MASTER CLOCK SYSTEMS & ACCESSORIES

GPS

NTP

DISPLAYS

COMPARATORS

FREQUENCY STANDARDS

CONVERTERS

DISTRIBUTION AMPLIFIERS

*For over 40 years **ESE** has been meeting the needs of the industry with a line of Master Clocks and related accessories. Providing accurate and cost effective methods for timekeeping, **ESE**'s Master Clock Systems enable one to interface and synchronize all components with the Master Clock. Whether using line frequency, an internal crystal timebase or referencing "UTC" (via GPS, NTP or Modem), **ESE** Master Clocks can be used to drive digital or analog slave clocks, as well as interface with video or computer systems. Also, existing "non-**ESE**" Master Clock systems can be updated or enhanced with **ESE** products. An **ESE** Translator/Converter may be required to interface with existing systems (refer to "Time Code Converters").*

Applications

- Government & Military Installations
- Schools & Distant Learning Centers
- Tele-Conferencing Centers
- Financial Institutions
- Broadcast Facilities
- Video Courtrooms
- Public Safety

Features

- GPS Traceability
- Easily Expanded
- Time Zone Offset Option
- Analog / Impulse Clocks
- Time And Date Digital, Analog & Video Displays
- GPS, NTP, Modem & Crystal Timebase Accuracy
- NTP, SMPTE/EBU, IRIG, ASCII, & **ESE** Time Code Outputs

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INTRODUCTION

BACKGROUND

Founded in 1971, ***ESE***'s first products consisted of a line of Digital Clocks and Timers designed specifically to meet the needs of the broadcast and medical industries. In the mid-'70s, the ES-160 which referenced a one second per month crystal time base was introduced... our first Master Clock. Soon after that, a new Master Clock that referenced WWV (NBS/NIST) was introduced. These products widened the market of the ***ESE*** product lines to include school systems, 9-1-1 dispatch centers and military installations.

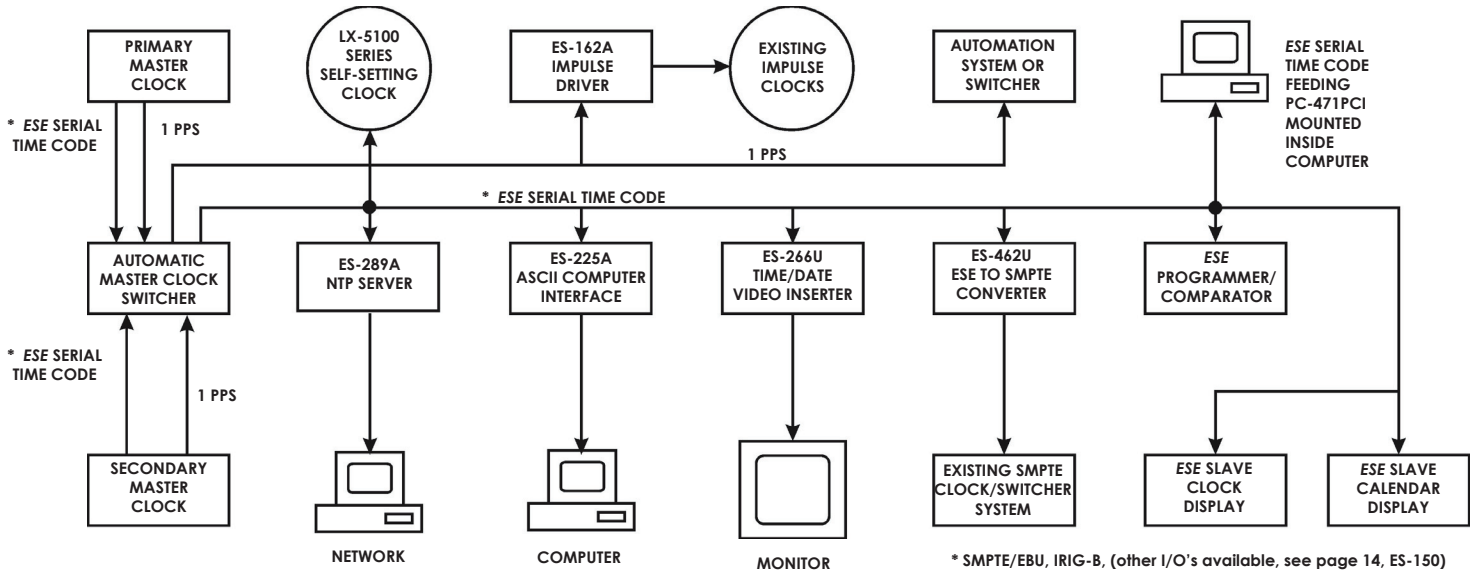
Since then, the Product Family has grown considerably. The Master Clock Family now includes over 50 standard products, highlighted by the ES-185U, GPS referenced Time Code Generator /Master Clock and the "U" Series of multi-code "Universal Time Code Displays".

ESE also works closely with several OEMs, designing and manufacturing products that meet unique requirements. These alliances have found ***ESE*** manufactured products in a variety of applications including post-production, military, telecommunications and even the Space Shuttle.

As the need for precision timing and time code equipment grows, so does ***ESE***. And, with the availability of new technology, so does our product line. With more than 200 standard products, ***ESE*** is certain to offer a solution to all of your precision timing requirements.

BLOCK DIAGRAM

Below is a Block Diagram showing a complete Master Clock System including Analog, Digital and Video Slaves, Computer Interfaces and an Automatic Master Clock System Switcher. Similar systems using SMPTE, EBU Time Code are also supported using ***ESE*** Equipment.



CUSTOM CAPABILITIES

Since 1971, ***ESE*** has manufactured over 2600 "Specials" (products defined by the customer's specific requirement... designed and built by ***ESE***). Many of these "Specials" have evolved into "Standard" Products, some of which are mentioned in this brochure. If you have a custom requirement, give us a call and put our "time" and experience to work for you.

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ECONOMY
GPS MASTER CLOCKS

The **ES-101**, **ES-102U** and **ES-103U** are low-cost yet very accurate GPS Master Clocks/Time Code Generators. All three receive time and date information from Global Positioning System satellites and supply data to the user in several different forms. A twelve-channel receiver is employed that is capable of tracking up to twelve (12) satellites simultaneously, although reception of only one is required for time data to be output.

All three units have ASCII (RS-232C), ***ESE***-TC89 and ***ESE***-TC90 Time Code outputs, two (2) One Pulse Per Second outputs and a GPS "Lock" output. Additionally, the **ES-102U** has a 6-digit display (hours, minutes & seconds) of time information and a SMPTE/EBU time code output. Meanwhile, the **ES-103U** has a 9-digit display (day of year, hours, minutes & seconds) and an IRIG-B time code output.

Several Options are available that allow the unit to meet most any demand required of a Master Clock or a Time Code Generator.

Features:

- SMPTE/EBU, IRIG-B, USB, ASCII (RS-232C) & ***ESE*** Time Code Outputs
- GPS "Lock" indicator
- Automatic Or Manual Daylight Saving Time Correction
- Leap Second Correction
- Rugged Desk Top & Rack Mount Enclosures
- Indoor / Outdoor Antenna With 16' Cable
- Time Zone Offset
- 6-Digit Or 9-Digit .56" LED Display
- Loss Of GPS Signal Output
- Dual 1 PPS Outputs
- Optional DC Operation for Field and Ground Mobile Applications

Included is an indoor/outdoor antenna which is connected to the unit via the provided 16' cable. If additional cable is required, "low-loss" cable, an "in-line" amplifier (**LA-12F** or **LA-12FN** for low-loss cable) or, for extra long cable runs where more than one in-line amplifier is used, an "Antenna Power Supply" (**ES-AB1A**) may be required. Consult the ***ESE*** factory or website for more information.

Software is also supplied permitting the user to continuously update a computer's Windows® clock to the time available on the Serial or USB port (ES-102U/ES-103U only).

