

# REVISION HISTORY

Refer to the DCA and associated markups for a complete description of the changes incorporated in a revision.

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SEE CHANGE RECORD FOR COMPLETE DOCUMENT REVISION HISTORY						
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# PTA12-300 POTS Telephone Adapter with NVIS Display



<b>CHANGE RECORD</b>	
<b>REV</b>	<b>CHANGE</b>
4.00	Initial release
4.01	All sections – updated to current templates. Section 6 – updated with latest drawings
4.02	Section 6 and 7 – updated with latest documents
4.03	Section 6 and 7 – updated with latest documents
AA	Section 6 – add document 556016-913-0
AB	Updated to electronic format Section 5.2 - update Continued Airworthiness statement Section 6 - Add the following documents: PTA12-300-701-0 revisions 1.21, 1.32, 1.33, and AA PTA12-300-518-0 revision 1.11 PTA12-300-614-0 revisions 1.11, 1.12, and 1.13 PTA12-6A-401-0 revision 1.31 PTA12-6-701-0 revisions 1.21, 1.22, 1.23, and AA PTA12-6-628-0 revisions 1.10, 1.11, and AA Replace SM55-3-606-0006 with SM55-3-606-0006 revision AA Add build standards PTA12-300-721-0, PTA6-721-1 and PTA12-6A-721-5

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## Section 4 Theory

### 4.1 INTRODUCTION

Information in this section consists of general information and theory of operation for the PTA12-300 POTS Telephone Adapter with NVIS Display.

Reference Section 6 for supporting documentation and drawings.

### 4.2 GENERAL INFORMATION

The PTA12-300 POTS Telephone Adapter is a keypad control and display unit for airborne telephone system applications. The PTA12-300 connects to a telephone system transceiver by a two-wire POTS (Plain Old Telephone Service) telephone interface.

The PTA12-300 POTS Telephone Adapter is a compact Dzus mount POTS telephone interface with a keypad input and display output. Many of the PTA12-300 functions are controlled by a microcontroller. The functions of the PTA12-300 include ring detect, ringer audio generate, DTMF tone generation, speech audio circuits, hook switch, flash, redial, speed dial functions and serial data communications. The speech circuits include a mic input amplifier and a phones output amplifier with front panel volume control. Hook switch control and indication is provided on the front panel. Ring indication is also provided on the front panel with a flashing green LED. A FLASH button is provided on the front panel for use with call transfer and call waiting. A HOLD button on the front panel mutes all audio to and from the headset and is indicated by a green LED. A REDIAL button on the front panel automatically redials the last number called. The interface to the satcom system transceiver is achieved by a two-wire POTS port. The front panel keypad has NVIS Green B compliant (as per MIL-STD-3009) backlighting provided. The display is an LED dot matrix character display with brightness control. Speed dial allows numbers to be stored and recalled from memory. A serial port allows for communications to satcom systems. Indication of Globalstar satcom signal strength and system availability status is provided by LED lit dead front text on the front panel.

### 4.3 THEORY OF OPERATION

#### 4.3.1 Main Subassembly

The Main subassembly contains the majority of circuits for the PTA12-300. All input and output signals to the product pass through the Main subassembly. Internal to the product, the Main subassembly interfaces to the Front Panel subassembly with a flat cable. The individual function blocks of the Main subassembly will be described in greater detail in the following sections.

##### 4.3.1.1 Power Supplies

Positive 28 Vdc power is supplied to the PTA12-300 through the external connector. There are five individual power supplies on the Main subassembly.

The +28 Vdc supply is over-voltage, over-current and reverse polarity protected. The +28 Vdc power supply is not regulated. The +28 Vdc power supply feeds a +17 Vdc linear regulated supply, which then feeds a +13 Vdc linear regulated supply. The +13 Vdc supply feeds a +5 Vdc linear regulated supply.

The +5 Vdc LED power supply is fed directly from the main power supply fuse. This supply is also over-voltage, over-current and reverse polarity protected. This supply is a switch mode buck regulator that converts +28 Vdc to +5 Vdc and is used solely to power the PTA12-300 front panel annunciator LEDs and the front panel display.

The +6.5 Vdc power supply is derived from the +13 Vdc power supply. It is produced by an operational amplifier buffered voltage divider from the +13 Vdc power supply. This supply is primarily used as a reference to the positive input of the audio operational amplifiers.

