

# Chapter 13

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## PT-720 High Speed Surveillance Dome

### 13.1 Introduction

The PT-720 is a High Speed Pan Tilt unit for use with CCTV cameras.

As well as the primary function of Pan Tilt and Zoom Control the PT-720 can also provide storage of up to 99 pre-set view locations including individual iris and focus settings for each location.

### 13.2 Caution

#### **CAUTION**

*The PT-720 Pan Tilt Unit MUST be placed into the MOTOR DISABLED mode before any installation, removal or maintenance is carried out.*

*Please refer to the installation and maintenance section of this chapter before removing the dome or installing any units.*

*Failure to comply could result in serious permanent injury to personnel.*

## 13.3 Features

The PT-720 has many advanced features not found in earlier units. These include:

- \* **VERY FAST** response to return to a pre-set location (0.85 seconds Maximum).
- \* Accurate framing of pre-set views, returning from any other view angle (0.1 degree precision).
- \* Electrical slip ring connection to and from the PTZ unit for unlimited pan rotation and a maximum 180° pan to a pre-set view.
- \* Dynamic Pan speed control - automatically adjusts the maximum pan speed depending on the zoom ratio, i.e. pan speed decreases as the picture "zoom in" increases.
- \* Low profile back box for mounting in locations with small ceiling space.
- \* Flash-Back recall of the previous view.
- \* Quick release mechanism for fast and easy restoration of a failed unit.
- \* All communications to/from the PT-720 site receiver is via a common TWO-WIRE line providing simultaneous control of up to 16 PT-720 site receivers per two-wire network. All data traffic is managed by a RD-315 two-wire transmitter module located in the CCTV equipment sub rack. Sites can be wired star or delta configuration and all sites are protected against high voltage destruction with line isolation transformers on the two-wire line.
- \* Optional communications are via direct bit transfer type radio or optical fibre links in RS-232 levels using a synchronous bit stream depicted as AF-232.
- \* RS-232 multi drop/insert fibre networks are suitable for linking multiple PT-720 sites using the synchronous format.
- \* Direct RS-232 from a RD-315 to one PT-720 can also be used over networks requiring a normal RS-232 asynchronous protocol. Mixed modes of communication can also be used. Fibre can be used to a first site and the two-

wire to the successive sites. Or two-wire to the first and then fibre continuing on the successive sites.

- \* Single direction AF-485 via the MAX-1000 HD Series Switcher. (See Chapter 11 of the Installation and Maintenance Manual - HD Quick Start Guide).

## 13.4 Technical Description

The PT-720 control PCB contains four major sections:

1. Power Supply
2. Communications Controller
3. Motor Controller
4. Iris Control

## 13.5 Power Supply

The PT-720 has a power requirement of 24 volts 4 amps, measured at the supply terminals.

### *Special Note!*

*The 24-Volt power connection to the PT-720 must be able to maintain 24 volts 4 amps, (100VA) measured at the dome terminals. This requires a low resistance feed cable from the 24 Volt source to the Dome.*

*Failure to provide this power requirement will result in unpredictable framing of pre-set view recalls.*

The table below indicates the cable size required to feed the PT-720 from a 24V AC power source.

<b>Cable feed Distance</b>	<b>Cross Sectional Area of Conductor</b>
5m (6 yd's)	1.0mm <sup>2</sup> (17 A.W.G.)
10m (11 yd's)	1.0mm <sup>2</sup> (17 A.W.G.)
15m (17 yd's)	1.5mm <sup>2</sup> (15 A.W.G.)
20m (22 yd's)	1.5mm <sup>2</sup> (15 A.W.G.)
30m (33 yd's)	2.5mm <sup>2</sup> (10 A.W.G.)

## Camera Power

The PT-720 power supply powers the PTZ controller board and provides power to the camera.

The camera power provided is:

24 Volts AC @500mA.

12 Volts DC (regulated) @ 500mA.

## Fuses

F1 F5A (fast) M205 \*

F2 F1A (fast) M205 \*

\* located on the cover at the top of the main PCB

## 13.6 Communications Controller

The communications microprocessor provides serial data connection to the main controller sub-rack card, (RD-315 or MX-128) from the motor controller and alarm/driver microprocessor.

LED indicators located on the bottom of the main PCB indicate the correct operation of the communications unit.

### LED Indicators

L1 Tx Data indicator

(blinks when data is sent to the system controller sub-rack)

L2 Rx Data indicator

(lights when valid data is received from the system controller, i.e. permanently on if only one PTZ site is controlled by the RD-315 controller or flashes when multiple sites are polled by the controller)

*✍ The LEDs will only operate for a little over 4 minutes after initialisation, then all LEDs on the PCB are extinguished for normal operation.*

### Communication Connection Options

The most common connection to the PTZ site is a two-wire data type cable, which carries the AFSK control information from a RD- 315 communications module.

In some situations a 4-Wire audio connection may be more suitable for the type of transmission equipment being used, i.e. Optical fibre AF channel bi-directional. In 4-Wire mode link audio sing around can be avoided.

Special interface connections for RS-232 and other types of fibre optics are listed at the end of this section.

Line Interface Link 2 wire 4 wire (LK4) selects the type of interface required for site communications.

Linking .. <2w> = selects balanced 2-wire communications.

Note: This is the NORMAL selection.

Linking .. <4w> = selects 4-wire communications.

Transmit data is via the line transformer to a balanced two-wire. Receive data is via the UNBAL-INPUT pins (DB15 9 & 11) and as suggested is unbalanced (i.e. pin (9) = Rx audio, pin (11) = ground).

## 4-Wire Operation

When 4-wire operation is selected on link LK4, link LK5, 6 & 7 will also have to be strapped to select the desired mode of 4-wire operation.

Links LK5, 6 & 7 have four positions, which require a link to be placed on each. i.e., if 4-wire AFSK operation is required then a link is placed on LK5, 6 & 7 "4 WIRE".

For 2-Wire operation NO links are required except when an optional Alarm/Control board is fitted to the PT-720 PTZ unit.

## Link Selection - LK5, 6 & 7

### Link Position 1 (4-Wire)

Placing a link on this position connects the AFSK receiver input to pin 9 & 11 on the DB15 connector for connection to the AFSK transmitter output in the System Control (RD-315) or to another PTZ Tx output.

### Link Position 2 (AF-232)

Selecting this option connects the RS-232 transceiver to DB15 connector on pin 9 (Rx), pin 10 (Tx), and pin 11 (Ground). This option may be used where a mix of 2 Wire AFSK operation and 4 Wire operation is used with equipment such as an optical fibre link which accepts RS232 levels. AF-232 uses AFSK data with RS232 levels. (up to 16 PTZ sites can be connected to a single System Controller card (RD 315).

### Link Position 3 (RS 232)

Selection of this option allows RS-232 operation of the PT-720. Connection to the DB15 connector is as the AF-232 position described above.

### Link Position 4 (I/O)

This position is not used.

## Link Selection - LK1

When operating in 2-Wire AFSK mode it may be necessary to send AF-232 on to a number of other PTZ sites. The source of the data to be passed on can be the incoming AFSK from the system control sub-rack (RD-315) or a previous PTZ site. Alternatively the source of the data may be the transmit AFSK from the local PT-720. The selection of the data source is achieved by moving the link on LK1.

### Link Position A

Selecting position A will place the locally generated AFSK Transmit data on the AF-232 Tx output. DB15 connector pin 10.

## Link Position B

The following modes are available when utilising this link position.

- 2-Wire to first dome, then AF232 to following domes
- AF232 to first dome, then 2-Wire to following sites.

Selecting position B will place the received 2W AFSK on the AF-232 Tx output. DB15 connector pin 10.

### ***Special Note!***

*If this mode of communication connection is selected, the links for LK5, 6 & 7 will need to be placed in position 3 - AF-232.*

*Refer to the diagrams following this note for examples of common operational modes and the required connections and linking.*

## Link Selection - LK3

Link LK3 is a test link used in the factory to test and align the PT-720. The normal position of the links is A-B and C-D with E, F, G & H open. For direct RS-232 control, link A-H and D-E.



## 13.7 DIP Switch Settings (SW2)

Located at the lower right side of the main PCB.

SW2	DESCRIPTION	ON	OFF	FACTORY
1	Mode Select	Master	Slave	OFF
2	Mode Select	Slave	Master	OFF
3	Poll Mode	Enabled	Disabled	ON
4	Not Defined			ON
5	Site ID Number	Refer to Table		OFF
6	Site ID Number	Refer to Table		ON
7	Site ID Number	Refer to Table		ON
8	Site ID Number	Refer to Table		ON

### Table of Site Numbers

SITE No.	SW2-5	SW2-6	SW2-7	SW2-8
1	OFF	ON	ON	ON
2	ON	OFF	ON	ON
3	OFF	OFF	ON	ON
4	ON	ON	OFF	ON
5	OFF	ON	OFF	ON
6	ON	OFF	OFF	ON
7	OFF	OFF	OFF	ON
8	ON	ON	ON	OFF
9	OFF	ON	ON	OFF
10	ON	OFF	ON	OFF
11	OFF	OFF	ON	OFF
12	ON	ON	OFF	OFF
13	OFF	ON	OFF	OFF
14	ON	OFF	OFF	OFF
15	OFF	OFF	OFF	OFF
16	ON	ON	ON	ON

Note: Factory Setting for Site Number = 1.

## **SW2-1 MODE SELECT (MASTER or SLAVE)**

The CC-2000 chip can be set to be the MASTER or SLAVE in a communications network (e.g. system to multiple PTZ site receiver configurations). The RD-315 would always be set to MASTER as it controls the sharing and distribution of data over the communications network.

## **SW2-2 DESTINATION TYPE (SLAVE or MASTER)**

The Destination Type allows the CC-2000 chip to transmit data to a specific location. It is easier to consider the Destination Type as an additional identity specifier in the transmitted data. When a Destination type of SLAVE is selected, a Site ID Code is included in the transmitted data to identify the exact destination location required (PTZ site receiver ID). When a destination type of MASTER is selected, no ID code is used as there is only one MASTER location in the network. The RD-315 module would always be set to a destination type of SLAVE.

