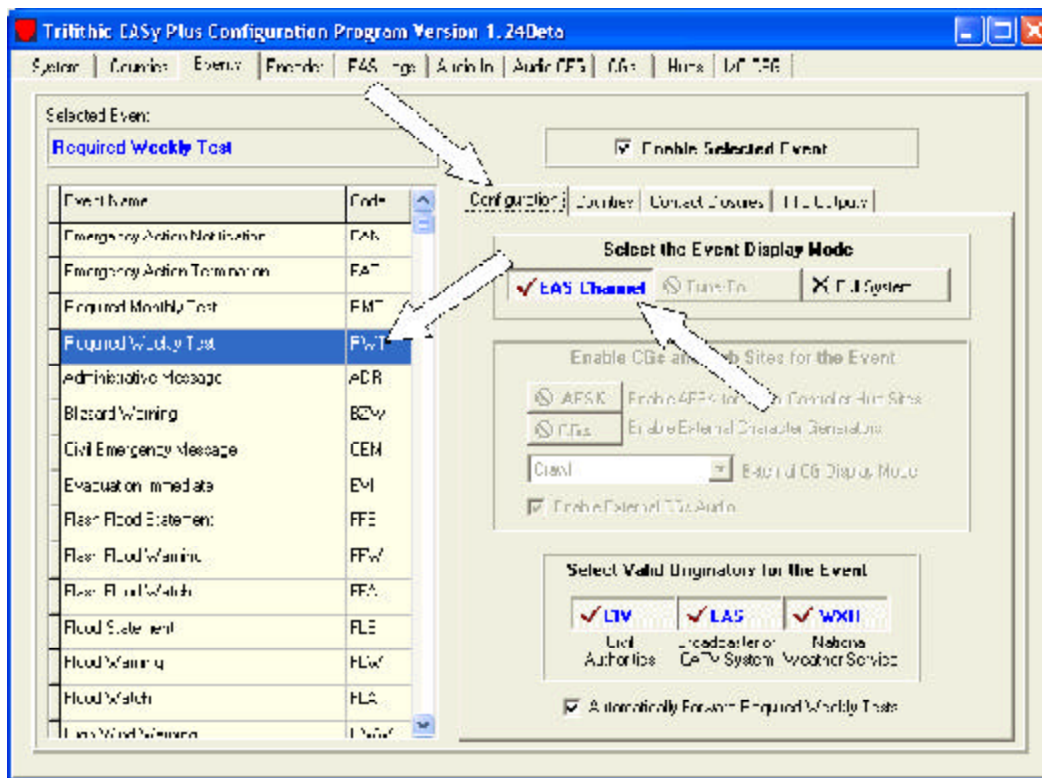
EVENTS tab

On the EVENTS tab you will check each event desired, and then *Enable Selected Event*.

To configure for each, click on the *Configuration* tab. Select *EAS Channel*, *Tune To*, or *Full Screen* for the display type of each event.

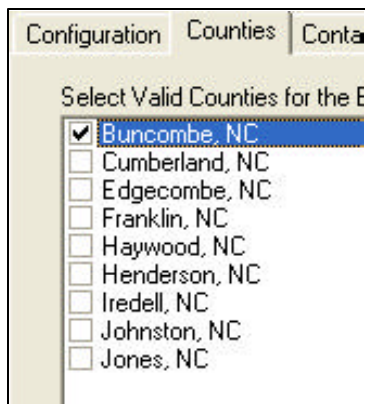
If remote hub site channel insertions take place, enable the *AFSK* option by clicking on its button.

Select Valid Originators for the Event enables which type of incoming radio transmission is valid for each event.



EVENTSCounties

For each event enabled you must attach the COUNTIES to that event. Click on the *Counties* tab and check each appropriate county for that event.



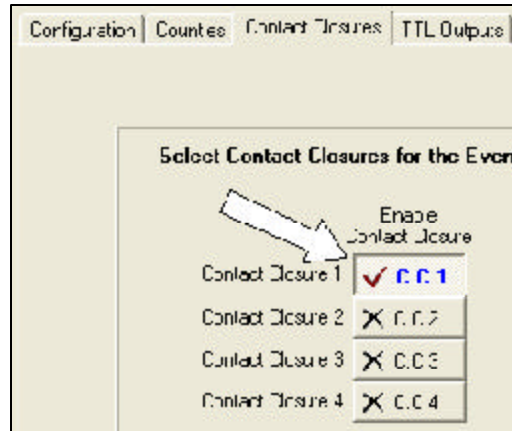
SELECTING CONTACT-CLOSURES

EVENTS Contact Closures

Typical headend components which need a contact-closure to operate are a comb generator or Motorola's OM-1000 data modulator.