#### **4.3.1.2 Microcontroller and Memory**

The microcontroller provides nearly all of the control functions for the PTA12-300. The microcontroller uses an 8.000 MHz crystal reference to derive the system clock. Flash memory contained within the microcontroller is used to store executable software code and all data items.

There are five control lines that the microcontroller uses to control the front panel display. These lines are routed from the Main subassembly through the Front Panel subassembly and terminate on the Display subassembly. The control lines send control information and data to the two dot matrix character displays.

The microcontroller is programmed with software using an in system programming port (ISP). The software is stored in the microcontroller onboard flash memory. This port consists of three lines that are accessed from a programming connector internal to the PTA12-300.

All other control lines as well as data storage will be described in more detail in the sections that follow.

#### **4.3.1.3 Keypad Encoder**

The keypad encoder receives nine lines from the keypad matrix on the Front Panel subassembly and encodes them down to six lines that are fed to the microcontroller for processing. The keypad encoder also provides a switch de-bounce function for each keypad matrix input line. The ESC keypad line is routed to the microcontroller directly from the Front Panel subassembly. This line is de-bounced and read by the microcontroller.

#### **4.3.1.4 Two Wire Interface**

The two-wire interface provides the analog POTS (plain old telephone service) for interconnections to SATCOM systems with the complimentary interface. The interface consists of a TIP signal and a RING signal. The TIP/RING lines are full-wave rectified and polarity desensitized through a diode bridge. The two-wire interface consists mainly of a Data Access Arrangement (DAA) IC and supporting circuitry.

The DAA circuit provides several functions: AC impedance control of the two-wire interface, DC loop current limiting, integrated hook switch, 2 – 4 wire conversion and optical isolation. The DC loop current limiting protects against over-current conditions on the line interface. The integrated hook switch opens and closes the line loop based on the status of a single bit logic input (HOOK). The HOOK signal is controlled and supplied by the microcontroller. The 2 – 4 wire conversion is a hybrid function that allows for full duplex communication on the TIP/RING lines. The two-wire portion refers to TIP/RING and the four-wire portion refers to the RX AUDIO/common and TX AUDIO /common. The RX AUDIO is an output from the two-wire interface and feeds the RX Audio Amplifier. The TX AUDIO is an input to the two-wire

interface and is fed by the TX Audio Mixer. The two-wire interface is isolated from the four-wire interface by an optical barrier in the DAA IC. The hook switch control is also optically isolated.

#### **4.3.1.5 Ringer Detect**

The TIP and RING lines of the two-wire interface also connect to the Ringer Detect circuit. This circuit monitors the line interface for the presence of an AC ringing signal. This signal is provided by the telephone service provider to signal an incoming call to the PTA12-300. The output of this circuit is a logic level low for an inactive ringing and a logic level high for active ringing. This logic signal is fed to the microcontroller for processing and also to the Ringer Discrete circuit.

#### **4.3.1.6 Ringer Discrete**

The Ringer Discrete circuit is an open collector output (RINGER DRIVE) with over-current and over-voltage protection. It is intended to drive an external annunciation device that would signal the presence on an incoming call on the two-wire interface. The Ringer Discrete output is routed to the PTA12-300 external connector. When a ringer logic high is present from the ringer detect circuit, the Ringer Discrete circuit provides a pull to ground path for a powered, discrete annunciation device. A logic low from the Ringer Detect circuit sets the RINGER DRIVE output as high impedance.

#### **4.3.1.7 Serial Port**

The serial port is a three line RS232 port consisting of SERIAL RX, SERIAL TX and ground. The serial port is connected to a UART contained within the microcontroller. The microcontroller has complete control of the serial port. The serial port RX and TX are fed directly to the PTA12-300 external connector.

#### **4.3.1.8 DTMF Encoder**

The DTMF encoder uses a 3.579 MHz crystal as a reference to generate tones. The DTMF encoder is controlled directly by three control lines and four data lines from the microcontroller. When a corresponding DTMF key is requested from the PTA12-300 front panel, the microcontroller sends the appropriate commands to the DTMF encoder IC. The DTMF encoder IC then produces the corresponding tone on its tone output (DTMF AUDIO). The tone output then feeds the DTMF Audio Amplifier.

