

Data Converter Units

Instructions for Use	
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LTC 8780 Series



IMPORTANT SAFEGUARDS

1. Read Instructions - All the safety and operating instructions should be read before the unit is operated.
2. Retain Instructions - The safety and operating instructions should be retained for future reference.
3. Heed Warnings - All warnings on the unit and in the operating instructions should be adhered to.
4. Follow Instructions - All operating and use instructions should be followed.
5. Cleaning - Unplug the unit from the outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
6. Attachments - Do not use attachments not recommended by the product manufacturer as they may cause hazards.
7. Water and Moisture - Do not use this unit near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, near a swimming pool, in an unprotected outdoor installation, or any area which is classified as a wet location.
8. Accessories - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury to a person and serious damage to the unit. Use only with a stand, tripod, bracket, or mount recommended by the manufacturer, or sold with the product. Any mounting of the unit should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.



9. Ventilation - Openings in the enclosure, if any, are provided for ventilation and to ensure reliable operation of the unit and to protect it from overheating. These openings must not be blocked or covered. This unit should not be placed in a built-in installation unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
10. Power Sources - This unit should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply you plan to use, consult your appliance dealer or local power company. For units intended to operate from battery power, or other sources, refer to the operating instructions.
11. Grounding or Polarization - This unit may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

Alternately, this unit may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

12. Power-Cord Protection - Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles, and the point where they exit from the appliance.
13. Power Lines - An outdoor system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outdoor system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal. U.S.A. models only - refer to the National Electrical Code Article 820 regarding installation of CATV systems.
14. Overloading - Do not overload outlets and extension cords as this can result in a risk of fire or electric shock.
15. Object and Liquid Entry - Never push objects of any kind into this unit through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the unit.

16. Servicing - Do not attempt to service this unit yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
17. Damage Requiring Service - Unplug the unit from the outlet and refer servicing to qualified service personnel under the following conditions:
 - a. When the power-supply cord or plug is damaged.
 - b. If liquid has been spilled, or objects have fallen into the unit.
 - c. If the unit has been exposed to rain or water.
 - d. If the unit does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the unit to its normal operation.
 - e. If the unit has been dropped or the cabinet has been damaged.
 - f. When the unit exhibits a distinct change in performance--this indicates a need for service.
18. Replacement Parts - When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.
19. Safety Check - Upon completion of any service or repairs to this unit, ask the service technician to perform safety checks to determine that the unit is in proper operating condition.
20. Coax Grounding - If an outside cable system is connected to the unit, be sure the cable system is grounded. U.S.A. models only--Section 810 of the National Electrical Code, ANSI/NFPA No.70-1981, provides information with respect to proper grounding of the mount and supporting structure, grounding of the coax to a discharge unit, size of grounding conductors, location of discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
21. Lightning - For added protection of this unit during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the unit due to lightning and power-line surges.

FCC & ICES INFORMATION

(U.S.A. and Canadian Models Only)

WARNING - This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and ICES-003 of Industry Canada. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Intentional or unintentional changes or modifications not expressly approved by the party responsible for compliance shall not be made. Any such changes or modifications could void the user's authority to operate the equipment.

The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No.004-000-00345-4.

SAFETY PRECAUTIONS

	CAUTION RISK OF ELECTRIC SHOCK. DO NOT OPEN!	
CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT OPEN COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.		

This label may appear on the bottom of the unit due to space limitations.



The lightning flash with an arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to presence of important operating and maintenance (servicing) instructions in the literature accompanying the

appliance.

Warning

To prevent fire or shock hazard, do not expose units not specifically designed for outdoor use to rain or moisture.



Attention: Installation should be performed by qualified service personnel only in accordance with the National Electrical Code or applicable local codes.



Power Disconnect. Units with or without ON-OFF switches have power supplied to the unit whenever the power cord is inserted into the power source; however, the unit is operational only when the ON-OFF switch is in the ON position. The power cord is the main power disconnect for all units.

SECURITE

	ATTENTION RISQUE D'ELECTROCUTION. NE PAS OUVRIR.	
Danger: Pour éviter tout risque d'électrocution, ne pas ouvrir le boîtier. Il n'y a pas de pièces remplaçables à l'intérieur. Pour toute révision, s'adresser à un technicien spécialisé.		

En raison de limitation de place, cette étiquette peut être placée sur le dessous de l'appareil.



L'éclair fléché dans un triangle équilatéral, avertit l'utilisateur de la présence d'une "tension dangereuse" non isolée à l'intérieur de l'appareil et d'une valeur suffisante pour constituer un risque d'électrocution.



Le point d'exclamation contenu dans un triangle équilatéral, avertit l'utilisateur de la présence, dans la documentation qui accompagne l'appareil, de consignes d'utilisation et de maintenance importantes.

Attention

Pour éviter le risque d'électrocution ou d'incendie, ne pas exposer à la pluie ou à l'humidité un appareil non conçu pour une utilisation extérieure.



Attention: L'installation doit être effectuée uniquement par du personnel de service qualifié conformément à la réglementation du Code Electrique National ou à la réglementation locale.



Disjonction de l'alimentation. Les appareils avec ou sans commutateurs ON-OFF sont alimentés à chaque fois que le cordon d'alimentation est branché à la source d'alimentation; toutefois, les appareils disposant de commutateurs ON-OFF ne fonctionnent que lorsque le commutateur ON-OFF est sur la position ON. Le cordon d'alimentation est la disjonction d'alimentation principale pour tous les appareils.

SICHERHEITSVORKEHRUNGEN

	VORSICHT RISIKO EINES ELEKTRISCHEN SCHLAGES NICHT ÖFFNEN!	
VORSICHT: UM EINEN ELEKTRISCHEN SCHLAG ZU VERMEIDEN, ABDECKUNG NICHT ENTFERNEN. WARTUNGEN ALLER ART QUALIFIZIERTEM PERSONAL ÜBERLASSEN.		

Aus Platzgründen kann diese Warnung auf der Unterseite des Gerätes angebracht sein.



Das Blitzsymbol im gleichseitigen Dreieck soll den Benutzer auf nicht isolierte "Hochspannung" im Gehäuse aufmerksam machen, die eventuell stark genug ist, um einen elektrischen Schlag zu verursachen.



Das Ausrufezeichen im gleichseitigen Dreieck soll den Benutzer auf wichtige Bedienungs- und Wartungsanleitungen in der dem Gerät beigelegten Literatur aufmerksam machen.

Warnung

Um Feuer oder elektrische Schläge zu vermeiden, setzen Sie das Gerät niemals Regen oder Feuchtigkeit aus.



Achtung! Die Installation sollte nur von qualifiziertem Kundendienstpersonal gemäß jeweilig zutreffender Elektrovorschriften ausgeführt werden.



Netzanschluß. Geräte mit oder ohne Netzschalter haben Spannung am Gerät anliegen, sobald der Netzstecker in die Steckdose gesteckt wird. Das Gerät ist jedoch nur betriebsbereit, wenn der Netzschalter (EIN/AUS) auf EIN steht. Wenn man das Netzkabel aus der Steckdose zieht, dann ist die Spannungszuführung zum Gerät vollkommen unterbrochen.

PRECAUCIONES DE SEGURIDAD

	PRECAUCION RIESGO DE CHOQUE ELECTRICO. ¡NO ABRIR!	
Precaucion: Para Reducir El Riesgo De Choque Eléctrico, Favor No Abrir La Cubierta. Este Equipo No Consta De Piezas O Partes Que Requieren Servicio O Mantenimiento. Para Reparaciones Favor Referirse A Un Técnico Calificado.		

Debido a limitaciones de espacio, esta etiqueta puede aparecer en la parte inferior de la unidad.



El símbolo representado por un relámpago con punta de flecha dentro de un triángulo equilátero, se muestra con el objetivo de alertar al usuario que existen "voltajes peligrosos" sin aislamiento, dentro de la cubierta de la unidad. Dichos voltajes pueden ser de tal magnitud que constituyen un riesgo de choque eléctrico a personas.