## **SW2-3 POLLING MODE**

### **Enabled**

Polling can be enabled within the communications network. When the RD-315 (MASTER) is set for polling, it will sequentially communicate with all known SLAVE locations (PTZ site receivers) in the network on a continuous basis. If a SLAVE location does not respond, then the RD-315 will report this change in status to the MAX-1000 system. When the RD-315 (MASTER) has control data to transmit to a SLAVE location, it will do so immediately, regardless of the position in the polling sequence. If no more data is to be sent to the same (or any other SLAVE location) then the polling sequence will resumed.

### **Disabled**

If polling is disabled then NO verification of SLAVE status is maintained. The RD-315 (MASTER) can dispatch control data to the required SLAVE location immediately. When a SLAVE location has data to be returned it will also do so immediately. As the communications protocol is of a Shared-Half-Duplex nature possible data clashes can occur causing a loss of transmitted data. Polling is usually

only disabled when the communications link is limited to simplex only and no return data is expected.

All SLAVE and MASTER locations on the communications network must be set to the SAME POLLING STATE (enabled or disabled).

## SW2-4 NOT DEFINED

This switch is not currently used. It should always be set to the (ON) position.

## 13.8 Motor Controller

### *Special Note!*

*Please read the Caution notes located at the start of this chapter and in the installation notes.*

The heart of the PT-720 is the Motor Controller microprocessor. Some of the functions carried out by the Motor Controller are:

- Initialise the PTZ site following power up or PTZ system reset. This includes the sensing of the zoom and focus position potentiometers and the indexing of the pan and tilt positions.
- Store up to 99 locations of the pan, tilt, zoom, and iris settings for future return to these pre-set views.
- Control the speed of the pan and tilt motors under manual and automatic operation.

## LED Status Indicators

Four LEDs located near the centre of the main PCB indicate the status of the motor controller microprocessor.

### *Special Note!*

*The LEDs will only operate for a little over 4 minutes after initialisation, then all LEDs on the PCB are extinguished for normal operation.*

## LED Indicators

L3 - Flashes when serial data is sent or received by the motor controller.

L4 - Iris Override PWM - duty cycle varies with iris control level.

L5 - Pan Index Point - toggles on/off as the pan index point is passed.

L6 - Tilt Index Point - toggles on/off as the tilt index point is passed.

## 13.9 DIP Switch Settings (SW1)

Located at the lower centre of the main PCB.

SW1	Description	OFF	ON
1	Lens Drive Voltage	+6V	+12V
2	Focus & Zoom Invert	Normal	Invert
3	Iris Invert	Normal	Invert
4	Manual Speed A	Refer table below	Refer table below
5	Manual Speed B	Refer table below	Refer table below
6	Auto Home	OFF	ON
7	Input - Output Enable	OFF	ON
8	Initialise - Motor Disable	OFF	ON

SW 1-4	SW 1-5	
OFF	OFF	Start 2°sec
ON	OFF	Start 6°sec
OFF	ON	Start 12°sec
ON	ON	User Defined Speed

## 13.10 CONNECTORS PIN OUTS

### DB15 - 6Way Screw Terminal Block on Backbox

PIN	FUNCTION
1	24V AC
2	24V AC
3	Audio Comms.
4	Audio Comms.
5	Aux
6	Aux

**Lens Connector DB1**

<b>PIN</b>	<b>FUNCTION</b>
1	Ground
2	Ground
3	N.C.
4	N.C.
5	Focus Motor Drive
6	+12V DC
7	Zoom Motor Drive
8	Iris Motor Drive
9	Iris Sense Input
10	Focus Sense Input
11	Zoom Sense Input
12	Focus/Zoom Pots -ve
13	N.C.
14	Focus/Zoom Pots +ve
15	Auto Iris Video Output

**Camera Connector DB2**

<b>PIN</b>	<b>FUNCTION</b>
1	Ground (-ve supply)
2	N.C.
3	24V AC
4	24V AC
5	+12V DC
6	N.C.
7	N.C.
8	N.C.
9	N.C.

**Video IDC Connector**

<b>PIN</b>	<b>FUNCTION</b>
1	+12V DC Power to Camera
2	Ground (-ve Supply)
3	Video - Coax inner conductor
4	Ground - Coax Shield

**DB15 Power/Data Video Connector**

<b>PIN</b>	<b>FUNCTION</b>
1	24V AC (A)
2	24V AC (A)
3	24V AC (B)
4	24V AC (B)
5	Site Rx DC 0V Common
6	NC
7	Video
8	Audio Comms. (A)
9	I/O Data 1
10	I/O Data 2
11	I/O Data 3
12	NC
13	NC
14	Video Screen
15	Audio Comms. (B)

## 13.11 Iris Control

The Maxpro PT-720 Dome caters for virtually all requirements in relation to Iris Control.

### Supported Modes:

- a. Auto Iris lens, no iris control required. The lens is installed with direct connectors of the auto-iris cabling to the camera.
- b. Auto Iris lens, iris control required. The auto-iris lens cabling is connected to connector DB1. Manual control of the lens is now possible along with store and recall of lens control settings under preset view call.

\*This configuration requires that the auto-iris lens be adjusted once the camera and lens are installed in the PT-720. The procedure is as follows:

- i. Ensure adequate illumination is available, re-initialise the PT-720.
- ii. Do not perform any iris-control functions from the CCTV Keyboard.
- iii. Adjust the controls on the auto-iris lens to provide an image which is approximately half way between fully open and fully closed iris.
- iv. From the CCTV Keyboard verify it is possible too fully open and fully close the iris.

*Cameras with ALC, AGC and ELC can mask the effects of iris adjustment, as the camera will internally compensate for level changes. For optimum control no automatic gain features on the camera should be enabled.*

- c. Manual Iris Lens, without iris feedback. The lens is connected directly to connector DB1. Full manual iris control is available from the CCTV Keyboard. An iris invert switch (SW1/3) is available to invert iris direction to ensure compatibility with all types of lenses.
- d. Manual Iris Lens, with iris feedback. As per item c with the added feature that store and recall of lens iris position is available under preset view call.



## 13.12 Tamper

Tamper switches may be extended to the RD-390 for transmission to the MAX-1000

with minor modification to the wiring. Contact your dealer for advice before carrying out any alterations.

## 13.13 Installing the PT-720

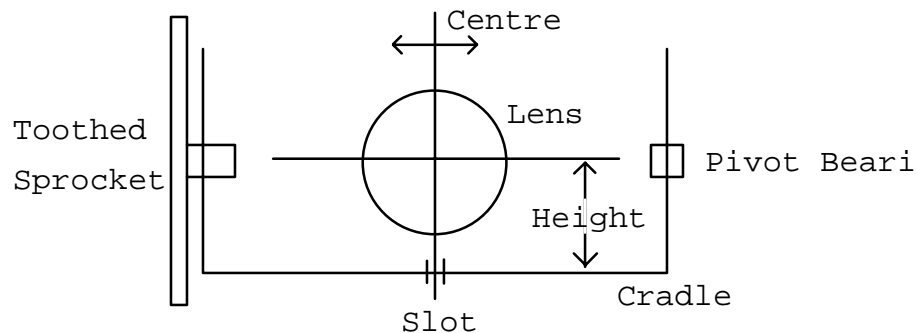
### Installing a Camera in the PT 720

The maximum length of the camera and lens assembly which can be fitted to the PT-720 is 280mm (11").

The camera must be positioned on the camera cradle to fulfil three criteria:

- \* The centre of the camera lens must be in line with the camera mounting slot.
- \* The centre of the camera lens must be in line with the cradle pivot point (bearing centre).
- \* The camera and cradle should be free to move through a full tilt from mechanical stop to stop without any fouling of the assembly or mask, i.e. the camera lens should not foul the mask and the camera wiring should be free to rotate.

### Camera Position



The adjustment of the camera should be automatic as the camera mount is usually in line with the lens assembly.

The height adjustment is achieved by slackening the three Allen screws, which hold the cradle, and moving the cradle up or down until the lens centre is aligned with the pivot bearing centre.

***Special Notes!***

*\* Care must be taken when tightening the Allen screws that secure the cradle to the toothed sprocket. The sprocket is made of plastic and the thread can be stripped by over tightening the screws. The maximum torque should not exceed 15 ins. lbs. (1.25 ft lbs.) - 1.7 NM.*

*\* Care must also be taken when assembling or positioning the PT-720 cradle to ensure the cradle is level. If the cradle is not level, the drive sprocket will not be vertical and can damage the reference position sensor as it rotates.*

*\* When fitting the camera it may be necessary to secure the camera body and the lens assembly both to the cradle due to the large forces generated under high acceleration. If there is any difference in height of two units -even a fraction of a mm /thousandth of an inch - then bending of the camera and lens assembly occurs and focus differences will be noticed between top and bottom of the field of view. Packing shims must be fitted between the camera or lens assembly to compensate for the height differential.*

After fitting the camera correctly, install the unit into the dome back box, fit the mask and check the cradle is free to move from stop to stop without fouling any part of the assembly.

**Positioning the Mount**

The PT-720 has a mechanical reference or INDEX point. This is required by the Motor Controller, as the stored positional information which allows the unit to return to a pre-set location is stored as a number of steps left or right, up or down, relative to the index point.

When a unit is powered up or reset it will automatically seek the index points and await further instructions. It is good practice to make this view as close as is reasonably possible to the main or primary view of the camera. It is not good practice to set the index point facing a blank wall etc.

The index point can be found by rotating the mount (power off) until the camera points in the same direction as the locking mechanism arm.

So, simply put, mount the PT-720 so the locking arm points in the direction of the primary camera view.

## 13.14 Backbox Mounting

Please refer to the installation notes -"*Positioning the Mount*"- for orientation of the Back Box.

### **Ceiling Mount**

The PT-720 is provided with a standard ceiling mount backbox which can be mounted in the ceiling cavity. Refer to the drawings at the end of this manual.

If the PT-720 is to be mounted into a standard ceiling tile, it is recommended that the ceiling tile be replaced with a 600mm (2ft) by 1200mm (4ft) by 15mm (6ins) melamine board. (Not supplied.)

The mounting collars (supplied as two half circles) can be used as a template to mark the ceiling tile with the main hole and screw holes. It can then be positioned through the main hole and the patch connector (D15) fitted to the Back Box.

The Back Box (with gasket fitted) is then secured with the 4 countersunk Allen screws. These Allen screws must be tightened until the countersunk head is flush with the backbox lip to ensure the acrylic cover will fit correctly.