#### **4.3.1.9 Hook Latch**

The Hook Latch circuit is used to toggle the hook signal without the need for pressing the PTA12-300 front panel hook switch. This circuit also performs a remote hook status annunciation whereby the hook status may be known at a location remote to the PTA12-300 front panel. The KEY IN line from the external PTA12-300 connector is read by the microcontroller (HOOK REQ). If the KEY IN line is pulled to ground for an adequate period of time, the microcontroller activates the hook signal which in turn will activate the KEY OUT line. The KEY OUT line is routed to the PTA12-300 external connector and is used to signal that the hook signal is active.

#### **4.3.1.10 LED Drivers**

The LED drivers consist of four MOSFETs that control four individual front panel LED annunciators, and one Master Driver MOSFET. These annunciators are: HOOK, HOLD, LNK and SYS. Each MOSFET gate is controlled individually by a microcontroller output. When turned on, the MOSFETs provide a low

impedance path to LED COM on the source for each. The drain for each MOSFET is routed to the LED annunciators on the Front Panel Subassembly. The Master Driver MOSFET provides a path for LED COM to ground. The gate of the Master Driver MOSFET is driven by a Pulse Width Modulated signal from the microcontroller.

#### **4.3.1.11 Flash Select**

The FLASH function when selected interrupts the hook line by a pre-selected duration. The hook FLASH pulse duration is dependant on which flash time is selected at the time of installation. This is determined by setting an externally accessible mini switch to FLA or FLB. FLA corresponds to a 90 ms flash duration and FLB corresponds to a 600 ms flash duration. The FLASH function is generated on the hook line internal to the microcontroller.

#### **4.3.1.12 Mic Bias**

The Mic Bias circuit provides a +13 Vdc bias on the MIC HI line. This is needed for applications in which a microphone is connected directly to PTA12-300 MIC HI/MIC LO and the microphone requires a DC bias to operate. This bias may enabled/disabled by an externally accessible mini-switch labeled MIC.

#### **4.3.1.13 Volume Control**

The Volume Control adjusts the level of the phones audio. The level may be increased or decreased on the PTA12-300 front panel by pressing the up/down keypad button. The volume control is set by two output lines from the microcontroller. One line is for increasing volume and the other is for decreasing volume. The phones audio is fed from the phones mute into the volume control. The adjusted phones audio level is fed to the phones amplifier for final amplification. The current phones volume level is stored in the microcontroller flash memory and is retained upon PTA12-300 power down.

#### **4.3.1.14 DTMF Amplifier**

The DTMF amplifier receives generated tones from the DTMF encoder. The DTMF tones are amplified and band pass filtered. The audio is then fed to a DTMF Level potentiometer for adjustment.

#### **4.3.1.15 Ringer Amplifier**

Ringer audio is generated by the microcontroller and fed to a Ringer Audio Level potentiometer. After level adjustment the audio signal path is split in two different paths. The ringer audio may be amplified and band pass filtered by the Ringer Amplifier. After amplification, the ringer audio is routed to the PTA12-300 external connector. Alternatively, the ringer audio is fed to a Ringer Select mini-switch. This switch allows ringer audio to be enabled or disabled on the phones output. If ringer audio is selected to be present on the phones output, then it is fed to the Phones Audio Mixer.

#### **4.3.1.16 Mic Amplifier**

The Mic Amplifier receives microphone audio from the Mic Bias circuit. The mic audio is then amplified and band pass filtered. The amplified mic audio is split in two different paths. In one possible path, the amplified mic audio is fed to the Mic Level potentiometer for adjustment. In the second path, the amplified mic audio is fed to the Sidetone Amplifier.

## **4.3.1.17 RX Audio Amplifier**

The RX audio signal originates from the two-wire Interface. The RX audio is amplified and band pass filtered by the RX Audio Amplifier. After amplification, the RX audio is fed to the RX Level potentiometer for adjustments. After RX Level potentiometer, the RX audio is routed to the Phones Audio Mixer.

## **4.3.1.18 Sidetone Amplifier**

The Sidetone Amplifier is fed by both the Mic Amplifier and the DTMF Amplifier. The Sidetone audio from both sources is mixed, amplified and band pass filtered. The output of the amplifier is then fed to the Sidetone Level potentiometer. After level adjustment, the Sidetone audio is routed to the Phones Audio Mixer.

## **4.3.1.19 Phones Amplifier**

The Phones Amplifier receives phones audio from the volume control. The Phones Amplifier has a fixed gain of ten. The amplified audio is then fed to the primary winding of an audio transformer for amplitude step up conversion. The audio transformer also provides isolation from the phones amplifier and the external connections. The secondary winding of the audio transformer is connected to the PTA12-300 external connector.