During the enabling and configuration of each event, there will normally be a contact-closure paired with the event. The relay contacts are found at the rear of the EASy-PLUS® system.

Enable the necessary number of contact-closures at the rear terminal strip of the EASy-PLUS® unit by clicking on the Enable buttons. There are four (4) available.

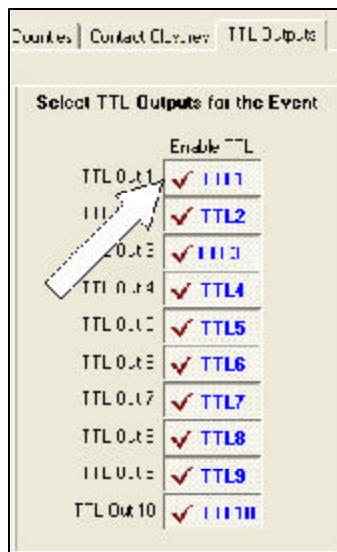


SELECTING TTL OUTPUTS

EVENTS TTL Outputs

Make sure to enable each of the TTL Outputs you intend to use for each event selected. The timing for each individual TTL output will be set using the I/O CFG tab.

Enabling TOO many outputs is not a problem. Just make sure the outputs you ARE using are enabled.



SETTING AUDIO INPUTS

AUDIO CFG

Enable the *Radio Receiver Board* and then select FM or AM frequency band.

Set the frequencies needed in your local area. Your local LP-1 and LP-2 monitoring stations can be found in your state's SECC E.A.S. plan or contact a local radio or television broadcaster.

If you cannot find a copy of the plan try contacting the FCC or go on-line to WWW.FCC.ORG and search their E.A.S. database.

The screenshot shows the 'Audio CFG' window with tabs for 'nties', 'Events', 'Encoder', 'EAS Logs', 'Audio In', and 'Audio CFG'. The 'Audio CFG' tab is active. Under 'Audio Expansion 1 (Inputs 1 & 2)', the 'Radio Receiver Board' is selected. Below this, 'Radio Receiver 1' is configured with 'FM' selected as the 'Receiver Band' and a frequency of '93.30 MHz'. 'Radio Receiver 2' is configured with 'AM' selected as the 'Receiver Band' and a frequency of '880 KHz'. Arrows point from the 'Radio Receiver Board' selection to the respective receiver configuration boxes.

Radio Receiver 1	Radio Receiver 2
Receiver Band: ☒ AM ☒ FM ☒ NOAA	Receiver Band: ☒ AM ☒ FM ☒ NOAA
Receiver Frequency: 93.30 MHz	Receiver Frequency: 880 KHz

When selections are complete, go back to the *System* tab and click on *Upload Configuration*.

SECTION 6

EASy-PLUS® Encoder/Decoder Installation and Wiring

6.1 INTRODUCTION

The EASy-PLUS® receives E.A.S. messages from up to six audio sources (internal or external), decodes the message, and operates Cable System equipment to replay the message for subscribers. In addition, messages can be originated by the user via local or remote control of the EASy-PLUS®. The E.A.S. audio sources for the EASy-PLUS® include internal AM/FM/NOAA radios and external audio inputs that can be connected to any known E.A.S. audio source. E.A.S. audio is decoded by the internal AFSK circuitry, sorted, and then interpreted to determine the type of emergency or test. The locations codes for which the emergency applies, and other information supplied in the E.A.S. header are also decoded. If a voice message is contained in the E.A.S. message, it is recorded for playback to subscribers. E.A.S. messages then pass through a series of tests to determine if the message matches predefined, user configurable filters and parameters for your location. E.A.S. activation of the cable system then automatically occurs. To play an E.A.S. message to your subscribers, the EASy-PLUS® activates TTL drivers and Contact Closures, as well as sending commands via RS-485 and High Data Rate AFSK. The EASy-PLUS® also supplies pertinent video and re-encodes and plays the E.A.S. FSK header and recorded audio. The TTL drivers, Contact Closures, and RS-485 commands activate your interface equipment (i.e. I.F. switching, comb generator, baseband character generators) throughout the headend to provide the emergency audio and video to all channels of the cable system. In addition to the E.A.S. messaging capabilities, the EASy-PLUS® logs all received and transmitted messages to a printer, the LCD display, and it's internal log storage area.