El símbolo de exclamación dentro de un triángulo equilátero, se muestra con el objetivo de alertar al usuario de que instrucciones de operación y mantenimiento importantes acompañan al equipo.

Peligro

Para evitar el peligro de incendio ó choque eléctrico, no exponga a la lluvia ó humedad, equipos que no han sido diseñados para uso exterior.



Atención: La instalación de este equipo debe ser realizada por personal capacitado, solo en acuerdo, y en cumplimiento de normas del "National Electric Code" (Código Eléctrico Nacional) ó las normas del Gobierno Nacional Local.



Para Desconectar la Alimentación: Unidades no equipadas con interruptores ON/OFF, son alimentadas cuando el cable de alimentación es conectado a la corriente eléctrica. Las unidades equipadas con interruptores son alimentadas de igual forma, pero adicionalmente requieren que el interruptor esté posicionado en ON. El cable de alimentación es el medio principal de desconexión del equipo.

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1 UNPACKING

Unpack carefully. This is electronic equipment and should be handled with care. Check for the following:

- Model number of unit.
- Four cables with 15-pin connectors at one end.
- One cable with 9-pin subminiature-D connectors.

If an item appears to have been damaged in shipment, replace it properly in its carton and notify the shipper. If any items are missing, notify your Philips Communication & Security Systems Inc. Sales Representative or Customer Service.

The shipping carton is the safest container in which the unit may be transported. Save it for possible future use.

2 SERVICE

If the unit ever needs repair service, the customer should contact the nearest Philips Communication & Security Systems Inc. Service Center for return authorization and shipping instructions.

Service Centers

U.S.A. & Canada: 800-366-2283
Mexico & Central America: 52-5-564-2726
Europe & Middle East: 44-1932-765666
South America: 54-1-956-0837
Australia: 61-2-888-9000
New Zealand: 64-4-237-7297



WARNING: Electrostatic-sensitive device. Use proper CMOS/MOSFET handling precautions to avoid electrostatic discharge.

NOTE: Grounded wrist straps must be worn and proper ESD safety precautions observed when handling the electrostatic-sensitive printed circuit boards.

3 DESCRIPTION

The LTC 8780 Series are data converter units that are designed to operate with the Allegiant® series of video matrix switcher/controllers and the LTC 5135 Series Controller/Followers. The LTC 8780 Series converts the biphas control code generated by the Allegiant system and the LTC 5135 Series into standard RS-232, and converts RS-232 back to biphas code. This provides the capability of transmitting the biphas control code over conventional RS-232 transmission media (phone modems, fiber optics, microwaves, etc.). The LTC 8780 Series can also be used to perform the Satellite Selector functions in Allegiant Satellite system configurations in addition to operating as a 15 channel remote signal distribution unit. A conceptual operational block diagram is shown in **Figure 1** and may be used for reference purposes.

The biphas control code generated by an Allegiant series switcher can contain three types of data — receiver/driver commands, Console Command Language (CCL) commands that control the SatelliteSwitching® functions, and switcher/follower data. When used in the biphas to RS-232 conversion mode, the LTC 8780 can be configured to selectively filter out each of these data types. This feature can reduce the amount of data that must be transmitted over the RS-232 interface. Utilization of this capability may be required in cases where a low baud rate is being used to transmit the control code of a large switcher configuration having multiple keyboards that are operating simultaneously.

As a subpart of its selective filtering capability, the LTC 8780 contains an address-matching feature that can provide one of two functions — it can disable transmission of CCL commands that do not match the selected address, or it can disable transmission of receiver/driver commands outside of a 64-camera block defined by the selected address. In a Satellite Selector Unit configuration, the LTC 8780 would be configured using the address matching feature so that only CCL commands associated with that specific Satellite address

are converted. In its receiver/driver address matching configuration, it can be used to limit the amount of data (as would be generated in a large switching system) from being transmitted over a RS-232 link operating at a low baud rate.

The LTC 8780 can be configured to operate as a signal distribution unit with 15 separate biphas code outputs. Either "star" or "daisy chain" wiring configurations may be used when connecting to the biphas outputs. Each output is capable of driving up to 8 receiver/drivers in a "daisy chain" configuration up to 1500 meters (5000 ft) using 1 mm² (Belden 8760 or equivalent 18 AWG) shielded twisted pair. In this signal distribution mode of operation, the biphas input code can be selectively filtered for the desired types of data as described above for the RS-232 to biphas operational mode.

The LTC 8780 Series provide a single RS-232 interface using two RS-232 interface connectors. In most applications like those described below, only one of the two connectors is used. In a Satellite Selector configuration, the "CONSOLE" interface of the LTC 8780 is connected to an Allegiant CONSOLE port using the supplied cable. The interface connector labeled "RS-232" provides a standard RS-232 interface for connection to a modem or other RS-232 compatible device. The data rate of the RS-232 interface is user selectable for 1200, 2400, 9600 or 38400 baud. **Note:** If the LTC 8780 is being used with variable speed receiver/driver control codes generated by an Allegiant series matrix switcher, a baud rate of 2400 or higher must be used. When the RS-232 interface involves modems, the LTC 8780 Series can be configured to send standard "AT" type commands to aid in establishing the communication link between the modems.

LED indicators are provided on the front panel to show RS-232 data being received, RS-232 data being transmitted, biphas data being received, biphas data being transmitted, and power ON. See **Figure 11**.

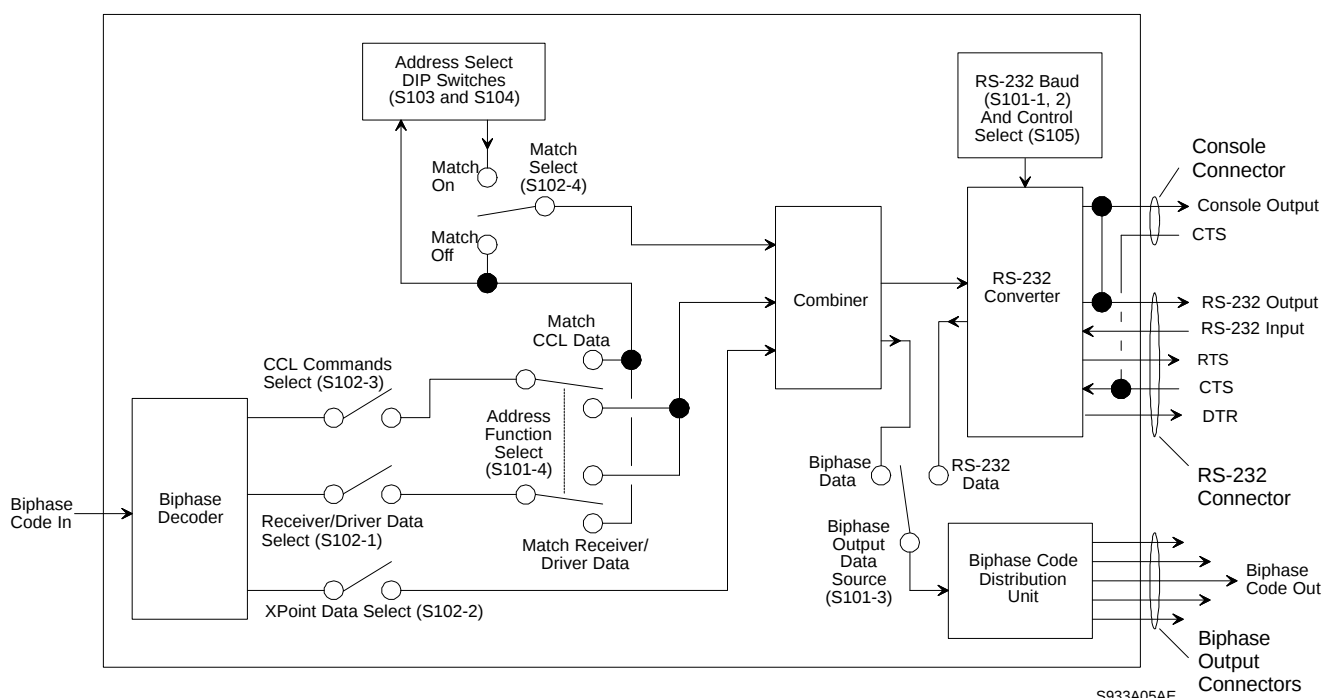


Figure 1: LTC 8780 Series Conceptual Operational Block Diagram

4 INSTALLATION

4.1 Power

LTC 8780/60 model operates from 120 VAC, 50/60 Hz power. LTC 8780/50 model operates from 220-240 VAC, 50/60 Hz power. The model number and operating voltage are shown on the label located on the bottom of the unit. These units are supplied with grounded power cords and grounding should not be defeated.