Specifications

	ES-101	**ES-102U**	**ES-103U**
Electrical:	117 VAC, 50/60 Hz	117 VAC, 50/60 Hz	117 VAC, 50/60 Hz
Power:	5 Watts Typical	15 Watts Typical	15 Watts Typical
Enclosure:	Desk Top	Rack Mount	Rack Mount
Mechanical:	1.6" H x 7" W x 5" D	1.75" x 19"; 10" Deep	1.75" x 19"; 10" Deep
Displays:	-	Six Digits, Yellow LED, .56" High	Nine Digits, Yellow LED, .56" High
Accuracy:	1 PPS @ <500ηS	1 PPS @ <500ηS	1 PPS @ <500ηS
Drift:	33mS/day (if no GPS signal)	33mS/day (if no GPS signal)	33mS/day (if no GPS signal)
Video Input:	-	RS-170A Composite Video/Blackburst, 1 Vpp, 75Ω	-
	-	-	-
Outputs:	***ESE***-TC89: drives 100 Slaves @ 4000'	***ESE***-TC89: drives 100 Slaves @ 4000'	***ESE***-TC89: drives 100 Slaves @ 4000'
	ESE-TC90: drives 100 Slaves @ 4000'	***ESE***-TC90: drives 100 Slaves @ 4000'	***ESE***-TC90: drives 100 Slaves @ 4000'
	1 PPS: TTL, 20% Duty Cycle	1 PPS: TTL, 20% Duty Cycle	1 PPS: TTL, 20% Duty Cycle
	1 PPS: TTL, 50% Duty Cycle	1 PPS: TTL, 50% Duty Cycle	1 PPS: TTL, 50% Duty Cycle
	-	SMPTE: 600Ω Balanced or Unbalanced	-
	-	-	IRIG-B: 3 Vpp(mark amplitude)600Ω
	RS-232C: ASCII Date & Time @9600 Baud 8 Data, No Parity, 1 Stop	RS-232C: Date & Time Output	RS-232C: Date & Time Output
		USB: Universal Serial Bus, Date & Time Output	USB: Universal Serial Bus, Date & Time Output
GPS Receiver:	Internal 12-Channel	Internal 12-Channel	Internal 12-Channel
Antenna:	Indoor/Outdoor with 16' Cable	Indoor/Outdoor with 16' Cable	Indoor/Outdoor with 16' Cable
Options:	Ant, BBU, DC, EBU, HR, IRIG-B, IRIG-E, J, K, P, P2, SMPTE, UL, 6-Digit, 9-Digit, 10ηS	Ant, BBU, DC, EBU, HR, J, K, UL, 10ηS	Ant, BBU, DC, HR, J, K, UL, 10ηS

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GPS MASTER CLOCK / TIME CODE GENERATOR

The **ES-185U** is a GPS (Global Positioning System) Master Clock and Time Code Generator. The unit displays nine digits (Day of Year, Hour, Minute & Second) of UTC (Coordinated Universal Time) as received via the internal 12-channel GPS receiver. Simultaneously, the **ES-185U** generates several types of time code (SMPTE/EBU, IRIG-B, ***ESE***-TC89, ***ESE***-TC90, RS232C/ASCII and USB) and an extremely accurate 1PPS signal (+/-10ηs). These outputs allow the **ES-185U** to easily interface with new or existing computer, automation and clock systems. An optional ethernet NTP (Network Time Protocol) port may be specified (**ES-185U/NTP**) allowing the clock to be an NTP server and providing clock set-up via a LAN.

Features:

- SMPTE/EBU, IRIG-B, USB, ASCII (RS-232C) & ***ESE*** Time Code Outputs
- USB Set-up Interface & Software
- Automatic or Manual Daylight Saving Time Correction
- GPS "Lock" Indicator
- 4-Hour Battery Back-Up
- Optional NTP Ethernet Port
- Leap Second Correction
- Loss of GPS Signal Output
- 9-Digit .56" LED Display
- Indoor / Outdoor Antenna and 16' Cable
- Optional DC Operation for Field and Ground Mobile Applications
- Rugged Rack Mount Enclosure
- Time Advance/Retard Feature for Synchronization Purposes
- Dual 1 PPS Outputs
- Time Zone Offset

Included with the **ES-185U** is an indoor/outdoor antenna which is connected to the unit via the provided 16' cable. If additional cable is required, "low-loss" cable, an "in-line" amplifier (**LA-12F** or **LA-12FN** for low-loss cable) or, for extra long cable runs where more than one in-line amplifier is used, an "Antenna Power Supply" (**ES-AB1A**) may be required. Consult the ***ESE*** factory or website for more information.

Software is also supplied with the **ES-185U** permitting the user to continuously update a computer's Windows® clock to the time available on the USB port. Other features allow the user to 1) select SMPTE mode (DF, NDF, EBU & Real Time) 2) offset the Time Zone displayed and output by the **ES-185U**, 3) advance or delay the time output for various synchronizing purposes and 4) modify dates for Daylight Saving Time.

Standard GPS Antenna
with16'cable

ES-Ant (Optional)
High Performance Antenna
with 19' cable

Specifications

Electrical: 117 VAC, 50/60 Hz
Power: 15 Watts Maximum
Mechanical: 1.75" x 19" Rack Mount, 10" Deep
Displays: Nine Digits, Yellow LED, .56" High
GPS Receiver: Internal 12-Channel
Antenna: Indoor/Outdoor Dome with 16' Cable
Accuracy: 1 PPS @ <10ηS (20% Duty Cycle)
IRIG-B @ 1μS
ESE TC89 & TC90 Time Code @ 17mS
SMPTE , +/- 3 to 12 Frames
Adjustable (Video Modes),
0 Frames (Real Time Mode)
Drift: 33mS/day (if no GPS signal)
Video Input: RS-170A Composite Video/Blackburst, 1 Vpp, 75Ω

Outputs: 1 PPS: TTL, 20% Duty Cycle
1 PPS: TTL, 50% Duty Cycle
IRIG-B: 3 Vpp (mark amplitude), 600Ω,
AM or TTL selectable
ESE Time Code: drives 100 Slaves @ 4000'
SMPTE: 600Ω Balanced or Unbalanced
RS-232C: Date & Time Output
USB: Universal Serial Bus, Date & Time Output
Ethernet (optional): 10/100 Base-T, NTP Output
Clock Set-up: USB, RS-232C, Network (Telnet or Windows®)
Battery: 4-Hour Back-Up (displays are blank)
Options: Ant, DC, HR, J, K, NTP, UL

NTP REFERENCED MASTER CLOCK/ TIME CODE GENERATOR

The **ES-188** is an NTP referenced Master Clock and Time Code Generator. It displays nine digits (Day of Year, Hour, Minute & Second) of time as received via a user selected NTP server. Simultaneously, the **ES-188** generates several types of time code (***ESE***-TC89, ***ESE***-TC90, USB, RS232C/ASCII, SMPTE/EBU and IRIG-B) and a 1PPS signal. These outputs allow the **ES-188** to easily interface with new or existing computer, automation and clock systems.

Features:

- ***ESE***, USB, ASCII (RS-232C), SMPTE/EBU & IRIG-B Time Code Outputs
- NTP Ethernet Port
- Automatic or Manual Daylight Saving Time Correction
- NTP Update Output
- 1 PPS Output
- USB Set-up Interface & Software
- 4-Hour Battery Back-Up
- NTP Sync Indicator
- 9-Digit .56" LED Display

- Optional DC Operation for Field and Ground Mobile Applications
- Rugged Rack Mount Enclosure
- Time Advance/Retard Feature for Synchronization Purposes (+/- 15 sec)
- Time Zone Offset

Applications include NPR's ContentDepot in which the **ES-188** extracts time data from the NPR satellite receiver. Connection is easily made between the units NTP port and the station's Local Area Connection (LAN). Option NPR permits the **ES-188** to drive legacy equipment.

Software supplied with the **ES-188** permits users to continuously update a computer's Windows® clock to the time available on the USB or serial port. Other features allow the user to select SMPTE mode (DF, NDF, EBU & Real Time), offset the Time Zone displayed and output by the **ES-188** and advance or delay the time output for various synchronizing purposes.

Specifications

Electrical: 117 VAC, 50/60 Hz
Power: 15 Watts Maximum
Mechanical: 1.75" x 19" Rack Mount, 10" Deep
Displays: Nine Digits, Yellow LED, .56" High
Accuracy: Network dependent, generally less than 1mS
Drift: 33mS/day (if no NTP signal)
Input: Ethernet: 10/100 Base-T
Battery: 4-Hour Back-Up (displays are blank)
Video Input: RS-170A Composite Video/Blackburst, 1Vpp, 75Ω

Outputs: ***ESE*** Time Code: drives 100 Slaves @ 4000'
USB: Universal Serial Bus, Date & Time Output
RS-232C: Date & Time Output
SMPTE: 600Ω Balanced or Unbalanced
IRIG-B: 3 Vpp (mark amplitude), 600Ω, AM or TTL selectable
1 PPS: TTL, 50% Duty Cycle
Clock Set-up: USB, RS-232C, Network (Telnet or Windows®)
Options: DC, HR, J, NPR, UL

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CRYSTAL CONTROLLED MASTER CLOCK / TIME CODE GENERATOR

The **ES-160U** is a Master Clock/Time Code Generator. The unit employs a voltage controlled/temperature compensated crystal oscillator which provides the **ES-160U** with an accuracy of one second per month. Six .56" yellow LEDs display real time while the unit simultaneously generates several types of time (and date) code (SMPTE/EBU, ***ESE***-TC89, ***ESE***-TC90 and RS232C/ASCII) and a 1 PPS signal.

Since the **ES-160U** is a completely self-contained unit with no link to GPS, USNO or WWV, it is a practical alternative where users have a concern over the "availability" of such time references. The **ES-160U** is designed as a "primary" Master Clock. However, the unit is an excellent choice for use as a "secondary" Master Clock in a system utilizing an Automatic Master Clock Switcher (**ES-150**) and any other Master Clock with an ***ESE*** Time Code output.