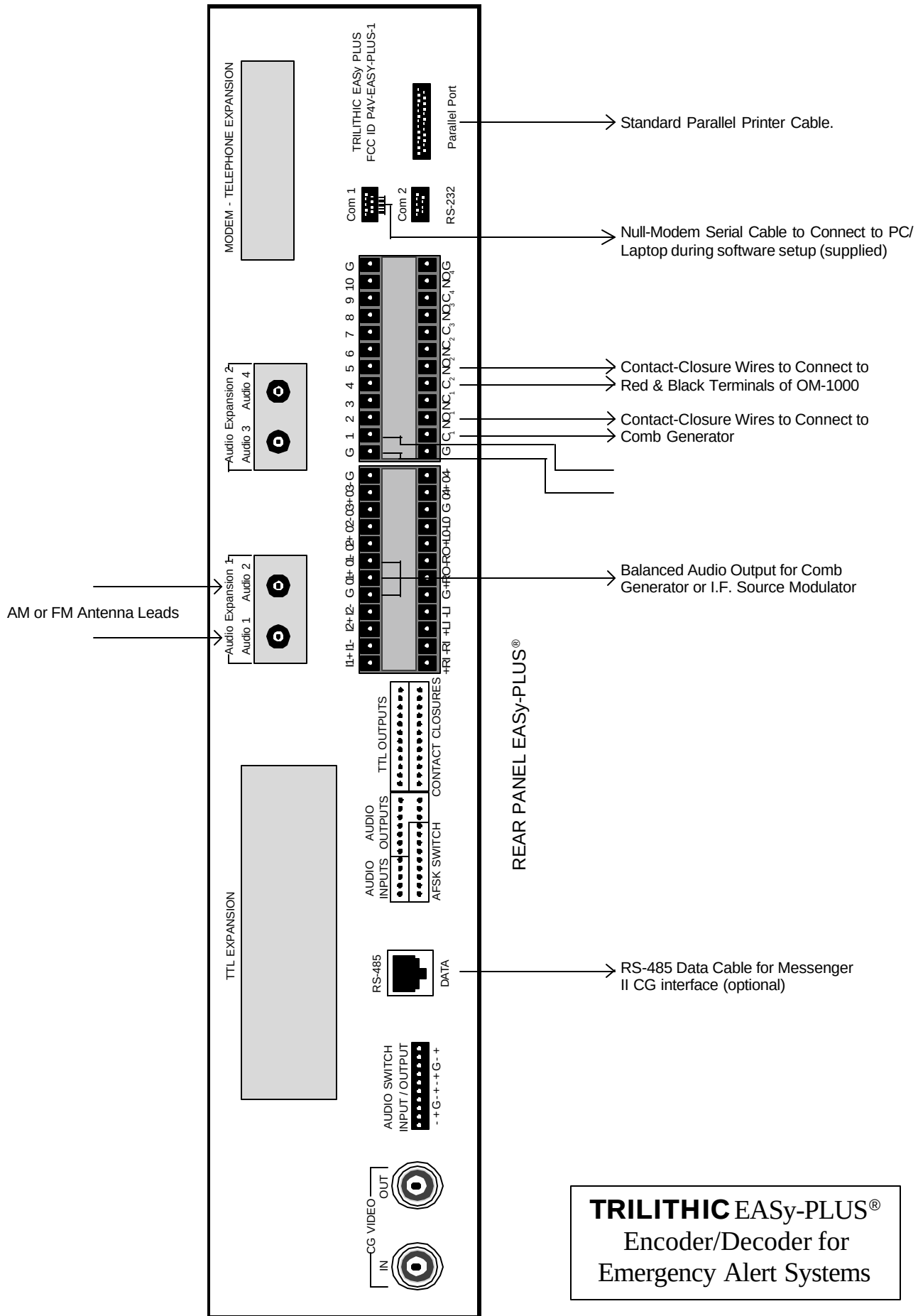
7.2 INSTALLATION AND WIRING OF THE EASy-PLUS® ENCODER/DECODER

Typical installation of the encoder/decoder requires the operator to attach radio antenna inputs at the Audio Expansion 1 coaxial input connectors, attach AUDIO and CG VIDEO Outputs to either an I.F. source modulator or audio input to a comb generator, and attach either TTL control line output to I.F. switching devices or a contact-closure output to the comb generator. Optional control of the Motorola OM-1000 QPSK modulator is accomplished by using a secondary contact-closure attached to the red and black terminals at the rear of the OM-1000.