The PT-720 unit can then be fitted to the Back Box. (Refer to *Fitting The PT-720*.)

### **Wall and Pendant Mount** - (optional)

Three alternative mounts are available for the PT-720 Back Box:

- \* Wall Mount Kit (PT-720W(WH) or PT-720W(BLK))

Refer to the drawings at the end of this chapter.

- \* Pendant Mount Kit (PT-720P(WH) or PT-720P(BLK))

Refer to the drawings at the end of this chapter.

\* Mounting Kit (PT-720MK)

Refer to the drawings at the end of this chapter.

The Wall or Pendant Mount must be secured to the supporting wall or ceiling with appropriate fasteners to support the total weight of the fixture (17 Kg - 38 Lbs.).

The cabling is then passed through the Mounting pipe and terminated onto the 6-Way Terminal Block on the top of the backbox (or DB15 connector on the side of the backbox, if a side entry backbox).

The Back Box is then fitted to the Mounting with the cables connected to the backbox.

**Sunshade** - PT-720SS - (optional)

The Sunshade may be fitted to the Wall or Pendant mount.

The unit is fitted at the same time as the Back Box and is secured to the backbox via a Sunshade Support Collar.

## 13.15 Fitting the PT-720

***CAUTION!***

*Please ensure the MOTOR DISABLE switch SW1-8 is set to the ON state (Up Position), toward the board centre.*

*Switch SW1 is located at the lower centre of the main PCB. SW1-8 is at the end switch of the switch closest to the large square integrated circuit.*

*Restoration of the MOTOR DISABLE switch will cause the unit to automatically PAN and TILT after approximately 3 seconds.*

*Please read the text following before commencing work on a PT-720.*

Most PTZ units are normally quite slow and the power of the pan and tilt motors is normally quite small. They do not constitute a danger to the operator or maintenance technician. The PT-720 looks similar to many other PTZ units. Please do not assume the PT-720 will behave like an older PTZ unit.

Two important factors set the PT-720 apart from its predecessors.

- \* The high speed of operation necessitates powerful Pan and Tilt motors.
- \* The Motor Controller is programmed to automatically move the camera without any commands or consent from the operator to do so.

***Standing on a ladder, holding a 6 Kg (14lb) unit above your head, is not a good time to have the unit spring to life and rotate through 360 degrees.***

Please give the unit the same respect you would to units with hazardous voltages and ensure the drive motors are disabled.

Placing the disable switch to the ON state will stop any operator from accidental or deliberate operation of the unit and will also ensure that the Motor Controller will not proceed with any motor operation. In short the motors are truly disabled and will not cause any harm.

Before fitting the PT-720 to the dome mounting ensure the SW1-8 is set to the ON state - MOTOR DISABLED -.

and,

Note the travel of the locking arm from open or unlocked to the fully closed or locked position. ***(Ensure that the locking arm is fully in the locked position when the unit is fitted into the housing.)***

Move the arm fully to the **unlocked** position.

Tilt the camera to allow easy access to the slip ring located at the base of the mounting. Supporting the unit at by the slip ring with one hand should be easy as this is directly above the centre of gravity of the assembly.

Alternatively, the locking arm may be rotated to a position opposite the pan motor.

The unit may then be supported with two hands by holding the pan motor in one hand and the locking arm side of the mounting with the other hand.

Note the D15 connector and the alignment of the securing pins. The longer pin should align with the locking handle.

Fit the safety cord to the keyhole bracket. You will have to support the locking arm from this point in time, as the cord will try to move the locking arm to the locked position. This is part of the function of the cord to hold the locking arm in the locked position.

Position the unit with the long pin entering the hole near the locking arm. Move the unit slightly until the other three pins enter the holes. A last little jiggle may be necessary to engage the D15 connector.

Move the locking arm to locked position. Ensure that the locking arm has moved completely through the entire travel as noted prior to fitting.

Check that the safety cord is still securely fitted to the keyhole bracket.

The MOTOR DISABLE switch SW1-8 is ready to be set to the OFF position.

***Special Note!***

*Approximately 3 seconds after the MOTOR DISABLE is turned OFF, the Pan and Tilt motors will drive the camera to the INDEX points.*

*Please ensure that you are clear of the unit and that the unit is free to move, i.e. no cables or other bits and pieces will foul the unit as it moves.*

After an operational check of the unit from the control panel, the mask and dome cover can be fitted.

## 13.16 Initialisation

When the motor is enabled (SW1/8 set to OFF) the unit will initialise several functions. The sense to the iris motor and focus motor are checked (not all cameras are the same as to which way the motors are driven with the application of a drive voltage).

The pan index point is sought and the tilt limits are tested. This may cause the unit to bump against the tilt end stops several times to ensure the correct points have been located. This is normal operation on turn on. Once the limit points have been established the unit will not drive completely to the end stops during normal operation.

To initiate an initialisation it is only necessary to switch SW1/8 ON for a second or more and then switch it OFF again. The unit will then carry out a complete initialisation procedure.

## 13.17 Removal of the PT-720 from a backbox

Remove the dome cover and the mask from the unit.

Carefully set the **MOTOR DISABLE** switch **SW1-8** to the **ON** position. Remember that the PT-720 may PAN or TILT at any time until SW1-8 is set ON.

Move the camera until the access can be gained to the base of the mounting.

Support the unit with one hand placed on the slip rings in the centre of the mounting base.

Release the locking arm and lower the unit until the mounting is clear of the mounting pins.

Release the safety cord and remove the unit completely from the backboard.

## 13.18 SPECIFICATIONS

### MECHANICAL

<b>Rotation</b>	360° continuous rotation
<b>Maximum Pan speed</b>	300° per second
<b>Minimum Pan speed</b>	2° per second
<b>Tilt</b>	90° from horizontal
<b>Maximum Tilt speed</b>	150° per second
<b>Minimum Tilt speed</b>	2° per second
<b>Maximum pre-set recall time</b>	0.85 seconds
<b>Bearings</b>	dual hermetically sealed for both pan and tilt
<b>Pre-set accuracy</b>	better than 0.1° (0.03%)
<b>Braking</b>	Logic controlled Electronic Positioning System ("LEPS")
<b>Net Weight</b>	8 kg
<b>Maximum load</b>	5 kg
<b>Release mechanism</b>	proprietary single lever quick release
<b>Gaskets</b>	PE Foam to lower dome.



**ELECTRICAL**

<b>Input voltage</b>	24 V AC
<b>Maximum load</b>	100 VA
<b>Camera power</b>	12 V DC or 24 V AC @ 500mA
<b>External connectors</b>	6-Way Terminal block with female chassis mount BNC
<b>Internal connectors</b>	video - BNC
	lens - 15 way "D" connector
	camera - 9-way "D" connector
<b>Site Receiver</b>	internal, plug in
<b>Site Receiver Comms.</b>	2 wire audio, 4-Wire, or RS-232
<b>Limit switches</b>	Programmable Electronic Limits ("PEL")
<b>Auxiliary slip rings</b>	4 auxiliary slip rings provided

**OPTICAL**

<b>Light loss through lower dome</b>	less than 1 <i>f</i> -stop
<b>Geometric distortion through lower dome</b>	better than 1%

## PHYSICAL

<b>Back box</b>	seamless aluminium.  (H) 180 mm x (D) 300 mm
<b>Camera mask</b>	A.B.S.
<b>Lower dome</b>	1.5mm acrylic, 300mm diameter
<b>Camera mount</b>	1.2 mm steel
<b>Finish</b>	stippled black powder coat

## ENVIRONMENTAL

<b>Temperature range</b>	10°C to 50°C
<b>Operating environment</b>	sealed dome, suitable for indoor, or outdoor  (when using PT-720SS sunshade)

## OPTIONS

<b>Sunshade</b>	for external use
<b>Pendant mounting kit</b>	for dropper mounting
<b>Wall mounting kit</b>	for wall mounting
<b>Mounting Kit</b>	for custom made wall or pendant mounts
<b>Fixed dome with adjustable camera mount and internal mask</b>	for fixed camera applications

*Note: All specifications subject to change without notice.*

## 13.19 Backbox Installation Tips

### Introduction

The PT-620/700/719/720 series of backboxes are provided with the option to use either ceiling or pendant style mounting methods.

As standard, the backbox is provided as ceiling style. Only the mounting holes around the backbox rim required drilling for fitting to a ceiling.

As a second option the backbox can be used for pendant style mounting. This would not require the mounting holes around the backbox rim to be drilled unless an optional PT-720SS (sunshade kit) is used.

### Using the backbox as a ceiling style unit

Remove all items and check that the following are included:

- 1x Backbox fitted with:
  - 1 x Angle bracket for electrical/video termination's
  - 1 x 6 way terminal strip
  - 1 x Female chassis mounted insulated BNC connector
  - 4 x M4X8 stainless button head Allen screws fitted to fixing blocks on rim of backbox
  - 1x Internal plate fitted with 1 x D15 female connector
- 2 x Half-mounting collars fitted with 2 cage nuts on each
- 4 x M6X30 countersunk Allen head bolts
- 1 x Rubber gasket with 4 holes (to fit around outside of backbox rim)

Once all items are checked use the following steps to mount the backbox.

1. Where the four dimples are located on the rim of the backbox drill 6mm holes at each location.
2. Cut a hole into the ceiling where the backbox is to be located. Be sure to cut the hole for the size of the backbox excluding the rim.
3. Hold the backbox in position (through the mounting hole) and mark the four mounting holes.
4. Fit the rubber gasket (with four holes) onto the back of the backbox rim.
5. Place a half-mounting collar to the top side of the ceiling and use an M6 X 30 countersunk Allen head bolt to fix the backbox. The head of these bolts should be on the inside of the rim. Repeat this for the three remaining holes. Ensure all bolts are tightened so to dimple the rim to countersink the bolt head into the rim. This will allow the acrylic dome cover to move freely on the backbox later.

The backbox can now be terminated and the dome installation completed.

### **Using the backbox as a pendant style unit**

Remove and check all items as per the above list.

#### ***Please note:***

The following items are not required from the above list when using the backbox for pendant mounting. These items can be disregarded.