Features:

- SMPTE/EBU, ASCII (RS-232C) and ***ESE*** (TC89 & TC90) Time Code Outputs
- 12 or 24 Hour Display
- Automatic Daylight Savings Time Correction
- One Second per Month "VCTCXO" Crystal Accuracy
- Rugged Rack Mount Enclosure
- 10-Hour Battery Back-Up
- 6-Digit .56" LED Display
- External Time Sync Input
- Simple Operation & Installation
- Several Options Available as well as Custom Modifications
- 1 PPS Output

Real Time (Hour, Minute & Second) and Gregorian Date (Month, Day & Year) are set via the front panel mounted "Set" switch. A rear mounted "Enable" switch is provided to protect the unit from accidental setting. Once set, the unit can be synchronized "manually" to any source of reliable time via the "Set" switch or "automatically" via the External Sync Input.

Software is also supplied with the **ES-160U** permitting the user to continuously update a computer's DOS or Windows® clock to the UTC (Coordinated Universal Time) available on the ASCII output.

Specifications

Electrical: 117 VAC, 50/60 Hz
Power: 15 Watts Maximum
Mechanical: 1.75" x 19" Rack Mount, 10" Deep
Displays: Six Digits, Yellow LED, .56" High
Accuracy: +/-33mS/day
Video Input: RS-170A Composite Video/Blackburst, 1 Vpp, 75Ω
Time Sync Input: TTL, 1 PPS or Slower

Outputs: 1 PPS: TTL, 50% Duty Cycle
ESE Time Code: drives 100 Slaves @ 4000'
SMPTE: 600Ω Balanced or Unbalanced
RS-232C: ASCII Date & Time @ 9600 Baud, 8 Data, No Parity, 1 Stop
Battery: 10-Hour Back-Up of CPU (displays are blank)
Options: DC, HR, J, NTP, UL

ECONOMY MASTER CLOCKS

Designed as an economical alternative to the more "sophisticated" Master Clocks, the **ES-192U/ES-194U** and the **LX-192U/LX-194U** have proven their value time and time again. These units feature a .56" six-digit yellow LED display and an ***ESE*** Serial Time Code output (capable of driving up to 100 Slaves at a distance of up to 4000 feet). Accessible on the rear mounted 9-pin D-sub connector are a 1 PPS Output, remote access to the two setting controls (Set and Select) and an External Sync Input (capable of synchronizing the unit with an external time reference).

These units provide a cost-effective solution whether the need is for the first building block of an economical Master Clock System or for a "secondary" clock used with an ES-150 (Automatic Master Clock "Switcher").

Features:

- ***ESE*** Time Code Output
- AM/PM Indicator (12 Hr Mode Only)
- 6-Digit .56" LED Display
- Simple Installation & Operation
- Auto DST Correction
- External Sync Input
- 1 PPS Output
- Optional Rack Mount Enclosure
- Optional 4-Hour Battery Back-Up
- Time and Date

ES-192U

ES-192UP

LX-192U

The **LX-192U** (12 Hour) and the **LX-194U** (24 Hour) are mounted in the "**LX-**" Series enclosure. This sleek design is engineered with the "high-tech" studio or editing suite in mind. The all aluminum enclosure is black texture coated and certain to fit perfectly into any environment where form as well as function is an issue.

The **ES-192U** (12 Hour) and the **ES-194U** (24 Hour) are housed in a black desk mount enclosure. Options 'P' (Rack Mount) and 'Q' (Console Mount) are available with the "ES-" models. And when the Rack Mount is specified, an optional battery back-up is also available.

The accuracy of these units is dependent entirely upon the power company's line frequency, an external sync input or the optional crystal time base. Time is set via two setting controls (Set and Select).

Specifications

Electrical: 117 VAC, 50/60 Hz
Power: 8 Watts Maximum
Mechanical: Desk Mount (LX-), 8" W x 1.7" H x 6" D
Desk Mount (ES-), 8" W x 2.8" H x 6" D
Displays: Six Digits, Yellow LED, .56" High

Accuracy: Dependent upon Line Frequency
Option 'C': ~2-3 Seconds per Week
Outputs: 1 PPS: TTL, 80/20% Duty Cycle
ESE Time Code (TC90): drives 100 Slaves @ 4000'
Options: BBU, C, D, HR, J, P, P2, Q, RS, UL

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MODEM INTERFACE MASTER CLOCK / TIME CODE GENERATOR

The **ES-181U** is a Master Clock that receives updated time information via an internally mounted modem. The unit supplies time information to the user in a variety of forms, including the nine-digit yellow LED display (Julian Day, Hours, Minutes and Seconds). Time codes available via rear-mounted connectors are SMPTE/EBU, ASCII (RS-232C), IRIG-B and ***ESE*** (TC89 or TC90). The unit also outputs two "1 PPS" signals (one "positive" and one "negative") and an "External Reference Input" is also provided that allows the clock's time base to be referenced to that of either a 10 MHz or a 5 MHz source (10 MHz is default).

Software is also supplied with the **ES-181U** permitting the user to continuously update a computer's DOS or Windows® clock to the time available on the ASCII output.

Features:

- SMPTE (or EBU), IRIG-B, ASCII & ***ESE*** Time Code Outputs
- Auto Update Via Modem From USNO
- Optional 10 MHz & 1 KHz Outputs
- Automatic Re-dial
- Auto Daylight Savings Time
- Easy Installation & Operation
- Rugged Rack Mount Enclosure

Specifications

Electrical: 117 VAC, 50/60 Hz
Power: 15 Watts Maximum
Mechanical: 1.75" x 19" Rack Mount, 10" Deep
Displays: Nine Digits, Yellow LED, .56" High
Accuracy: +/-50ms of UTC (after update)
Drift: One Second per Month (without Update)
Video Input: RS-170A Composite Video/Blackburst-1 Vpp, 75Ω
Reference Input: (10 MHz or 5 MHz), 500mVpp, 75Ω
Modem: Hayes® Compatible 2400bps

Outputs: 1 PPS: TTL, 50% Duty Cycle
IRIG-B: 3 Vpp (mark amplitude), 600Ω
ESE Time Code: drives 100 Slaves @ 4000'
SMPTE: 600Ω Balanced or Unbalanced
RS-232C: ASCII Date & Time @ 9600 Baud, 8 Data, No Parity, 1 Stop
Battery: 4-Hour Back-Up of CPU (displays are blank)
Options: HR, J, UL

"DIGITAL" TIME & DATE DISPLAY

ESE offers two different size displays of the Digital Clock/Calendar displays The **ES-126U** is a twelve-digit Time Code Reader (***ESE***-TC90, ASCII, SMPTE or EBU) that displays six digits (Hours, Minutes & Seconds) of time and six digits (Month, Day & Year or optionally Day, Month & Year) of date. The displays are .56" high yellow LEDs and the unit is mounted in a 1 3/4" Rack Mount enclosure. The **ES-127U** is identical to the **ES-126U** except that it has 1.0" high LED displays and its Rack Mount enclosure is 3 1/2" high.

Features:

- Perfect Synchronization With Master
- Long-Life Yellow LED Displays
- Optional Time Zone Offset
- Reads ***ESE***, ASCII, SMPTE Or EBU Time Code
- Rack Mount Enclosure

ES-126U

ES-127U

These units are designed to read the serial data from any Master Clock, Converter or Calendar that has a ***ESE***-TC90 Time Code output (properly formatted ASCII, SMPTE or EBU can also be read by either unit). TC90 contains time and date data and is available on the ES-101, ES-102U, ES-103U, ES-160U, ES-181U, ES-185U, ES-188, ES-192U/194U, ES-195 & ES-206U. All other ***ESE*** Master Clocks are capable of driving either the **ES-126U** or **ES-127U** only if an ES-195 (Master Calendar) is used to convert their code (TC76 or TC89) into TC90 time code. (Masters with TC76 time code must be in 24 hour format.)

Specifications

ES-126U

Input: ***ESE*** TC90, ASCII, SMPTE or EBU
Electrical: 117 VAC, 50/60 Hz, 10 W
Mechanical: 1.75" x 19" Rack Mount 10" Deep
Displays: 12 digits, .56" High Yellow LED (20' Viewing Distance)
Options: Black, ***ESE***, J, TZ(DIP), UL, W

ES-127U

ESE TC90, ASCII, SMPTE or EBU
117 VAC, 50/60 Hz, 10 W
3.5" x 19" Rack Mount 10" Deep
12 digits, 1.0" High Yellow LED (35' Viewing Distance)
Black, Blue, ***ESE***, Green, J, Red, TZ(DIP), UL, W

TIME CODE READERS

These six-digit (or four-digit) displays are designed to be "Universal" Time Code Readers. All models described below are able to auto-detect, read and display ***ESE*** (TC76™, TC89™ or TC90™), ASCII (format A, 0 or 1 @ 9600 baud; RS-232C, RS-422A or RS-485), EBU or SMPTE time code.