7.3 PINOUT DESIGNATIONS AT THE REAR PANEL OF THE EASy-PLUS® ENCODER/DECODER.

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SECTION 7

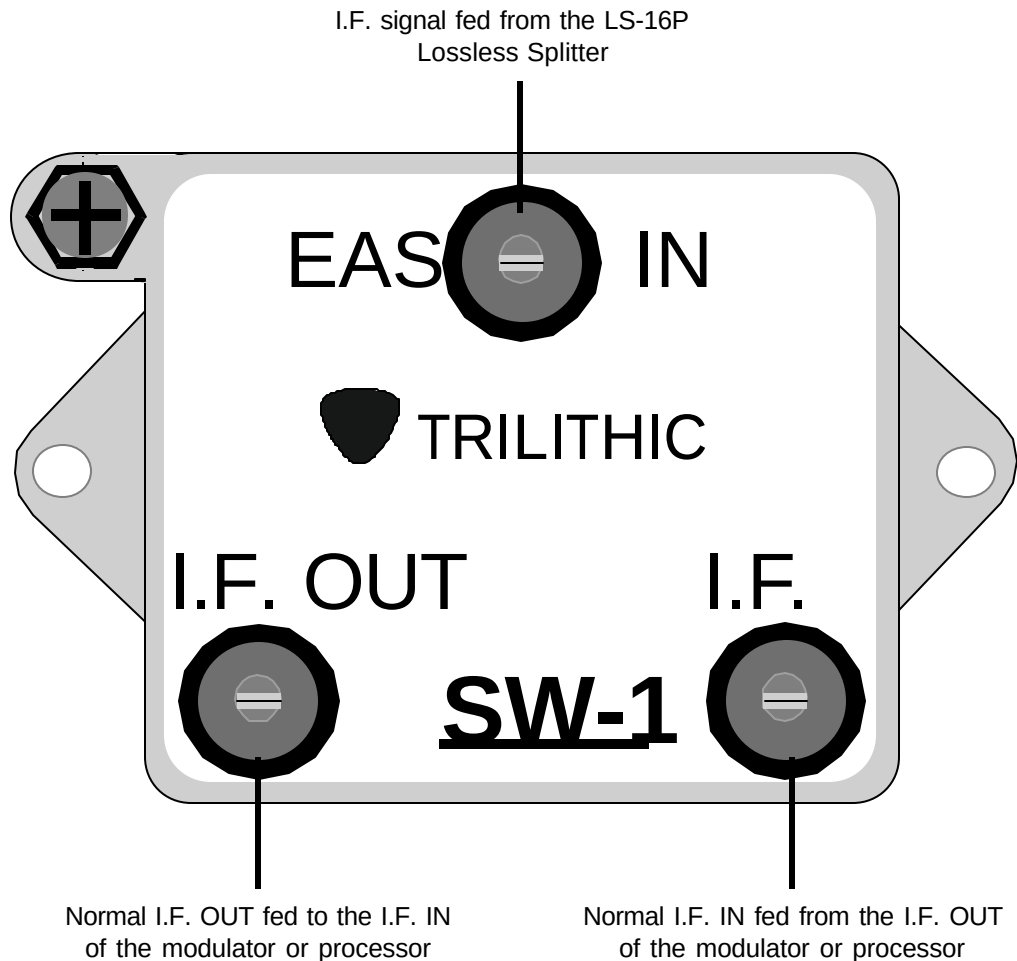
I.F. (Composite I.F., Aux. I.F., Single I.F.) INTERFACE and INSTALLATION

7.1 INTRODUCTION Single I.F. Replacement

Composite I.F. (both visual and aural intermediate carriers on the same coaxial cable) replacement is a technique which is used to change the program content on a channel without altering the RF output carrier frequency or amplitude. With this technique you will need to install an I.F. switch in the composite I.F. loop-through on the rear of the modulator or processor housing (i.e. the channel's rack mount assembly). Generally, modulators have this I.F. loop on the back of the housing. In some cases, you may be able to install the loop into the housing to implement this type of switching. For the E.A.S. application, the alternate I.F. signal will be taken from an independent distribution system which will be explained as you move through this manual.

Single (Composite) I.F. Switch Installation (SW-1)

The first step when assembling the E.A.S. system is to install an SW-1 or SW-4 switch on the rear of each modulator or processor. The SW-1 is a three terminal device used to substitute the current I.F. source with an alternative I.F. source. The SW-4 switch is a two terminal device with a terminal strip localized as a contact-closure for such chassis as the S-A Continuum modulators and processors.