## **4.3.1.20 Mic Mute**

Mic audio from the Mic Level potentiometer is fed to Mic Mute. Mic Mute is comprised of a series solid-state audio switch. The Mic Mute is controlled by a microcontroller output. When Mic Mute is active, the audio switch is opened and audio is prohibited from passing on to the TX Audio Mixer. In the inactive state, audio is allowed to pass to the TX Audio Mixer.

## **4.3.1.21 Phones Mute**

Phones audio from the Phones Audio Mixer is fed to Phones Mute. Phones Mute is comprised of a series solid-state audio switch. The Phones Mute is controlled by a microcontroller output. When Phones Mute is active, the audio switch is opened and audio is prohibited from passing on to the Phones Volume Control. In the inactive state, audio is allowed to pass to the Phones Volume Control.

## **4.3.1.22 Phones Audio Mixer**

The Phones Audio Mixer receives audio from three different sources and sums them together. These sources are ringer audio, RX audio and sidetone audio. The mixer also performs audio band pass filtering before the phones audio is routed to the Phones Mute circuit.

## **4.3.1.23 TX Audio Mixer**

The TX Audio Mixer receives audio from two different sources and sums them together. These sources are mic audio and DTMF audio. The mixer also performs audio band pass filtering before the TX audio is routed to the two-wire Interface.

## 4.3.1.24 Lights Control

Backlighting power may be supplied by +28 Vdc or +5 Vdc. The backlighting power is applied to the PTA12-300 external connector. The presence of either +28 Vdc or +5 Vdc backlighting is sensed and feeds the LED & Display Dimming circuit. The backlighting signal is then fed to the Lights Level potentiometer to allow for intensity adjustments. After adjustment the backlight voltage drives the base of transistor through an operational amplifier current control circuit. The transistor emitter provides current to the backlight LEDs on the Front Panel subassembly.

## 4.3.1.25 LED & Display Dimming

The LED & Display Dimming circuit receives a backlight sense from Lights Control. This sense input is compared to a voltage reference and a comparator determines whether the backlighting is turned on. The comparator output is then converted to microcontroller compatible input and fed to the microcontroller for processing. This input determines the Pulse Width Modulation signal used to drive the LED annunciators and display. Annunciators and displays are dimmed when backlighting is on.

## 4.3.2 Front Panel Subassembly

The Front Panel subassembly receives the following signals from the Main subassembly: backlighting, keypad interface, LED status control and control and data. The control and data signals are relayed to the Display subassembly. The Front Panel subassembly contains the switch contacts for all of the front panel keypad buttons, the HOOK, HOLD, LNK and SYS status LED annunciators and the backlighting LEDs for the keypad. This subassembly interfaces to the Main subassembly with a flat flex cable. The individual function blocks of the Front Panel subassembly will be described in greater detail in the sections to follow.

### 4.3.2.1 Backlighting

The backlighting circuit consists of two series circuits of LEDs in parallel. The power required to turn on the LEDs is provided from the Lights Control circuit on the Main subassembly. The LEDs are mounted on the Front Panel subassembly and backlight the keypad membrane through NVIS filters.

### 4.3.2.2 Keypad

The Keypad consists of a matrix of switch contacts. The exception is the ESC key, which is not included in the switch matrix and is fed directly to the microcontroller on the Main subassembly. The switch matrix row/column lines are routed to a keypad encoder on the Main subassembly. Any of the switch contacts may be closed by a conductive pill on the keypad membrane when a keypad button is pressed.

### 4.3.2.3 Discrete LEDs

Each annunciator (HOOK, HOLD, LNK and SYS) consists of a single Discrete LED, and is controlled by the LED Drivers circuit on the Main Subassembly. The light emitted from these LEDs is NVIS filtered before being sent to the front panel annunciator.

### **4.3.3 Display Subassembly**

The display subassembly receives power supply, control and data signals from the front panel subassembly. These signals originate on the main subassembly and are routed through the front panel subassembly. The display subassembly simply contains two dot matrix character displays that are viewed on the front panel of the PTA12-300.

**Section 4 ends**

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## Section 5 Maintenance

### 5.1 INTRODUCTION

Information in this section consists of troubleshooting, disassembly/reassembly instructions and test equipment information for the PTA12-300 POTS Telephone Adapter with NVIS Display.

Review all notes, warnings and cautions.

This unit contains electrostatic discharge sensitive components. All assembly/disassembly and maintenance procedures should be performed at a static protected workstation.

### 5.2 CONTINUED AIRWORTHINESS

The Airworthiness Limitations Section is FAA approved and specifies maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

There are no new (or additional) airworthiness limitations associated with this equipment and/or installation.

Maintenance of the PTA12-300 POTS Telephone Adapter with NVIS Display is 'on condition' only. Periodic maintenance of this product is not required.

### 5.3 DISASSEMBLY/REASSEMBLY

Refer to Exploded View PTA12-300-904-0 for all disassembly/reassembly procedures. Reference Section 6 for supporting documentation and drawings.

The PTA12-300 contains surface mount components. Specialized equipment and training is required to change these components. Contact Cobham Technical Support department for additional information.

#### 5.3.1 Disassembly

**Note:** Some screws may be secured with Loctite and an initial abrupt twist may be necessary to break the bond.

- 5.3.1.1 Remove cover M2 from chassis M1 by unfastening six flathead screws M10 (two from each side of the unit, and two from the back).
- 5.3.1.2 Release Main subassembly SA1 connector J601 from chassis M1 by unfastening locking hardware M7 and two screws M9.
- 5.3.1.3 Release display shield M3 from chassis M1 by unfastening four flathead screws M10 (two from each side of the unit).
- 5.3.1.4 Release faceplate M4 from chassis M1 by unfastening four flathead screws M10.
- 5.3.1.5 Carefully release the locking bar on Main subassembly SA1 connector J602 to remove cable assembly W1.

5.3.1.6 Remove faceplate M4 and display shield M3 from chassis M1, and remove cable assembly W1 from inside chassis M1.

5.3.1.7 Pull the locking bar of Main subassembly SA1 connector J602 out to the unlocked position (away from the body of connector J602).

**Note:** The locking bar is not removable from the connector.

5.3.1.8 Carefully pull the unconnected end of cable W1 through the slot in display shield M3, and release the other end of cable assembly W1 from Main subassembly SA1 connector J602.

5.3.1.9 Pull the locking bar of the connector on Faceplate M4 out to the unlocked position (away from the body of connector J1).

**Note:** The locking bar is not removable from the connector.

5.3.1.10 Detach cable assembly W1 from the connector on Faceplate M4.

5.3.1.11 Remove Main subassembly SA1 from chassis M1 by unfastening four panhead screws M8.

**Note:** This PTA12-300 faceplate is not user serviceable. If the unit malfunctions, it should immediately be returned to the factory for any necessary repair or service.

## 5.3.2 Reassembly

To reassemble the unit reverse the procedures outlined in 5.3.1 with the additional steps listed below:

5.3.2.1 When reconnecting cable assembly W1 to the connector on Faceplate M4, check that the non-conductive side of cable assembly W1 is facing towards the top of Faceplate M4.

5.3.2.2 When reconnecting the other end of cable assembly W1 to Main subassembly SA1 connector J602, check that the non-conductive side of cable assembly W1 is facing away from the adjacent edge of Main subassembly SA1 PCB M601.

## 5.5 TEST EQUIPMENT

Reference Section 6 for supporting documentation and drawings.

### 5.5.1 Test Cables

The appropriate cables for testing this unit may be fabricated using schematic TS-PTA-CA-002-401-0. Reference Section 6 for supporting documentation and drawings.

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## Section 5 ends

## Section 6 Documentation and Drawings

### 6.1 INTRODUCTION

This section contains the documentation necessary for maintenance and troubleshooting of the PTA12-300 POTS Telephone Adapter with NVIS Display.

Review all notes, warnings and cautions.

### 6.2 DOCUMENTATION AND DRAWINGS

Alternate manufacturers' part numbers may be used. Consult Cobham for approved alternate parts.

#### 6.2.1 Product Documents

This is an HTML file containing hyperlinks to all relevant files and can be accessed [here](#).

#### 6.2.2 Product Test and Alignment

All maintenance procedures are in the HTML file and can be accessed [here](#).

**Note:** If a document refers to "the applicable Build Standard", select the appropriate drawing for the serial number of the unit.

### 6.3 SUBASSEMBLY DOCUMENTATION AND DRAWINGS

#### 6.3.1 Subassembly

All subassembly documents are in the HTML file and can be accessed [here](#).

**Note:** The PTA12-6A uses some of the PTA12-6 drawings, with the Parts List changes listed in Section 6.3.1.1 below.

##### 6.3.1.1 Parts List Changes

The PTA12-6A Parts List is identical to the PTA12-6 Parts List with the following exceptions:

##### REMOVE

<u>IDENT</u>	<u>DESCRIPTION</u>	<u>MFR. P/N OR VALUE</u>	<u>PACKAGE</u>	<u>P/N</u>	<u>QTY</u>
D616 – D617	SM, Rectifier, 1A, Silicon	CMR1F-10M	SMA	74-21-100	2
R624	SM, Thick Film, 1/16 W, 1%	100 kOhm	0603	70-58- 1005	1
R625	SM, Thick Film, 1/16 W, 1%	22.1 kOhm	0603	70-58- 2214	1
R630	SM, Carbon Film, 1/2 W, 5%	27 Ohm	2010	70-52-271	1
R631	SM, Metal Film, 1/8 W, 1%	34.8 kOhm	1206	70-54- 3482	1
R633 – R634	SM, Carbon Film, 1/8 W, 5%	8.2 Ohm	1206	70-50-820	2

## ADD

<u>IDENT</u>	<u>DESCRIPTION</u>	<u>MFR. P/N</u> <u>OR VALUE</u>	<u>PACKAGE</u>	<u>P/N</u>	<u>QTY</u>
D616 – D617	NOT INSTALLED			N/A	
R624	SM, Thick Film, 1/16 W, 1%	10 kOhm	0603	70-58-104	1
R625	SM, Thick Film, 1/16 W, 1%	1.40 kOhm	0603	70-58-1402	1
R630	SM, Carbon Film, 1/2 W, 5%	51 Ohm	2010	70-52-511	1
R631	SM, Metal Film, 1/8 W, 1%	5.11 kOhm	1206	70-54-5113	1
R633 – R634	SM, Carbon Film	0.0 Ohm	1206	70-50-000	2

### 6.3.2 Subassembly Test and Alignment

**WARNING:**  
**High volume settings can cause hearing damage.**  
**Set the headset volume control to the minimum volume setting prior to conducting tests, and slowly increase the headset volume to a comfortable listening level.**

**CAUTION:**  
 Do not take a ground from the instrument panel or similar location that shares a ground return with a turn and bank, horizon or other motor driven instrument. This may cause the PTA12-300 unit to pick up the sound of the motor as ground loop interference.

For all maintenance procedures are in the HTML file and can be accessed [here](#).

**Note:** The PTA12-6A uses some of the PTA12-6 drawings, with the Alignment Procedure changes listed in Section 6.3.2.1 below.

#### **6.3.2.1 Alignment Procedure Changes**

Identify and perform the base **Alignment Procedure** (PTA12-6-628-0) for the serial number of the unit with the following exceptions:

- a) Replace all references to PTA12-6 with PTA12-6A.
- b) Replace all references to TJ-PTA12100 with 55-60-016.
- c) Add the following lines to the equipment list in Section 2:
 

08-55-030	Cobham	Flat Flex Cable
55-60-016	Cobham	PTA12-300 NVIS B Front Panel
- d) Replace the step connecting the TJ-PTA12100 Front Panel Assembly to the PTA12-6 with the following:  
 Connect PTA12-300 Front Panel 55-60-016 J1 to PTA12-6A J602 using 30 pin flat flex cable 08-55-030.

### **Section 6 ends**

**Section 7 Bulletins****7.1 INTRODUCTION**

Service and Information Bulletins released by Cobham are available in [Section 6.html](#).

**7.2 BULLETIN LISTING**

<b>Bulletin Number</b>	<b>Subject</b>	<b>Date Issued</b>
603-0001	Annunciator luminance. (MOD 2)	Jan 4, 2007
603-0002	Luminance Too High. (MOD 3)	Apr 19, 2007
603-0003	HOLD noise levels. (MOD 4)	Jul 17, 2007
603-0004	Phones driver runs too hot. (MOD 5)	Aug 21, 2007
603-0005	Screws are being stripped. (MOD 6)	Mar 12, 2008
603-0006	Corrected dimming circuit. (MOD 7)	May 8, 2008 Revised Apr 16, 2018
603A0004	Updated to WED labels (MOD 8)	Mar 31, 2010
603-0007	Modified Dzus Fasteners (MOD 9)	Oct 19, 2010

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**Section 7 ends**