4.2 Mounting

LTC 8780 Series are supplied as desktop units. For rack mounting, the optional LTC 9101MK rack-mount kit is available. LTC 8780 Series are half-rack units.

4.3 Control Code Inputs

The biphasic code input connector is located on the rear of the unit next to the power cord. See **Figure 12**. Connection is made using one of the supplied 15-pin cable assemblies. Only the CODE IN -, SHIELD, and CODE IN + pins of this connector are used. Other wires on the supplied cable should be removed or cut off. The CODE IN -, SHIELD, and CODE IN + wires are then connected to the device generating the biphasic code (such as the CODE or SDA output of an Allegiant main CPU bay, an output from a LTC 8568/00 Signal Distribution unit, or an output of a LTC 5135 Series controller/follower).

4.4 Code Outputs

The biphasic code outputs can be connected to receiver/drivers, switcher followers, code mergers, signal distribution units, or other devices that normally accept Allegiant biphasic control code. The Allegiant series receiver/driver units can be connected in either "star" or "daisy chain" connections. In a "star" connection, each receiver/driver is connected to a different code output and is terminated (refer to receiver/driver Installation and Operating Instructions for termination procedures). For a "daisy chain" connection, the cable is connected to one code output and then "looped" through each receiver/driver along the way. The last (and only the last) unit in the "daisy chain" connection should be terminated. A combination of the "star" and "daisy chain" connections may be used in an installation. Connection between the code outputs and the receiver/driver should be made using 1 mm² (Belden 8760 or equivalent 18 AWG) shielded twisted pair cable up to a maximum of 1500 meters (5000 ft) in length. Cable assemblies with 15 pin connectors are supplied for making connections to the CODE OUTPUT connectors found on the rear of the LTC 8780. See **Figure 12**.

4.5 Console Connector

When being used in the Satellite Selector configuration, the CONSOLE connector is used to interface the LTC 8780 Series unit to either an Allegiant system CONSOLE port, a LTC 5112 switcher, or a LTC 5124 switcher. See **Figure 12**. The supplied Console cable is used when interfacing to an Allegiant system. Attach one 9-pin connector of the cable to the CONSOLE connector on the LTC 8780 Series unit. Connect the other 9-pin connector of the cable to the CONSOLE port on the Allegiant system's main CPU bay. When interfacing to either a LTC 5112 or a LTC 5124, only a two-conductor connection is required. The appropriate connector end of the supplied LTC 8780 console cable can be cut off so that the cable can be spliced into the Accessory Output connector of the LTC 5112 or LTC 5124. Connect pin 3 of the LTC 8780 CONSOLE connector (Transmit) to pin 12 of the LTC 5112 or LTC 5124 Accessory Output. Also connect pin 5 of the

(Ground) to pin 15 of the LTC 5112 or LTC 5124 Accessory Output. The other end of the Console cable should be connected to the LTC 8780's CONSOLE port. See **PIN OUTS**.

The cover is fastened to the chassis by two screws on the bottom near the rear of the unit. Disassembly is as shown.

4.6 RS-232 Connector

This connector is used for interfacing to a modem or other RS-232 device. See **Figure 12**. Connection is made using a user supplied cable (for standard modem connections, a standard RS-232 DCE to DTE modem cable will work). See **PIN OUTS**.

4.7 DIP Switches

Prior to connecting power to the unit, the internal DIP switches should be set for the desired operation. The LTC 8780 Series unit contains electrostatic- sensitive devices. Grounded wrist straps must be worn and proper ESD safety precautions should be observed when adjusting the DIP switches.

Note: The LTC 8780 must ALWAYS be powered off and on if any changes are made to the internal DIP switches.

Remove the cover following the directions below. Locate DIP switches S101 through S105. See **Figure 3** for their positions on the printed circuit board. Set the DIP switches to obtain the desired operation, then re-install the cover.

4.8 Cover Removal



Removal of the cover and adjustment of internal controls should only be performed by qualified service personnel — not user serviceable. The unit should always be unplugged before removing the cover and remain unplugged while the cover is removed.

4.8 Démontage du Couvercle



Le démontage du couvercle et le réglage des commandes internes doivent être effectués par du personnel qualifié- pas de service par l'utilisateur. L'appareil doit toujours être débranché lorsque l'on retire le couvercle et doit rester débranché pendant que le couvercle est ôté.

4.8 Entfernung der Abdeckung



Die Entfernung der Abdeckung und Hantieren im Innern des Gerätes sollten nur von qualifiziertem Personal erfolgen. Der Stecker des Gerätes sollte immer aus der Steckdose gezogen werden, bevor man die Abdeckung entfernt, und nicht wieder hineingesteckt werden, solange die Abdeckung entfernt ist.

4.8 Desensamble de la Cubierta



Atención: La cubierta ha de ser removida solo por personal de servicio autorizado - este equipo no contiene partes que requieran mantenimiento por usuarios. Antes de remover la cubierta asegurarse de que el equipamiento ha sido desconectado de la alimentación. Esta debe permanecer desconectada mientras la cubierta este fuera de lugar.

The cover is fastened to the chassis by two screws on the bottom near the rear of the unit. Disassembly is as shown in **Figure 2**.

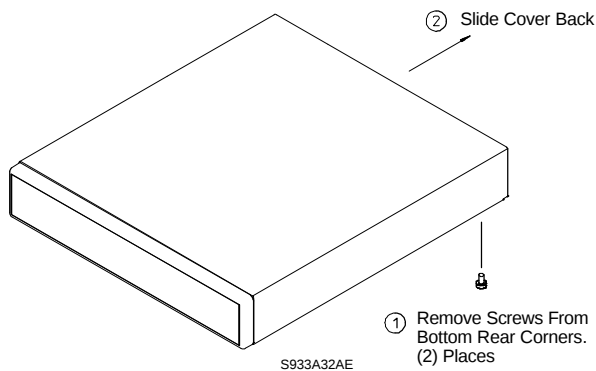


Figure 2: Cover Removal

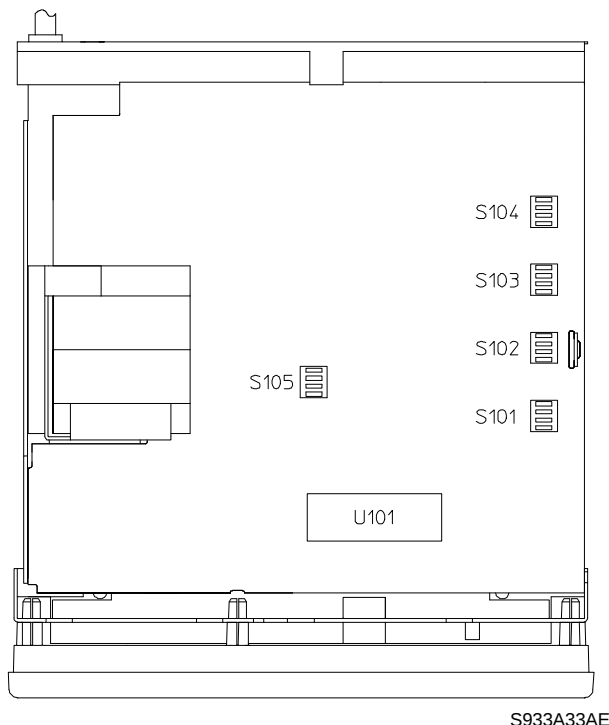


Figure 3: Location of DIP Switches (S101 - S105)

5 OPERATION

Once the application has been determined, the operational setup of the LTC 8780 must be implemented via DIP switches. The DIP switches are read by the unit on power-up and should only be changed when the LTC 8780 Series system's power is OFF. The paragraphs below describe in detail each DIP switch function, and Tables 1 - 6 summarize this information.