- 2 - Half-mounting collars fitted with 2 cage nuts on each
- 4 - M6X30 countersunk Allen head bolts
- 1 - Rubber gasket with 4 holes (to fit around outside of backbox rim)

The following procedure is required when using a PT-720P (pendant kit), or a PT-720W (wall mount kit) to adapt the backbox for pendant/wall mounting.

Located in the PT-720P or PT-720W kit the following items will be required to adapt the backbox.

- 1 - Pendant fixing plate (threaded mounting collar)
- 1 - O-Ring
- 4 - M6X30 Allen button head bolts
- 1 - Backbox gasket (weather seal)

Use the following steps to adapt the backbox for pendant mounting.

1. Remove the two nuts and screws holding the six way terminal strip to the mounting bracket and remove the connector. Unscrew all wires terminated into the six way terminal strip.
2. Cut away heatshrink on BNC connector and de-solder the wires on the connector.
3. Remove the four M6 Allen head bolts from the top of the backbox. These are no longer required.
4. Remove the angle bracket from the top of the backbox.
5. With the rubber backbox gasket, feed the cables through the large hole and place the gasket in line with the hole on the top of the backbox.
6. Place the pendant fixing plate on top of the gasket and feed the cables through the hole in the plate.
7. Fit two of the M6X30 Allen button head bolts (including nuts and washers) to the two mounting holes at the opposite end to where the cables come through the pendant fixing plate. **Note:** Ensure the head of the bolts are installed from the inside of the backbox.

8. Place the angle bracket over the pendant fixing plate and feed all cables through the gable gland on the bracket. This bracket should be oriented so the coax connector is facing toward the centre of the backbox. Line the two mounting holes of the angle bracket with the holes in the pendant fixing plate, the backbox rubber gasket and the backbox.
9. Using the remaining two M6X30 Allen button head bolts provided, fasten the pendant fixing plate to the backbox.

*Note: Ensure the head of the bolts are directed from the inside of the backbox.*

10. Re-terminate the cables back into the six way terminal strip and fix the terminal strip back onto the angle bracket along with the BNC connector. A length of heat shrink is provided to shrink onto the BNC connector.

Refer to the “Backbox Terminations Circuit Diagram in the List of Drawings section of this chapter (13.20) for termination details.

The backbox can now be fitted onto the pendant or wall pole, terminated and the dome installation completed.

## 13.20 Installation Tips and Traps

### Introduction

Experience has shown a number of conditions which have to be met to successfully install a PT-720 Dome. A number of easily made errors can also occur which can damage or reduce the performance of the dome assembly.

### Camera Installation

The camera lens centre must be in line with the cradle pivot bearings and must also line up with the centre of the cradle - above the camera mounting slots.

The camera lens should not foul the dome mask when it is fitted to the assembly.

The camera cradle must be level or horizontal to prevent the reference magnet in the toothed sprocket from damaging the magnetic reference sensor located on the main body.

If the mechanism does not initialise properly on start up, in otherwords, keeps trying to drive a motor in a particular direction of pan or tilt (usually), then it is very likely that either a magnet has been broken on the pulley, or the sensor board has been knocked out of alignment. The most likely cause of this is because the camera tray has not been aligned properly once re-fitted. Severe transport damage or dropping the unit can bend the sides and result in a similar outcome.

It is strongly recommended that both pulleys are checked to ensure they can rotate freely without magnets hitting sensors before installing the unit into the backbox and powering up.

The Allen screws securing the cradle to the toothed sprocket must not be over tightened as the plastic used in the construction of the sprocket is easily stripped.

The camera and lens assembly should both be secured to the cradle to prevent movement of the camera during high acceleration and braking. This may cause misalignment of the camera and lens assembly resulting in the inability to simultaneously focus the top and bottom of the picture. The effect can be eliminated

by placing packing shims under the lower item (camera body or lens assembly) until they are in alignment.

## Noise Considerations

The noise produced by a PT-720 can be minimised with the following steps:

The drive belts should not be too tight. Belt tension can be adjusted by re-positioning the stepper motors.

All rubber gaskets should be fitted correctly. The gaskets on the stepper motors, between the back box and ceiling, and between the securing plate and the back box are the most significant.

The back box should not touch other objects, particularly metal cable trays etc.

## Dome Operation

Caution must be observed fitting the PTZ mechanism to the back box or while carrying out any maintenance or adjustment to the unit. The speed and force of a rotating PT-720 is enough to cause a maintenance technician to lose balance and fall from the ladder used to reach the dome assembly.

The unit can be immobilised by setting DIP switch 1/8 ON (located on the Main PCB - lower centre)

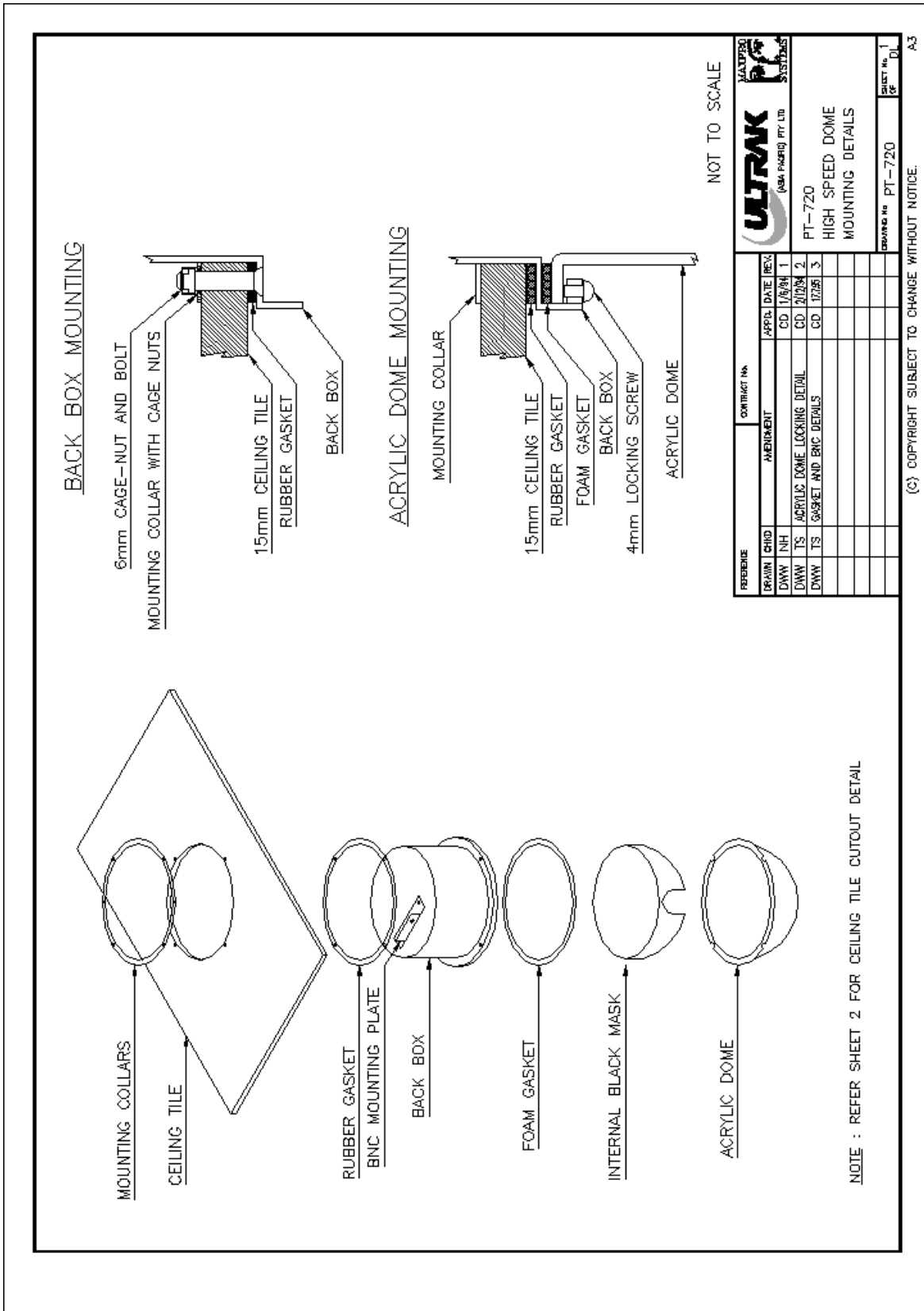
Resetting the switch to OFF will cause the unit to initialise.

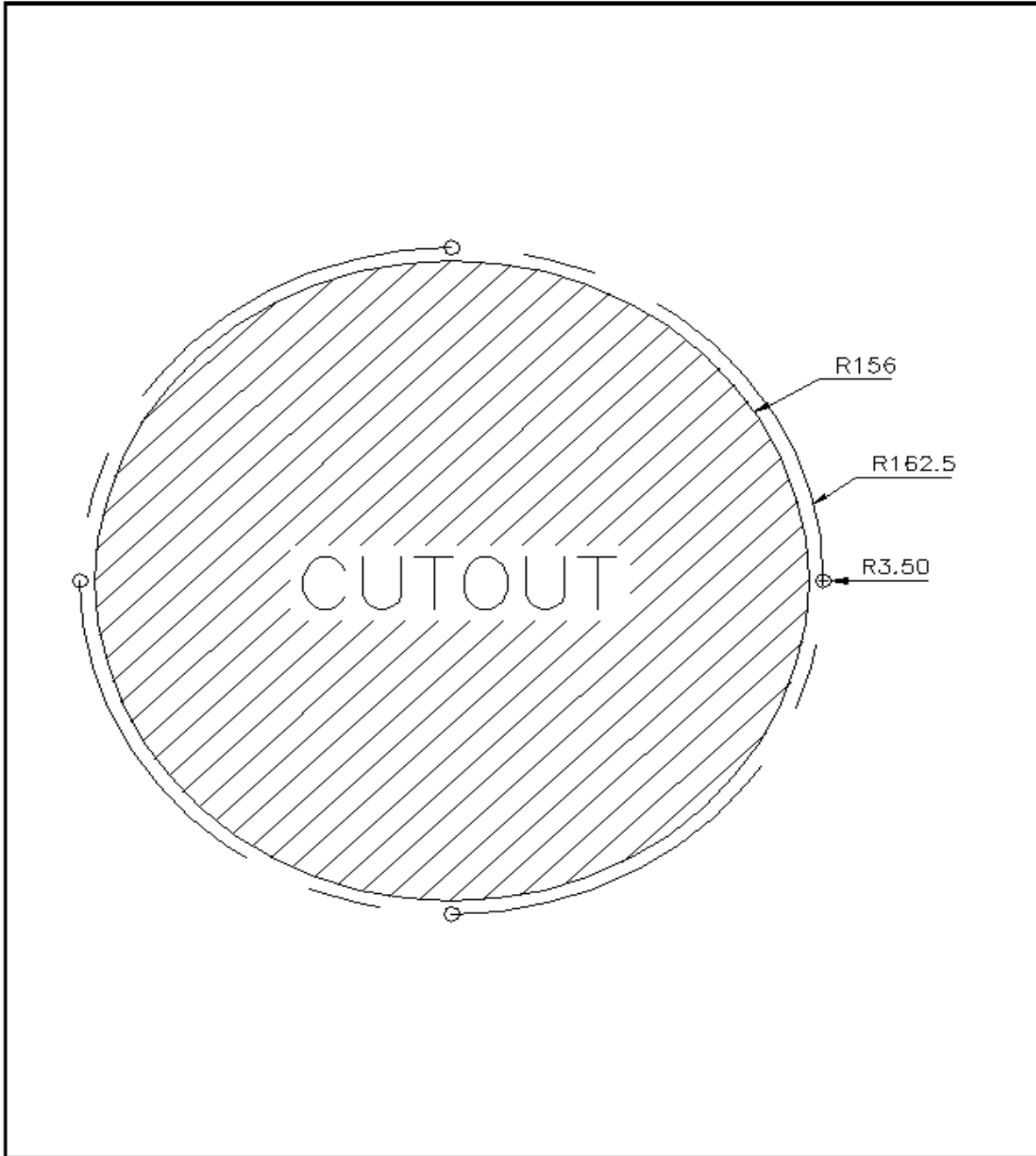
**For full details refer to the PT-720 Chapter,  
"Installing a Camera in the PT-720" & "Fitting the  
PT-720"**