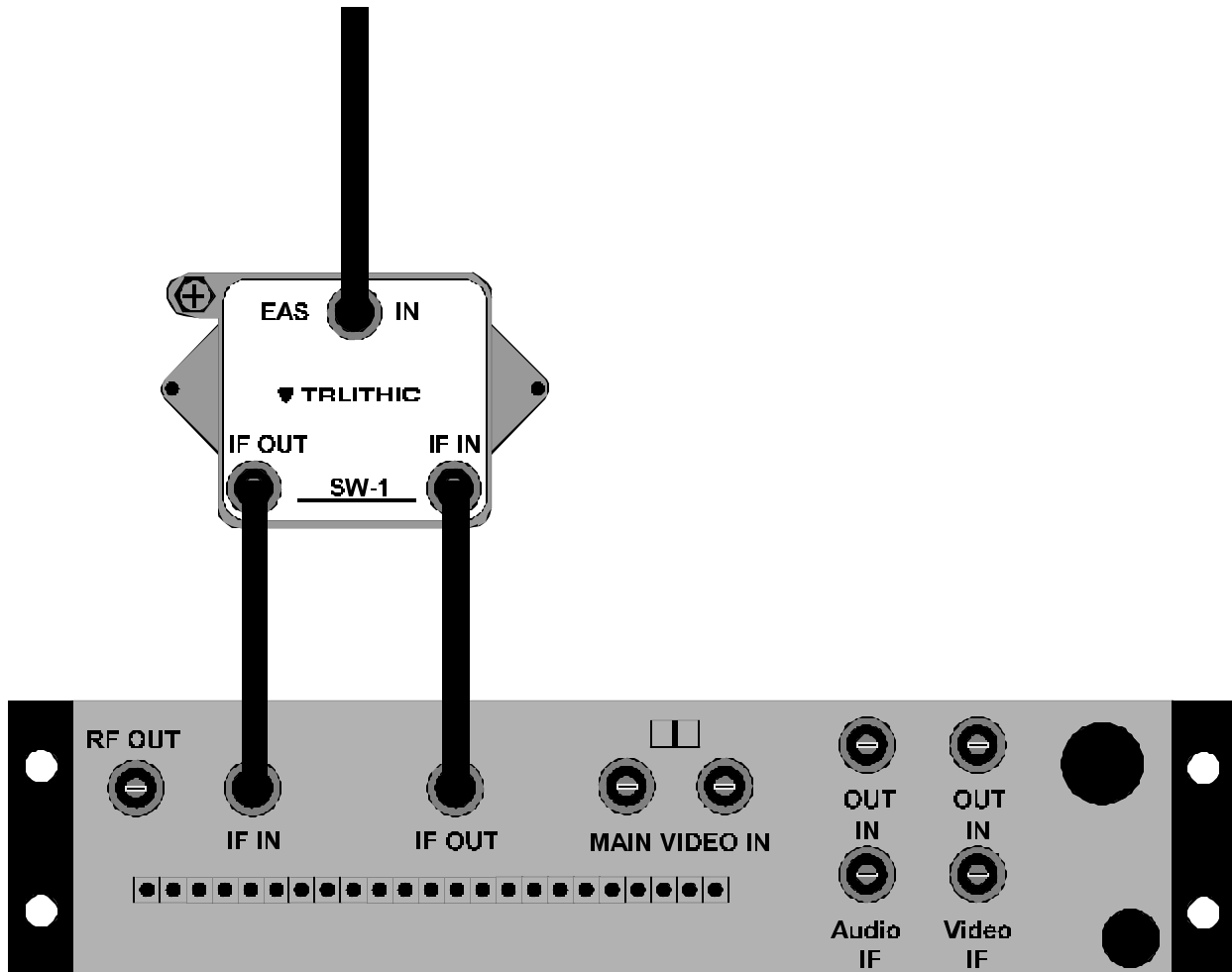


For each SW-1 installed, you will need two (2) 75 Ohm cables of equal length about three (3) to six (6) inches in length. The next step will cause a brief interruption of the channel involved while the I.F. switch is being connected, but the signal will return once the switch is installed.

Connect the 75 Ohm cable from the **I.F. OUT** of the modulator or processor to the **I.F. IN** of the SW-1 switch. Connect the I.F. OUT of the SW-1 switch to the **I.F. IN** of the same modulator or processor. See the following diagram. You will

connect the **EAS IN** at the SW-1 switch later in this procedure.

Repeat this procedure on all modulators and processors that have a composite I.F. loop-through on the rear of their housing.