Switches S101-1 and S101-2, labelled "BAUD" on the LTC 8780 Series printed circuit board, are used to set the baud rate of the RS-232 interface. Four selections are available - 1200, 2400, 9600, and 38400. Configure the baud rate of the LTC 8780 to conform to the requirements of the device being interfaced to. **Note:** If the LTC 8780 is being used with variable speed receiver/driver control codes generated by an Allegiant series matrix switcher, a baud rate of 2400 or higher must be used. If the LTC 8780 is being used in its Satellite Selector configuration, its baud rate must be set to the same baud rate as the

SatelliteSwitching system (either an Allegiant, a LTC 5112, or a LTC 5124). See **Table 1** to determine the proper setting for the desired baud rate.

Switch S101-3, labelled "CODE DIST", selects the source of the data transmitted from the biphasic code outputs. If this switch is OFF, the RS-232 to biphasic mode is enabled, and the RS-232 input data is the source of the biphasic code output. If this switch is ON, the biphasic code distribution mode is enabled, and the biphasic code input data is the source of the biphasic code output. See **Table 1**.

Switch S101-4, labelled "ADDR FUNCT", determines the functionality of DIP switches S103 (ADDRESS LOW) and S104 (ADDRESS HIGH). The ADDR FUNCT switch is operational only when switch S102-4 (MATCH) is ON. With the ADDR FUNCT switch in the OFF position, only CCL commands containing addresses which match the settings of S103 and S104 are transmitted. With the ADDR FUNCT switch in the ON position, only receiver/driver commands with addresses for cameras within a block of 64 which match the settings of S103 and S104 are transmitted. See **Table 1**.

The three switches described in the next few paragraphs (S102-1 to S102-3) select a filtering action which control the types of biphasic input data (receiver/driver commands, Console Command Language (CCL) commands, and switcher/follower data) that are to be decoded. Refer to **Table 1**. This selective filtering action applies to converted data in either the biphasic to RS-232 output configuration (S101-3 to OFF) or the biphasic to biphasic (distribution mode) configuration (S101-3 to ON). The selective filtering action does not apply to data being received at the RS-232 interface. In this case, all data received from the RS-232 interface is transmitted on the biphasic code outputs regardless of how the biphasic transmit select switch (S101-3) is set. With this capability, the LTC 8780 can be used to decode, and selectively filter, biphasic input data to RS-232 output while simultaneously converting received RS-232 data to biphasic output.

Switch S102-1, labelled "RCVR DRVR", determines whether or not receiver/driver type commands received at the biphasic input are transmitted. If this switch is OFF, receiver/driver commands are filtered out of the data stream and are not transmitted. If the RCVR DRVR switch is ON, receiver/driver commands are transmitted, subject to the MATCH (S102-4) and ADDR FUNCT (S101-4) switch settings. See **Table 1**.

Switch S102-2, labelled "XPOINT", determines whether or not crosspoint data received at the biphasic input is transmitted. If this switch is OFF, crosspoint data is filtered out of the data stream and is not transmitted. If the XPOINT switch is ON, all crosspoint data is transmitted. Note that the crosspoint data is not subject to the MATCH (S102-4) and ADDR FUNCT (S101-4) switch settings. See **Table 1**.

Switch S102-3, labelled "CCL", determines whether or not Console Command Language commands are transmitted. If this switch is OFF, CCL commands are filtered out of the data stream and are not transmitted. If the CCL switch is ON, CCL commands are transmitted, subject to the MATCH (S102-4) and ADDR FUNCT (S101-4) switch settings. See **Table 1**.

Switch S102-4, labelled "MATCH", is used to select the address/block matching feature of the LTC 8780. This feature is used in conjunction with the ADDR FUNCT switch (S101-4) described above to filter out CCL or receiver/driver data with address that do not match the settings of switches S103 (ADDRESS LOW) and S104 (ADDRESS HIGH). If the ADDR FUNCT switch is ON, the filtering action applies only to receiver/driver data. If the

ADDR FUNCT switch is OFF, the filtering action applies only to CCL data. See **Table 1**.

S103 and S104 are the Address select DIP switches. See **Table 2**. These switches apply only if the MATCH switch (S102-4) is ON. The Address DIP switches are used to set a value which would be compared against the incoming CCL data (when S101-4 is OFF) or receiver/driver data (when S101-4 is ON). Only that data which corresponds to the value set via the Address DIP switches would be transmitted. When used as a Satellite Selector Unit in an Allegiant Satellite configuration, the Address DIP switches are used to set the Satellite's address so that only CCL commands associated with the Satellite would be transmitted. See **Table 4**. When the LTC 8780 is configured to pass satellite commands, it also automatically passes the "Synchronize Satellite Time/Date CCL command. The "Synchronize Satellite" command is a unique CCL command selected in the Time Event table found in the Allegiant Master Control Software package or the TC8850 Graphical User Interface (GUI) software. It is used to synchronize the time and date of all satellite locations to the time and date as generated by the main Allegiant system. If desired, the LTC 8780 can selectively pass Allegiant "Synchronize Satellite Time/Date commands by configuring the unit in the Satellite Selector mode, but setting the site address to 256 (all S103 and S104 switches to ON). In this configuration, the LTC 8780 can be used to generate time/date commands for interfacing to other non-Allegiant products.

The Address select DIP switches can also be used to limit the amount of transmitted receiver/driver commands so that only data within a block of 64 addresses that correspond to the value set via the Address select would be transmitted. See **Table 5**. This filtering action feature for receiver/driver data outside of a block of 64 addresses might be necessary in larger switcher configurations where only a slow RS-232 baud rate is available. If MATCH is OFF, no address/block matching is done and the Address DIP switches are ignored. The Address select DIP switches use a binary progression format to determine their value, i.e., all switches OFF represent a value of 0, while all switches ON represent a value of 255. The DIP switch settings and the equivalent values are shown in the CCL Address Select and the Receiver/Driver Block Select tables.

DIP Switch S105, labelled "MODEM CMD", controls various features which are used to define how the RS-232 interface will operate. These features are described in the paragraphs below. Refer to **Table 3**.

Switch S105-1, labelled "MODEM CMD", controls the operation of the ORIGINATE feature switch (S105-2) described below which is available to assist in making a connection using modems compatible with the "AT" command set. If any other type of interface is being used, this option should be disabled by setting switch S105-1 to OFF. See **Table 3**.

Switch S105-2, labelled "ORIGINATE", is active only when S105-1 is set to ON (MODEM CMD), and should be set according to the following guidelines. See **Table 3**.

"AT" COMMAND COMPATIBLE MODEMS WITH
DIRECT CONNECTION

In this context, a "direct connection" means that it is not necessary to dial a phone number to connect the modems. In this case, the LTC 8780 units are configured so that one issues the answer command "ATA", and the other issues the originate command "ATX1D". The MODEM CMD switch (S105-1) should be set to ON on both units. The ORIGINATE switch (S105-2) should be set to ON in the LTC 8780 being used as the originating unit and OFF in the unit being used as the answering unit. After power on, the units will delay for 30 seconds (to allow sufficient time for modem initialization) before sending any RS-232 data. The LTC 8780 units can be powered on in either order, but steps should be taken so that no RS-232 data is sent until the connection is made. This can be assured by either turning off or disconnecting the biphasic code input source until the connection is made.