## 13.21 LIST OF DRAWINGS

<b>Page No.</b>	<b>Description</b>
13.34	Mounting Details
13.35	Ceiling Cut-out Detail
13.36	Pendant Mount
13.37	Pendant Mount with Sunshade
13.38	Sunshade Support Retaining Clip Assembly Detail
13.39	Mounting Kits
13.40	Mounting Configurations
13.41	CCT Board Switch & Connect Data
13.42	Backbox Terminations Circuit Diagram
13.43	Standard 2-Wire Line Connections
13.44	AF-232 to First PTZ Site then 2-Wire
13.45	Typical 4 Wire Audio Connection to Optics
13.46	RS-232 to PTZ Site
13.47	RS-232 Multi Drop to Many Sites

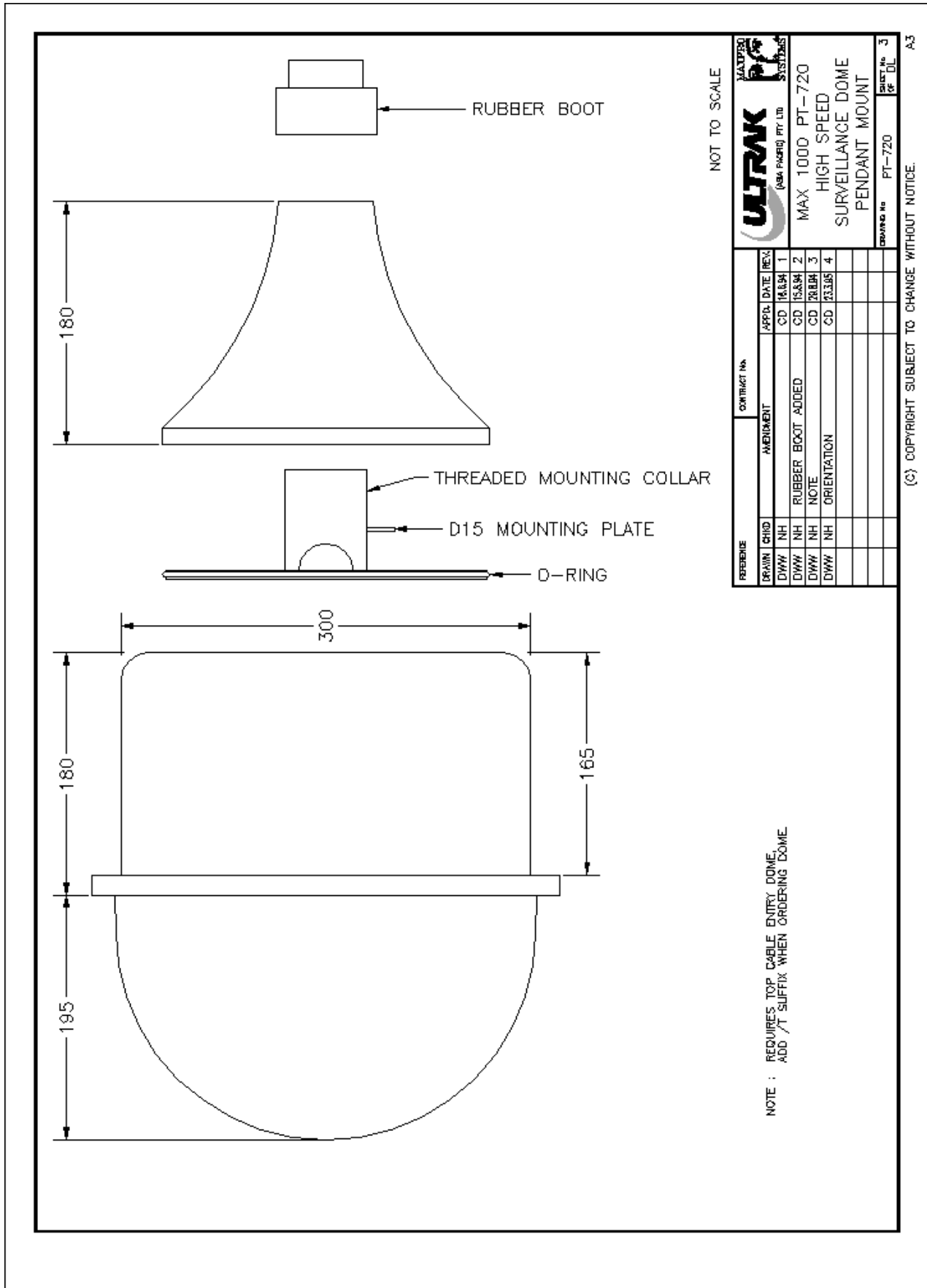




REFERENCE			CONTRACT No.			 
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.	
DWW	NH		CD	1.6.94	1	PT-720 HIGH SPEED DOME CEILING CUTOUT DETAIL
DWW	NH		CD	17.7.95	2	
						DRAWING No PT-720

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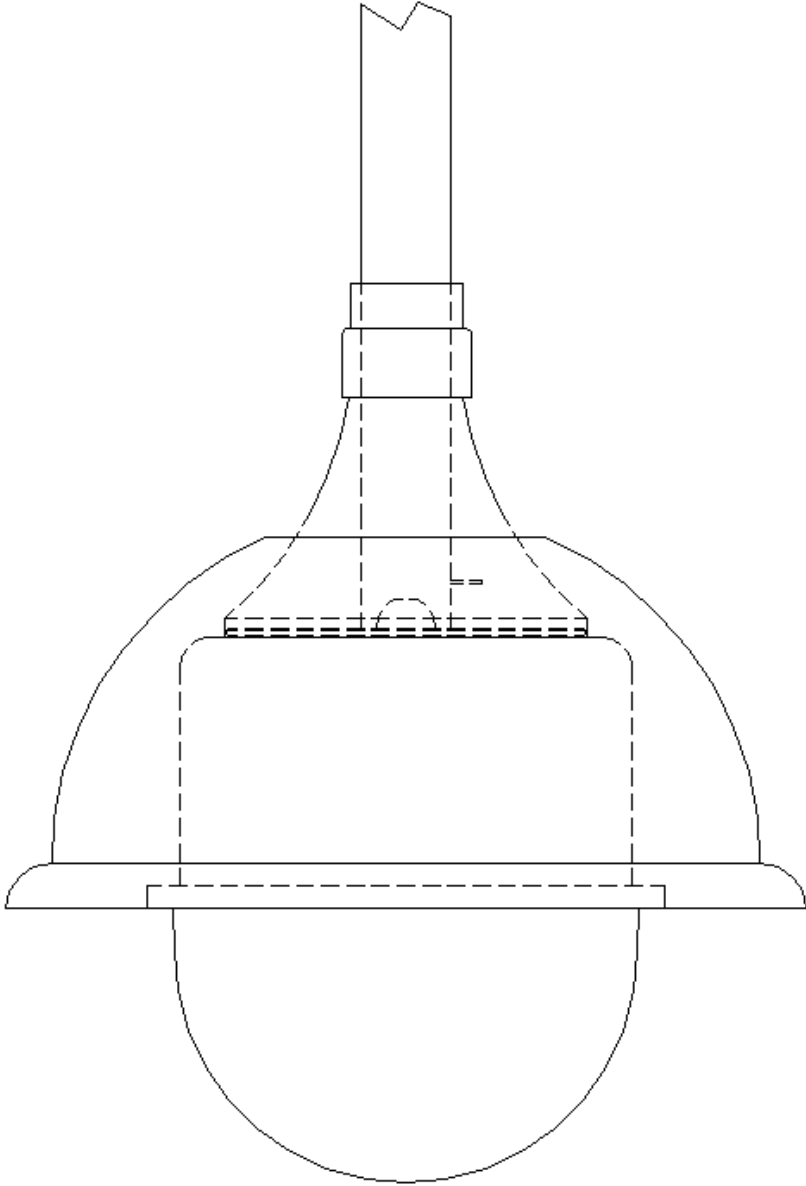
ULTRAK (ASIA PACIFIC) PVT. LTD.

MAX 1000 PT-720 HIGH SPEED SURVEILLANCE DOME PENDANT MOUNT

DRIVING CHD AMENDMENT APPL. DATE REV. CD 16.8.94 1 CD 15.8.94 2 CD 28.01.04 3 CD 03.09.05 4

REFERENCE CONTRACT No. DRAWING No. PT-720 SHEET No. 3 OF 01

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NOTES : 1. REQUIRES TOP CABLE ENTRY DOME.  
 2. SUNSHADE AND SHROUD ARE WHITE BIRCH.