7.2 Selecting a “Designated E.A.S. Channel” at I.F.

You will assign one channel on the cable system as the “Designated E.A.S. Channel”. This is the channel on which all E.A.S. alerts and messages received via your Local Primary monitoring stations (i.e.: AM, FM, or NOAA) will be displayed. Depending on installation techniques used, these messages and alerts will appear in the form of a gen-locked crawl message over either the existing video or over a full page blue background. Selecting a low priority channel (one which is not trapped or scrambled as it enters every home on the system) as the “Designated E.A.S. Channel” is optimum. Generally, a community access channel, government channel, or character generator channel in the VHF television band (i.e.: ch. 2-13) is ideal to use for the “Designated E.A.S. Channel”.

NOTE: IN ALMOST ALL INSTANCES A MODULATOR WITH A COMPOSITE I.F. LOOP WILL BE USED FOR THE “DESIGNATED EAS CHANNEL”. THERE ARE EXCEPTIONS, SUCH AS BASEBAND OR CHARACTER GENERATOR EAS SYSTEMS OR COMBINATIONS OF BASEBAND AND I.F. SYSTEMS. THESE EXCEPTIONS WILL BECOME APPARENT IN EACH INTERFACE SECTION OF THIS MANUAL.

7.3 LS-16P Lossless Splitter Placement and Connection

The LS-16P is a precision I.F. distribution amplifier (D/A) which has a 20dB continuously variable precision attenuator for I.F. alignment on each of its 16 output connections. The LS-16P is also used to insert a DC drive voltage on the output drop cable’s center conductor for activating each SW-1 or SW-4 switch, as well as other LS-16P input connections when the EAS system is activated.

For most applications, multiple LS-16P(s) will be needed. In all installations, the first LS-16P, which receives its input

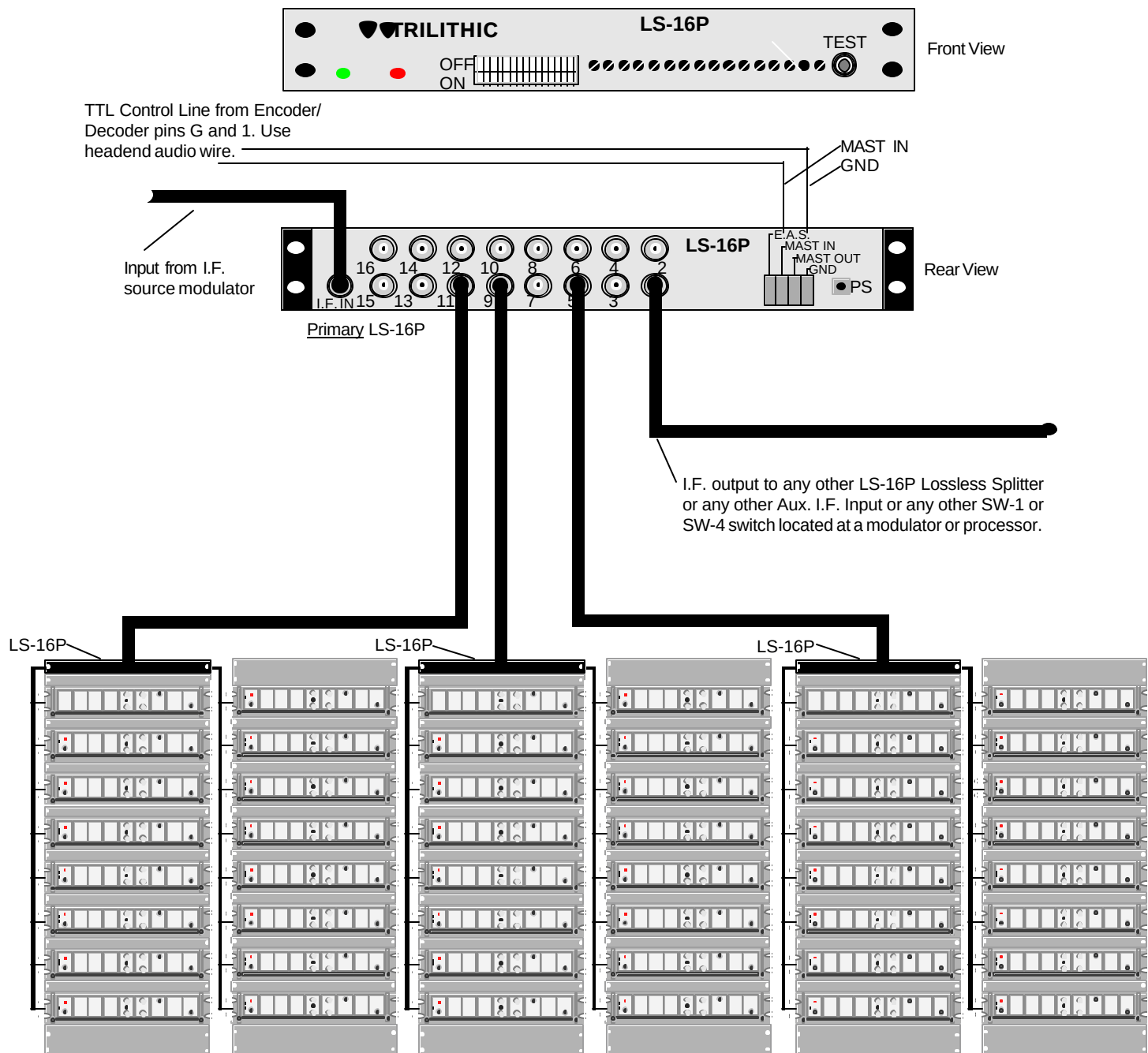
from the I.F. source modulator, should be labeled by the customer as the “Primary LS-16P”. Any other Primary LS-16P output port may be used to drive Secondary LS-16P(s) input ports or SW-1 and SW-4 switches.

For example, in a typical headend of 46 channels you will need three (3) LS-16P(s). One LS-16P will serve as the Primary and the two (2) remaining LS-16P(s) will serve as Secondaries. Total channel capacity will be twelve (14) ports from the Primary LS-16P, with the remaining two (2) ports of the Primary feeding two (2) Secondary LS-16P(s). Two (2) times sixteen (16), or thirty (32) ports from the Secondary LS-16P(s) added to the fourteen (14) ports leftover from the Primary LS-16P totals 46 ports.

As shown in the following diagram, one (1) LS-16P will serve up to sixteen (16) remotely located SW-1 and/or SW-4 equipped modulators and processors and/or Secondary LS-16P(s). When installing the LS-16P, place in bays or racks where their distribution coverage will be maximized. See the following diagrams.



Typical LS-16P Placement and Connection.



The composite I.F. distribution system is now installed.

7.4 Auxiliary I.F. Switch Installation (SW-4)

The SW-4 switch is used to locally activate a contact closure on the rear of a modulator or processor enabling the internal I.F. switch built into the chassis. The E.A.S. I.F. signal and DC current are fed to the input port of the SW-4 switch from the LS-16P. The signal passes through the switch to the Aux. I.F. Input port on the rear of the modulator or processor. The DC current is blocked at the input to the SW-4 and converted to a normally open (N/O and N/C) contact closure. The N/O terminal of the SW-4 should be attached to the rear of the modulator on the appropriate screw terminal to cause the internal I.F. switch to activate when the LS-16P distribution system sends its signal to the SW-4. The ground terminal on the SW-4 should also be attached to an appropriate grounding point on the modulator or processor.

7.5 Single (Composite) I.F. Source Modulator Installation (IFS-3)

The I.F. modulator receives its video signal from the CG VIDEO OUT at the rear of the EASy-PLUS® and audio from the terminal strip and modulates these signals onto I.F. subcarriers. Once the IFS-3 source modulator is mounted, connect the **RF OUT** port to the **I.F. IN** port on the Primary LS-16P.

7.6 Precision I.F. Level Alignment of the LS-16P Lossless Splitter

The LS-16P was designed for precision I.F. output level adjustment. In most instances, different modulators or processors require different I.F. input levels to maintain proper RF output levels due to the absence of an AGC at the I.F. stage. It is imperative that the headend maintain the same R.F. output level on each channel during an entire E.A.S. sequence of events. When alternate I.F. levels match those I.F. levels which are currently present at the rear of the modulator or processor, system wide stability of the trunk amps, pilot carriers, slopes, R.F. levels and scrambling systems will be maintained.

DC power is delivered through the coaxial cable's center conductor to enable the Secondary LS-16P(s), the SW-1(s), and the SW-4(s) switches.

CAUTION: DO NOT INSTALL FIXED OR VARIABLE ATTENUATOR PADS IN THE INPUT OR OUTPUT CABLES OF ANY LS-16P LOSSLESS SPLITTER. ELECTRICAL SHORTING OF THESE DEVICES MAY OCCUR.