"AT" COMMAND COMPATIBLE MODEMS WITH PHONE-LINE CONNECTION

This procedure can be used to establish a connection over a standard telephone line. In this case, one of the phone modems must be set to the Auto-Answer mode (see the modem instructions to configure this). The LTC 8780 unit connected to the auto-answer modem should have the MODEM CMD switch (S105-1) set to OFF. At the originating end, the MODEM CMD and ORIGINATE switches (S105-1 and S105-2) should both be set to ON. Begin with the originating LTC 8780 unit turned OFF. With the modems on and ready, dial the phone number for the answering unit. After the answering modem answers, power on the originating LTC 8780 Series unit. The originating unit provides a 30 second delay to allow for the modem connection to be made. No RS-232 data should be sent until the communication link between the modems is made. If the modem connection takes longer than 30 seconds, the biphasic code input source should be either turned off or disconnected until the connection is made.

Switch S105-3, labelled "CHECK CTS", provides an option for activating the LTC 8780 unit's RS-232 interface CTS handshake feature. The LTC 8780 unit is always ready to accept data, therefore the RTS and DTR handshake lines are always active. If the CTS DIP switch is ON, the LTC 8780 Series will transmit RS-232 data ONLY when the CTS signal is asserted. If the CTS DIP switch is OFF, the state of the CTS is ignored, and data will be transmitted freely. See **Table 3**.

The LTC 8780 CONSOLE connector is only intended to be used for transmitting data to an Allegiant system CONSOLE port when used in a Satellite Selector configuration. When connected in this fashion, the Allegiant CONSOLE port must be configured with handshake turned OFF. When the Allegiant handshake is OFF, it does not check its own CTS line before transmitting, but it still generates its RTS output. **It is therefore recommended that the LTC 8780 CHECK CTS switch (S105-3) is turned ON, and it is mandatory that the Allegiant is configured with its Handshaking turned OFF.**

It is not necessary to utilize handshake lines if the LTC 8780 is being used with a LTC 5112 Series or LTC 5124 Series switcher operating in a satellite configuration. In this case, the LTC 8780's CTS DIP switch should be turned OFF.

DIP Switch	Switch Number	Function												
S101	1 and 2 (BAUD)	RS-232 Baud Rate Select: <table><tr><th>Switch Number</th><th>Baud Rate</th></tr><tr><td>2 1</td><td></td></tr><tr><td>OFF OFF</td><td>1200</td></tr><tr><td>OFF ON</td><td>2400</td></tr><tr><td>ON OFF</td><td>9600</td></tr><tr><td>ON ON</td><td>38400</td></tr></table>	Switch Number	Baud Rate	2 1		OFF OFF	1200	OFF ON	2400	ON OFF	9600	ON ON	38400
	Switch Number	Baud Rate												
	2 1													
	OFF OFF	1200												
OFF ON	2400													
ON OFF	9600													
ON ON	38400													
	3 (CODE DIST)	Biphase Output Data Source: ON = Biphase Input to Biphase Output OFF = RS-232 Input to Biphase Output												
	4 (ADDR FUNCT)	Address Function Select: ON = R/D Block Select OFF = CCL Address Select												
S102	1 (RCVR DRVR)	R/D Enable: ON = Enable Transmission of R/D Messages OFF = Disable Transmission of R/D Messages												
	2 (XPOINT)	Crosspoint Enable: ON = Enable Transmission of Crosspoint Messages OFF = Disable Transmission of Crosspoint Messages												
	3 (CCL)	CCL Enable: ON = Enable Transmission of CCL Messages OFF = Disable Transmission of CCL Messages												
	4 (MATCH)	Match: if Address Function Select = ON (R/D BLOCK SELECT) ON = Only R/D Messages with addresses within R/D block selected by Address DIP Switches are transmitted OFF = R/D Message addresses not checked if Address Function Select = OFF (CCL ADDRS SELECT) ON = Only CCL Messages with addresses that match Address DIP Switch are transmitted OFF = CCL Message address not checked												

Table 1 - Function Select DIP Switch Definitions

DIP Switch	Switch Number	Function
S103	1 - 4 (ADDR LOW)	Address or Block Select Low Order Bits
S104	1 - 4 (ADDR HIGH)	Address or Block Select High order Bits

Table 2 - Address Select DIP Switch Definitions

DIP Switch	Switch Number	Function
S105	1 (MODEM CMD)	Modem Command ON = Send Initialing Command to Modem OFF = No Command Sent to Modem
	2 (ORIGINATE)	Originate ON = Modem Command = "ATX1D" OFF = Modem Command + "ATA"
	3 (CHECK CTS)	Check CTS ON = Check CTS Before Transmitting Data OFF = Ignore CTS
	4	Not Used

Table 3 - RS-232 Control DIP Switch Definition

Address DIP Switches								DIP Switch Value	CCL Address Selected
S104				S103					
4	3	2	1	4	3	2	1		
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	0	1
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	1	2
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	2	3
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	3	4
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	4	5
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	5	6
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	6	7
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	7	8
X	X	X	X	X	X	X	X	(continue series)	
ON	ON	ON	ON	ON	ON	ON	OFF	254	255
ON	ON	ON	ON	ON	ON	ON	ON	255	256

Table 4 - CCL Address Select Examples

Address DIP Switches								DIP Switch Value	Receiver/Drivers Selected
S104				S103					
4	3	2	1	4	3	2	1		
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	0	None
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	1	1 - 64
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	2	65 - 128
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	3	129 - 192
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	4	193 - 256
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	5	257 - 320
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	6	321 - 384
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	7	385 - 448
X	X	X	X	X	X	X	X	(continue series)	
ON	ON	ON	ON	ON	ON	ON	OFF	254	16256 - 16319
ON	ON	ON	ON	ON	ON	ON	ON	255	16320 - 16383

Table 5 - Receiver/Driver Block Select Examples

DIP Switch	Switch Number	Default Setting	Function
S101	1	OFF	9600 Baud Rate
	2	ON	9600 Baud Rate
	3	OFF	RS-232 to Biphase Mode Selected
	4	OFF	Not Used When MATCH is OFF
S102	1	ON	Receiver/Driver Commands Enabled
	2	ON	Crosspoint Messages Enabled
	3	ON	CCL Commands Enabled
	4	OFF	Address MATCH Function Disabled
S103	1 - 4	All OFF	Not Used When MATCH is OFF
S104	1 - 4	All OFF	Not Used When MATCH is OFF
S105	1	OFF	Modem Command Disabled
	2	OFF	Not Used When Modem Command Disabled
	3	OFF	CTS Not Checked
	4	OFF	Not Used

Table 6 - Default DIP Switch Settings

6 TYPICAL APPLICATIONS

The following examples describe common configurations for the LTC 8780 Series. Refer also to **Figure 4** through **Figure 10**. The symbol "X" means that the DIP switch position doesn't matter - it will work in either position.

1. RS-232 TRANSMISSION OF ALL DATA (**Figure 4**)
To send and receive all biphasic data over an RS-232 link, set the DIP switches as follows:

BAUD - Set to the desired baud rate, see **Table 1**.

CODE DIST - X for biphasic to RS-232 site, OFF for RS-232 to biphasic site.

ADDR FUNCT - X.

RCVR DRVR - ON.

XPOINT - ON.

CCL - ON.

MATCH - OFF.

ADDRESSES - X.

MODEM CMD - Refer to section on DIP Switch S105 settings.

ORIGINATE - Refer to section on DIP Switch S105 settings.

CHECK CTS - Refer to section on DIP Switch S105 settings.

2. DISTRIBUTE BIPHASE CODE (ALL DATA), PROVIDING 15 SEPARATE OUTPUTS (**Figure 5**)

BAUD - Set to 38400 (both ON).

CODE DIST - ON.

ADDR FUNCT - X.

RCVR DRVR - ON.

XPOINT - ON.

CCL - ON.

MATCH - OFF.

ADDRESSES - X.

MODEM CMD - OFF.

ORIGINATE - X.

CHECK CTS - OFF.

3. TRANSMIT ONLY RECEIVER/DRIVER COMMANDS FOR 1 BLOCK OF 64 CAMERAS (**Figure 6**)

BAUD - Set to the desired baud rate, see **Table 1**.

CODE DIST - X for transmitter, OFF for receiver.

ADDR FUNCT - ON for transmitter, X for receiver.

RCVR DRVR - ON.

XPOINT - OFF.

CCL - OFF.

MATCH - ON for transmitter, OFF for receiver.

ADDRESSES - For transmitter, configure to select the desired block of 64 cameras; refer to **Table 5**, X for receiver.

MODEM CMD - Refer to section on DIP Switch S105 settings.

ORIGINATE - Refer to section on DIP Switch S105 settings.

CHECK CTS - Refer to section on DIP Switch S105 settings.

4. SATELLITE SELECTOR UNIT CONFIGURATION (**Figure 7**)

BAUD - Set to the same baud rate as the Allegiant System Console interface, according to **Table 1**.

CODE DIST - X.

ADDR FUNCT - OFF.

RCVR DRVR - OFF.

XPOINT - OFF.

CCL - ON.

MATCH - ON.

ADDRESSES - Configure to match the Satellite Address. See **Table 4** for examples.

MODEM CMD - OFF.

ORIGINATE - X.

CHECK CTS - ON.

If connecting to an Allegiant system, be sure to configure the Allegiant system's CONSOLE port with handshaking turned OFF.

5. DUAL MASTER-SATELLITE CONFIGURATION (**Figure 8**)

BAUD - Set to the desired baud rate, see **Table 1**.

CODE DIST - OFF.

ADDR FUNCT - X.

RCVR DRVR - ON.

XPOINT - ON.

CCL - ON.

MATCH - OFF.

ADDRESSES - X.

MODEM CMD - Refer to section on DIP Switch S105 settings.

ORIGINATE - Refer to section on DIP Switch S105 settings.

CHECK CTS - Refer to section on DIP Switch S105 settings.

7 PIN OUTS

7.1 Code Output Connectors

Pin	Connection	Pin	Connection	Pin	Connection
1	Shield (Ground)	6	Code +	11	Code -
2	Shield (Ground)	7	Code +	12	Code -
3	Shield (Ground)	8	Code +	13	Code -
4	Shield (Ground)	9	Code +	14	Code -
5	Shield (Ground)	10	Code +	15	Code -

7.2 Code Input Connector

Pin	Connection	Pin	Connection
1	Code In -	9	No Connect
2	No Connect	10	No Connect
3	TTL Code Out	11	Code In +
4	No Connect	12	No Connect
5	12 VAC RTN (Not Used)	13	Ground
6	Shield	14	No Connect
7	No Connect	15	12 VAC (Not Used)
8	No Connect		

7.3 RS-232 Input/Output Connector

Pin	Connection	Pin	Connection
1	No Connect	6	No Connect
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	No Connect
5	Ground		

7.4 Console Input/Output Connector

Pin	Connection	Pin	Connection
1	No Connect	6	No Connect
2	No Connect	7	No Connect
3	TXD	8	CTS
4	No Connect	9	No Connect
5	Ground		

7.4.1 Console Cable

9-Pin Connector

1
2
3
4
5
6
7
8
9

9-Pin Connector¹

Not Used
3
2
1
8
Not Used
5
Not Used
Not Used

1. Place a jumper between pins 4 and 6 and place a second jumper between pins 1 and 7.

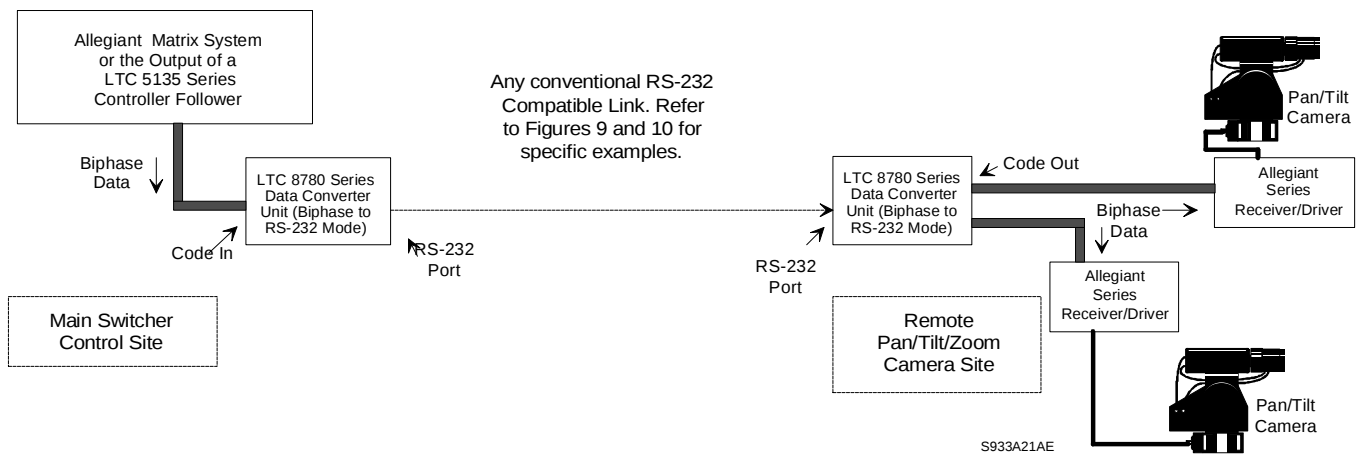


Figure 4: LTC 8780 Series Typical Application Diagram

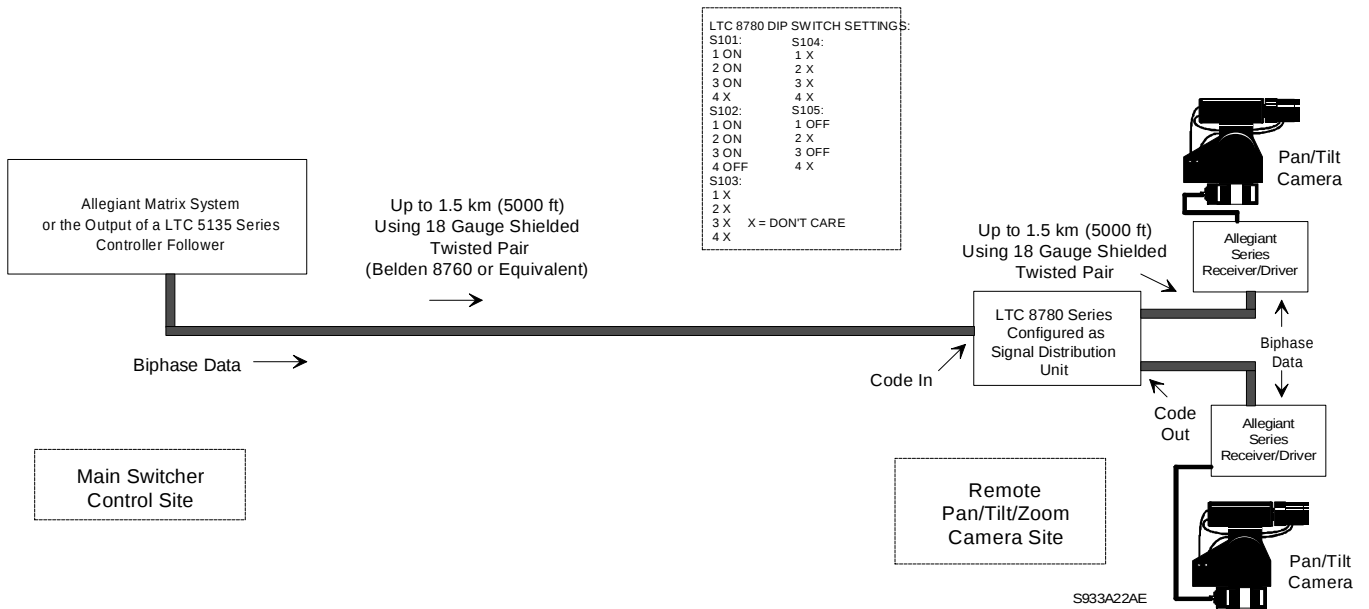


Figure 5: LTC 8780 Series Configured As Remote Signal Distribution Unit

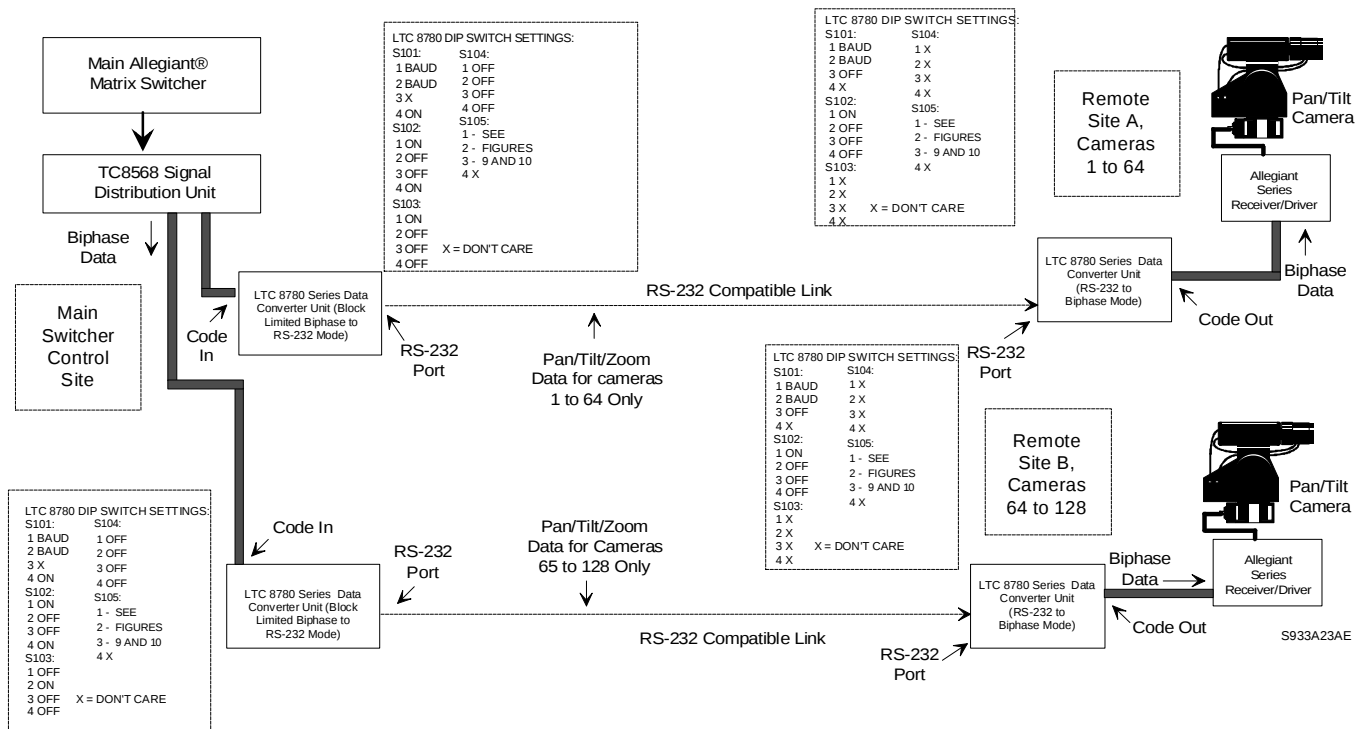


Figure 6: LTC 8780 Series Configured For Block Limited Transmission