Setup Features allow the unit to display time in either 12 or 24 hour format and if reading ***ESE*** Time Code to display "Date" information and if reading SMPTE/EBU to display "User Bits". An Error Detection and Correction Feature maintains flicker-free operation in the event of poor quality or loss of time code. An Error Detection Indicator is also included and the Error Correction Feature may be turned-off via an internal DIP switch.

Several Options are available with "U" Series Readers. LED color options of Amber, Blue, Green and Red can be specified on the 1", 2" and 4" units with LED displays.Option "TZ" allows the unit to be "offset" to other time zones via an internal set of DIP switches. ***ESE*** and ASCII (RS-232C) time code outputs are also optionally available. Most units are available with a rack mount enclosure, option "P". Other options are listed below.

Each Reader requires only a single pair of wires (or coax) between itself and the Master Clock (or other source of time code). The wiring arrangement can be parallel, serial or both. Please note that extra long cable runs may require a Distribution/Isolation Amplifier, refer to page 15 (ES-243) for more information.

Features:

- Reads SMPTE/EBU, ASCII or ***ESE*** Time Code
- Error Detection & Correction
- Optional Time Zone Offset
- Optional ***ESE***, & RS-232C Time Code Outputs
- Display Date or Time
- 0.4" To 4.0" Display Sizes
- 12/24 Hour Format
- Simple Installation & "Hands-Off" Operation
- Long-Life LED Displays
- Desk Top, Console, Wall & Rack Mount Enclosures
- Perfect Synchronization With Master Clock

ES-996U
ES-943U

ES-161U
ES-166U
ES-991U

ES-161UP
ES-166UP
ES-996UP

ES-171U
LX-161U
ES-166UQ
LX-166U

SPECIFICATIONS

Model Number	Description	Viewing Distance	Time Code Input	Options
ES-171U	6-digit, 0.4" Red LED in Console mount enclosure	10'	*ESE*, SMPTE/EBU	J, V, TZ, UL, W
LX-161U	6-digit, .56" Amber LED in "LX-" enclosure	20'	*ESE*, SMPTE/EBU, ASCII	J, RS, TZ, UL
ES-161U	6-digit, .56" Amber LED in Desk mount enclosure	20'	*ESE*, SMPTE/EBU, ASCII	***ESE***, J, NTP, P, P2, Q, RS, TZ, UL, W
LX-166U	6-digit, 1.0" Amber* LED in "LX-" enclosure	35'	*ESE*, SMPTE/EBU, ASCII	J, RS, TZ, UL
ES-166U	6-digit, 1.0" Amber* LED in Desk mount enclosure	35'	*ESE*, SMPTE/EBU, ASCII	***ESE***,J,NTP, P, P2,Q,RS,TZ,UL,W, Wall
LX-991U	4-digit (Hr, Min), 2.3" Amber* LED in "LX-" enclosure	70'	*ESE*, SMPTE/EBU, ASCII	J, TZ, UL
ES-991U	4-digit (Hr, Min), 2.3" Amber* LED in Desk mount enclosure	70'	*ESE*, SMPTE/EBU, ASCII	J, NTP, P, TZ, UL, W, Wall
LX-993U	6-digit, 2.3" (1" Sec) Amber* LED in "LX-" enclosure	70'	*ESE*, SMPTE/EBU, ASCII	J, TZ, UL
ES-993U	6-digit, 2.3" (1" Sec) Amber* LED in Wall mount enclosure	70'	*ESE*, SMPTE/EBU, ASCII	J, P, TZ, UL, W
ES-996U	6-digit, 2.3" Red* LED in Wall mount enclosure	70'	*ESE*, SMPTE/EBU, ASCII	CW, J, NTP, P, TZ, UL, W
ES-941U	4-digit (Hr, Min), 4.0" Red* LED in Wall mount enclosure	120'	*ESE*, SMPTE/EBU, ASCII	J, NTP, TZ, UL, W
ES-943U	6-digit, 4.0" Red* LED in Wall mount enclosure	120'	*ESE*, SMPTE/EBU, ASCII	J, NTP, TZ, UL, W

*Amber, Blue, Green or Red LED display color can be specified

Display	Power	Electrical
0.4" LED:	5 Watts	117 VAC, 50/60 Hz
.56" LED:	5 Watts	117 VAC, 50/60 Hz
1.0" LED:	5 Watts	117 VAC, 50/60 Hz
2.3" LED:	8-10 Watts	117 VAC, 50/60 Hz
4.0" LED:	8-10 Watts	117 VAC, 50/60 Hz

Enclosure	Style	Dimensions
0.4" - Console:	Black ABS Plastic	2.2" H x 4.5" W x 4.5" D
.56" - LX:	Black Texture (High-Tech)	1.7" H x 8" W x 6" D
.56" - Desk:	Black Plastic / Aluminum	2.8" H x 8" W x 6" D
1.0" - LX:	Black Texture (High-Tech)	3.5" H x 10" W x 6" D
1.0" - Desk:	Black Plastic/ Aluminum	5.5" H x 10.4" W x 6.6" D
2.3" - LX:	Black Texture (High-Tech)	3.5" H x 12" W x 6" D
2.3" 4-digit Desk:	Black Plastic/ Aluminum	5.5" H x 10.4" W x 6.6" D
2.3" 6-digit Wall:	Black Textured Aluminum	5" H x 12" W x 3.5" D
2.3" 6-digit Wall:	Black Textured Aluminum	5" H x 15" W x 3.5" D
4.0" 4-digit Wall:	Black Textured Aluminum	7" H x 19" W x 3.5" D
4.0" 6-digit Wall:	Black Textured Aluminum	7" H x 26" W x 3.5" D

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SELF-SETTING
5", 12" & 16" ANALOG CLOCKS

The **LX-5105**, **LX-5112** and **LX-5116** are Self-Setting Analog Clocks with 5", 12" and 16" viewing diameters, respectively. The units are designed to operate as Time Code Readers (Slaves), Stand-Alone Clocks or Impulse Clocks. All three can read, decode and display time information from most any Master Clock or other source of time code. A rear-mounted DIP switch permits the clock to display time as received from a source of SMPTE/EBU, ***ESE*** or ASCII time code (IRIG-B is optional). After a very simple "set-up" procedure and receipt of time code, the clock automatically sets itself to the exact time and continuously slaves to the time code. (If time code is lost, an error indicator is lit and the clock continues counting while referencing an internal crystal time base.)

Other user defined modes of operation allow the clocks to be synchronized to a Master Clock with a 1 PPS alternating 12 VDC/24 VDC output or to be set to real time and allowed to run based on their internal crystal oscillators. The second hand is completely silent and can be programmed for "Sweep" or "Step" mode.

The initial set-up allows each clock to have the hours (and/or minutes) offset to that of another time zone. Also, since the unit can continuously track time code, there is no need to twice annually compensate for daylight savings time, provided the Master Clock automatically adjusts itself accordingly.

Features:

- Silent
- Reads ***ESE***, ASCII, SMPTE or EBU Time Code
- Simple Installation & "Hands-Off" Operation
- 5", 12" or 16" Dials
- Optional IRIG-B Input
- Time Zone Offset
- Lighted-Dial Option
- Self-Setting
- Sweep Or Step Second Hand
- Error Indicator
- Rack Mount Option
- Stand-Alone, Impulse & Reader Modes
- Battery Back-Up

Specifications

Power: 5 Watts Maximum (15 Watts with Light option)
Electrical: 117 VAC, 50/60 Hz
Mechanical: Desk Mount (LX-5105); Wall Mount (LX-5112 & LX-5116)
Dimensions: LX-5105: 6.95" High x 8.73" Wide x 3.45" Deep;
LX-5112: 13.95" x 13.95" x 3.45" Deep;
LX-5116: 17.45" x 17.45" x 3.45" Deep
Inputs: SMPTE/EBU: 10kΩ, Balanced or Unbalanced, 100mVpp to 10 Vpp;
ESE: TC76, TC89 or TC90, 120kΩ, Unbalanced;
ASCII: 120kΩ, Unbalanced;
Impulse: Alternating 12 VDC (or optional 24 VDC)
Battery: 9v, Maintains CPU for up to 60 Hours
Viewing Distance: 20, 60 & 80 feet, respectively
Options: IRIG, J, Light, P, P2, UL

SELF-SETTING
DIGITAL / ANALOG CLOCK

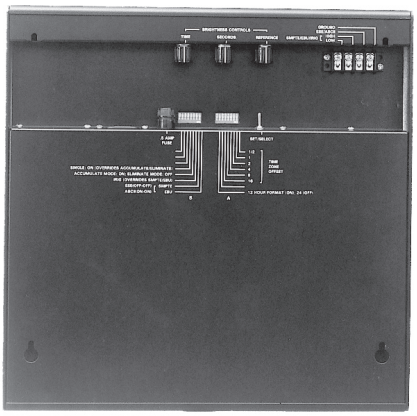
The **LX-5212** is a 12" Digital / Analog Clock. The unit is designed to read and display time as received from most any source of time code. Alternatively, the clock may be manually set and operated in stand-alone mode. Six 1" high LEDs display hours, minutes and seconds. Simultaneously, 60 discrete LEDs simulate the "analog" sweep of the Second Hand. Twelve other discrete LEDs, located around the dial at 5-second increments, stay lit continuously and serve as reference indicators. Three Brightness controls allow the intensity of the three "sets" of LEDs to be set independently.