The I.F. alignment procedure consists of setting the output level of the I.F. source modulator and then setting the output levels on the Primary and Secondary LS-16P(s) for proper I.F. levels at the rear of the modulators and processors. The Master Gain on all LS-16P(s) is factory set to unity gain. This adjustment should not need to be reset. Each 20dB potentiometer on the front panel of the LS-16P is factory set to 0 dB loss (i.e.: 42 dBmV output on each port of the LS-16P if the IFS-3 is set to 42 dBmV output.)

The test point on the front panel of the LS-16P(s) is to check for signal presence **ONLY**. No test alignment measurements should be made at this test point.

7.7 Procedure for precision I.F. Alignment:

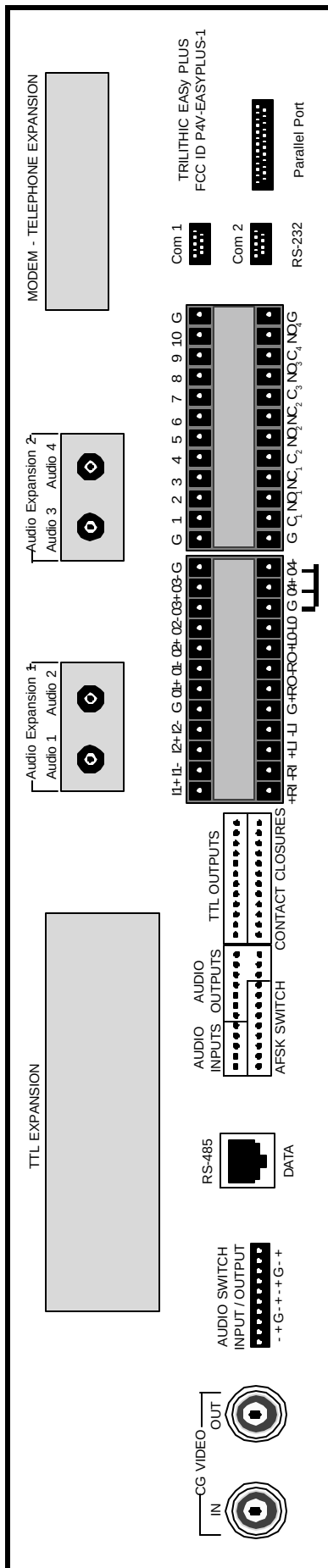
1. Set the output level of the I.F. source modulator to maximum and then pad its output down to 2 dBmV higher than the highest I.F. level on your modulators/processors (typically 32-42 dBmV). Set the audio carrier level 13-17 dBmV down from the video carrier.
2. Turn all J1 - J16 dip switches on the front panel of the Primary LS-16P to **OFF** (disabled), except for those dip switches which control the feeds of the Secondary LS-16P(s) INPUTS. These dip switches will remain **ON** (enabled) at all times.
3. Enable the I.F. alignment mode in the menu system of the EASy-PLUS® encoder/decoder.
4. Using a spectrum analyzer or field strength meter connected to the trunk line test point, identify the channel under alignment.
5. If applicable, be sure to disable any I.F. AGC switches on all modulators in the headend under I.F. alignment.
6. Looking at the channel under alignment on the spectrum analyzer or field strength meter, note the output level.
7. Turn the dip switch **ON** (enable) for the channel under setup, **ONLY**. This will enable the SW-1 or SW-4 switch at the rear of the modulator or processor under setup. You should now see the "I.F. Alignment Screen" appear on the television on the channel under test channel.
8. Using the respective potentiometer J1 - J16 on the front of the LS-16P for the channel under alignment, turn the potentiometer counterclockwise until the exact R.F. output level is achieved on the spectrum analyzer or field strength meter.
9. Turn the appropriate dip switch back **OFF** (disable) on the LS-16P.
10. Proceed to the next channel and repeat steps 4 through 10 until all channels are aligned.
11. Turn the I.F. AGC(s) **ON** for all modulators.
12. At the keypad of the EASy-PLUS unit, take the menu system out of I.F. alignment.
13. Turn all dip switches **ON** (enable).

CAUTION: The EAS system will not trigger in the automatic mode for an EAS alert while the system is in the "I.F. Alignment" mode.

You have now completed the composite precision I.F. alignment procedure.

SECTION 8

COMB GENERATOR INTERFACE and INSTALLATION



Rear Panel



9710 Park Davis Drive
Indianapolis, IN 46235
(317) 895-3600

P/N 0010224001

Made in U.S.A.



EASy-PLUS[®] SYSTEMS

INSTALLATION AND OPERATION MANUAL

Emergency Alert System Model: EASy-PLUS[®] Encoder/Decoder

Revision: 1.02