NOT TO SCALE

REFERENCE		CONTRACT No.		APPL. DATE REV.	
DWM	NH	AMENDMENT	CD	18.8.94	1
DWM	NH	NOTES	CD	28.09.04	2
DWM	NH	ORIENTATION	CD	23.03.05	3

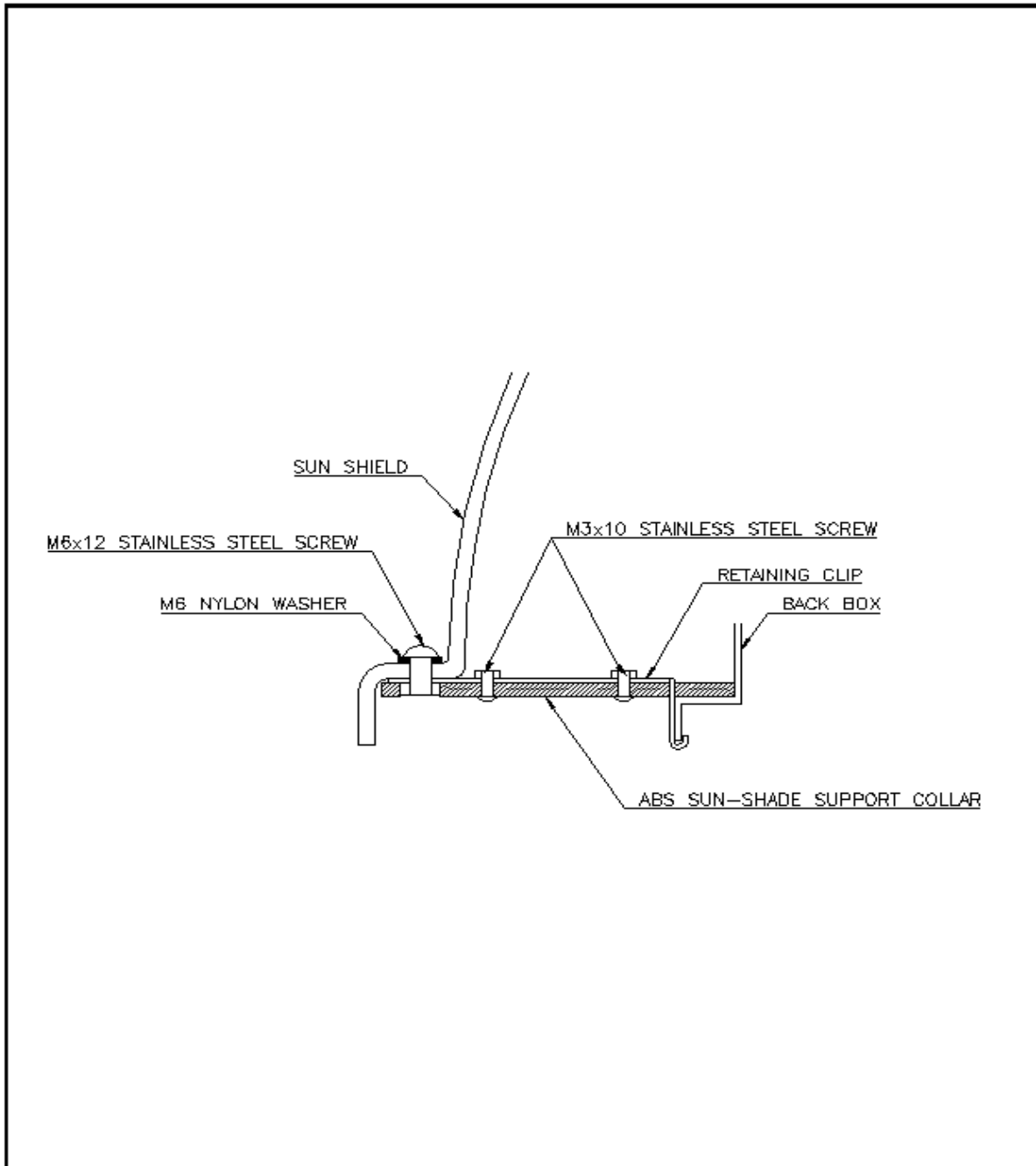
**ULTRAK**  
 (ASIA PACIFIC) PVT. LTD.  
 SYSTEMS



MAX 1000 FT-720  
 HIGH SPEED  
 SURVEILLANCE DOME  
 PENDANT MOUNT WITH SUNSHADE

Drawing No. PT-720  
 SHEET No. 4  
 OF DL

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A-3



REFERENCE		CONTRACT No.				 
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.	
DWW	PJC		NH	2.6.99	1	PT-720 SUN SHADE SUPPORT RETAINING CLIP ASSEMBLY DETAIL
DRAWING No PT720-14					SHEET No 1	1

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A4

PT-720SH  
TOP SHROUD KIT  
COLOUR : STIPPLE BLACK / WHITE BIRCH

PT-720P  
PENDANT MOUNT KIT  
COLOUR : STIPPLE BLACK / WHITE BIRCH  
WEATHER SEAL

PT-720MK  
PENDANT MOUNT  
COLOUR : STIPPLE BLACK / WHITE BIRCH  
WEATHER SEAL

PT-720SS  
SUNSHADE KIT  
COLOUR : WHITE BIRCH

PT-720W  
WALL MOUNT KIT  
COLOUR : STIPPLE BLACK / WHITE BIRCH

FRONT VIEW

SIDE VIEW

500

400

NOT TO SCALE

REFERENCE	CHD	AMENDMENT	CONTRACT No.	APPL. DATE	REV.
DWW	NH			CD 15/03/04	1
DWW	NH	SHROUD KIT		CD 26/03/04	2
DWW	NH	PT-720MK		CD 30/03/04	3
DWW		C/O 154		NH 03/04	4

ULTRAK  
(ASIA PACIFIC) PTE. LTD.

MAX 1000 PT-720  
HIGH SPEED  
SURVEILLANCE DOME  
MOUNTING KITS

DRAWING No. PT720-5

SHEET No. 1

OF 1

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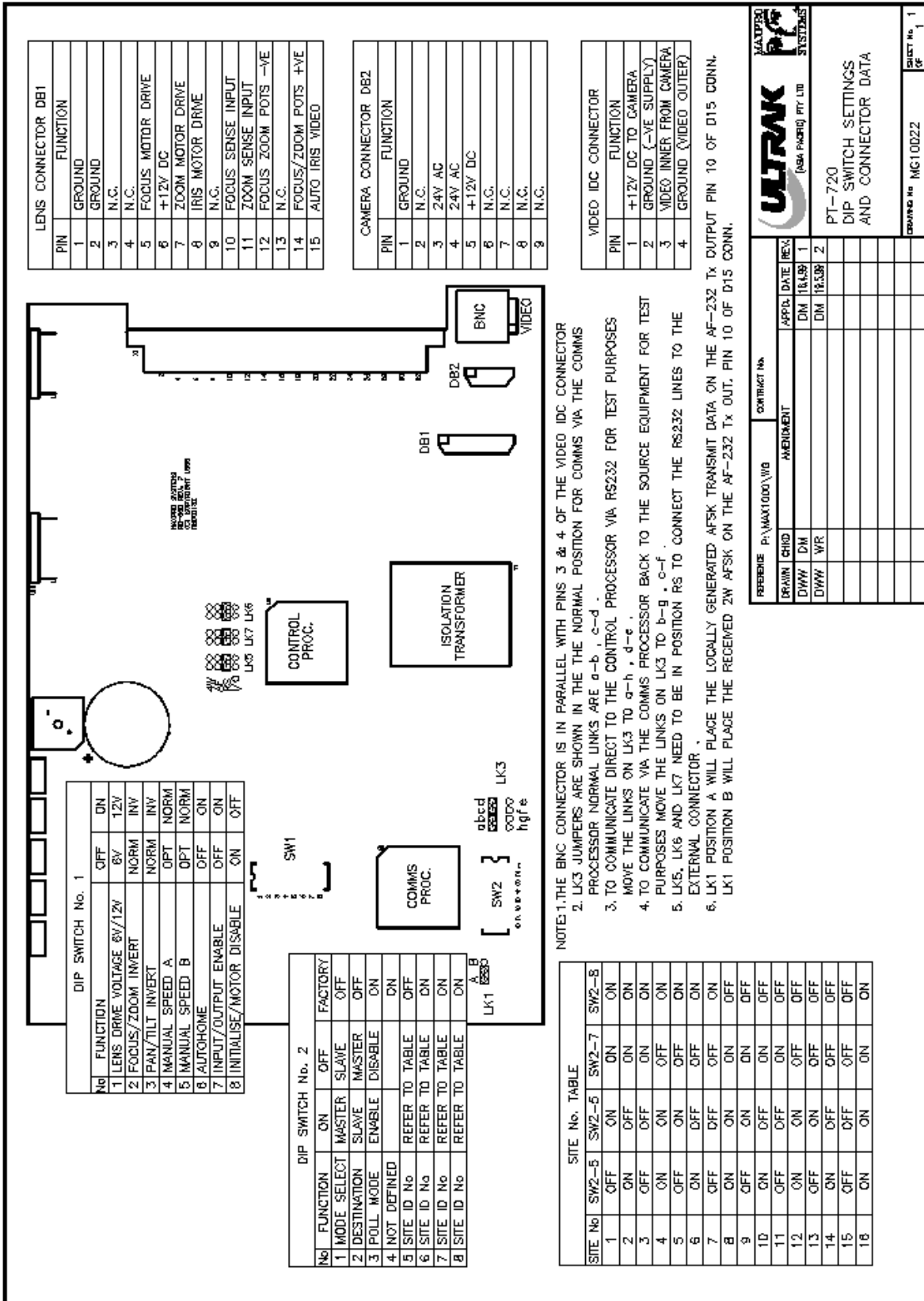
REFERENCE	CONTRACT No.	AMENDMENT	APPL. DATE	REV.
DRAWN DWW			CD 15/8/94	1
CHD				
NH				

