IMAGE VIDEO
Division of 1077541 Ontario Limited

TSI-1000ACO
TALLY SYSTEM INTERFACE
AUTOMATIC CHANGEOVER

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WARRANTY

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If during a period of ninety (90) days from the date of original purchase for use, an Image Video product requires a part replacement, due to defective materials or workmanship, the equipment is to be returned to the factory and the necessary new part will be furnished by Image Video, including the labour directly associated with the repair and all shipping charges, at no cost to the customer.

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This warranty excludes tubes and assembled products not of Image Video manufacturer whether or not they are incorporated in an Image Video product or sold under an Image Video part or model number. Image Video will not be responsible for any expense or loss of revenue or property incurred by the purchaser due to a malfunction in the equipment.

All vendor instruments, components, vacuum tubes, assembled products, and other devices in this system not manufactured by Image Video, shall be warranted according to the agreement supplied by the manufacturing company.

This warranty is in lieu of all others expressed or implied, and no representative or person is authorised to assume any other liability in connection with the sale of our products.

PLEASE CALL OUR SALES DEPARTMENT TO OBTAIN A RETURN AUTHORISATION NUMBER WHEN RETURNING PRODUCTS FOR SERVICE OR REPAIR OR FOR ANY OTHER REASON.

TSI-1000ACO
Tally System Interface
Automatic Changeover

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Revision	*Date*	*Changes*
A	February 4, 2004	Original document

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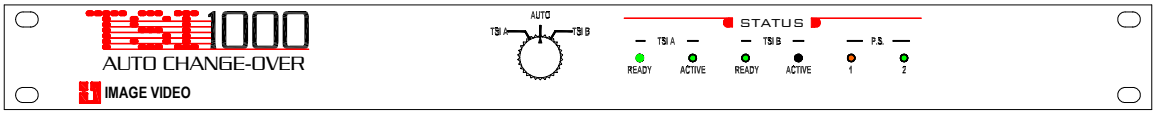
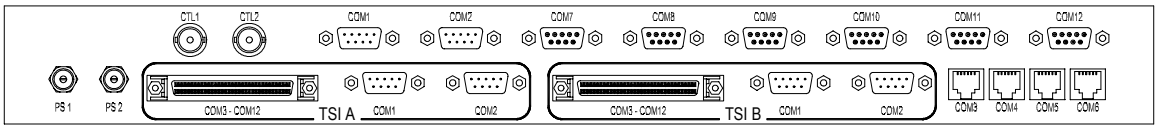
1 INTRODUCTION

1.1 PREFACE





The TSI-1000ACO Automatic Changeover provides an automatic changeover of the TSI-1000 Tally System Interface serial ports in a Tally Display System. The Automatic Changeover monitors the TSIs to select the best interface to control the Tally Display System. The unit also provides status to the console and back to the TSIs of the health of both TSIs and the Automatic Changeover itself.

Serial port switching is done using multi-pole double-throw relays. The switchover algorithm of the unit prevents needless switching between the TSIs. Redundant power supplies and failsafe relay control logic within the TSI-1000ACO enhance the system reliability.

A front panel override control allows the system operator to manually select either TSI as the system interface.

Interconnection between the ACO and the TSIs is simplified by the use of multi-pair interconnect cables.

Throughout this manual the TSI-1000ACO Automatic Changeover is referred to as the ACO and the TSI-1000 Tally System Interface is referred to as the TSI or TSIs when referring to both.

2 INSTALLATION

2.1 GENERAL

This section assists in the installation and connection of the TSI-1000ACO Automatic Changeover. The unit has rear panel connections for power, the two TSIs, and the system serial ports.