The unit accepts several types of input data: SMPTE/EBU time code, IRIG-B time code, ***ESE*** Time Code (or ***ESE*** "Timer" Code) or ASCII time code on a rear mounted terminal block. If the time code source should fail, the decimal point located between hours and tens of minutes flashes to alert you of the failure, and the clock will continue to keep time using its internal crystal.

The LED Second Hand may be configured in any one of three modes (Accumulate, Eliminate and Single) and is switchable on-the-fly. If receiving 24 hour format time code (or 12 hour format with an AM/PM bit), the unit may be configured for 12 or 24 hour format. The **LX-5212** also provides a Time-Zone offset feature that adds a selected number of hours to the incoming time code value.

Features:

- Reads ***ESE***, ASCII, IRIG-B, EBU Or SMPTE Time Code
- 12 Hour & 24 Hour Modes
- Error Indicator
- Trailing, Leading And Single "Second-Hand" Modes
- Also Able To Read ***ESE*** "Timer" Code
- Stand - Alone & Reader Modes
- Self Setting
- One-Inch High Amber Digital Display
- Three Separate Brightness Controls
- Simple Installation & "Hands-Off" Operation
- 12" Dial
- Rack Mount, 220 VAC & "UL" Options
- Time Zone Offset
- Completely Silent



LX-5212 can also receive "Timer" code from any ***ESE*** "Up" or "Up/Down" Timer (with or without tenths of seconds) and display Timer information with Second-Hand fully operational. When counting "Down", a minus sign "-" appears to the left of the minutes display. If displaying tenths of seconds, the minus sign is omitted.

Optional rack-mounting side flanges may be specified. An external UL-approved wall-mount transformer is also available; when this option is ordered, the usual AC line & internal transformer are eliminated. 110-120 VAC operation is standard (220-240 VAC optional).

Specifications

Inputs: SMPTE / EBU: 10kΩ, Balanced Or Unbalanced, 100mVpp to 10 Vpp
ESE / ASCII: 120kΩ, Unbalanced, ***ESE*** Time (Timer) Code or RS-232C ASCII
IRIG-B: Impedance: 25KΩ Minimum; Mark Amplitude: 10 Vpp Maximum, 0.3 Vpp Minimum; Mark To Space Ratio: 3:1 Nominal

ESE* Format**: ***ESE "TC89" or "TC90"

ASCII Format: 9600 Baud, 8 Data, No Parity, 1 Stop HHMMSS<CR>
(HH=Hours MM=Minutes SS=Seconds <CR> = Carriage Return)

Power Required: 110-120 VAC, 50-60 Hz, 15 Watts Max.

Mechanical: 13.95" H x 13.95" W x 3.45" D, Wall Mount Enclosure; 11.5" Diameter Face

Options: J, P, UL

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ESE/SMPTE VIDEO INSERTER SERIES

The **LX-266U** series is a family of Reader/Video Inserters which decode ESE or SMPTE timecode via a single BNC connector and superimpose the data upon a video signal(s) looped through the unit.

Models in the **LX-266U** series are available with one channel up to twelve channels. Units that contain one to four channels have a 1¾" rackmount enclosure, models with five to twelve channels have a 3½" rackmount enclosure.

Features

- Wide Range (100mVPP-10 VPP) AGC Input
- Multiple Mask Selection
- On-Screen Programming
- Automatic Error Detection and Correction
- Vertical and Horizontal Size & Position Controls
- Operates With NTSC or PAL Video
- Superimposed or Keyed Video Characters
- Brightness Control

LX-266U/4

LX-266U/12

The on-screen programming in setting the **LX-266U** could never be easier. Settings include Size, Position, Brightness, Blanking, and Mask Mode. Mask Mode enables the user to select between several styles of background masks which include solid characters on video, solid characters on a solid mask, translucent characters on video or translucent characters on a translucent mask. Specifying option "Text" allows the user to add unique text insertion for each channel, up to 3 lines and as many as 30 characters per line.

SPECIFICATIONS

Power: 2-25 (/1-/12) Watts Max
Electrical: 90-264 VAC, 47-63 Hz
Video Connectors: 2-BNC (per channel)
Display: 12 Digits Keyed or Superimposed on Video, Adjustable Size
Enclosure: 1.75" x 19" Rack Mount, 10" Deep (LX-266U/1, /2, /3, /4)
3.50" x 19" Rack Mount, 10" Deep (LX-266U/5, /6, /7, /8, /9, /10, /11, /12)

ESE/SMPTE Time Code Input: 1-BNC (per unit)
ESE/SMPTE Input Impedance: 120KΩ
Input Mark Amplitude: 10 VPP Max., 0.3 VPP Minimum
Mark to Space Ratio: 3:1 Nominal
Video In/Out: 1 VPP, 75 ohms
Options: DC, SV, Text-USB, Text-Net, UL

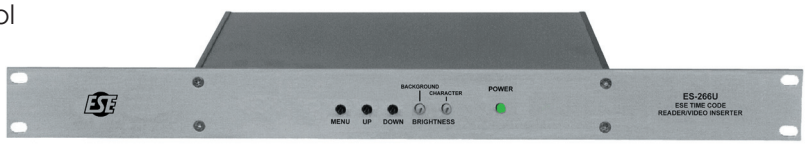
"VIDEO" TIME & DATE INSERTER

The **ES-266U** is a Video Time and Date "Inserter" which receives and decodes either ***ESE*** or SMPTE Time Code (selectable via an internal DIP switch). Six digits of Time (Hr, Min, Sec) and six digits of Date (Month, Day, Year) are then superimposed onto a video signal looped-thru the unit.

On-screen menus allow adjustment of the **ES-266U** display Size and Position, Mask Mode (black background on/off and transparent or solid display), Display Mode (side-by-side / stack / time only / date only), 12/24 Hour mode, and Time Zone offset. The Date may be manually set if receiving time codes which do not provide date information (i.e. TC76™/TC89™ or SMPTE without date-encoded User-Bits). The brightness of the characters and background may be individually set via front-panel controls. The display may be turned on/off via a front-panel control. Two BNC video outputs are provided. An RS-232 interface & Windows® Control Panel software are included, which allow remote control of the display modes

Features:

- Vertical and Horizontal Position Control
- Daylight Savings Time Correction
- Operates With NTSC Or PAL
- Vertical and Horizontal Size
- ***ESE*** Serial Time Code™ Input
- On-Screen Programming
- Multiple Mask Selection
- Brightness Control
- Leap Second Correction
- Side-By-Side Display Can Be Stacked
- "Blankable" Time or Date
- 12 Hour Format (with AM/PM Indicator) Or Optional 24 Format



Specifications

Electrical: 117 VAC, 50/60 Hz
Power: 7 Watts Maximum

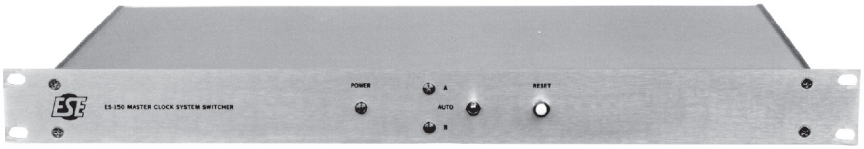
Mechanical: 1.75" x 19" Rack Mount, 10" Deep
Input: Any ***ESE*** Time Code (TC76 must be 24 Hr)
Options: Black, D, DC, J, L2 , L4 , P2, R, SV, UL

MASTER CLOCK
SYSTEM SWITCHER

The **ES-150** is an Automatic Time Code Switchover unit. It is designed to provide a simple/automatic method for switching between a Primary Master Clock and a Secondary Master Clock. The unit receives ***ESE*** time code from two different sources (A & B) and if a fault is detected from the Primary Clock (A), the **ES-150** automatically switches to the Back-Up Clock (B). Once a fault is detected, the unit remains in the "B" state until manually reset. Front panel mounted LEDs indicate status and a toggle switch allows manual switching between A and B.

Features:

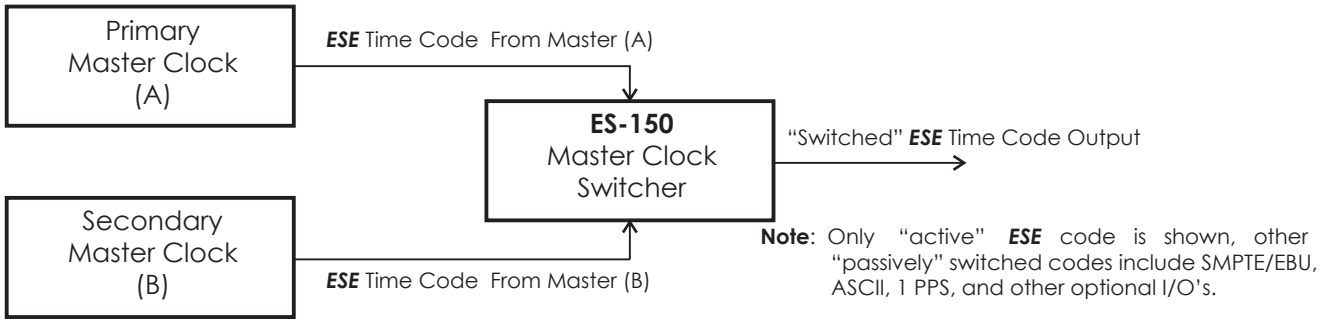
- Up To Four Additional (optional) Input/Output Circuit Switchovers
- Five Standard Input/Output Circuit Switchovers
- Automatic Time Code Switchove
- Simple Installation & Operation
- Rack Mount Enclosure
- LED Status Indicators



The unit also provides passive switchover inputs (A & B) and outputs for SMPTE/EBU time code, ASCII, a 1 PPS signal and an inverted 1 PPS signal. The status of these outputs is controlled by the same circuitry as the ***ESE*** time code and will therefore switch from A to B whenever the ***ESE*** time code is switched.

Optionally, the **ES-150** can be specified to include passive I/O circuitry for switching many other signals that are common in a Master Clock System. These include IRIG-B time code, 1 KHz, 10 MHz and a 12 or 24 VDC Alternating I/O (Analog Clock signal of the ES-162A and Favag Systems). Also optionally available is a Parallel BCD output derived from the ***ESE*** time code.

Simplified Master/Switcher Arrangement



Specifications

Active I/O Circuits: ***ESE*** Time Code
Passive I/O Circuits: SMPTE/EBU, ASCII, 1 PPS, $\overline{1\ PPS}$
Electrical: 117 VAC, 50/60 Hz
Power: 2 Watts
Mechanical: 1.75" x 19" Rack Mount, 10" Deep
Optional I/O Circuits: IRIG-B, 1 KHz, 10 MHz, 12/24 VDC Alternating
Options: B, Black, J, UL, I/O Sets (Additional I/O Passively Switched Circuits)

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TIME CODE ISOLATION & DISTRIBUTION AMPLIFIERS

Since the early '80s, ***ESE***'s Audio and Video Distribution Amplifiers have been recognized for their broadcast quality and durability. Using very similar technology, ***ESE*** presents a line of Distribution Amplifiers (DAs) capable of isolating and distributing most any type of Time Code. The basic idea for each model is the same... provide the ability to distribute time code and compensate for lengthy cable runs while isolating each unit in the Master Clock System.

Described below are units capable of handling any of the IRIG time codes, ***ESE*** Time Code, SMPTE/EBU time code or ASCII time code. If you're in need of a DA not mentioned here refer to our *DISTRIBUTION AMPLIFIERS* Brochure available on our website or contact the ***ESE*** Factory.

ES-210
Quad 1x6 1/5/10 MHz DA

The **ES-210** provides four independent 1x6 Frequency DAs in a single rack-mount enclosure. Each DA has loop-thru inputs and six isolated outputs, all accessible via BNC connectors. Screwdriver-adjustable Gain controls are provided on the front of the case. The Gain control provides an overall signal level adjustment of -1.6 to +3.4 db. Unused outputs need not be terminated.

ES-243
Quad 1x6 ESE DA *(or IRIG-'TTL')*

The **ES-243** is designed to accept any ***ESE*** time code signal or any IRIG time code in its "TTL" form and output up to 24 identical copies. The unit has four separate and isolated channels, each with six available outputs. Inputs and outputs are via rear mounted BNC connectors and each output is capable of driving up to 4000' of cable. The unit is rack mounted.

ES-245
Quad 1x6 SMPTE/EBU DA

The **ES-245** is a Distribution Amplifier designed to distribute and isolate most any audio signal including SMPTE and EBU time code. Four channels, each with six outputs, provide up to 24 identical copies. Inputs and outputs are available on the rear mounted terminal blocks (optional XLR connectors are available). The unit is rack mounted.

ES-249
1x8 RS-232C/ASCII DA

The **ES-249** is designed to accept RS-232C/ASCII and output up to eight identical copies. The unit has a single input and eight outputs that are accessible on rear mounted 9-pin D-sub connectors. Due to the nature of RS-232C, if long cable runs are required, it may be necessary to utilize other time code that is later translated into RS-232C. The unit is rack mounted.

ES-250
1 x 24 RS-232/ASCII DA

The **ES-250** is an RS-232C Isolation and Distribution Amplifier. Three 1 x 8 amplifier circuits allow the incoming signal to be distributed via the 24 outputs. The unit receives RS-232C and buffers the signal so that each of the 24 outputs can drive a single "user" at a distance of up to 50 feet (per output). All inputs and outputs are via rear mounted terminal block connectors.

ES-251
1 x 24 RS-232/ASCII DA

The **ES-251** is an RS-232C Isolation and Distribution Amplifier. Three 1 x 8 amplifier circuits allow the incoming signal to be distributed via the 24 outputs. The unit receives RS-232C and buffers the signal so that each of the 24 outputs can drive a single "user" at a distance of up to 50 feet (per output). All inputs and outputs are via rear mounted terminal DB-9 connectors.

Specifications

	ES-210	ES-243	ES-245	ES-249	ES-250	ES-251
Electrical:	110-120 VAC, 50/60 Hz	117 VAC, 50/60 Hz	117 VAC, 50/60 Hz	117 VAC, 50/60 Hz	110-120 VAC, 50/60 Hz	110-120 VAC, 50/60 Hz
Power:	5 Watts Maximum	2 Watts Maximum	5 Watts Maximum	2 Watts Maximum	2 Watts Maximum	2 Watts Maximum
Mechanical:	1.75" x 19"; 5" Deep	1.75" x 19"; 5" Deep	1.75" x 19"; 5" Deep	1.75" x 19"; 5" Deep	1.75" x 19"; 5" Deep	3.25" x 19"; 5" Deep
Time Code-	10 KHz-15mHz +/- .5db,	***ESE*** (TC76, TC89 or TC90) or	SMPTE/EBU (balanced	ASCII (RS-232C)	ASCII (RS-232C)	ASCII (RS-232C)
Input/Output:	1 Vpp nominal, 50 ohm	IRIG (A, B or E) In AM Form	or un-balanced)	-	-	
Connectors:	BNC	BNC	Terminal Block	9-Pin D-Sub	Terminal Block	9-Pin D-Sub
Configuration:	Quad 1 x 6 (1 x 24)	Quad 1 x 6 (1 x 24)	Quad 1 x 6 (1 x 24)	Single 1 x 8	1 x 24	1 x 24
Options:	J,UL	J, UL	Black, J, UL, XLR	J, UL	J, UL	J, UL

TIME CODE CONVERTERS

All too often communication between various equipment is impossible due to a "language barrier". When time information must be shared, a Time Code Converter (Translator) may be a very simple solution. With more than a dozen "standard" Time Code Converters (and at least that many "Custom" Time Code Converter products), ***ESE*** is certain to offer a solution to any language barrier.

Described below are several Time Code Converters that have solved many Time Code "communication" problems. If a problem exists that is not addressed in this brochure, please contact the ***ESE*** factory for a simple solution to your "communication" needs.

Features:

- Translate SMPTE/EBU, NPR, NTP, ***ESE***, ASCII & IRIG
- Simple Installation & "Hands-Off" Operation
- Optional 220 VAC and/or "UL" Operation
- Synchronization Of Automation Equipment

Model Number	Translates Time Code From	Into	Digital Display
LX/ES-161U/NPR	NPR (SOSS)	***ESE*** (TC90)	Yes (.56" Yellow LED)
LX/ES-161U/RS	***ESE*** (TC76, TC89 or TC90)	ASCII (formats '0', '1' or 'A')	Yes (.56" Yellow LED)
ES-195	***ESE*** (TC76-24Hr, TC89 or TC90)	ASCII (*Grass Valley Group* Master-21) & TC90	Yes (.56" Yellow LED)
ES-198	NTP	***ESE*** (TC90)	Yes (.56" Yellow LED)
ES-223	***ESE*** (TC90)	IRIG (B & E) & ASCII (RS-232C & RS-485)	No
ES-225A	***ESE*** (TC76, TC89 or TC90)	ASCII (RS-232C & RS-485)	No
ES-226	ASCII (formats '0' or '1')	***ESE*** (TC90) & (IRIG-B or IRIG-E)	No
ES-267	LTC	VITC	No
ES-269	VITC	LTC	No
ES-274U	IRIG-B	SMPTE/EBU	No
LX/ES-453U/*ESE*	SMPTE/EBU	***ESE*** (TC89)	Yes (.56" Yellow LED)
LX/ES-453U/RS	SMPTE/EBU	ASCII (formats '0', '1' or 'A')	Yes (.56" Yellow LED)
ES-462U	***ESE*** (TC76, TC89 or TC90)	SMPTE/EBU	No

Model Number	Enclosure	Applications
LX/ES-161U/NPR	LX or ES (desk top)	NPR Radio Code (SOSS)can drive ***ESE*** Clock System
LX/ES-161U/RS	LX or ES (desk top)	Interface ***ESE*** Clock System with Computer
ES-195	Clear Anodized Rack Mount	Synchronize GVG Master 21 with ***ESE*** Master or convert TC89 into TC90
ES-198	Black Anodized Rack Mount	NTP referenced Time Code Generator can drive ***ESE*** Clock System
ES-223	Clear Anodized Rack Mount	Synchronize Voice & Data Loggers with ***ESE*** Master, TZ Option
ES-225A	Black Anodized Desk Top	Interface ***ESE*** Clock System with Computer
ES-226	Black Anodized Desk Top	Synchronize ***ESE*** Slaves, Voice & Data Loggers from "ASCII" Master Clock
ES-267	Black Anodized Desk Top	Convert Longitudinal Time Code (LTC) to Vertical Interval Time Code (VITC)
ES-269	Black Anodized Desk Top	Convert Vertical Interval Time Code (VITC) to Longitudinal Time Code (LTC)
ES-274U	Black Anodized Rack Mount	Stripe (for editing) Video Tape previously encoded with IRIG-B
LX/ES-453U/*ESE*	LX or ES (desk top)	Interface non-***ESE*** Master System (outputting SMPTE) with ***ESE*** Equipment
LX/ES-453U/RS	LX or ES (desk top)	Interface existing SMPTE/EBU with Computer System
ES-462U	Black Anodized Rack Mount	Interface older ***ESE*** Master Clocks with SMPTE/EBU equipment

NOTE: Due to space limitations, not all features, options and specifications are described above. Contact the ***ESE*** Factory for more detailed information.

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GPS BASED FREQUENCY STANDARD

The **ES-110** generates a stable source of 10 MHz and 1 PPS using GPS (Global Positioning System) satellites as a reference. The unit provides 10 MHz in both Sine Wave and Square Wave (5 volt logic) form. The 1 PPS output is a 50% duty, 5 volt logic signal, positive-edge coinciding with the UTC seconds change. An ***ESE*** TC90™ Time Code output is also provided for driving remote time displays. Internal DIP switches allow configuration of the Time Code, Time Zone, antenna cable length compensation, and the satellite tracking mode.

If frequency distribution is needed, we offer the **ES-210** a Quad 1x6 1/5/10 MHz Distribution Amplifier. The **ES-210** provides four independent 1x6 Frequency DAs in a single rack-mount enclosure (see page15).

Features

- Disciplined Temperature-Compensated Crystal Oscillator
- Two 10 MHz Outputs (1 - Sine & 1 - Square)
- Ruggedized Desk-Top Enclosure
- ***ESE*** Time Code Output
- Phase Coherent 1 PPS Output
- GPS Timing Reference With 1 x 10^{-8} Accuracy
- Several Options Available

Specifications

Outputs: 10 MHz Sine Wave, BNC, 4 VPP into 50 ohms
10 MHz Square Wave, 5 VPP CMOS/TTL, BNC
1 PPS, 50% Duty, 5 VPP CMOS/TTL, BNC
ESE Time Code™ (TC90), Drives 100 Slaves @ 4000', BNC
Accuracy: 1 x 10^{-8}
GPS Receiver: Internal 12-Channel
Antenna: Indoor/Outdoor with 16' Cable

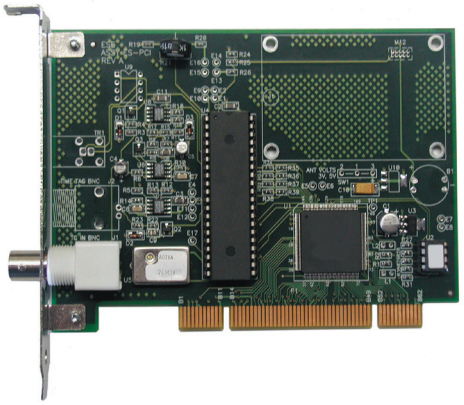
Antenna Input: L1, 1.57542 GHz, TNC
Enclosure: Desk-Top, Black Anodized Aluminum
Dimensions: 1.6" H x 10" W x 4.8" D
Electrical: 117 VAC, 50/60 Hz
Power: 5W maximum
Options: Ant, BBU, DC, J, P, UL

ESE & SMPTE PCI CARD

The **PC-471PCI** is a "PC" card designed to plug into any computer with a vacant PCI slot. The unit continuously reads Time Code (selectable ***ESE*** TC76, TC89, TC90 and SMPTE Formats L, E, S) and updates the time of the PC. The card may be installed in a 32-bit slot or a 64-bit slot. Windows® (95/98/ME/NT/2000/XP) compatible software is provided which synchronizes the PC clock. The software also allows selection of Time Code, Update Rate and Time Zone Offset.

Features

- Simple Installation & Hands-Off Operation
- Synchronizes PC To Master Clock System
- Reads SMPTE or ***ESE*** Time Code
- Windows® Software Included
- Time Zone Offset



Specifications

Signaling Protocol: 3.3V or 5 V
Time Code Input: ESE (TC76, TC89, TC90) or SMPTE (Formats L, E, S)
Drift Rate: +/- 1 Second per month
Card Size: 5.25" L x 3.75" H
OS Requirements: Windows® (95/98/ME/NT/2000/XP)
Connector: BNC

NTP TIME SERVERS

ESE's line of NTP (Network Time Protocol) Time Servers provides a simple method of putting accurate time information onto a network. NTP is arguably the most reliable method for sharing time information on a network (LAN , WAN or Internet, etc.). And, each of these four NTP Time Servers offers a perfect solution for providing accurate and synchronized time throughout a network. The concept is as simple as plugging the Server into the network, configuring the unit and allowing any client to request "highly accurate" time from the NTP Time Server.

Features

- Create NTP From Most Any "Non-NTP" Master Clock
- NTP Primary Time Server **(ES-104A)**
- Several Options Available
- Platform Independent
- Simple Installation & Hands-Free Operation
- 10/100BaseT - NTP Data Port (RJ-45)
- Rugged Desktop Enclosure
- ***ESE*** Time Code Output

Applications

- Telephone & Radio Dispatch Time Stamps
- Manufacturing Process Control
- Broadcast Facilities
- Financial Institutions
- Securities Exchanges
- Military Installations
- Digital Signatures

The **ES-104A** employs an internal GPS Receiver as its time reference. This provides the user a source of UTC (Universal Coordinated Time) from an NTP Primary (Stratum 1) Time Server. In contrast, **ES-289A**, **ES-299E** and **ES-911A/NTP** receive their time reference from external sources of time code. They are in essence time code translators, each receiving time code and "outputting" NTP. The **ES-289A** accepts either SMPTE/EBU time code (must include Date data) or ***ESE*** Time Code™, while the **ES-299E** references either IRIG (A,B or E) and NASA 36. Designed to accept ASCII time code, the **ES-911A/NTP** accepts any of the formats that follow: NENA (Format "1"), ***ESE*** (Format "A"), or NMEA 0183, and also accepts ***ESE*** (TC-90).

All four units include an ***ESE*** Time Code™ output which is capable of driving up to 100 ***ESE*** Slave Clocks at a distance of up to 4000 feet. A rear mounted DB-9 connector allows access to the GPS / Time Code Lock status output. All configuration is accomplished via the 10/100BaseT network connection (RJ-45).

Specifications

I/O Connection: Network: 10/100BaseT Ethernet, RJ-45
Outputs: ***ESE*** Time Code™ TC89 or TC90, Drives 100 Slaves @ 4000', BNC
GPS Receiver: Internal 12-Channel (**ES-104A** only)
Antenna: Indoor/Outdoor with 16' Cable (**ES-104A** only)
Antenna Input: L1, 1.57542 GHz, TNC (**ES-104A** only)
Time Code Input:
- **ES-289A**: ***ESE*** (TC-90), SMPTE or EBU Time Code with Date data, BNC
- **ES-299E**: IRIG (A,B or E), NASA 36, BNC
- **ES-911A/NTP**: ASCII (RS-232C): NENA (format "1"), ***ESE*** ("A"), or NMEA 0183 (GPRMC), DB-9
  ESE (TC-90) via BNC

Drift: 33ms/Day (if no GPS signal)
Configuration: Web page or Telnet
Enclosure: Desk-Top, Black Anodized Aluminum
Dimensions: 1.6" H x 7" W x 5" D
Electrical: 117 VAC, 50/60 Hz
Power: 5W maximum
Options: Ant (**ES-104A** Only), BBU, J, P, P2, UL

142 SIERRA ST., EL SEGUNDO, CA 90245 (310)322-2136 FAX (310)322-8127 www.ESE-WEB.com

TIME CODE COMPARATORS

The ES-700 Series is a family of programmable event controllers that provide a number of contact closure outputs at predetermined times. These controllers allow the user to automate multiple events with simple programming.

Features:

- Reads & Compares ***ESE*** Time Code
- PC Programmable
- Custom Modifications Available
- Easily Expanded
- Simple Installation & Programming For "Hands-Off" Operation

ES-716

The **ES-716** is an ***ESE*** & SMPTE/EBU Time Code Comparator. The unit reads Hours, Minutes and Seconds and compares Hours and Minutes (jumperable to Minutes and Seconds) and includes two contact closure outputs. The two event times are set using the front panel thumbwheel switches. The duration of each contact closure output is one second and may be disabled if desired by using a rear-mounted toggle switch.

Each event activates a one second internal audible alarm which may be disabled via a rear-mounted toggle switch.

ES-737

The **ES-737** is an ***ESE*** time code comparator. The ES-737 reads TC89 and TC90 Time Code. The unit compares the Day, Hours, Minutes and Seconds when reading TC90 time code (Hours, Minutes and Seconds when reading TC89 time code). Up to 100 events are possible, with up to 10 relay contact closure outputs. Each event may be assigned to the desired output. Programming is accessible on the front panel keypad entry system.

Each event activates a one second internal audible alarm which may be disabled via a rear-mounted toggle switch.

ES-747

The **ES-747** is a PC programmable ***ESE*** Time Code Comparator. The unit reads and compares Hours, Minutes & Seconds and includes up to 100 programmabe events via to 10 relay contact closure outputs. Each event may be assigned to the desired output. Software is provided to program the event times and relays. A USB port is located on the rear panel to interface with a PC.

Each event activates a one second internal audible alarm which may be disabled via a rear-mounted toggle switch.

*Various models are available in the ES-700 series from Time Code Readers (ESE, SMPTE/EBU & IRIG) to Stand-Alone Clocks and Elapsed Timers with Thumbwheel, Keypad or PC Interface programmability. Please contact the ***ESE*** factory for more detailed information.

SPECIFICATIONS

	ES-716	ES-737	ES-747
Time Code:	ESE & SMPTE/EBU	ESE (TC89 & TC90)	ESE (TC89 & TC90)
Input Level:	100 mVPP to 10 VPP	CMOS Compatible	100 mVPP to 10 VPP
Impedance:	2kΩ	2kΩ	2kΩ
Relays:	2 Reed	10 Reed	10 Reed
Relay Rating:	10 W @ 500 mA	10 W @ 500 mA	10 W @ 500 mA
Mechanical:	1.75" x 19", 10" Deep	3.5" x 19", 10" Deep	1.75" x 19", 10" Deep
Electrical:	110-120 VAC, 60 Hz	110-120 VAC, 60 Hz	110-120 VAC, 60 Hz
Power:	15 Watts	15 Watts	15 Watts
Options:	BBU, DC, J, UL	BBU, DC, J, Relay, UL	BBU, DC, J, NTP, UL

OPTIONS

Options listed below are available only on certain products and descriptions are relative to products described in this brochure. Refer to product "Specifications" or the Price List for option availability. Features neither listed as a Standard Feature nor available as an Option may be available on a "Custom" basis. Please consult the ***ESE*** Factory.

Amber — ***Amber Display***: Replaces standard colored LEDs with Amber LEDs.

Ant — ***GPS Antenna***: High Performance GPS Antenna for harsh RF Environments.

B — ***Parallel BCD Output***: Provides a Parallel BCD (CMOS Compatible) output. ES-169B may be substituted when option "B" is not available.

BBU — ***Battery Back-Up***: An internal battery with built-in charger is supplied. Standard on most Master Clocks.

Black — ***Black Anodized Front Panel***: Available on most rack mount units.

Blue — ***Blue Display***: Replaces standard colored LEDs with Blue LEDs.

C — ***Crystal Timebase***: A .002% crystal is employed for those applications requiring independence from the line frequency. A trimmer is included for greater accuracy (2-3 seconds/week).

CW — ***Ceiling / Wall Mount Bracket***: A ceiling/wall mount bracket is supplied allowing mounting to a ceiling or wall. The viewing angle can be adjusted as desired.

D — ***Remote Control***: This option provides a connector wired to switches on a control plate via a six foot cable. Extra cable available.

DC — ***DC Power***: Unit is operated exclusively from an external "DC" supply (+11 to +35 VDC is required).

EBU — ***EBU Time Code***: The unit is configured to read and/or output EBU Time Code instead of SMPTE (standard, or at no charge on many units).

ESE — ***ESE Time Code Output***: An ***ESE*** Time Code output (TC90) is provided allowing the unit to drive ***ESE*** Time Code Slaves.

EXT — ***External Time Base***: Available when a user prefers to reference the clock of an existing source of either 1 MHz, 5 MHz or 10 MHz. Frequency must be specified when ordered.

Green — ***Green Display***: Replaces standard colored LEDs with Green LEDs.

HR — ***Hour & 1/2 Hour Relay Closure***: A contact closure occurs each hour and 1/2 hour (1/2 hour can be defeated). Relay contacts are rated at 10 Watts maximum load, 500mA maximum switching current.

I/O Sets — ***Additional Input & Output Sets***: Specify L-IRIG, L-1KHz, L-10MHz and/or L-VDC.

IRIG(5100) — ***IRIG-B Time Code Input:*** Allows the unit to synchronize with a source of IRIG-B.

IRIG-B — ***IRIG-B Time Code Output:*** Provides an IRIG-B time code output.

IRIG-E — ***IRIG-E Time Code Output:*** Provides an IRIG-E time code output.

J — ***220 VAC, 50/60 Hz Operation***: Required on many overseas applications.

K — ***Precision Frequency Outputs***: 10 MHz and 1 KHz Outputs are provided.

L2 — ***Two Additional Video Input/Output Sets***: Available on most Video Inserters.

L4 — ***Four Additional Video Input/Output Sets***: Available on most Video Inserters.

Light — ***Lighted Dial***: Available only on LX-5100 Series Analog Clocks. The dial of the clock can be illuminated. A brightness control is included.

NPR — ***National Public Radio***: The NPR option on the LX/ES-161U provides a NPR time code input allowing the unit to read & display time code as received from NPR and inlcudes an ***ESE*** time code output. The NPR option on the ES-188 provides an NPR time code output.

NTP — ***NTP Server***: Provides an NTP (Network Time Protocol) Server. Allows for synchronization of computer networks and LAN control.

NTP-C — ***NTP Client***: Provides an NTP Client Display. Allows for synchronization with an NTP server.

P — ***19" Front Panel (Rack Mount)***: Designed for mounting into a standard equipment rack. Panel is 1/8" clear or black anodized Aluminum and chassis is 5" - 10" deep.

P2 — ***Dual Rack Mount***: Allows specific units to be mounted side-by-side on a single Rack Mount panel.

Q — ***Console Mount***: The unit is housed in an enclosure 8" deep, front panel is 3.5" x 9".

R — ***Remote Input***: Rear-mounted connector for Remote Control.

Red — ***Red Display***: Replaces standard colored LEDs with Red LEDs.

RS — ***RS-232C Output***: An RS-232C ASCII Computer Interface is supplied (RS-422A can alternatively be specified).

SMPTE/EBU — ***SMPTE(or EBU) Time Code***: SMPTE or EBU time code outputs may be specified (not available with IRIG)

SV — ***S-VHS Connectors***: S-VHS connectors are provided and the unit becomes S-VHS compatible.

Text-Net — ***Text Insertion***: Text Insertion of up to 3 lines and up to 30 characters per line via Ethernet input & USB input.

Text-USB — ***Text Insertion***: Text Insertion of up to 3 lines and up to 30 characters per line via USB input.

TZ — ***Time Zone Offset***: Internal DIP switch allows the hours (and half-hour) to be independently offset to any time zone.

UL — ***UL Power Supply***: The unit is supplied with a UL/CSA approved wall mount power supply.

W — ***3-Wire Power Cord***: Recommended where static charges can occur. Standard on many units, otherwise a 2-wire cord is supplied.

Wall — ***Wall Mount Enclosure***: Black powder-coated enclosure replaces standard housing.

XLR — ***XLR Connectors***: The rear mounted terminal block is replaced with XLR connectors (the chassis is 3 1/2" high).

1pps — ***One Pulse Per Second***: A TTL Pulse is output once per second.

6-Digit — ***6-Digit Display***: A 6-digit (Hr, Min, Sec) front panel mounted display (.56" LED) is included

9-Digit — ***9-Digit Display***: A 9-digit (Days, Hr, Min, Sec) front panel mounted display (.56" LED) is included.

10ηS — ***10ηS Accuracy***: The accuracy of the unit is improved to 10ηS.

FIVE YEAR WARRANTY

All products described in this brochure are warranted free of mechanical and electrical defects, and will be replaced or repaired without charge if found defective under normal operating conditions when used as intended. Assembled products must be returned for adjustment within five years of purchase. Before returning goods, please write or call for shipping instructions.

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