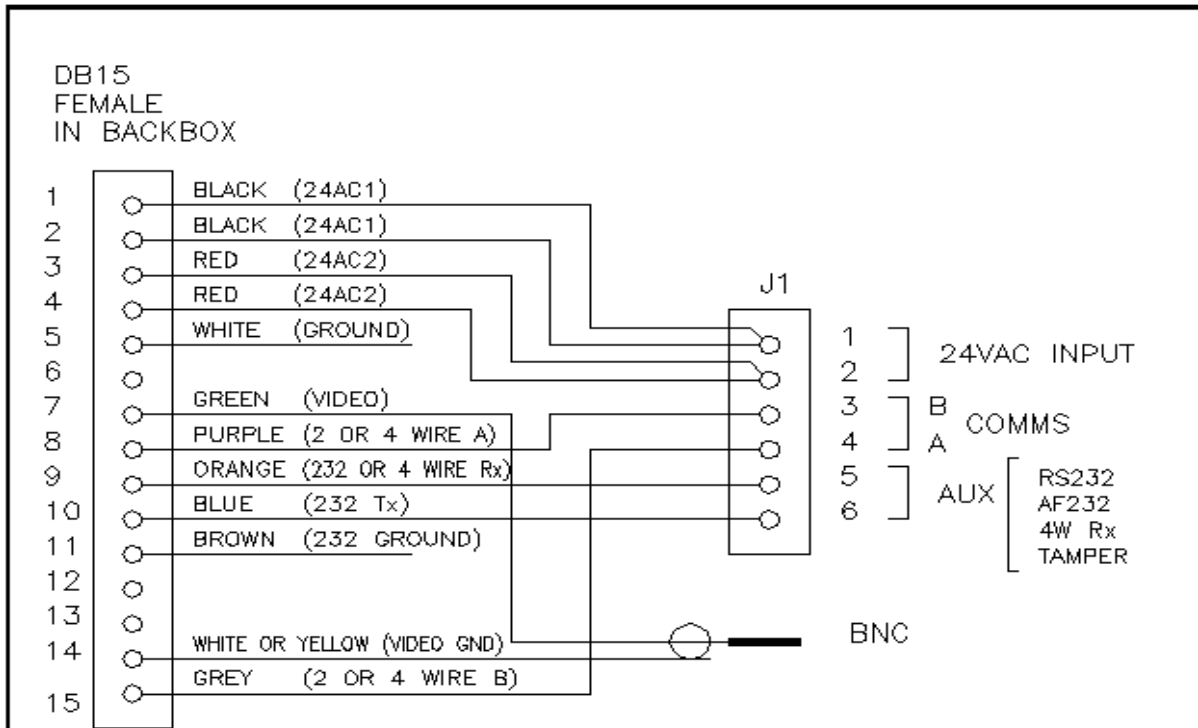
MAX 1000 FT-720  
HIGH SPEED  
SURVEILLANCE DOME  
MOUNTING CONFIGURATIONS

Drawing No. PT-720      SHEET No. 6  
OF 10

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PT-720 TERMINATIONS

RS232 + AF232 (SINGLE SITE/LINE)

REMOVE GREY WIRE PIN 4  
CONNECT BROWN WIRE PIN 4

4 WIRE

REMOVE BLUE WIRE PIN 6  
CONNECT BROWN WIRE PIN 6

TAMPER

FACTORY MODIFICATION  
- MODE DEPENDANT

AF-485

USE TERMINALS 3 & 4 (B&A)  
(USING HD-MX-128)

NOTE: INSTALL 120 OHM RESISTOR ACROSS  
TERMINALS 3&4 WHEN USING THIS CONFIGURATION

PT-719 TERMINATIONS

RS-485

USE TERMINALS 3 & 4 (B&A)  
(USING RD-316 OR HD-MX-128)

REFERENCE		CONTRACT No.			
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.
TB	DWW		CD	14.12.95	1
DWW	DM	BNC CONNECTION	CD	9.1.96	2
PJC	DWW	NOTES ADDED	CD	1.4.97	3
DWW	WR	NOTES ADDED	DM	19.5.99	4
DWW	DM	NOTES ADDED	DM	11.6.99	5

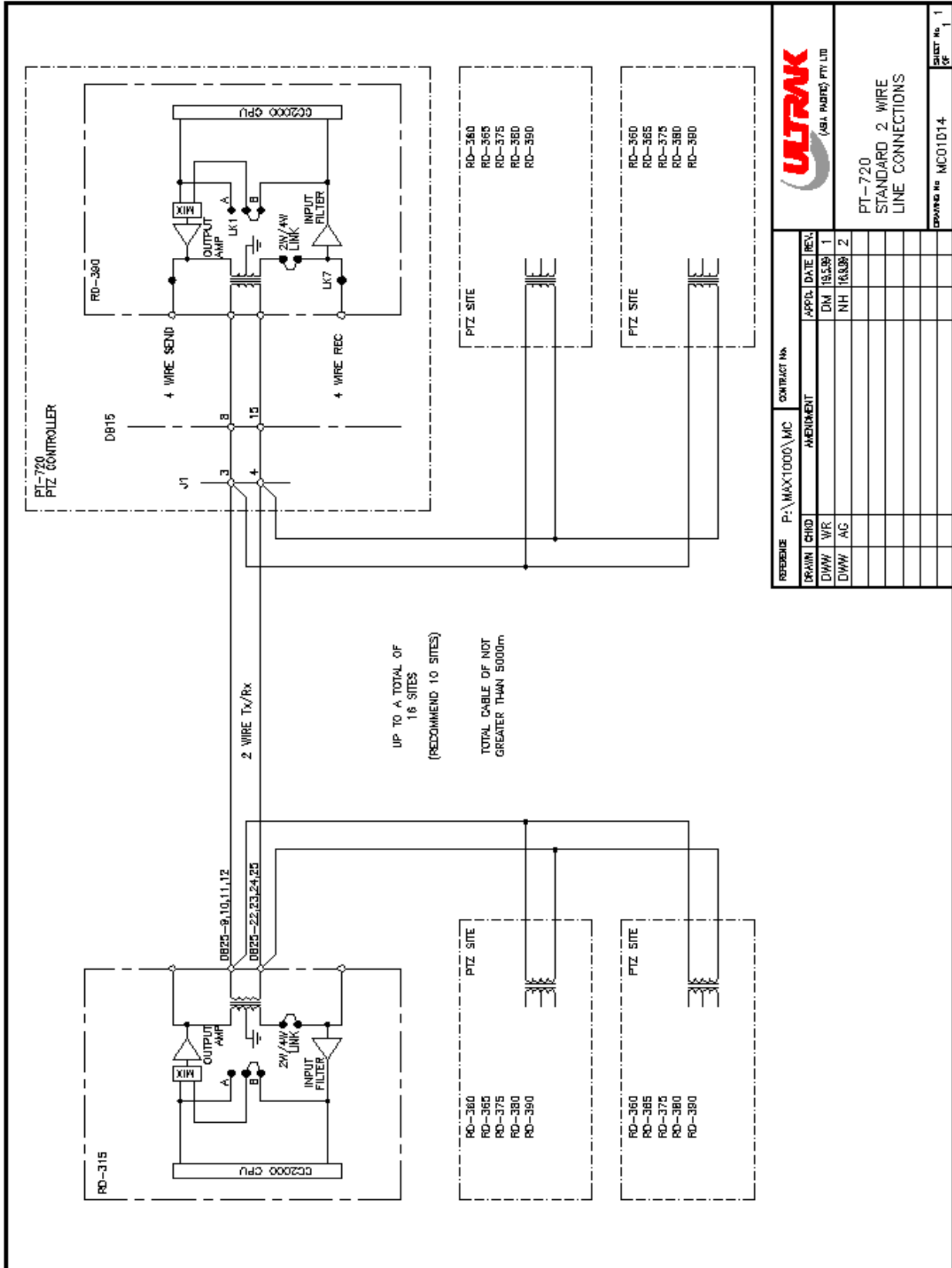


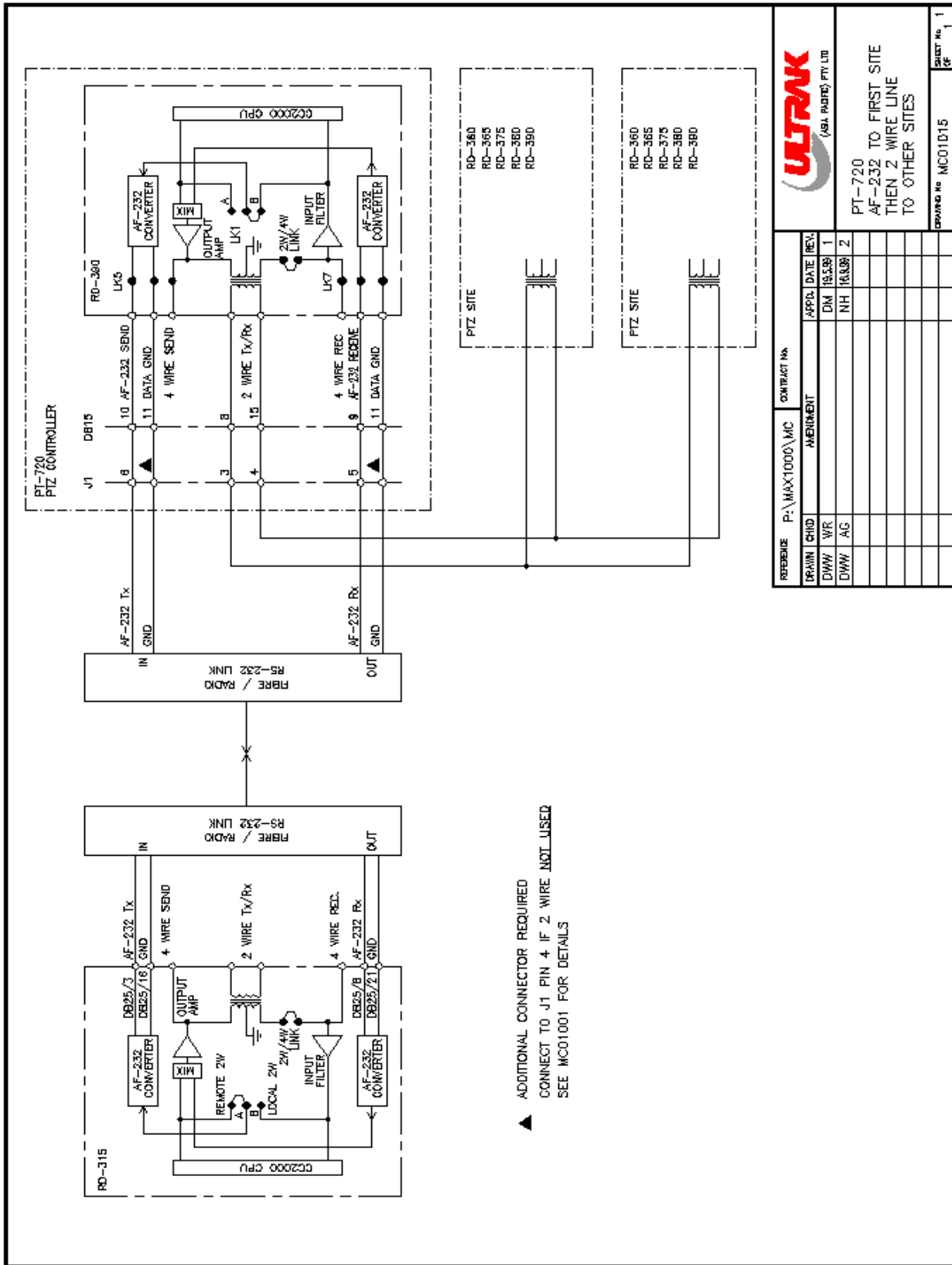
PT-719/720  
BACKBOX TERMINATIONS  
CIRCUIT DIAGRAM