Figure 1: ACO Rear Panel

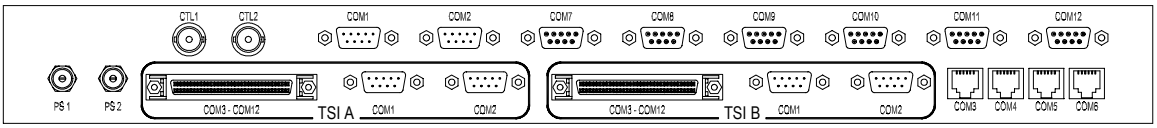
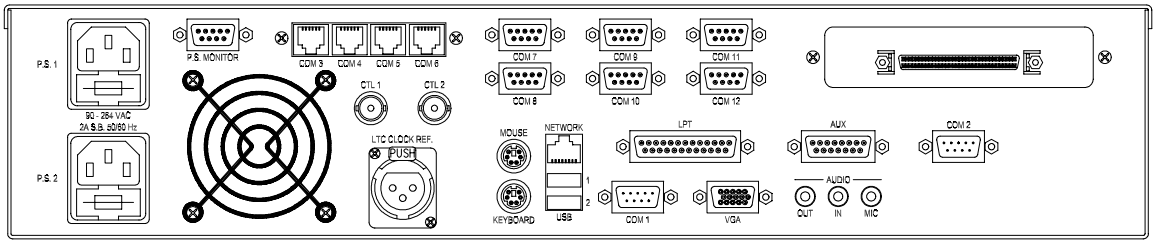


Figure 2: TSI Rear Panel



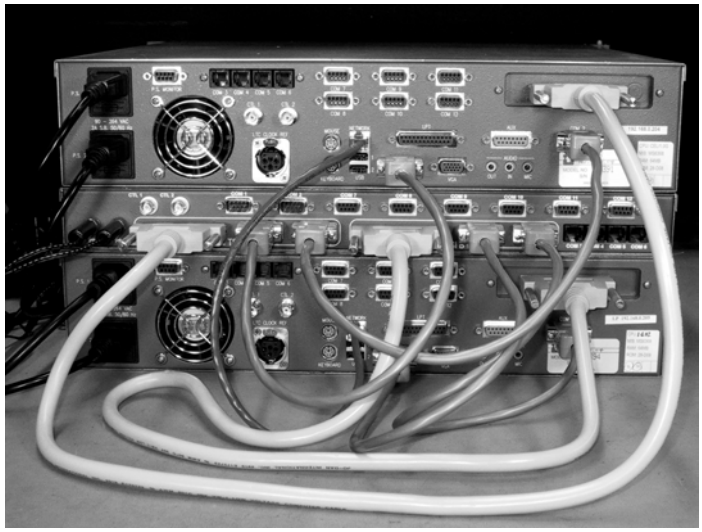
All devices monitored and controlled via a serial link are connected to the TSI-1000ACO. The time code and LAN connections are made directly to the TSIs. In systems without a LAN an Ethernet crossover cable interconnects the TSIs.

2.2 EQUIPMENT LOCATION

The TSIs and the ACO should be mounted together in a standard 19" rack. There are no special mounting requirements, however, it should be noted that any excessive direct light on the front of the units could make the LEDs difficult to distinguish. Adequate clearance should be provided at the rear of the units for the connectors and cables. Adequate clearance must be provided at the sides of the units for ventilation.

The TSIs are designated 'A' and 'B' for identification. The units are usually arranged with the 'A' TSI on top, the ACO in the middle and the 'B' TSI on the bottom.

Figure 3: ACO and Two TSIs



2.3 POWER

Power is applied to the ACO from one or two external power supplies via the connectors PS1 and PS2 on the rear of the unit. Power from both connectors is internally combined and regulated. The ACO can be powered from either connector, however, for maximum reliability power supplies should be connected to both connectors.

Status of the external power supplies is indicated by LEDs on the front of the unit. See Table 4 on page 7 for details.

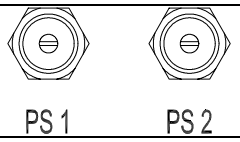
The standard TSI-1000ACO is equipped with two wall-mount power supplies with locking connectors. Plug the power supply outlet plugs into the power connectors on the rear of the ACO and the supplies into available AC power outlets.

Confirm the wall-mount power supply conforms to the local AC power source before plugging it into the AC power outlet.

If other power supplies are being used, the power connector should be wired according to Table 1 below. The mating connectors are coaxial power plugs with a 2.5mm centre pin (Switchcraft 760, Switchcraft 760K, or equivalent).

Table 1: Power Connector Pinout

Pin	*Function*
Centre	+9 to +35V DC
Sleeve	Ground



2.4 TSI-1000 TO TSI-1000ACO INTERCONNECTION

The serial data ports from each TSI are connected to the ACO with the supplied 68-conductor and 9-conductor cables.

The COM1 and COM2 connectors in the TSI A and TSI B groups on the rear of the ACO connect to the COM1 and COM2 on the respective TSIs using the female 9-pin 'D' to female 9-pin 'D' cables. The COM3-COM12 connectors in the TSI A and TSI B groups connect to the unlabelled 68-pin connectors on the respective TSIs using the male 68-pin half-pitch 'D' to male 68-pin half-pitch 'D' cables.

Figure 4: Interconnect without a LAN

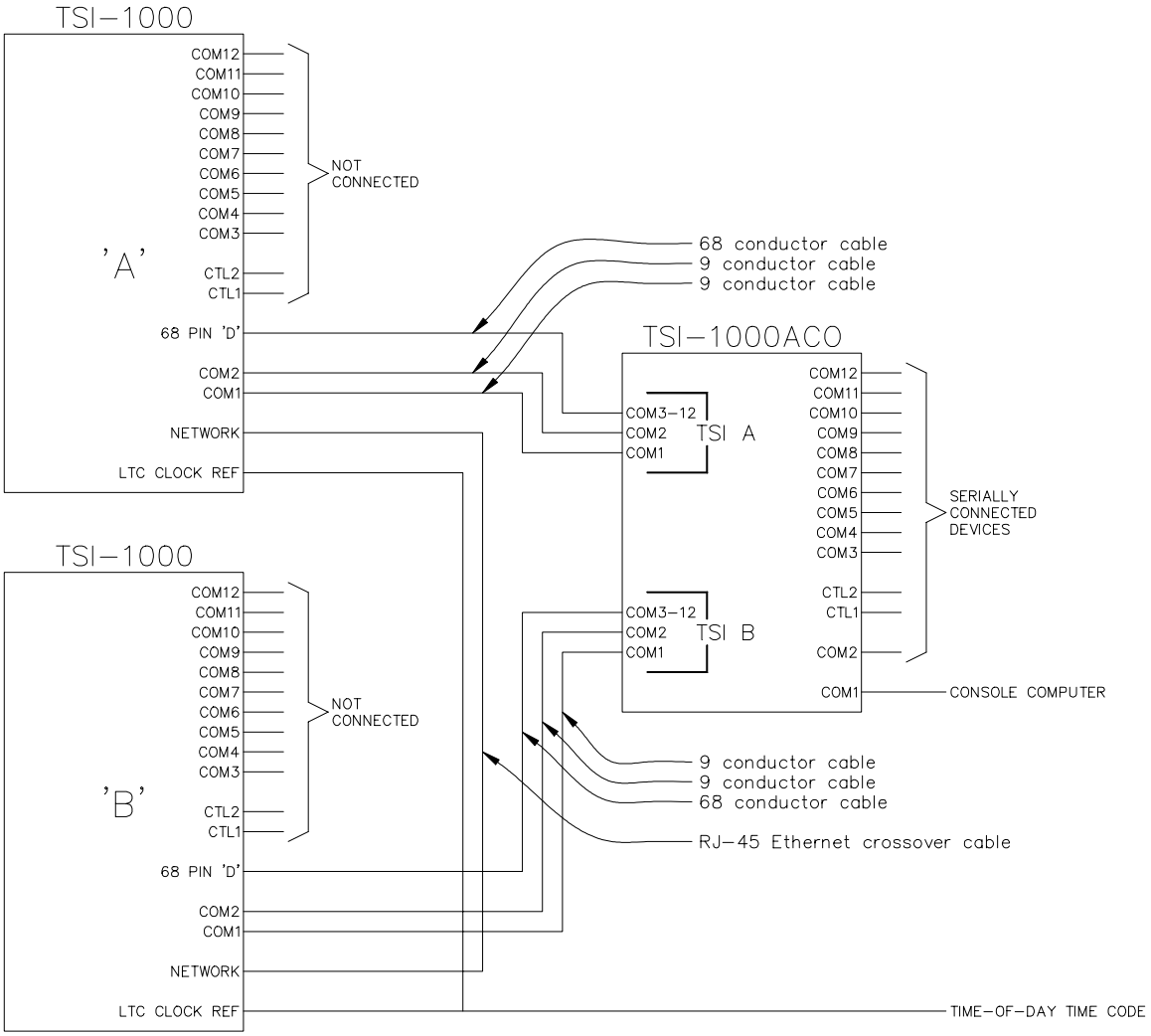
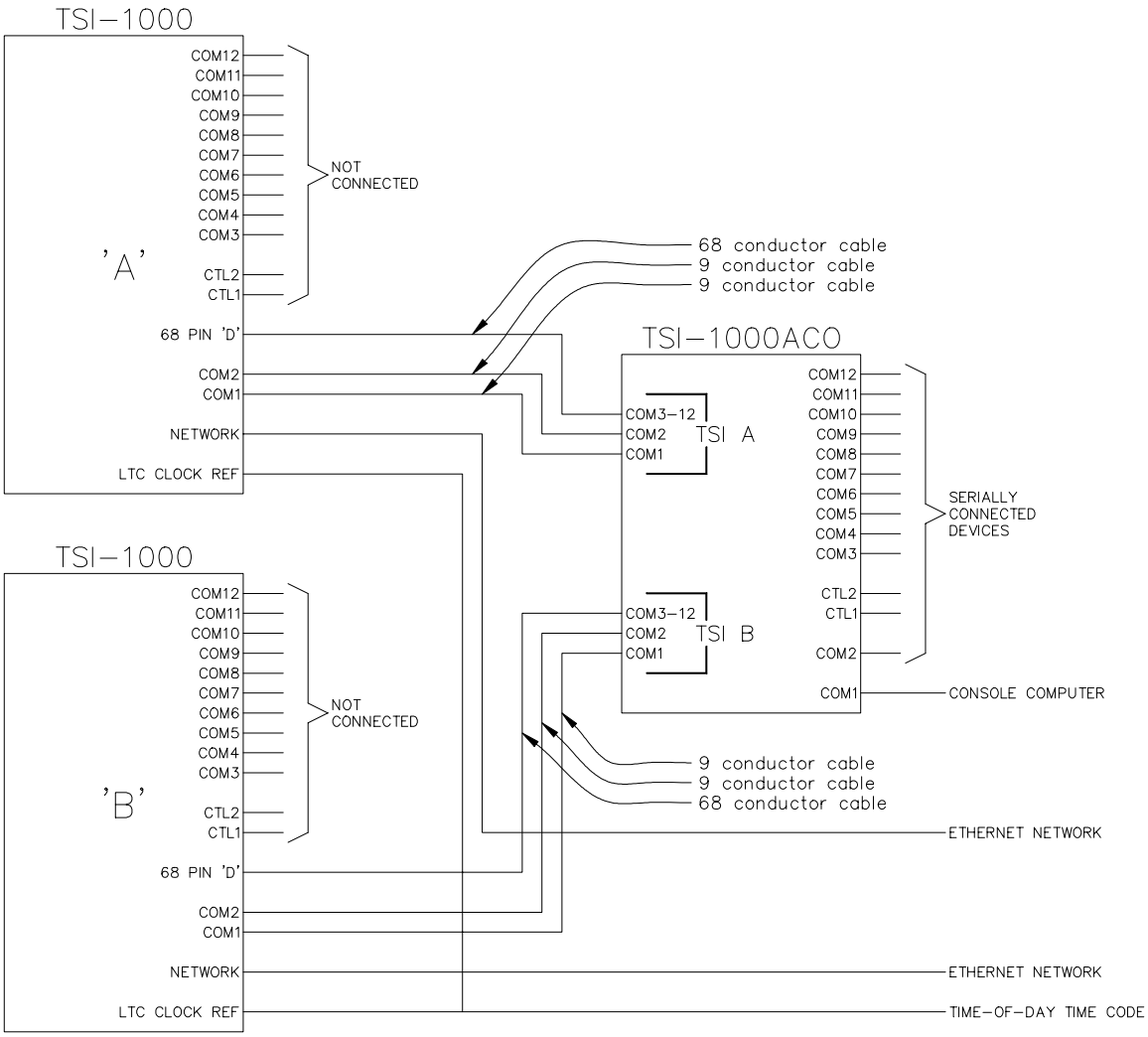


Figure 5: Interconnect with a LAN



2.5 TSI-1000 TO TSI-1000 INTERCONNECTION

The two TSIs are interconnected via their LAN ports. The RJ-45 connector NETWORK on the rear of the TSI-1000 provides the LAN interface.

In a system where a LAN connection is not required to connect to networked devices, connect the NETWORK connectors on the two TSIs using the supplied RJ-45 to RJ-45 Ethernet crossover cable. See Figure 4 on page 4.

In a system where a LAN connection is required to connect to networked devices, the NETWORK connectors of both TSIs must be connected to the network hub using customer supplied CAT5 cable. See Figure 5 above.

2.6 TALLY SYSTEM SERIAL CONNECTIONS

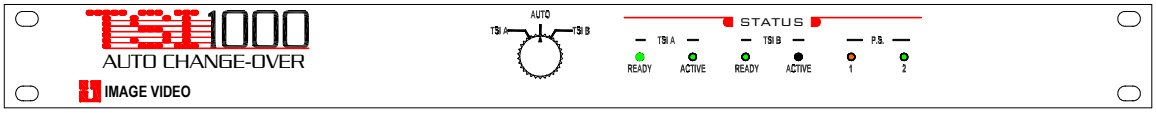
The connections to the devices that are monitored and controlled via a serial link are connected to the COM2 to COM12 9-pin 'D' connectors and the CTL1 and CTL2 BNC connectors on the rear of the ACO.

The pinouts of the connectors are identical to the respective connectors on the TSI-1000.

3 CONFIGURATION AND OPERATION

This section describes the configuration and operation of the TSI-1000ACO Automatic Changeover. The ACO selects the TSI-1000 Tally System Interface that will control the tally system. The TSI selection can be automatic or the 'A' or 'B' TSI can be selected manually.

Figure 6: ACO Front Overlay



The front panel rotary switch controls the operational mode. The front panel tricolour LEDs show the status of the ACO, the external power supplies, and the monitored TSIs.

3.1 TSI-1000ACO CONFIGURATION

There is nothing to configure in the ACO.

3.2 TSI-1000 CONFIGURATION

Both TSIs in a backup pair must be configured with the network address of each other. The TSIs recognise the other TSI in its backup pair since both TSIs are configured with the same system identification number. Refer to the Tally System Interface configuration manual.

The designation of 'A' and 'B' to the TSIs is determined by whether the TSI is connected to connector group TSI A or TSI B on the rear of the ACO. The 'A' or 'B' designation is transmitted to the TSIs by the ACO.

3.3 OPERATIONAL MODE

The ACO operates in one of three modes: automatic selection of the active TSI-1000, manual selection of the 'A' TSI-1000, and manual selection of the 'B' TSI-1000. The operating mode is selected using the front panel rotary switch.

The ACO continually monitors the heartbeat signal from both TSIs to determine if they are ready to be the active TSI. The TSIs must continually send a properly formatted heartbeat signal to be considered ready.

3.3.1 Automatic Mode

The active TSI can be selected automatically by putting the rotary switch in the AUTO position.

The TSI that is selected as the active unit in the automatic mode is determined by the ready state of both TSIs. The ACO will only switch to the standby TSI if the currently selected TSI is not ready and the standby TSI is ready. If both TSIs are ready or not ready the active selection will not change.

3.3.2 Manual Mode

Either TSI can be manually selected as the active TSI by putting the rotary switch in the TSI A or TSI B position as required.

Manual selection of the 'A' or 'B' TSI cannot be overridden by the selection logic of the ACO.

3.3.3 Power Off Selection

The 'A' TSI is selected when the ACO is off.

3.4 STATUS DISPLAY

The status of the ACO and the TSIs is displayed by tricolour LEDs on the front panel of the ACO and the TSIs. Expected conditions are indicated by LEDs illuminated with a solid colour. Abnormal conditions are indicated by LEDs illuminated with a flashing colour.

3.4.1 Ready Status

The READY LEDs on the front panel of the ACO indicate the ready status of the TSIs. The possible status conditions are listed in Table 2 below.

Table 2: READY LED Indications

LED Colour	*Condition*	
Green	Ready	A proper heartbeat signal is being received from the TSI. This is the normal condition.
Red	Not ready	No heartbeat signal is being received from the TSI. This problem is usually caused by the TSI being turned off or not connected to the ACO.
Blinking Red	Fault	A bad heartbeat signal is being received from the TSI. This problem is usually caused by a faulty TSI.

3.4.2 Active Status

The ACTIVE LEDs on the front panel of the ACO indicate the active status of the TSIs. The possible status conditions are listed in Table 3 below.

Table 3: ACTIVE LED Indications

LED Colour	*Condition*	
Green	Automatic Selection	This ready TSI has been automatically selected as the active unit.
Blinking Green	Manual Selection	This ready TSI has been manually selected as the active unit.
Off	Not Selected	This TSI has been selected as the standby unit.
Red	Not Ready Selection	This not ready TSI has been selected as the active unit. The usual cause of this problem is when neither TSI is ready or a not ready TSI has been manually selected.
Blinking Amber	TSI-1000ACO Fault	The ACO has an internal relay control fault. Either the relays are not changing to what the control logic has selected (the ACTIVE LED of the selected TSI will be blinking amber) or the relay state cannot be determined (both ACTIVE LEDs will be blinking amber).

3.4.3 Power Supply Status

The PS1 and PS2 LEDs on the front panel indicate the power supply status of the ACO. The possible status conditions are listed in Table 4 below.

Table 4: PS1 and PS2 LED Indications

LED Colour	*Condition*	
Green	Power Supply Okay	The external power supply is connected and is supplying power to the ACO.
Red	Power Supply Off	The external power supply is connected to the ACO; however, there is no power from the supply. The problem is usually caused by the power supply being unplugged from the wall outlet.
Off	Power Supply Disconnected	The external power supply is not connected. The problem is usually caused by the power supply being unplugged from the ACO.
Blinking Red	Power Supply Fault	The external power supply is connected, however, it is not supplying enough power to the ACO. The problem is usually caused by an incorrect or faulty external power supply.
Blinking Amber	TSI-1000ACO Fault	The ACO has an internal power supply fault.

3.4.4 TSI-1000 CPU Status LEDs

The CPU LEDs on the front panel of the TSIs indicate the active status of the TSI. The possible status conditions are listed in Table 5 on page 8.

Table 5: TSI-1000 CPU LED Indications

LED Colour	*Condition*	
Green	Active	This TSI is the active unit.
Blinking Green	Active	This TSI is the active unit. The LED blinks when receiving a message from the console.
Amber	Standby	This TSI is the standby unit.

3.4.5 TSI-1000 COM and CONSOLE Status LEDs

The COM1 to COM12 and CONSOLE LEDs on the front panel of the TSIs indicate the operational status of the serial ports and the console. The LEDs on the active TSI indicates the serial port and configuration console status as per normal tally system operation. The LEDs on the front of the standby TSI will be off.