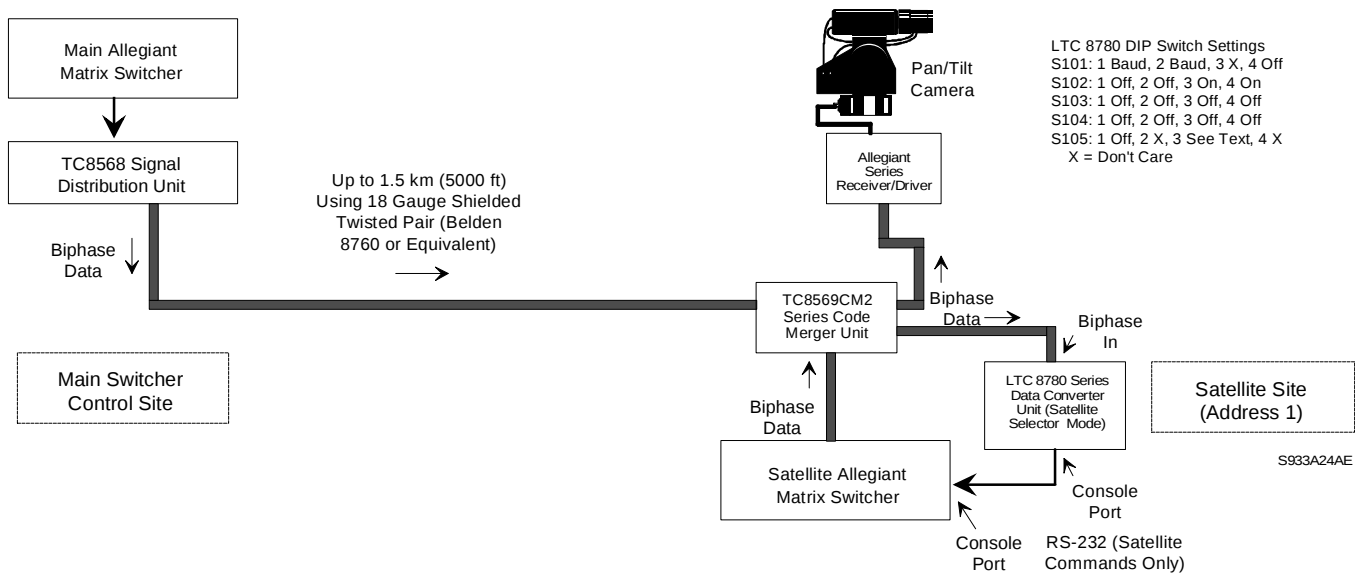


Figure 7: LTC 8780 Series Configured as Satellite Selector Unit

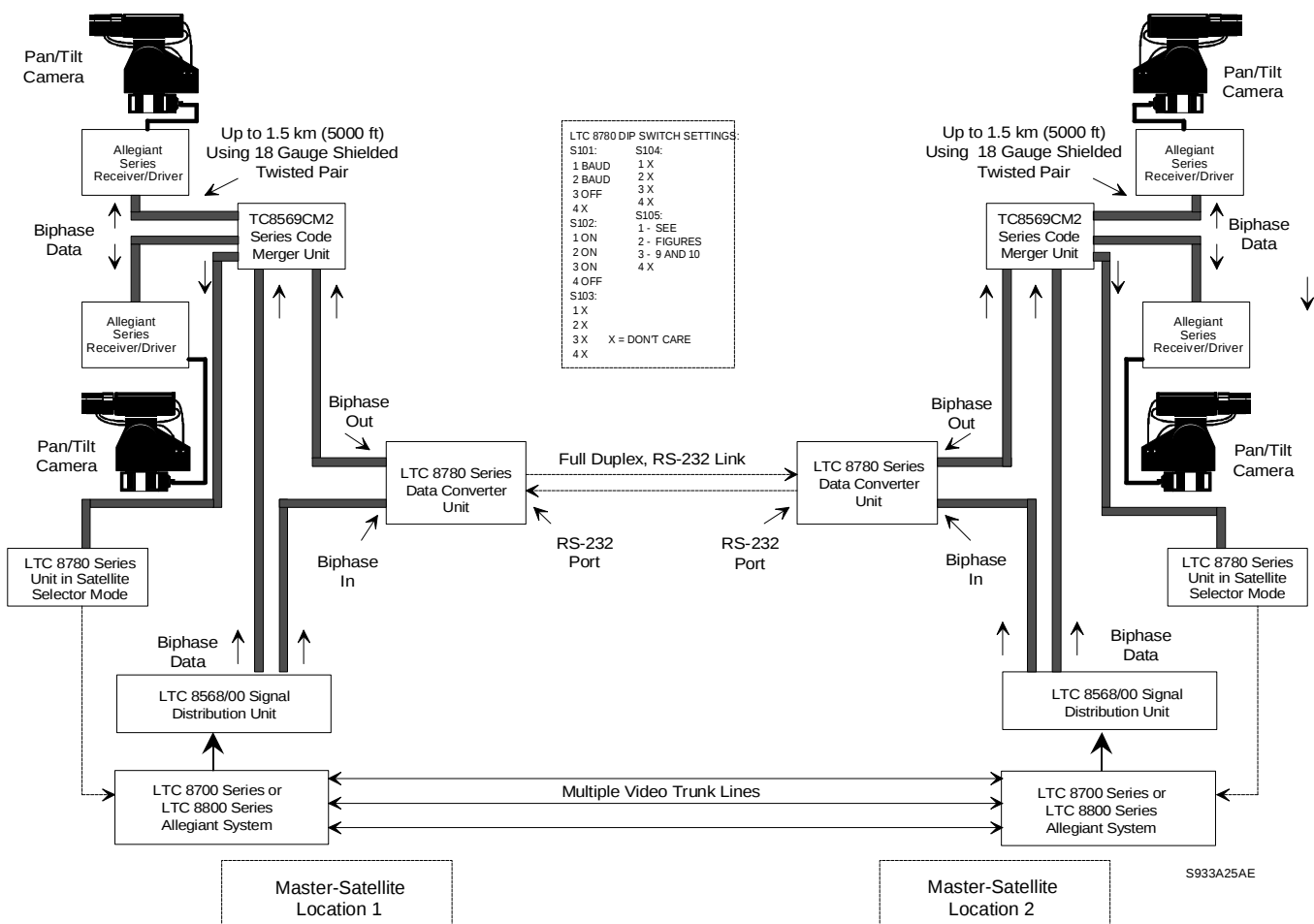


Figure 8: LTC 8780 Series Used in Dual Master-Satellite Configuration

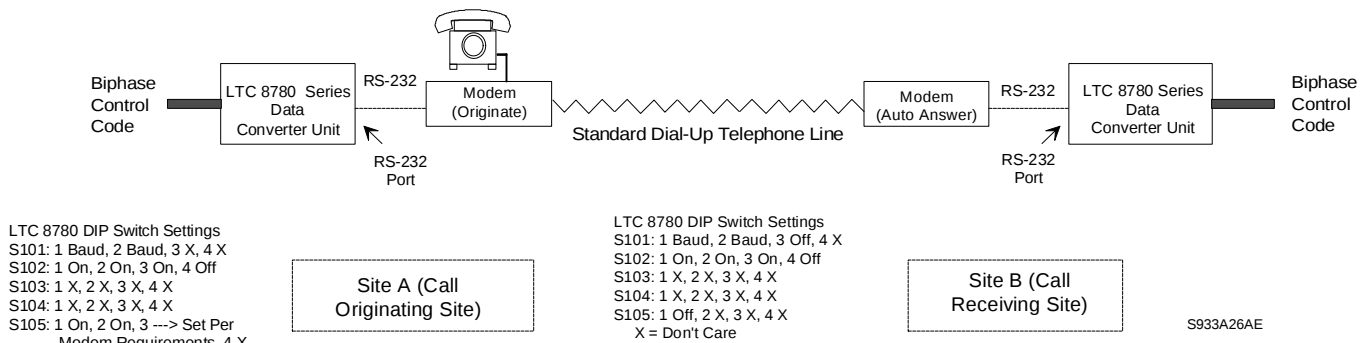


Figure 9: Detail A - Dial-Up Phone Modem Configuration

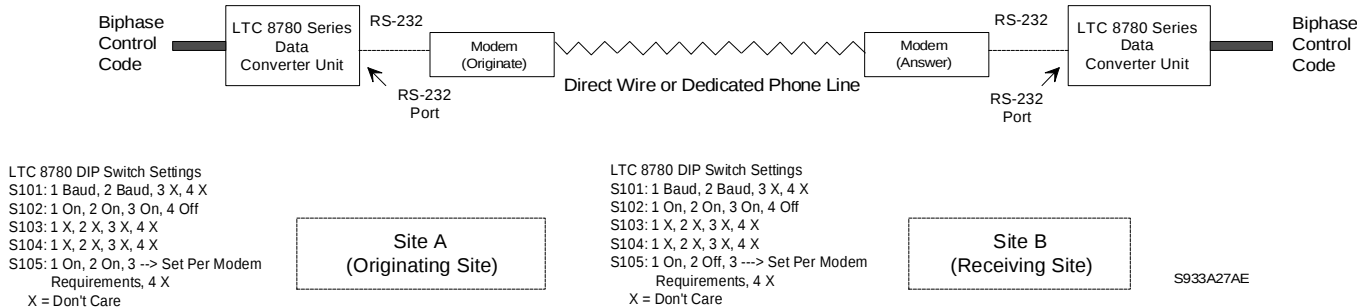


Figure 10: Detail B - Dedicated Direct-Wire Configuration

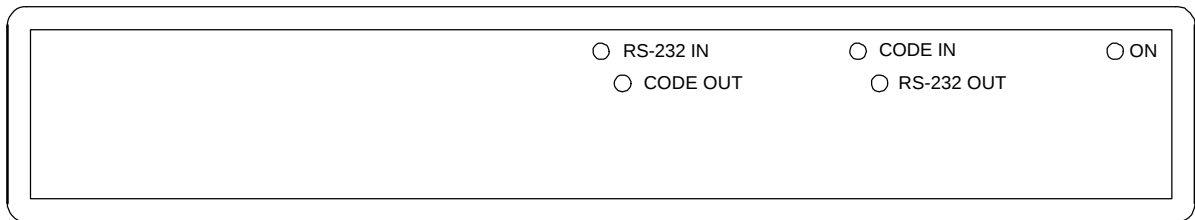


Figure 11: Front Panel

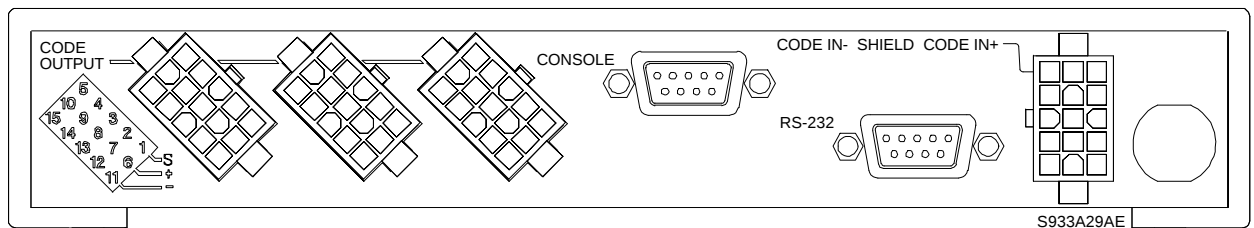


Figure 12: Rear Panel