DRAWING No MCD1001 SHEET No 1 OF 1

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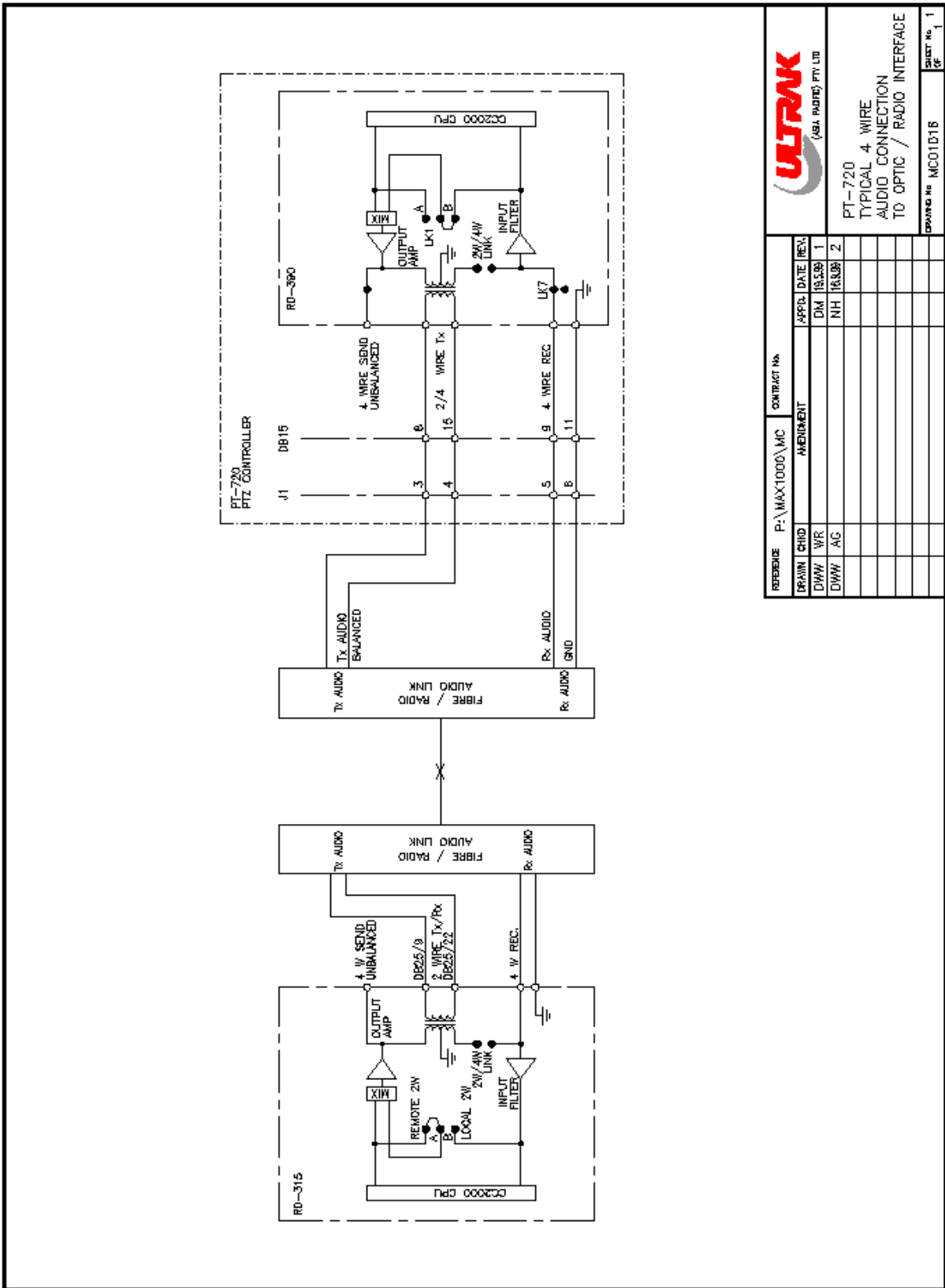
A4





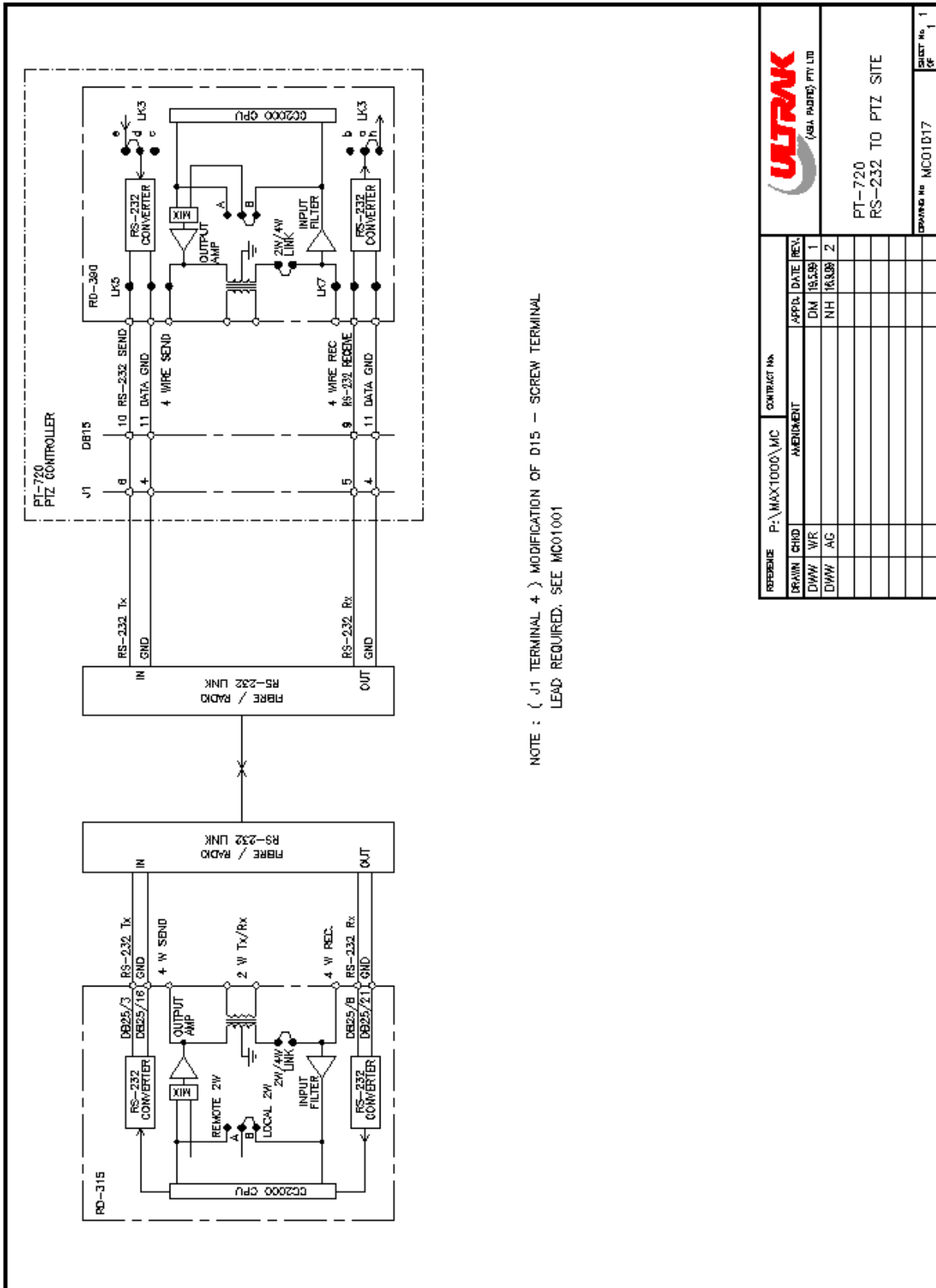
 (ASIA PACIFIC) PVT. LTD.	
REFERENCE: P:\MAX1000\MC	CONTRACT No.
DRAWN: CHD	AMENDMENT
DWW: WR	APPD. DATE: REV.
DWW: AG	DM: 16.03.01 1
	NH: 16.03.02 2
PT-720 AF-232 TO FIRST SITE THEN 2 WIRE LINK TO OTHER SITES	
DRAWING No. MC01015	SHEET No. 1 OF 1

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NOTE : ( J1 TERMINAL 4 ) MODIFICATION OF D15 -- SCREW TERMINAL LEAD REQUIRED. SEE MIC01001

REFERENCE: P:\MAX1000\MC DRAWN: CHD DWM: WR DWM: AG	CONTRACT No. APPROVAL DATE: 15/3/99 APPROVAL BY: NH APPROVAL NO: 18/3/99
PT-720 RS-232 TO PTZ SITE	
Drawing No: MIC01D17	
SHEET No. 1 OF 1	

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## Notes: