Honeywell

MAXPRO-Net

Crosspoint Matrix Video Switching System

Hardware Installation Manual

HMXMU001018 – 10/06 - Rev. C

ISSUE	DATE	REVISIONS
A	March 2005	Initial Release (PCN 1980)
B	March 2006	Revised Installation Instructions
C	October 2006	Added detailed drawing for connecting to HVBMATPIT and VideoBloX Chassis in Chapter 12. Revised the part numbers for VideoBloX reference materials.

FCC COMPLIANCE STATEMENT

INFORMATION TO THE USER: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the users will be required to correct the interference at their own expense.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

USERS OF THE PRODUCT ARE RESPONSIBLE FOR CHECKING AND COMPLYING WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND STATUTES CONCERNING THE MONITORING AND RECORDING OF VIDEO AND AUDIO SIGNALS. HONEYWELL VIDEO SYSTEMS SHALL NOT BE HELD RESPONSIBLE FOR THE USE OF THIS PRODUCT IN VIOLATION OF CURRENT LAWS AND STATUTES.

IMPORTANT SAFEGUARDS

1. **READ INSTRUCTIONS –** All 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 result in the risk of fire, electric shock, or injury to persons.

7. **WATER AND MOISTURE** – Do not use this unit near water or in an unprotected outdoor installation, or any area that is classified as a wet location.

8. **ACCESSORIES** - Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult and serious damage to the equipment. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions and should use a mounting accessory recommended by the manufacturer. Wall or shelf mounting should follow the manufacturer's instructions and should use a mounting kit approved by the manufacturer.

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

10. **VENTILATION** - Slots and openings in the cabinet and the back or bottom are provided for ventilation and to ensure reliable operation of the equipment and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. Equipment should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation, such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

11. **POWER SOURCES** – This product 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 supplied to your home, consult your product dealer or local power company. For products designed to operate from battery power or other sources, refer to the operating instructions.

12. **GROUNDING OR POLARIZATION** – The power supply supplied with 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.

13. **OVERLOADING** – Do not overload outlets and extension cords as this can result in a risk of fire or electric shock.

14. **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 monitor.

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 liquids have 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 enclosure 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 CHECKS** – 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. **LIGHTNING AND POWER LINE SURGES** – 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.

21. **HEAT** – The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

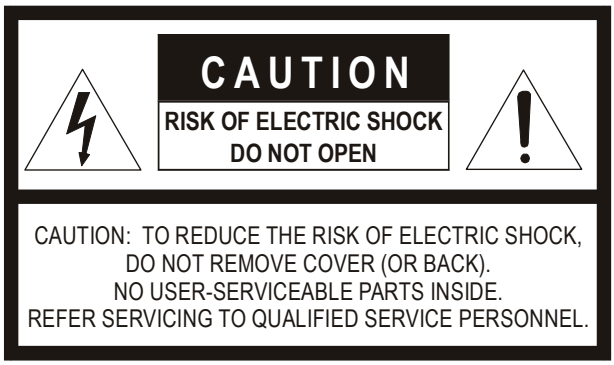
22. **INSTALLATION** – Do not install the unit in an extremely hot or humid location, or in a place subject to dust or mechanical vibration. The unit is not designed to be waterproof. Exposure to rain or water may damage the unit.

23. **WALL OR CEILING MOUNTING –** The product should be mounted to a wall or ceiling only as recommended by the manufacturer

EXPLANATION OF GRAPHICAL SYMBOLS

	The lightning flash with 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 the presence of important operating and maintenance (servicing) instruction in the literature accompanying the product.

CAUTION



WARNINGS

	WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.
	WARNING: DO NOT INSERT ANY METALLIC OBJECT THROUGH VENTILATION GRILLS THIS PRODUCT TO RAIN OR MOISTURE.
	WARNING: THIS UNIT MUST BE OPERATED WITH A PROPERLY GROUNDED 3-PIN CONNECTION. NON-OBSERVANCE OF THIS STANDARD PRACTICE MAY RESULT IN A STATIC ELECTRICITY BUILD-UP THAT MAY RESULT IN AN ELECTRIC SHOCK WHEN EXTERNAL CONNECTIONS ARE TOUCHED.

WARNING: OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES. Grounded wrist straps must be worn and proper ESD safety precautions observed when handling the electrostatic-sensitive printed circuit boards.

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CHAPTER 1:
GENERAL INFORMATION

1.1 INTRODUCTION

MAXPRO-Net combines custom designed software with a high performing Windows 2003 Server resulting in Honeywell's Turn Key Centralized Management Console Server designed for system configuration, system management and system monitoring of Honeywell's crosspoint matrix video switchers. The modular hardware architecture and flexible configuration software design simplifies troubleshooting for customers or Honeywell Field Service Engineers. The equipment utilizes replaceable modules fitted with LED indicators to assist with fault diagnosis.

Before attempting fault finding on any system some knowledge of the basic operation is required. This is most easily obtained by reference to the system block diagram. The system access codes are required for some of the more sophisticated diagnostic facilities provided within the MAXPRO-Net crosspoint matrix video switch.

This is followed by a simple logical one step at a time identification of actions and operation. By analyzing the LED indications and swapping suspect modules within the subrack it is possible to locate faults remotely with a Technician in front of the rack and an Engineer on the telephone.

For all of the following information it is assumed that service is being carried out on a previously operating system, that is, one that has been commissioned correctly and has become faulty after some time of normal operation.

Fault finding techniques differ slightly during commissioning and are usually more complex and difficult to isolate as they often occur in conjunction with other faults masking the symptoms and responses to changes made.

Incorrect programming can falsely present itself as faulty equipment. Some of the module exchange techniques may be of assistance in verifying incorrect programming. However, this manual does not attempt to cover any aspects of macro programming.

This manual is intended for service of the MAXPRO-Net only and does not attempt to solve problems with cameras, monitors or video link equipment. General purpose service manuals and aids can be ordered from your system agent.

1.2 ACKNOWLEDGMENTS

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CHAPTER 2:
ELECTROSTATIC DISCHARGE (ESD)

2.1 WARNINGS

All circuitry in this system contains a considerable number of MOS and other static sensitive components. Static damage may or may not cause instant failure of a circuit and therefore, could go undetected. This damage can cause reduced life span or early system failure.

(a) If possible, switch off the RD-PS6/9 supplying the subrack under service when changing modules. Module exchange can be done while the system is powered, however, special care should be taken to ensure that modules are plugged in and out squarely and do not touch other adjacent modules.

(b) Always discharge static from yourself by touching a conductive part of the main equipment cabinet before handling any circuit module.

(c) All precautions should be taken not to handle electronic connection edges of circuit boards. This is to minimize the chance of static damage and to avoid deposit of acids from the skin on critical surfaces.

(d) Do not poke your finger at components or touch IC pins. These are all good ways of causing static damage. Components are also physically delicate.

(e) All circuit modules equipped with memory components are to be protected from sunlight and strong UV-light.

(f) If static potential is high from carpet floor coverings, chairs, or other furnishings, additional grounding should be used by way of a wrist strap for the person handling the installation of cards.

(g) Circuit modules with backup batteries can be easily damaged, as some parts of the circuit are still live even when un-plugged. The backup battery itself can cause damage if conductive objects make contact with the circuit board.

(h) To protect against physical damage leave individual circuit boards in their boxes and in their anti-static bags until they are required.

(i) When plugging leads into the back of a sub-rack or computer, always make personal contact with the chassis of the sub-rack or computer before mating the connectors. This will, at least, equalize static levels between the lead and the computer.

WARNING: These procedures apply equally to both working and faulty circuit modules. Careless handling, storage and transporting will cause secondary or future faults.

CHAPTER 3:
WARRANTY AND MODULE REPLACEMENT

3.1 WARRANTY PROCEDURE

Modules are exchangeable items, and will be replaced at no charge during the warranty period, provided the damage is a normal electronic component failure. Outside the warranty period, or if a module has been damaged by misuse, modules will be repaired in our workshops for a flat rate service charge.

The replacement module warranty continues until the original warranty period expires. Out of warranty repairs or exchanges are warranted only for faulty workmanship. Warranty dispatched modules will be invoiced at list price. Upon return of the faulty module, the invoice will be canceled or reduced to the exchange module value.

After determining that a unit is faulty and still within the warranty period, please use the following procedure. Failure to do so may delay the process of repairing / replacing and returning the unit.

Contact Honeywell or your System Supplier to obtain a Return Authorization Number (RAN). This enables us to track your unit through our system.

Pack the units appropriately, in the original packing if possible. Honeywell will charge for repairs to equipment where damage has been caused by poor packing or transport.

Mark the Return Authorization Number (RAN) clearly on the outside of the box before shipping as well as in the accompanying documentation.

If the unit being returned is for repair from outside of Australia, the paperwork should clearly mention the following: the original purchase order number, Return Authorization Number (RAN) and, that the units are to be repaired. Serial numbers are often helpful.

Freight for all repairs is borne by the customer at all times. Please state your preferred carrier, account numbers and any other details required for returning your units after repair.

Repairs are normally completed quickly. If you wish to enquire about the status of a repair please have your Return Authorization Number (RAN) reference ready.

Following this procedure will greatly assist Honeywell in turning around your unit quickly and minimize the cost and interruption to your customers.

3.2 LOAN PROCEDURE

When requesting loan equipment, please use the following procedure. Failure to do so may delay the process of receiving goods, or affect further loan requests.

Contact Honeywell to obtain a Return Authority Number (RAN). This enables us to track your loan equipment through our system.

Fax an official company purchase order to Honeywell for the full value of the goods required for loan purposes. Ensure the Return Authority Number (RAN) is clearly stated on the purchase order to avoid delays. Discounts DO NOT apply to loan equipment.

Freight for all loan equipment from and to Honeywell is borne by the customer at all times. Please state your preferred carrier, account numbers and any other details required on the purchase order.

Loan equipment is provided for fourteen days only. Any extension to this time must be approved by Honeywell. Failure to return equipment within fourteen days can affect future loan services and/or credit facilities.

All loan equipment (if not covered by warranty conditions) is subject to a standard 20% re-stocking fee. All loan equipment must be re-packed in the original packing and must not have any damage. Honeywell will charge for repairs to equipment where damage has been caused by poor packing or transport.

Mark the Return Authority Number (RAN) clearly on the outside of the box before shipping as well as in the accompanying documentation. Do NOT write directly on the carton. If the RA number cannot be identified, the product will be returned immediately at your expense.

Following this procedure will greatly assist Honeywell in providing this service.

CHAPTER 4:
TEST EQUIPMENT

4.1 GENERAL REQUIREMENTS

- BNC patch cables and joiners
- Test monitor (preferably portable)
- Test video cord 3 pin IDC to BNC
- Digital multimeter
- 75 ohm termination
- BNC T adapter
- RS-232 indicator modules and Patch Cords

4.1.1 More Complex Faults

- 20 MHz Oscilloscope
- Video generator
- Test program PATCH232.EXE (Supplied on the MAXTOOLS disk)
- Null modem cables and adapters
- IBM compatible computer with at least two serial ports (Preferably a portable unit)

4.2 ON-SITE EQUIPMENT

In most installations some form of communication is required from the camera to the control room monitors. VHF or UHF hand held radios best suit this requirement. Mobile telephones sometimes have application in this area. Adjustments such as focus, iris and camera position can usually be set in this manner. Back focus can also be done "in situ" although better results are usually obtained by doing this under controlled conditions in the workshop.

Notes:

CHAPTER 5:
DIAGNOSIS AND TROUBLESHOOTING

5.1 GENERAL

All VIDEO TYPE modules have an auxiliary 75 ohm output connection point available on the front edge of the module. This provides for simple connection of test equipment when system commissioning or servicing is required. This test video output connector is a 3 pin, 0.1" spaced, male IDC type, where the center pin is the active video output and the other two pins are grounded.

This test video output on the modules gives the technician, total front panel access to all video output channels in a switching system, without the need to remove or patch connections on the rear of the video switching subrack equipment.

5.2 EXAMPLE FAULT ANALYSIS

As every system is different, only general techniques for fault location can be provided. Fault location can be performed by using the procedures and applying them to the actual block schematic for your specific system.

It is essential that the service engineer has a good operational knowledge of the specific system in question. Remember that with the macros, the system features can be wide and varied. First study the block schematic to understand the video paths, the modules of concern, and their slot locations. A few hours spent on this at this point could save many hours of frustration.

Remember that each video module has a monitor point on the front of it for easy access of the test monitor. Every module has at least one LED indicator to show data flow to the module and bi-directional modules have LEDs for data flow in both directions and CPU fail indicators. LEDs show all normal operation actions and all abnormal operations either by not flashing or flashing at the wrong time.

Do not forget to look at the error log file first. It is very useful for intermittent fault locating as it may have logged the fault and the slot location in many cases.

5.2.1 No Video from One Camera

If a specific camera cannot be viewed on any monitor that had the correct source group access, then check with a test monitor that video is present at the input to the sub-rack. If so, move the camera cable to another (spare) input which will have to be programmed for the required camera number PTZ details, etc. If it then works, then the input VDA fitted to the back of the sub-rack is most likely faulty.

5.2.2 No Video on One Monitor

Assuming that the monitor operation has been checked by applying a direct signal, the fault could be in a number of modules. For a small system only one RD-85 and one RD-200 are in the video circuit for the monitor channel. It is critical that the block diagram is used to locate the signal path and modules related to the faulty channel.

The first step would be to make a normal keyboard selection for this monitor. While doing this, watch the LED indicators on the modules and check that a yellow LED flashes on the subrack RD-105, RD-85 and the RD-200. If they do, then it is reasonable to assume that the communication to these modules is operating.

There are now two ways to determine the faulty module. The first is to swap one at a time with modules from an operating channel. The second is to monitor the video test output on the front of each module with the test monitor.

If the data indicator LEDs do not flash on one of the modules, then it would be worth swapping this with another channel to verify its operation. Press the Reset button on the upper front edge of the sub-rack controller (RD105) and allow a few seconds for the system to warm boot before continuing with the tests.

5.2.3 No Text on Monitor or Monitors

Very similar to test as for the above. Make a normal action and check that the data LEDs flash. If text is lost on one monitor, only then swap the module with another and reset. If there is no text, or no text update on any monitor and all the RD-200 modules are in one subrack, then check that the data LED is flashing on the RD-105 module when selections are made from a keyboard logged to the faulty monitor. If not, then there may be a communication problem with the control computer or the subrack RD-105 module. Use an RS-232 tester or PATCH232 to check data flow.

5.2.4 No Operation from a Keyboard

The symptoms of this fault can occur because a keyboard is logged off. Check this first. Check that the cable from the keyboard has not been damaged by stretching or excessive flexing and that the keyboard has power. If the cable and connections seem okay, then insert an RS-232 tester and check that the LEDs flash when a keyboard action is made. If the LEDs do flash, then it may be necessary to swap with another keyboard to check the input port to the computer (do not forget to set the correct keyboard ID code). Alternatively, use PATCH232 to verify that the data from the keyboard is of good quality. Always check the transmission speed for keyboards especially if it is transferred across a link such as microwave or fiber optic. Use of in-built test modes as detailed on page (5.8) may be helpful.

5.2.5 Total System Failure

If there are pictures but they cannot be changed, then note the text inserters. Write down any special messages that may be displayed.

The system will try and place system error messages on the text inserters if the system control computer is in difficulty. The first fix would be to try a RESET on the system RD-AT100 control computer. This may solve the problem. Wait a few moments for the system to re-boot. If there is no action, then connect the test monitor to the menu video output on the back of the control computer.

Re-set the system again. Check the progress of the boot on the test monitor. It may be that a very strong main's power corruption spike has caused change in the CMOS setup RAM. This will be evident in the progress of the boot. If the computer is operating correctly but the rest of the system is blank then check the power supply LED indicators.

Ensure that the LEDs are on for all outputs. If none are on, then the RD-PS6/9 may have a blown mains fuse. Circuit diagrams are given for the power supplies, as a power supply failure could cause significant down-time of the system. On site repair may be carried out if required.

The power supplies are well protected with fuses so it is very unlikely that components in a power supply will go faulty.

5.2.6 Problems with PTZ or Lens Operation

From operations on the keyboard, it can be determined if a problem is partial at a site or a complete site fail. A loss of communications at a site will cause the system alarm to activate for a PTZ fail.

In some instances a loss of video from the site may occur simultaneously. This combined fault would almost certainly indicate a loss of power at the site.

On opening the site, the receiver LED indicators show the status of all fuses. If a site is having problems with part of a control function, it is most likely that the problem is in the external hardware of the PTZ or lens.

Most PTZ site faults occur because of poor installation and the subsequent mechanical damage to the wiring from movement.

The error log file would also have logged any fail or restore action on the PTZ site receiver, even if it is only because of a temporary loss of power.

However, if a PTZ site has genuinely failed then the LEDs tell the story. First is the communications LED flashing off and on. If not, then a check of the cabling to the site may be required.

If the power supply boards have blown fuses and the change of a fuse does not fix the problem and the fuse blows again, a replacement of the control board may be required. PTZ sites on poles are often susceptible to lightning strike. If this happens, then the site receiver may not be serviceable at all.

5.3 MACRO ERRORS

Macro errors are displayed as a warning message on the video monitors text overlay for a period of two seconds following the error condition occurring. It is also recorded in a text file called ERRORLOG that can be viewed in the MaxMon Error Log window or in the Maxmon utility, together with a macro trail to help identify the cause of the macro error.

Macro Error Definition Table	
01	Format error in extended command
02	Format error in conditional command
03	Unknown command in expression evaluation
04	Unknown command in update expression
05	Numeric variable range error
06	Scan sequence range error
07	External alarm range error
08	Auxiliary control output range error
09	Invalid numeric evaluation error
10	Macro timer range error
11	Macro timer command error
12	Macro timer period error
13	System macro range error
14	Unknown video output channel
15	Unknown video input source
16	Invalid external alarm control logic
17	Invalid auxiliary output control logic
18	Invalid camera disable logic
19	Invalid PTZ speed
20	Unknown system constant error
21	Unknown text message command error
22	Invalid operator sign used with commands
23	invalid keyboard identification number
24	Invalid alarm stack entry i.e.: not an alarm macro
25	Invalid alarm display group (1 ⇔ 50) only
26	Macro string exceeds 255 characters
27	Conditional statement missing closed brackets
28	Invalid real time clock time or date definition
29	Invalid video source command

5.3 MACRO ERRORS, CONTINUED

Macro Error Definition Table	
30	String variable command format error
31	String variable range error
32	Unknown evaluate command for string
33	Too many nested do-while loops
34	Format error in do-while loop
35	Maximum loop cycles has been exceeded
36	Keyboard priority range error
37	Invalid keyboard identity for macro numeric input command
38	Invalid destination for keyboard macro numeric input command
39	Too many digits requested for keyboard macro numeric input
40	Invalid scan clear command
41	No dynamic macro timer available
42	User flag range error (0 ⇔ 8 only)
43	Keyboard operator range error (0 ⇔ 100 only)
44	User defined character range error, in direct comm port writes
45	Undefined comm port number, in direct comm port writes
46	Internal change network source
47	Internal change network source node command format error
48	Scan sequence entry number is out-of-range i.e.: greater than (99)
49	Error in command format received from a subrack/keyboard
50	Parity error in received data from a subrack/ keyboard
51	Range error in Blank Channel command (valid 0 - 3 only)
52	Unknown Special WORD command. eg <WARM-BOOT> etc.
53	Other errors detected during Cold/Warm Boot. Check ERRORLOG.

5.3.1 ERRORLOG Report (in SetMax Configurator)

When a Macro Error is detected, it is written into the ERRORLOG database that can be viewed from SetMax Configurator (ErrorLog Tab). This error report contains the time/date that the macro error occurred, the macro error number and a macro trail.

The macro trail details the actual event that caused the macro to begin execution and lists the various system macro library lines called prior to the macro error occurring.

This information is essential in locating the actual macro command that generated the error. The following are examples of reported macro errors.

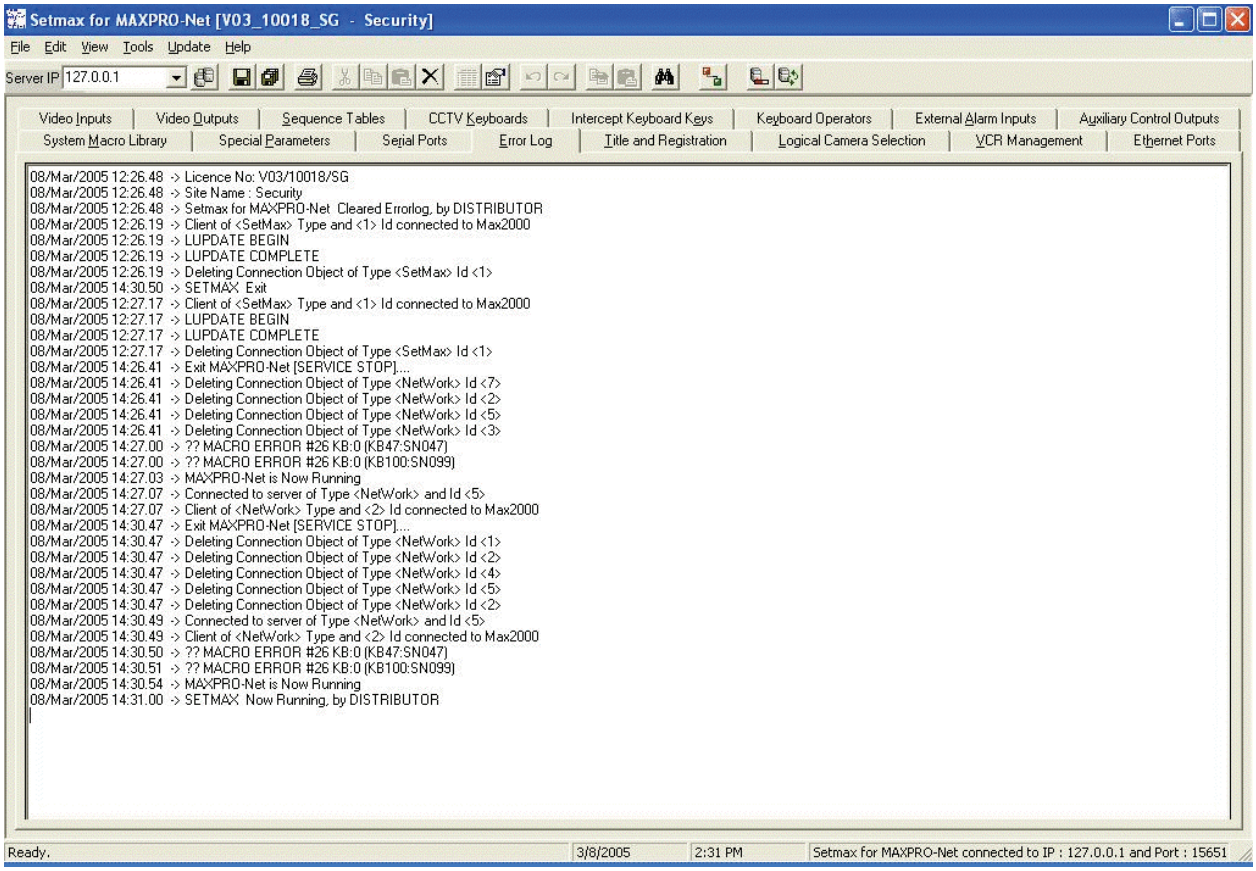
```
27/NOV/96 17:39.31 -> ??MACRO ERROR #15 KB:1 (KB01:KI017,%040,%041,%042)
27/NOV/96 17:39.42 -> ??MACRO ERROR #51 KB:5 (KB05:AS104,%301,%050)
27/NOV/96 17:39.50 -> ??MACRO ERROR #14 KB:34 (KB34:TM001,%113,%114)
```

The following table describes the two-letter macro event code for the reported macro error.

Event Code	Description of Event
AS	External alarm start macro
AF	External alarm finish macro
VS	Video input start macro
VF	Video input finish macro
CB	System cold boot macro
WB	System warm boot macro
KI	Keyboard key intercept macro (key-pressed)
KR	Keyboard key intercept macro (key-released)
PE	Keyboard post event macro (executed)
NT	Network macro received from another MAXPRO-Net network node
LN	local network macro (internal action request type)
LB	local network macro (status broadcast type)
SN	operator sign-on macro
SF	operator sign-off macro
UM	keyboard user macro
TM	timed-event macro
DM	Direct macro command from an external system (via highlevel)

The macro error report also details other important events in the MAXPRO-Net Crosspoint Matrix Video Switching System. For example:

5.3.1 ERRORLOG Report (in SetMax Configurator), Continued



5.4 DATA STREAM TESTING

Some of the following sample fault-finding techniques suggest looking at the Data Stream. There are many methods of viewing the data stream ranging from simple indicator boxes, that will help diagnose wiring errors or breaks or loss of data, to RS232 data stream logging programs such as PATCH232.

5.4.1 RS232 Breakout or Indicator Boxes

The MAXPRO-Net® Server uses XON and XOFF signaling protocol and therefore does not require hardware handshake signals to be wired. Only three (3) wires - TX Data, RX Data and Signal ground are required.

Using your RS232 test box, even high-speed data can be seen clearly as the LED indicators flash quickly. This indicates that data is being generated but does not indicate its speed or other characteristics.

After connecting all equipment, ensure that a light is displayed on the Data Breakout Box for each direction. This means the TX Data line is connected. If using a multimeter to determine the transmit pin, its voltage should be between -9V and -15V with reference to the ground pin.

5.4.2 PATCH232 Test Program

PATCH232 can assist in solving problems relating to speed, format and protocol as well as being particularly useful for diagnosing intermittent problems.

System Requirements

MAXPRO-Net Server communicates with external devices and accepts commands from external computers, keyboards, GUI's, access control systems etc. An on-board VGA chip-set is included for displaying system configuration and diagnostic software. One PCI Bus 8 Port Serial RS-232 COM card is included, providing for communications between external devices, such as matrix switching sub-racks, pan/tilt and dome receivers and keyboards. Keyboard and mouse included.

In order to use PATCH232, you will require an IBM compatible computer with two serial communications ports (COM1 & COM2), preferably a portable unit. A Hard Disk Drive is recommended if the recorder function is going to be used. A variety of patch cords and adapters are usually required.

Overview

PATCH232 is a very useful service tool as it allows you to look at the data being passed down an RS-232 link. This enables you to evaluate the data and check that what data you think should be appearing is actually there. It also allows you to see any data corruption, which can be very hard to find if you are not able to see the data. Another very useful feature is the ability to insert a command in either direction. PATCH232 has a recording mode that allows it to act as a data logger. This feature is handy for any intermittent problems as you can leave PATCH232 to record all data passed over the link, to be examined at a later date.

Instructions for Use

PATCH232 can be used at either end of the link. To connect the laptop remove the cable going to the MAXPRO-Net® Control Computer from the Subrack (RD-500 keyboard or High-Level Interface) and connect it using any necessary adapters to COM2 on the laptop. Then connect COM1 of the laptop to the communications port on the MAXPRO-Net® Control Computer using a NULL MODEM adapter or cable. When this is complete, turn the power to the laptop ON and run 'PATCH232.EXE'. The program will then prompt you for the required low level protocol, i.e. Baud rate (19200, 9600, 1200, 600, 300), Parity (even, odd, none), Number of data bits (7 or 8) and the Number of stop bits (1 or 2).

The normal MAXPRO-Net® serial port settings are as follows:

- Subracks, RD-530 Keyboards and High Level Interfaces
  19200, E, 7, 1
- RD-500 Keyboards
  9600, E, 7, 1

These are indicative only, as most devices can be configured differently to suit the site. Please check your documentation for the correct values if PATCH232 does not seem to work.

5.4.2 PATCH232 Test Program, Continued

From MASTER to SLAVE Window:

This window displays all data received from COM1 (Master) and at the same time the data is re-transmitted to the Slave via COM2. Any data manually sent from PATCH232 to the Slave will also be displayed in this window.

From SLAVE to MASTER Window

This window displays all data received from COM2 (Slave) and at the same time re-transmits the data to the Master via COM1. Any data sent from PATCH232 to the Master will also be displayed in this window.

Comms Status Window:This window displays the current comms' and the recorder status.

Commands

<ESC> To return to DOS.

<M> Send command to MASTER. Pressing the 'M' key enables you to enter a string or command that will be sent to the MASTER. For example, you could send to the MAXPRO-Net® Control Computer, the Subrack #1 reset command (*1Z) which would cause the MAXPRO-Net® software to WARM BOOT and update all subracks.

<S> Send command to SLAVE. Pressing the 'S' key enables you to enter a command that is sent to the SLAVE.

<R> Recorder log ON/OFF. Pressing the 'R' key toggles the record status on and off. When the record mode is enabled, all data received is time and date stamped and recorded to files on the hard disk. Two files are created MASTER.LOG that contains all data received from the MASTER (COM1), and SLAVE.LOG that contains all data received from the SLAVE (COM2). If the files already exist, PATCH232 will append them.

Internal Diagnostics

Additional Diagnostics are available from MaxMon. (See MaxMon Diagnostics Utility.)

The MaxMon Utility can display the following details simultaneously at runtime:

- Received data,
- Transmitted data
- Macro Trails
- Macro Execution sequence
- Video Source Control Selection
- Video Switch selections.

5.4.2 PATCH232 Test Program, Continued

In addition, MaxMon can act as a Remote system keyboard. Direct camera menu control can be exercised from MaxMon.

MaxMon also provides recent system status (Configuration status, Monitor/keyboard/operator relations.

These run-time diagnostics are particularly useful as they enable you to diagnose the operations of the system while it is running. When some experience has been gained, these facilities assist in rapid commissioning and debugging.

CHAPTER 6 :
MODULE INFORMATION

6.1 MODULES

The following table provides a list of the modules available for use with the MAXPRO-Net Crosspoint Matrix Video Switching System, and the availability of Data Sheets and other information. Configuration, connections, DIP switch settings, etc., where available, can be obtained from the sources listed in the table. Modules are listed in numeric order.

Module ID	Description	Information Location Key
MX04 & MX08	Multi-Port Serial Cards	DS, S&I, MSD, TS
MX18	Auto Changeover Unit	DS, S&I, MSD, TS
RD85	Video Switching	S&I, MSD, TS
RD89	Video Verification / Loss	S&I, MSD, TS
RD105B	Subrack Controller	DS, S&I, MSD, TS
RD200	Text Inserter	S&I, MSD, TS
MX205	Enhanced Text Inserter	MSD,TS
RD220	Hidden Text Inserter	MSD,TS
RD315	PTZ Controller	DS, S&I, MSD,TS
RD316	PTZ Controller	DS, S&I, MSD,TS
RD378E	Site Receiver	PSM,S&I,MSD,TS
RD400	Alarm Input Card	DS, S&I, MSD,TS
HMX440	Relay Output Card	DS, S&I, MSD, TS
RD490	Universal Peripheral Interface	DS, S&I, MSD, TS
RD494	Resistive Ladder Interface	DS, S&I, MSD, TS
PT-719	PTZ Dome (High Speed)	PSM, S&I, MSD, TS
PT-720	PTZ Dome (High Speed)	PSM, S&I, MSD, TS
HMXPS9	Subrack Power Supply	S&I, MSD, TS

6.1 MODULES, CONTINUED

The information location keys are listed in the preferred order of access. Whilst it may be easier to call Technical Support, this may not optimize your usage of Technical Support Units. For further details, please refer to your Commissioning Manual.

Key	Information Location
DS	Data Sheet (packed with product)
S&I	Service & Install Manual
TS	Via Technical Support
MSD	From your DISTRIBUTOR
PSM	Product Specific Manual

CHAPTER 7:
DATA SHEETS

7.1 DATA SHEETS

The pages in this section are copies of the information supplied with each individual unit as shipped. Due to improvements and new products, the information on these pages may become incomplete. Please verify data sheets that are supplied with units are not of a later revision to those in this section, before discarding.

ID	DESCRIPTION PAGE
MX08 & MX04	MULTI-PORT SERIAL CARDS
MX18	SYSTEM CONTROLLER AUTO CHANGEOVER UNIT
RD85	VIDEO SELECTION MODULE (1 CH.)
RD89	VIDEO VERIFICATION CARD
RD105B	SUBRACK CONTROLLER
RD200	TEXT INSERTION MODULE
MX205	TEXT INSERTION MODULE (+ seconds)
RD315	PTZ CONTROLLER
RD316	PTZ CONTROLLER
RD378E	PTZ SITE RECEIVER – MULTI SPEED
RD379E	PTZ SITE RECEIVER – MULTI SPEED
RD400	ALARM INPUT CARD
MX440	RELAY OUTPUT CARD
RD490	REMOTE VCR CONTROL
RD494	RESISTIVE LADDER PROGRAMMABLE PERIPHERAL INTERFACE MODULE
HEGS5300	ENHANCED KEYBOARD
HMXPS9	SYSTEM POWER SUPPLY
RD9021	I/O INTERFACE MODULE
HMX1676	TEXT INSERTION SUBRACK

Notes:

7.2 MX04 & MX08 MULTI-PORT SERIAL CARDS

The MX04/MX08 cards are used to provide multiple RS-232 serial communication ports in MAX-1000 System Controllers. The MX04 and MX08 provide 4 ports and 8 ports respectively. The boards plug into any available ISA expansion slot in the control computer, with the maximum combination being two MX08 and one MX04 boards, giving a total of 20 ports.

Note: This card is not used with MAXPRO-Net. MAXPRO-Net uses standard windows PCA Serial Port expanders.

7.2.1 Switch Settings

Each board has a 4-way DIP switch. This sets the address for each port and is detailed in the table below. Note that SW4 is not used. No two cards in any System Controller should have the same switch settings.

MX08 Switch Settings

SW1	SW2	SW3	PORT 1	PORT 2	PORT 3	PORT 4	PORT 5	PORT 6	PORT 7	PORT 8
ON	ON	ON	$3F8~ $3FF	$2F8~ $2FF	$2B0~ $2B7	$2B8~ $2BF	$1A0~ $1A7	$1A8~ $1AF	$1B0~ $1B7	$1B8~ $1BF
ON (DEFAULT)	ON	OFF	$160~ $167	$168~ $16F	$170~ $177	$178~ $17F	$180~ $187	$188~ $18F	$190~ $197	$198~ $19F
ON	OFF	ON	$2A0~ $2A7	$2A8~ $2AF	$2B0~ $2B7	$2B8~ $2BF	$1A0~ $1A7	$1A8~ $1AF	$1B0~ $1B7	$1B8~ $1BF
ON	OFF	OFF	$2F8~ $2FF	$2A8~ $2AF	$2B0~ $2B7	$2B8~ $2BF	$1A0~ $1A7	$1A8~ $1AF	$1B0~ $1B7	$1B8~ $1BF
OFF	ON	ON	$3F8~ $3FF	$2F8~ $2FF	$3E8~ $3EF	$2E8~ $2EF	$280~ $287	$288~ $28F	$290~ $297	$298~ $29F

7.2.1 Switch Settings, Continued

MX04 Switch Settings

SW1	SW2	SW3	PORT 1	PORT 2	PORT 3	PORT 4
ON	ON	ON	$3F8~ $3FF	$2F8~ $2FF	$2B0~ $2B7	$2B8~ $2BF
ON (DEFAULT)	ON	OFF	$160~ $167	$168~ $16F	$170~ $177	$178~ $17F
ON	OFF	ON	$2A0~ $2A7	$2A8~ $2AF	$2B0~ $2B7	$2B8~ $2BF
ON	OFF	OFF	$2F8~ $2FF	$2A8~ $2AF	$2B0~ $2B7	$2B8~ $2BF
OFF	ON	ON	$1A0~ $1A7	$1A8~ $1AF	$1B0~ $1B7	$1B8~ $1BF
OFF	ON	OFF	$180~ $187	$188~ $18F	$190~ $197	$198~ $19F
OFF	OFF	ON	$3F8~ $3FF	$2F8~ $2FF	$3E8~ $3EF	$2E8~ $2EF

7.2.2 Jumper JP1

This jumper controls the IRQ number for port 1 interrupt. Setting the jumper in the top position selects IRQ3 (default), and in the bottom position selects IRQ4. Selecting IRQ4 may be required in some high-level interface applications. Ports 2 to 8 (or ports 2 to 4 with the MX04) are fixed at interrupt IRQ3.

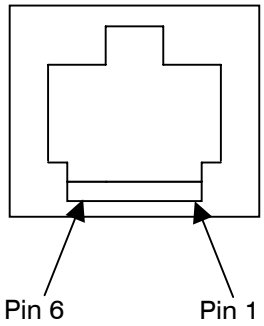
7.2.3 Interface Board

The MX04/ MX08 connects to the interface board via a 34-position ribbon cable. Attach the ferrite clamp (part 840954-011) included in the expansion kit to the 34-position ribbon cable at the end closest to the interface card (the board with the RJ11 connectors).

The interface board is fixed inside the back panel of the control computer, and is fitted with RJ11 connectors to allow easy connection to MAX-1000 subracks, keyboards, and other MAX-1000 equipment. Pin connections from the RJ11 connectors are as follows:

RJ11 Socket (rear of System Controller)

Pin 1 – 12VDC
Pin 2 – N/C
Pin 3 – TX Data
Pin 4 – Signal GND
Pin 5 – Rx Data
Pin 6 – Power GND



The interface board provides fused 12VDC only at RJ11 connectors 3 and 4 (ports 3 & 4) to power HEGS5300 and ULTRAKey keyboards.

NOTE: When D25 connectors are provided, (or fitted to a System Controller), standard RS-232 pin allocations apply (i.e. pin 2 = TX, pin 3 = RX, pin 7 = GND).

NOTE: When D25 connectors are fitted to a System Controller, the keyboard power (HEGS5300) is provided on port 4 (i.e. pin 13 = +12VDC, pin 25 = GND).

NOTE: A maximum of 2 keyboards can be powered directly from a single interface board.

Notes:

7.3 MX18 SYSTEM CONTROLLER AUTO CHANGEOVER UNIT

The MX18 System Controller Auto Changeover Unit is used to combine two MAXPRO-Net Servers to increase reliability, with automatic changeover in the event of a System Controller failure. (MX-18 can also be used with MAX-1000.)

The MX18 is fitted with dual Power Supply monitored inputs for true redundancy operation.

Serial port expansion is also provided for subrack or keyboard communications.

DIP SWITCH IDENTITY CODE SETTING – VERSION 2.xx FIRMWARE

Identity Code	SW 1-1	SW 1-2	SW 1-3	SW 1-4
H70	OFF	OFF	OFF	OFF
H71	ON	OFF	OFF	OFF
H72	OFF	ON	OFF	OFF
H73	ON	ON	OFF	OFF
H74	OFF	OFF	ON	OFF
H75	ON	OFF	ON	OFF
H76	OFF	ON	ON	OFF
H77	ON	ON	ON	OFF
H78	OFF	OFF	OFF	ON
H79	ON	OFF	OFF	ON
H80	OFF	ON	OFF	ON
H81	ON	ON	OFF	ON
H82	OFF	OFF	ON	ON
H83	ON	OFF	ON	ON
H84	OFF	ON	ON	ON
H85	ON	ON	ON	ON

Data Speed	SW 2-3	SW 2-4
19200 baud	OFF	OFF
9600 baud	OFF	ON
1200 baud	ON	OFF

Data Format	8 bit no parity	7 bit even parity
SW 2-2	ON	OFF

ACK Filter	Pass <Ack>	Block <Ack>
SW 2-1	ON	OFF

CAUTION: To avoid the MX18 indicating failure during system startup, be sure to set the '**All**' parameter in the CTRL field of the Serial Communications Ports, for any ports that are connected to a MX18.

The MX18 is designed to report various status information regarding its operation. It simulates a RD400 alarm input module located in pseudo-slot (0). In order for these alarms to be generated, they must first be enabled. This is done automatically by the MAX-1000 when the required alarm status pseudo inputs are defined in the External Alarm Input Table.

CAUTION: Alarm inversion is NOT supported. All alarms must be defined as "N/O" type alarms. With the exception of ALARM (1), all other alarms are enabled only for the MX18 using the base ID code (i.e. H70).

ALARM 1. The MX18 CPU is operating correctly, to detect CPU fail.

This alarm is ACTIVATED 10 seconds after any RESET command, or 10 seconds following cold-boot initialization.

ALARM 2. Master Computer Fail.

An alarm ACTIVE is generated when communications is lost with the MASTER Computer. The alarm will CLEAR upon restoration of communications with the MASTER computer.

ALARM 3. Standby Power Supply Lost.

An alarm ACTIVE is generated when the + 9VDC standby power supply falls below approximately 6V. The alarm will CLEAR upon restoration of the standby power supply.

ALARM 4. Main Power Supply Lost.

An alarm ACTIVE is generated when the + 9VDC main power supply falls below approximately 6V. The alarm will clear upon restoration of the main power supply.

ALARM 5. Slave Computer Fail.

An alarm ACTIVE is generated when communications is lost with the SLAVE Computer. The alarm will CLEAR upon restoration of communications with the SLAVE computer.

ALARM 6. Master Selected Status.

An alarm ACTIVE is generated when the MASTER Computer is selected as the system controller. The alarm will CLEAR if the SLAVE Computer is selected as the system controller. This alarm is activated by Automatic & Manual selection changeover.

ALARM 7. Slave Selected Status.

An alarm ACTIVE is generated when the SLAVE Computer is selected as the system controller. The alarm will CLEAR if the MASTER computer is selected as the system controller. This alarm is activated by Automatic & Manual selection changeover.

ALARM 8. Not defined.

The MAX PROTOCOL commands that the MX18 will recognize and respond to, are listed below. It will only listen to commands from the currently selected MASTER or SLAVE Computer. Commands from the non-selected one will be ignored.

“Z” RESET command (RX/TX)

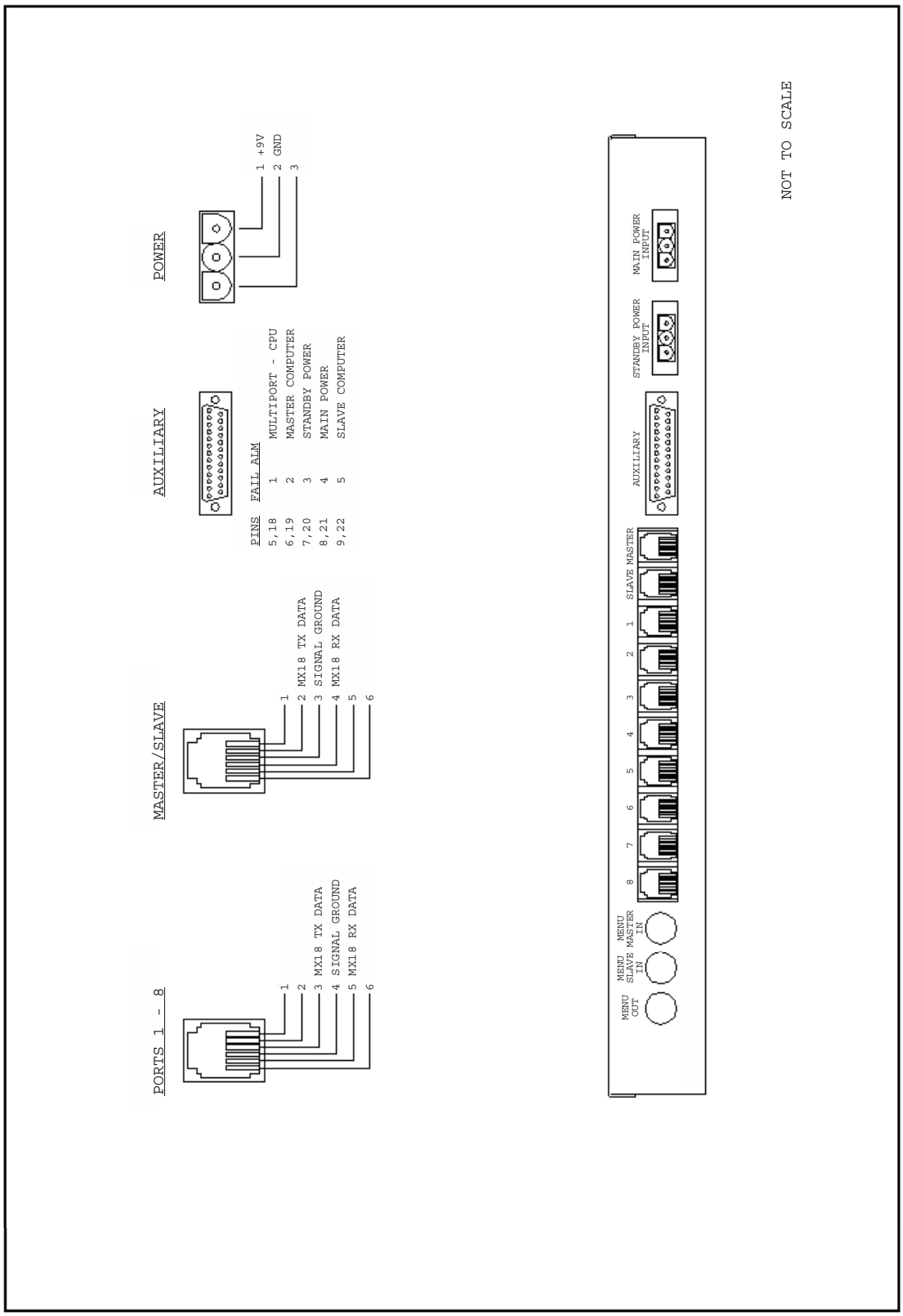
When a warm reset is received the MX18 only re-initializes the alarm states. No other action or indication is given.

“X” POLL command (RX/TX)

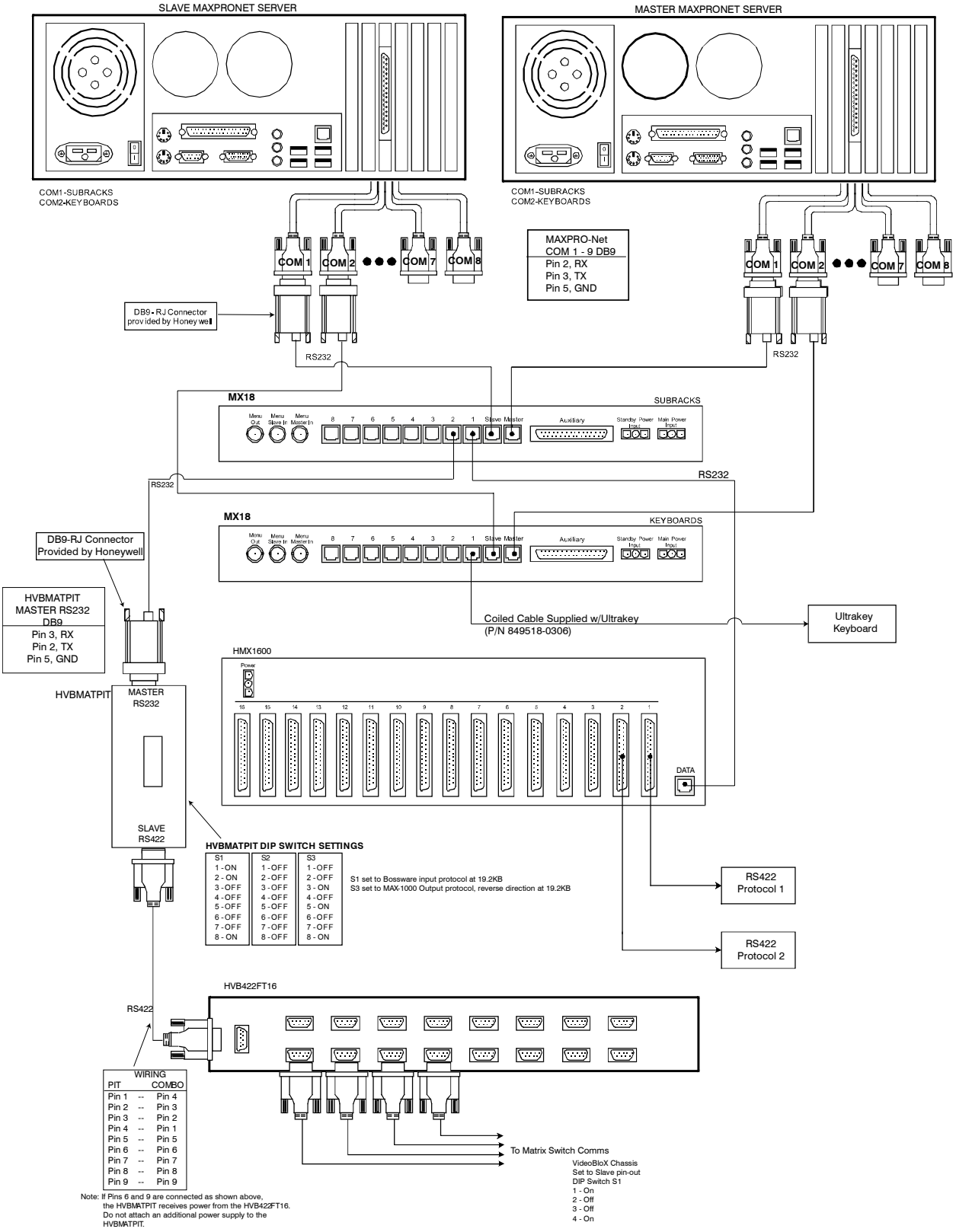
When the poll request command is received the MX18 will immediately generate the poll answer sequences. This is used to satisfy the subrack polling mode (if in use).

“R” READ command (TX)

When an enabled pseudo alarm changes state a read command sequence is generated to represent the new status of that specific alarm. The format is identical to that generated by a RD400 alarm input module.


POWER
1 +9V
2 GND
3
AUXILIARY
PINS FAIL ALM
5,18 1 MULTIPORT - CPU
6,19 2 MASTER COMPUTER
7,20 3 STANDBY POWER
8,21 4 MAIN POWER
9,22 5 SLAVE COMPUTER
MASTER/SLAVE
1
2 MX18 TX DATA
3 SIGNAL GROUND
4 MX18 RX DATA
5
6
PORTS 1 - 8
1
2
3 MX18 TX DATA
4 SIGNAL GROUND
5 MX18 RX DATA
6
MENU OUT
MENU SLAVE IN
MENU MASTER IN
8 7 6 5 4 3 2 1 SLAVE MASTER
AUXILIARY
STANDBY POWER INPUT
MAIN POWER INPUT
NOT TO SCALE

7.3.1 Integration of MX18 System Controller with MAXPRO-Net and VideoBloX Matrix Chassis



Notes:

7.4 RD85 VIDEO SELECTION MODULE

The RD85 video switching module is a single channel video switcher. It can select any of the 32 video input signals (from the mother board video buss) or it's own cascade video input (used when stacking multiple video switching subracks). All video switching is vertical interval and in addition, a clamp-to-black period can be inserted at the switching transition to HIDE any frame roll that may occur for unsynchronized video signals. The video output from the RD85 module is fully DC restored for all video source selections.

7.4.1 Operation

The RD85 video switching module is designed for use in any of the MAXPRO-Net video switching subracks. One RD85 module is used for every channel of video switching required (per subrack) or 32 inputs of full matrix.

The subrack control microprocessor (RD105B) manages the operation of every RD85 module used within the subrack. Video switching commands are sent from the MAXPRO-Net system control computer to the subrack control microprocessor (RD105B). The command is then decoded by the RD105B. The actual number of the video input required is then written to the appropriate RD85 video switching module, causing the new video source to be selected by that channel.

7.4.2 Vertical Interval Switching

When a new video input selection is written to the RD85 module, it is firstly stored in a primary-latch. Note, this new video source number has not been selected yet. When the next vertical interval sync pulse occurs (of the currently selected video signal), the new video source number is transferred into a secondary-latch that actually makes the new video source selection. The new video signal is now selected by the RD85 module and available from its video output connector. This method of vertical interval switching assumes that all video source signals are all vertically synchronized. If they are not, then frame roll may still occur. Where no video signal was selected previously, the new video source selection is made immediately.

7.4.3 Clamp-To-Black Video Switching Transition

When unsynchronized video sources are used in the video switching system a short "CLAMP-TO-BLACK" period can be inserted at the video switching transition. This allows any frame roll that may occur, to do so during the Clamp-to-Black period (i.e. the roll is invisible), giving the illusion of synchronized video switching. The Clamp-to-Black period is link selectable by LK2 on the RD85 module PCB. The link can be positioned in eight positions to select a different period. The period is defined in numbers of video fields to be clamped [i.e. link settings (fields)]:

Link Position (fields)	Black Period (milliseconds)
0	zero period
1	20Ms
2	40mS
4	80mS
8	160mS
16	320mS
32	640mS
64	1280mS
oo (+ Audio)	Continuous black

7.4.4 Used As A Black Source

The Clamp-to-Black can be set to infinity by removing the Black Pause Link and placing it in the Video position of LK1 (lower). In this position the module will output the Sync. pulses only of the default camera selection. This can be used in a system as a Blank (Black) Source. Input 1 of the subrack containing the Black Source card MUST have a video source connected.

7.4.5 Used For Audio Switching

The Continuous Black Period is selected by removing the Black Pause Link and placing it in the Audio position of LK1 (upper) when the RD85 is required to switch audio signals.

7.4.6 Diagnostic Video Connector

The front of the RD85 Module has a 3-pin “IDC” style connector with the video signal present on the center pin and the ground on either of the two outer pins. The video on this connector is the same as the output connector and may be used to diagnose the system, from the front of the subrack rather than the rear.

7.4.7 Indicator

L1 illuminates when the RD85 Module has data written to it by the RD105B Subrack Controller Module.

Notes:

7.5 RD89 Video Fail/Video Analysis Module

CAUTION: The following data refers to RD89 modules of revision 5 hardware and later.

7.5.1 Operation

The RD89 Video Fail/Video Analysis Module is specifically designed to provide for automated monitoring of video presence, level and quality. This functionality in conjunction with the crosspoint matrix video switching capability provided by MAXPRO-Net® software allows a high level of automated and custom response to video source exceptions. The RD89 monitors/analyzes video inputs (up to 32 maximum) on a sequential basis. The typical monitoring period is 100ms per input and therefore, the module can scan all 32 inputs in approximately 3 seconds. If less video inputs have been configured for monitoring, the scan period will be reduced accordingly.

7.5.2 Installation

The RD89 may be installed in any 3RU video slot within MAXPRO-Net® subrack. The module may be configured to monitor/analyze subrack bus video or an external input via the subrack cascade input.

7.5.3 DIP Switch Definitions

SW1/1 Video Fail Mode / Video Analysis Mode

In the OFF position, the RD89 functions in the Video Fail detection mode and detects lost video, low and high level video. In the ON position, the RD89 functions as a Video Analyzer for automatic VCR playback analysis.

SW1/2 Video Bus / Cascade Select

In the OFF position, the video input to the RD89 is from the subrack video bus. In the ON position, the video input is from the subrack cascade input.

7.5.3 DIP Switch Definitions, Continued

SW1/3 Low Level Video Enable / Video Analyzer Sensitivity 1

In the Video Fail mode of operation, this switch, if ON, enables reporting of low-level video alarms. In the OFF position, the low level video alarm reporting is inhibited.

In the Video Analyzer mode, this switch in conjunction with SW1/4 provides for selectable analyzer sensitivity (see table below).

SW1/4 High Level Video Enable / Video Analyzer Sensitivity 2

In the Video Fail mode of operation, this switch, if ON, enables reporting of high-level video alarms. In the OFF position, the high level video alarm reporting is inhibited.

In the Video Analyzer mode, this switch in conjunction with SW1/3 provides for selectable analyzer sensitivity (see table below).

7.5.4 Video Analyzer Sensitivity Selection

SW1/3	SW1/4	Sensitivity
OFF	OFF	LOW
ON	OFF	MID 1
OFF	ON	MID 2
ON	ON	HIGH

7.5.5 Indicators

L1 (RED) Video Fail Mode – illuminated indicates that the video level is too high or too low.
Video Analyser Mode – unused.

L2 (RED) Video Fail Mode – illuminated indicates lost video.
Video Analyzer Mode – illuminated indicates poor quality or lost video.

L3 (GREEN) Illuminates when the RD89 module is reading data from the subrack data bus.

L4 (AMBER) Illuminates when the RD89 module is writing to the subrack data bus.

7.6 RD105/105B Subrack Controller Module

Every subrack must have one RD105 (except the HMX32128 which requires a HMX128), and every subrack requires an RS-232 port on the MAXPRO-Net Server or MX18. The RD105 subrack control module is a slave microprocessor controller developed to oversee the operation of an individual MAXPRO subrack (both video switching and I/O types). It decodes all MAX protocol commands directed to the various modules located in the subrack and performs the actual communication with the individual modules. Video switching source selection, text insertions update, output control and alarm input detection and set-up, are just some of the control tasks of the RD105 module. As it plays an integral part of all system operations, the RD105 module would have to be classed as the most important module in the MAXPRO-Net Crosspoint Matrix Video Switching System.

Operation

The RD105 subrack control module is located in a specially allocated 'SCM' slot or slot '0' of a MAXPRO subrack. Only one (1) RD105 module can be installed into a subrack, and only into the 'SCM' slot position (top left slot). **NEVER plug a RD105 module into any other slot position as damage may occur**.

The RD105 module communicates with the MAXPRO-Net Server through a full duplex RS-232 asynchronous serial line. There is a separate RS-232 communication line for each subrack in the system. Although the data content from the MAXPRO-Net Server to subrack is generally the same for all subracks, an identity number is included into each MAX protocol command to direct the command string to the required subrack. As each RD105 module (i.e. each subrack) in a system application has its own unique identity code number, the MAX protocol commands will only be accepted by the correct RD105 module.

Watch-Dog RESET

The design of the RD105 module is of a conventional nature with the exception of the RESET circuit. Due to the overall importance of the system's continuous operation, the reset circuit is actually a Watch-Dog RESET circuit. Its function is as follows:

While the RD105 module is operating normally, a continually pulsing output is generated by the on-board RD105 subrack management software. This pulsating signal is monitored by the hardware circuit, being the watch-dog reset. If the pulsing output should cease for more than 500msec, then the watch-dog reset circuit generates a new hardware RESET to the microprocessor, restarting the module's management software and attempts correcting the fault condition. Note, that the RD105 module also generates a RESET command string that is sent to the MAXPRO-Net Server to force a re-initialization of the system.

RD105 LED Indicators

There are four LED indicators on the RD105 module. Their functions are as follows.

- **RESET**: Whenever the RD105 module resets, this RED LED (L1) illuminates. It actually displays the logic condition of the CPU-FAIL signal on the bus.
- **POWER**: Whenever power is applied to the RD105 module, this GREEN LED (L2) becomes on, and remains on until the power is removed.
- **SEL**: This YELLOW LED (L3) indicator blinks when any slot in the subrack is written to.
- **COMM**: When a MAX protocol command is received by the RD105 module, this YELLOW LED indicator (L4) blinks.

The 'SEL' and 'COMM' LED indicators are useful for following data communications between the MAXPRO-Net Server and any module within a subrack.

DIP Switch Settings
Subrack Identity Number (001 to 799):

Units	**S1-4**	**S1-3**	**S1-2**	**S1-1**
Tens	**S1-8**	**S1-7**	**S1-6**	**S1-5**
Hundreds		**S2-3**	**S2-2**	**S2-1**
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON

SW2-7	**SW2-6**	**BAUD RATE**
OFF	OFF	19.2K BAUD
OFF	ON	9600 BAUD
ON	OFF	1200 BAUD
ON	ON	NOT USED

SW2-8	**MODE**	**DESCRIPTION**
OFF	RD-100	Normal subrack control
ON	RD-104	RD-6464 subrack - RD84 control

Note: SW2-4 and SW2-5 are not currently used. They should always be left **OFF**.

Notes:

7.7 RD200 TEXT INSERTION MODULE

The RD200 text inserter module is a single channel video-processing device used to write up to five (5) lines of text information onto a video picture. The displayed text is used to display labeling and feedback information to the system operators through the video monitors. Information such as, camera identification, time/date display, monitor number, current operator access and other system operation information can all be displayed.

Some other applications for the RD200 text inserter modules are text labeling for VCR recorded signals (recorded camera identity and time/date), display of alarm detection information. Text can be displayed in a variety of modes including straight forward white text over the video picture, white text with black shadowing, white text with a solid black background for the entire text insertion window, reverse mode to exchange white and black display. (i.e. give black text on a white background or shadow.), Normal or double height text when bold displays are required. (e.g. alarm display, for VCR recording to increase replay readability). A text display can be FLASHED to attract the system operator's attention.

The positioning of the text on the screen is programmable from the Setmax Configurator. No manual settings are done on the RD200 module itself, so modules may be swapped and changed without worrying about resetting DIP switches or trim pots for each application.

Operation

The RD200 text inserter module is designed for use in the MAXPRO-Net video switching subrack and occupies one slot. It is capable of processing one video signal only; so one RD200 module is needed for every video output channel requiring text insertion. The cascade input (for each slot) is used as the video input to each RD200 module. The processed video signal (video + text) is returned at the video output for that slot.

The usual implementation of a RD200 module is as follows. The video output from a video-switching module (RD85) is patched to the cascade input of the allocated RD200 module. The resultant output from the RD200 module (video + text) is then taken away as the actual video output for that video switching channel.

The slot allocation for the RD200 modules is totally variable (programmable at the time of system configuration). As it occupies a slot position in the video switching subrack (i.e. another possible video output channel position), it may sometimes be desirable to locate the RD200 modules in a separate (stand-alone) video switching subrack. This all depends on the video output channel requirements within a given system application.

The RD200 module has an in-built video distribution amplifier (VDA) to buffer the processed video signal. The VDA gives a true 75-ohm drive capability at its output.

Diagnostic Video Connector

The front of the RD200 has a 3-pin “IDC” style connector, with video present on the centre pin and ground connected on the outer pins. The video on this connector is the same as the output connector and may be used to diagnose the system from the front of the subrack.

Indicators

The L1 located on the front of the RD200 illuminates when the RD200 is receiving data from the RD105 / RD105B Subrack Controller Module.

Jumper Settings

The RD200 may have a settable link labeled LK2 consisting of three in-line pins or solder points. The two end points will be marked “A” and “B”. If the system is operating on Version 3 MAX-1000 software then link “B” to the centre point. If the system is operating on Version 4 MAX-1000 software, then link “A” to the centre point. If the RD200 does not have a LK2 jumper facility, then it is not suitable for use in a Version 4 system.

CAUTION: Only one 75-ohm video output is available (for system use) from each RD200 module.

7.8 MX205 TEXT INSERTION MODULE

The MX205 Text Insertion Module is a single channel video-processing device used to write up to five (5) lines of text information onto a video picture with the added benefit of displaying seconds of time, unlike the RD200 Text Insertion Module.

NOTE: The MX205 is a Surface-Mount Device Module that has been designed to supersede the previous RD205 Module.

In addition to test insertion, the MX205 Module provides Dynamic Cable Equalization up to 700 meters. The displayed text is used to display labeling and feedback information to the system operators through the video monitors. Information such as, camera identification, time/date display, monitor number, current operator access and other system operation information can all be displayed.

Some other applications for the MX205 Modules are; text labeling for VCR recorded signals (recorded camera identity and time/date), and display of alarm detection information. Text can be displayed in a variety of modes including straight forward white text over the video picture, white text with black shadowing, white text with a solid black background for the entire text insertion window, reverse mode to exchange white and black display (i.e. give black text on a white background or shadow.), and normal or double-height text when bold displays are required (e.g. alarm display, for VCR recording to increase replay readability). A text display can also be FLASHED to attract the system operator's attention.

The positioning of the text display on a screen and display mode required is programmable from the MAX-1000 System Configuration Utility. No manual settings are done on the MX205 Module.

Module Operation

The MX205 Text Inserter Module is designed for use in a MAXPRO-Net video switching subrack or a Pre-Text subrack and occupies one slot. It is capable of processing one video signal only, so one MX205 Module is needed for every video output channel requiring text insertion. The cascade input (for each slot) is used as the video input to each MX205 Module. The processed video signal (video + text) is returned at the video output for that slot.

The usual implementation of a MX205 Module is as follows. The video output from a video-switching module (RD85) is patched to the cascade input of the allocated MX205 module. The resultant output from the MX205 Module (video + text) is then taken away as the actual video output for that video switching channel.

The slot allocation for the MX205 Modules is totally variable (programmable at the time of system configuration). As it occupies a slot position in the video switching subrack (i.e. another possible video output channel position), it may sometimes be desirable to locate the MX205 Modules in a separate (stand-alone) video switching subrack. This depends on the video output channel requirements within a given system application.

The subrack control microprocessor (RD105) manages the operation of every MX205 text inserter module used within a subrack. Text insertion update commands are sent from the MAXPRO-Net Server to the subrack control microprocessor (RD105). The command is then decoded by the
RD105. The new text information is then written to the appropriate MX205 module.

LED Indicators

L1 Lights when MX205 Module is written to by the RD105 Subrack Controller Module.

L2 Lights when MX205 Module writes to RD105 Subrack Controller Module.

7.9 RD315 PTZ SITE COMMUNICATIONS MODULE

The RD315 site communications module is used to communicate with theRD378E site receivers, RD379 site receivers, and the RD380 Elbex Dome Site Receivers. The RD315 can control any combination of these site receivers for up to 16 PTZ sites, all connected to the same two-wire network.

The RD315 uses a specially designed communications protocol allowing control data to be transported at high speed over the two-wire network. All PTZ sites connected to the two-wire network may be automatically monitored (polled). If any site should become inactive (i.e. blown fuse, cut cables), then an alarm may be generated corresponding to the detected site failure.

The RD315 module provides an RS-232 port. This allows for easy monitoring and servicing of other two-wire networks and some special modes of communication connection. Five LED indicators are provided on the front edge of the module:

L1 Green PTT Active
L2 Red TX Failed
L3 Green PTZ Comms
L4 Yellow Reading Data From Subrack
L5 Green Writing Data To Subrack.

The RD315 uses a Telecom approved line isolation transformer. This provides the connection to the 600 ohm balanced two-wire network.

Note: Only standard twisted pair cable is required for the line connections up to 5 Km of cable length.

The data format is true AUDIO to Line (0.3 to 5 kHz bandwidth) and can tolerate a total line attenuation of up to 20dB. It supports 4-wire audio interface for connection to simplex audio channels (microwave, optical fiber, etc.) The most important feature is that all communications to/from the RD315 is through a common TWO-WIRE line providing simultaneous control of up to 16 site receivers per two-wire network.

Sites can be of wired, star or delta configuration and the RD315 is protected against high voltage destruction with a line isolation transformer on the two wire lines. Optional communications are through direct bit transfer type radio or optical fiber links at RS-232 levels using a synchronous bit stream depicted as AF-232.

Direct RS-232 from a RD-315 to one PTZ site can also be used over networks requiring a normal RS-232 asynchronous protocol. Mixed modes of communication can also be used. An optical fiber cable can be used for the first site and a two-wire line onto the successive sites. Or a two-wire line to the first and then the optical fiber cable continuing onto the successive sites. The site receiver manuals contain drawings that show many methods of connecting to the RD-315.

7.9.1 PTZ Site Wiring

The normal connection to the site is a two-wire data type cable that carries the AFSK control information from the 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 fiber AF channel bi-directional. In a 4-wire mode, link audio ring-around or feed-back can be avoided. There are special interface connections for RS-232 and other types of fiber optics.

7.9.2 DIP Switch Setting

The RD-315 module uses the standard CC-2000 communications controller chip. This chip is also used on all PTZ site receivers. As such, the CC-2000 chip must be setup for the desired and compatible mode of operation.

Communications Modes

SW1	Description	ON	OFF	Factory
1	Mode Select	Master	Slave	ON
2	Destination	Slave	Master	ON
3	Poll Mode	Enable	Disabled	ON
4	Not Defined	-	-	ON

7.9.3 Setting Audio Communication Link Points

Line Interface Link 2 wire 4 wire (LK1) selects the type of audio connection required for site communications.

Linking <2w> = selects Balanced two-wire communications. Note: This is the Default setting.

Linking <4w> = selects four-wire communications. Transmit data is through the line-transformer to a balanced two-wire and is from the normal two-wire connection pins. One side of this can be connected to ground if required to make the circuit unbalanced. Alternatively the un-balanced audio can come from (DB25 pin 6 audio) and (DB25 pin 19 ground). Receive audio is through the unbalanced input (DB25 pin 7 audio) and (DB25 pin 20 ground).

LEVEL POTS: These are factory set and should never need adjusting. However, on long cable runs, an increase in levels may be used. Both pots increase with a clockwise rotation. RV1 is receive level and RV2 is transmit level.

Line Interface Connector part of DB25 for the used slot.

Pin No	Description
6	Hi-Z Unbalanced TX audio OUTPUT
19	Hi-Z Unbalanced TX audio GROUND
7	Unbalanced RX audio INPUT
20	Unbalanced RX audio GROUND
22-25	Balanced 2-wire line (first wire) / 4-wire TX
9-12	Balanced 2-wire line (second wire) / 4 wire TX

NOTE: For normal system installations, the two-wire line is connected across pins 22 and 9 of the D25 connector corresponding to the slot position of the RD 315 module. The UNBALANCED INPUT should not be wired more than a few meters in length and must be shielded, as it is a high impedance input.

The preferred connection point for 4-wire TX output is from the line transformer, pins 22,9.

Pin No.	Description
8	Receive Data (data to site)
3	Transmit Data (data from site)
16, 21	Signal Ground

7.9.4 Direct RS-232 Control Or Data Testing

Direct connection can be made to the communication processor. RS-232 Communications can be used during testing to monitor the serial data traffic going out to other PTZ sites. i.e. A laptop computer can be used to show the actual data information as it is being transmitted. This port can also be used to communicate directly with a single PTZ site receiver in a standard RS-232 format.

RS-232 Part of DB25 connector

Pin No	Description
14,15	RS-232 Signal Ground
1	RS-232 Receive Data
2	RS-232 Transmit Data

7.9.5 LED Indicators

L1 TT indicator. If ON, indicates that the PTT drive circuit is active. PTT active selects transmit mode on a two-way radio.

L2 TX DATA indicator. Blinks when the valid data is being transmitted to a PTZ site receiver.

L3 COMMS indicator. Remains ON for valid PTZ site communications. Switches OFF if a polled PTZ site receiver does not answer.

L4 MODULE WRITE indicator. Blinks when the RD-315 module has been written to by the RD105 subrack controller module.

L5 MODULE READ indicator. Blinks when the RD-315 module has been read by the RD105 subrack controller module.

7.9.6 Subrack Slot D25 Connector Pin Allocations

Pin No	Description
14,15	RS-232 Signal Ground
1	RS-232 Receive Data
2	RS-232 Transmit Data
3	AF-232 Output
16	AF-232 Signal ground
8	AF-232 Input
21	AF-232 Signal ground
4	RX MUTE Sense INPUT
17	Rx MUTE Sense GROUND
5	PTT drive OUTPUT
8	PTT common (GROUND)
6	Hi-Z Unbalanced TX audio OUTPUT
19	Hi-Z Unbalanced TX audio GROUND
7	Unbalanced RX audio INPUT
20	Unbalanced RX audio GROUND
22-25	Balanced 2-wire line (first wire)/4w TX
9-12	Balanced 2-wire line (second wire)/4w TX

Notes:

7.10 RD316 MODULE - RS-422/485 PTZ SITE TRANSMITTER MODULE

7.10.1 General

The RD316 Communications Interface module is specifically designed to provide protocol conversion and direct connection between the MAXPRO-Net system and third party peripheral equipment. The RD316 allows for simplex, two wire half-duplex, and four wire full duplex communication formats. Manchester, NRZ and NRZI encoding formats are also supported. A switch-selectable transformer on board provides ground isolation in these modes, if required.

7.10.2 Installation

The RD316 may be installed in any I/O slot within MAXPRO-Net subrack. All external connections are via the subracks' DB25 connector for the appropriate slot. The following table lists the connector pin-out details.

DB25 pin	Description
3	Ground
4	Ground
5	RX ‘B’
6	RX ‘B’
7	TX ‘B’
8	TX ‘B’
9	Transformer ‘B’
10	Transformer ‘B’
11	Transformer ‘B’
12	Transformer ‘B’
16	Ground
17	Ground
18	RX ‘A’
19	RX ‘A’
20	TX ‘A’
21	TX ‘A’
22	Transformer ‘A’
23	Transformer ‘A’
24	Transformer ‘A’
25	Transformer ‘A’

WARNING: Honeywell makes no representation and offers no warranties as to the accuracy and/or suitability of third party protocols and command formats. Such protocols and command formats are based upon information supplied to Honeywell by third party manufacturers/suppliers at the time of implementation.

7.10.3 Indicators

The RD316 has three on board status indication LEDs. The functions of these are as follows:

Upper LED (***green***) indicates the RD316 module is currently transmitting or receiving data.

Center LED (***yellow***) indicates the RD316 module is writing data to the subrack.

Lower LED (***green***) indicates the RD316 module is reading data from the subrack.

NOTE: All three LEDs will flash continuously if an invalid mode switch setting is selected.

7.10.4 DIP Switches

Both the operating mode of the RD316 and the transmission format are selectable via the on-board DIP switches. Mode switch settings and the appropriate format switch settings for the supported interface/protocol modes are detailed on the succeeding pages. The general function of the format switches are as follows:

Position	Function when ON
SW1-1	Connect data output to isolation transformer
SW1-2	Connect terminating resistor across RX pair
SW1-3 & 4	Connect TX and RX pairs for two wire half duplex operation

7.10.5 Diamond Electronics - FastScan/SmartScan

Format switch SW1 1 - 4 OFF

Mode switch SW2 1 - 8 OFF

Data Connection

FastScan/SmartScan receivers may be daisy chained or star connected with up to 16 receivers supported per RD316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

The auto-iris function supported by the receivers may be enabled by setting auxiliary output 1 as defined in MAXPRO-Net to ON, any manual iris control function activated thereafter will return the receiver to manual iris mode.

Using The Diamond Dome Camera Set-up Menu

Before You Start:

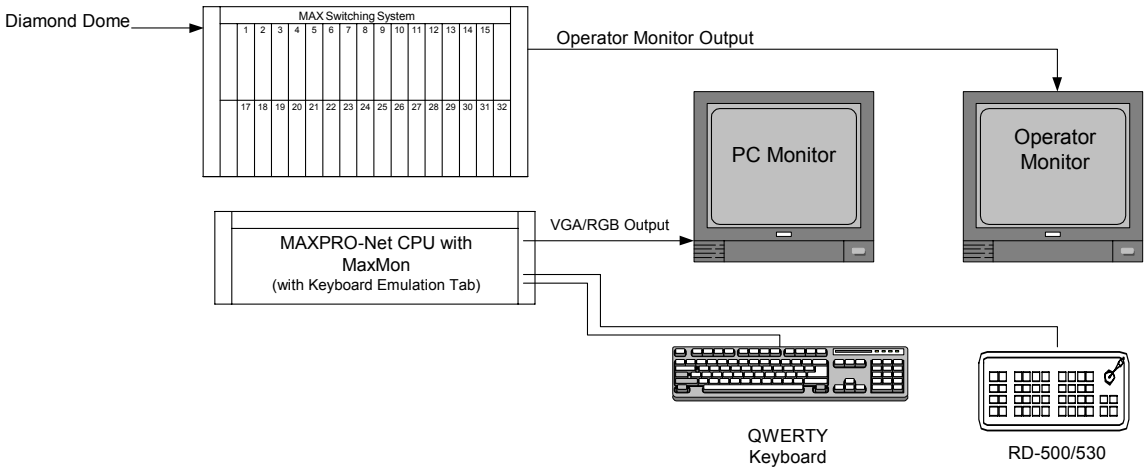
1. Is the Dome operational and can you control it? Pan/Tilt etc
2. Check Firmware version:

Controller Card	Firmware Version
RD316	V2.0 and above
HMX128	MX-308 Chip V1.06 and above

3. Equipment Required:
   - MAXPRO-Net System
   - Dome to be configured
   - MaxMon Utility
   - QWERTY Keyboard
   - Two monitors

7.10.5 Diamond Electronics - FastScan/SmartScan, Continued

Equipment Configuration



Operation

1. Log QWERTY keyboard (System Keyboard) to the Operator monitor (See MaxMon Manual for details).
2. Select the Dome being configured, from the Operator monitor.
3. Select the required Set-up menu from the Test monitor in the Maxmon menu.
4. Select the required option from the menu now displayed on the Operator monitor.
5. Make the required changes.
6. Esc to exit the configuration menu on the Operator monitor.
7. Log off System Keyboard from MaxMon
8. Use the MAXPRO-Net system as normal.

7.10.6 PELCO - Intercept/Legacy – AD Format

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	1, 3 - 8 OFF
	SW2	2 ON

Data connection

Intercept/Legacy receivers may be connected with up to 16 receivers supported per RD-316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A). Terminal A should connect to RX+, and terminal B should connect to RX-.

Note: Receiver addressing via the onboard DIP switch is true binary with a supported range of 1 through 16 on each RD316. Data rate is 2400bps.

7.10.7 PELCO - Intercept/Legacy – Pelco 9750 Format

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	2 - 8 OFF
	SW2	1 ON

Data connection

Intercept/Legacy receivers may be connected with up to 16 receivers supported per RD316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A). Terminal A should connect to RX+, and terminal B should connect to RX-.

Note: Receiver addressing via the onboard DIP switch is true binary with a supported range of 1 through 16 on each RD316. Data rate is 4800bps.

Note: Intercept and Legacy are trademarks of PELCO.

7.10.8 PELCO – Coaxitron Interface Format

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	2, 4, 6 - 8 OFF
	SW2	1, 3, 5 ON

Note: Receiver addressing via the onboard DIP switch is true binary with a supported range of 1 through 16 on each RD-316. Data rate is 4800bps.

7.10.9 Maxpro – RS-485 – Non Polling

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	2, 3, 5 - 8 OFF
	SW2	1, 4 ON

Data connection

Maxpro RS-485 receivers may be connected with up to 16 receivers supported per RD316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.10 Maxpro – RS-485 – Polling

Format switch	SW1	1, 2 OFF
	SW1	3, 4 ON
Mode switch	SW2	1, 3, 5 - 8 OFF
	SW2	2, 4 ON

Data connection

Maxpro RS-485 receivers may be connected with up to 16 receivers supported per RD-316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.11 Vicon Standard

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	4 - 8 OFF
	SW2	1 - 3 ON

Data connection

Vicon RS-485 receivers may be connected with up to 16 receivers supported per RD-316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.12 Vicon Extended

Format switch SW1 1 - 4 OFF

Mode switch SW2 1 - 3, 5 - 8 OFF
SW2 4 ON

Data connection

Vicon RS-485 receivers may be connected with up to 16 receivers supported per RD-316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.13 Panasonic - WV-CS600/WV-RM70, WV-CS600A/WV-RM70, and WV-CSR600

Format switch SW1 1 - 4 OFF

Mode switch SW2 1, 2, 4 - 8 OFF
SW2 3 ON

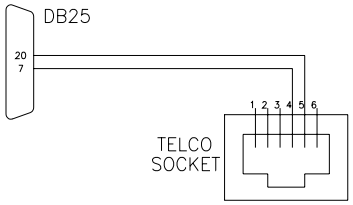
Data connection

Panasonic RS-485 receivers may be connected with up to 16 receivers supported per RD316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

The WV-RM70 should be set up at a data rate of 9600bps. All other settings should be left at factory default values.

Note: It should be noted that some Panasonic receivers do not have preset view set command capability via RS-485, and as such this function will not work. WV-CS600A and later equipment supports this functionality.

Connection details from a Panasonic WV-CSR600 dome to the I/O slot of a subrack (populated with a RD-316 module):



7.10.14 Panasonic - WV-CS850 Series

Format switch SW1 1 - 4 OFF

19.2Kbps
Mode switch SW2 2, 4 - 8 OFF
SW2 1, 3 ON

or

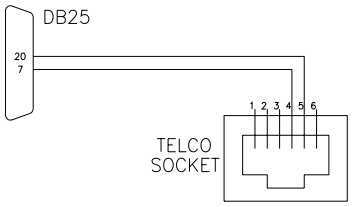
9600bps
Mode switch SW2 1, 4 - 8 OFF
SW2 2, 3 ON

Note: WV-CS850 Protocol was introduced in version 2.07 firmware. This version only supports 19.2Kps. However, version 2.08 firmware and above does support 9600bps as well as 19.2Kbps.

Data connection

Panasonic RS-485 receivers may be connected with up to 16 receivers supported per RD-316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A). The WV-CS850 should be set for
4-wire duplex operation.

Connection details from a Panasonic WV-CSR600/CS850 dome to the I/O slot of a subrack (populated with a RD-316 module) :-



7.10.15 American Dynamics

Two formats are implemented. 2 byte suitable for single speed receivers, e.g. AD 1689, and a 4 byte version suitable for Cobra domes.

2 Byte Manchester

Format switch	SW1	1 ON
	SW1	2 - 4 OFF
Mode switch	SW2	1, 2, ON
	SW2	3 - 8 OFF

4 Byte

Format switch	SW1	1 ON
	SW1	2 - 4 OFF
Mode switch	SW2	1, 2, 4 ON
	SW2	3, 5 - 8 OFF

Data connection

AD Manchester receivers may be daisy chain connected with up to 16 receivers supported per RD316 Module.

Field cables may connect to DB25 pin pairs 22(A) & 9(B), 23(A) & 10(B), 24(A) & 11(B), 25(A), & 12(B).

Pin (A) is equivalent to AD pin designation White.

7.10.16 Philips/Burle

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	1 - 4, 6 - 8 OFF
	SW2	5 ON

Data connection

Up to 16 Philips/Burle RS-232 receivers may be connected via suitable RS-485 converter(s) to a RD316 Module. Data communication to the receivers is simplex requiring only a two-wire circuit. The RS-485/232 converter(s) may connect to D25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A). The RD-316 utilizes a data rate of 9600bps, wiring distances and topology should be carefully planned to ensure reliable data transfer.

7.10.17 Star/Chugai/Sanyo SMD12P, SMD20P, VCC9200P

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	1, 3, 4, 6 - 8 OFF
	SW2	2, 5 ON

Data connection

Star/Chugai/Sanyo RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD-316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.18 Mark Mercer

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	1, 5 – 8 OFF
	SW2	2, 3, 4 ON

Data connection

Mark Mercer RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD-316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.19 Videv

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	5 – 8 OFF
	SW2	1 – 4 ON

Data connection

Videv RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD-316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.20 VCL

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	2 – 4, 6 – 8 OFF
	SW2	1, 5 ON

Data connection

VCL RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD-316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.21 SpeedDome

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	2, 5 – 8 OFF
	SW2	1, 3, 4 ON

Data connection

Speedome RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD-316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.22 Kalatel

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	3, 4, 6 – 8 OFF
	SW2	1, 2, 5 ON

Data connection

Kalatel RS-485 protocol converters may be directly connected with up to 16 receivers supported per RD316 Module. Converter cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A). Tours 1-4 (where supported on Kalatel product) may be activated through use of auxiliary outputs 5-8. Auxiliary output 2 is mapped to the auto focus function.

Note: A Kalatel protocol converter must be used to convert the protocol to RS485 format. One type is the KTD-93-1.

7.10.23 Baxall

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	1, 2, 4, 6 – 8 OFF
	SW2	3, 5 ON

Data connection

Baxall RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.24 Bocom

Format switch SW1 2 - 4 OFF
SW1 1 ON

Mode switch SW2 1, 2, 5 – 8 OFF
SW2 3, 4 ON

Data connection

Bocom Manchester receivers may be daisy chain connected with up to 16 receivers supported per RD-316 Module. Field cables may connect to DB25 pin pairs 22(A) and 9(B), 23(A) and 10(B), 24(A) and 11(B), 25(A) and 12(B).

7.10.25 Ultrak KX Series Multiplexors

Format switch SW1 1 - 4 OFF

Mode switch SW2 4, 6 – 8 OFF
SW2 1 - 3, 5 ON

Data connection

Ultrak multiplexers may be daisy chain connected with up to 16 units supported per RD316 module. Multiplexer data terminal RXA connects to DB25 pin 20 or 21, data terminal RXB to DB25 pin 7 or 8.

The list of supported functions is as follows:

Function No.	Multiplexer Function
1	Camera 1
2	Camera 2
3	Camera 3
4	Camera 4
5	Camera 5
6	Camera 6
7	Camera 7
8	Camera 8
9	Camera 9
10	Camera 10
11	Camera 11
12	Camera 12
13	Camera 13
14	Camera 14
15	Camera 15
16	Camera 16
17	Full screen
18	2x2 display mode
19	2x3 display mode

Function No.	Multiplexer Function
20	Set
21	4x4 display mode
22	Zoom
23	Select
24	Live record
25	VCR
26	Sequence
27	Hold (freeze)
28	Up arrow
29	Down arrow
30	Left arrow
31	Right arrow
32	Menu

7.10.26 Ranger FLIR

Note: The Ranger FLIR protocol is effective from version 2.08 firmware onwards

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	1 - 3, 6 - 8 OFF
	SW2	4, 5 ON

Data connection

A single Ranger FLIR camera is supported by each RD316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A). The data rate/frame specification is 19k2, 8 data bits, no parity, 1 stop bit. The special functions within the Ranger FLIR camera are mapped to the following MAXPRO-Net® functions:

power on/off	aux1
auto brightness toggle	aux2
power standby	aux3
reticle on/off	aux4
polarity toggle	aux5
calibration	aux6
video overlay toggle	aux7
home	preset call 0
brightness control	preset calls 71-79 (fff-000)
contrast control	preset calls 81-89 (fff-000)
as set node	preset call 91
as start	preset call 92
as stop	preset call 93
as rate 400	preset call 94
as rate 600	preset call 95
as rate 800	preset call 96

7.10.27 Elbex

Note: The Elbex protocol is effective from version 2.10 firmware and later.

Format switch	SW1	1 - 4 OFF
Mode switch	SW2	1, 3, 6 – 8 OFF
	SW2	2, 4, 5 ON

Data connection

One Elbex RS-422 receiver may be connected per RD316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.28 Tracam

Note: The Tracam protocol is effective from version 2.10 firmware onwards

Format switch SW1 1 - 4 OFF

Mode switch SW2 3, 6 - 8 OFF
SW2 1, 2, 4, 5 ON

Data connection

Tracam RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

Notes:

- Auxiliary Output 1 is used for the “Drive Forward “ command.
- Auxiliary Output 2 is used for the “Drive Reverse” command.

7.10.29 JVC

Note: The JVC protocol is effective from version 2.10 firmware onwards

Format switch SW1 1 - 4 OFF

Mode switch SW2 1, 2, 6 – 8 OFF
SW2 3, 4, 5 ON

Data connection

JVC RS-485 receivers may be daisy chain or star connected with up to 16 receivers supported per RD316 Module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.30 VST – RS-485 – Unidirectional

Note: The VST Unidirectional and bi-directional protocol is effective from version 2.15 firmware onwards.

Format switch SW1 1-4 OFF

Mode switch SW2 1,6-8 OFF
2-5 ON

Data Connection

VST RS-485 receivers may be connected with up to 16 receivers supported per RD-316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A).

7.10.31 VST – RS-485 – Bidirectional

Format switch	SW1	1 OFF 2-4 ON
Mode switch	SW2	6-8 OFF 1-5 ON

Data Connection

VST RS-485 receivers may be connected with up to 16 receivers supported per RD-316 module. Field cables may connect to DB25 pin pair 7(B) and 20(A) or pin pair 8(B) and 21(A). The RD-316 will report PTZ site communication failure alarms and the status of the alarm inputs on the VST receiver.

7.11 RD378E PTZ SITE RECEIVER

7.11.1 Features

The RD378 is an intelligent pan/tilt/lens controller for use at a remote camera site. Its primary function is to operate the pan/tilt unit and zoom/focus lens controls.

Features include:

- All communication to/from the RD378 site receiver is via a common two-wire line providing simultaneous control of up to 16 site receivers per network. All data traffic is managed by a RD315 two-wire transmitter module located in the equipment subrack. 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.
- Capable of controlling any 24V DC pan/tilt unit at variable speeds and the lens functions at two speeds.
- Capable of retaining and subsequent re-positioning of up to 100 separate PTZ views (presets).
- When a view is selected, the pan tilt unit slows down as the required position is approached.
- Pan and tilt speeds vary with the zoom position of the lens.
- A site tamper alarm input for securing the control cabinet, the alarm being sent to the main MAXPRO-Net Server.
- Communication options including synchronous bit stream at RS-232 levels known as AF-232.
- Direct RS-232 from a RD315 control card to one RD378 over networks where normal RS-232 asynchronous protocol is required.
- Mixed modes of communication can also be used. Fiber can be used to the first site and then the two-wire line to the successive sites. Or perhaps two-wire to the first site, and then fiber continuing to successive sites.
- If the optional I/O expansion board (IO378) is fitted, then an additional seven direct contact or current-loop sensing alarm inputs are available. The board also provides eight separate relay output contacts, and an iris output for control of motorized manual iris lenses.

7.11.2 Power Supply

The site receiver is supplied with AC mains power via the IEC connector mounted on the PCB support bracket. This connector contains fuses, rated at 2A (@220VAC), and a power filter. The IEC socket is connected under the support bracket to the toroidal transformer primary. The transformer secondaries provide the following voltages to the site receiver and have the associated fuses installed.

- $2 \times 20V/5A$ via PL17 and PL18. F1 and F2 are rated at 5A. With the fuses in place, the resulting unregulated $\pm 28V$ DC will light LED's L18 and L19. Used for pan/tilt motor drive.
- $2 \times 10.5V/2A$ via PL19 and PL20. F3 and F4 are rated at 2A. With the fuses in place the resulting unregulated $\pm 12V$ DC will light LED's L2 and L3, and the regulated 5V will light L1. Used to provide power for lens drive, 12V DC camera power, and to supply the microcontrollers and associated circuits with regulated 5V.
- $1 \times 24V/1A$ via PL2. F5 is rated at 1A. With the fuse in place LED L20 will light. Used for AC camera power.

The 24V used to power an AC camera is output from the board at PL2. This supply is isolated above ground. Alternatively, if a 12V DC camera is used, power is supplied from PL1.

7.11.3 Communications

The RD378 site receiver communications are controlled by the CC-2000 micro-controller. This section details the switch and jumper settings needed for the required mode of communications.

Balanced TWO wire audio

The normal connection to the site receiver is a two-wire type cable that carries AFSK control information from a RD-315 communications module. For this mode of operation, the cable is connected into PL4, and LK6 must be in position "2W". In addition, the LK2 must have jumpers to link "A→B" and "C→D" to link the communications processor to the motor control processor. (Factory default).

FOUR wire audio

In some situations, a 4-wire audio connection may be more suitable. For example, when an optical fiber AF channel is being used. The receive data is an unbalanced input at PL3, while the transmit data is via a balanced two-wire at PL4. Audio sing around or feedback can be avoided using this type of connection. The receive data cable should not be wired further than a few meters and must be shielded as it is a high impedance input. LK6 must be in position "4W". In addition, the LK2 must have jumpers to link "A→B" and "C→D" to link the communications processor to the motor control processor.

CAUTION: The UNBAL-INPUT should not be wired further than a few meters and must be shielded, as it is a high impedance input.

7.11.3 Communications, Continued

AF-232

The RD378 also supports AFSK data at RS-232 levels, known as AF-232. For this format use connector PL7, and LK6 must be in position “2W”. LK1 is used to select “Echo on” (B) or “Echo off” (A) for data. In Position “A” the site receiver’s own data is transmitted in AF-232 format. This is also sent in position “B”, but in addition the receive data is also transmitted.

Note: The RD315 communications modules used to control the RD378 have a similar link, and only one end can be used in the “echo on” mode. AF-232 communications contain full protocol for multi drop applications and is suitable for optical fiber TX/RX. A multi drop ring loop fiber data system can be used to communicate with up to 16 PTZ sites. Another option is to run optical fiber to the first PTZ site and then normal 2-wire connection continues onto other sites.

SW2 Switch Settings

The use of the communications DIP switch SW2 is summarized in the table below. Following is more details of the functions of each switch.

SW2	DESCRIPTION	ON	OFF	FACTORY
1	Mode Select	Master	Slave	OFF
2	Destination	Slave	Master	OFF
3	Poll Mode	Enabled	Disabled	ON
4	Not Used			***ON**
5	Site ID No	Ref table page 8		
6	Site ID No	Ref table page 8		
7	Site ID No	Ref table page 8		
8	Site ID No	Ref table page 8		

*SW2-4 MUST be set to the ON position.

SW2-1 Mode Select (master or slave)

The RD-378 should have this switch set to off to select slave mode.

SW2-2 Destination Type (master or slave)

The RD-378 should always have this switch set to off to select a destination of master.

SW2-3 Polling mode

The polling mode on all RD-378 site receivers and RD-315 control card on the communications network should be set to the same (ON or OFF). Usually, polling is switched ON and in this mode the RD-315 control module will sequentially communicate with all known slave locations (PTZ site receivers) in the network on a continuous basis. If the RD-378 does not respond to this polling, then this change will be reported to the MAXPRO-Net system.

Polling is usually only switched OFF when the communications link is limited to simplex only and no return data is expected.

7.11.3 Communications, Continued

SW2-4 Not Used

This switch is currently not used. It must always be set to the ON position.

SW2-5 to SW2-8 Site ID Number

These switches set the ID number of the site receiver. Refer to the table below to set required ID number.

SITE ID	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

LED Indicators

There are two LEDs associated with the communications micro-controller. L4 is the site communications indicator and lights when the RD-378 is polled or receives valid control data. L5 is the TX data indicator and lights when the RD-378 transmits valid data back to the system. This would usually be to indicate a change of state of alarm inputs.

7.11.4 Motor Drive

The second microcontroller on the RD-378 receives data from the CC-2000 communications chip, and generates the appropriate control waveforms for pan, tilt and lens motors.

Connections

Connections for pan and tilt motors are made at PL16 and PL15 respectively. The motor speed is varied using pulse-width modulation. The slowest speed generates a waveform with mark space ratio of 1:9, whilst the maximum speed generates 10:0 (i.e. the DC level of ±28V). A brake output is also provided to release the motor brakes as the motor drive waveform starts, and to re-apply the brakes when a halt command is received.

The motor drive and brake outputs are protected with a current limit of 5A. Should a current spike pass this threshold, the output drive will switch off until a new output is generated from the motor drive processor. In addition re-settable fuses are used to protect the output. These become open circuit after a few seconds if excess current (but less than 5A) is drawn from either motor drive output. After a few seconds these fuses automatically reset.

The zoom and focus drive is output from PL9. Speed is again controlled using pulse-width modulation, and this time the output is current limited to 80mA.

Preset Connections

If the pan/tilt motors and lenses used are fitted with position pots, up to 100 preset views can be programmed into the RD-378 site receiver. The board provides a 5V reference that is output to the pan/tilt pots at PL12, and to the focus/zoom pots at PL14. The return voltage is then dependant on the position of the associated pot, and is input at PL11 for pan/tilt and PL13 for focus/zoom. The views are set and recalled from the system keyboard.

7.11.4 Motor Drive, Continued

LED Indicators

The motor, brake and lens outputs each have a pair of LEDs to indicate when the output is driving either +ve or –ve. These are listed below.

LED	INDICATION
L6	Focus –ve
L7	Focus +ve
L8	Zoom –ve
L9	Zoom +ve
L10	Tilt –ve
L11	Tilt +ve
L12	Tilt Brake –ve
L13	Tilt Brake +ve
L14	Pan –ve
L15	Pan +ve
L16	Pan Brake –ve
L17	Pan Brake +ve

SW3 Switch Settings

The use of the motor drive switch SW3 is summarized in the table below. Following is a more detailed description of the use of each switch.

SW3	DESCRIPTION	ON	OFF	FACTORY
1	Lens Voltage	6 Volt	12 Volt	ON
2	Privacy Zones	Enabled	Disabled	OFF
3	Auto Home	Enabled	Disabled	OFF
4	Pan/Tilt inversion	Inverted	Normal	ON
5	Focus/Zoom inversion	Inverted	Normal	OFF
6	I/O fitted	Enabled	Disabled	OFF
7	Speed 1	Ref to table		
8	Speed 2	Ref to table		

SW3-1 Lens Voltage

This switch sets the voltage required to control zoom, focus and manual iris on the camera lens.

SW3-2 Privacy Zones

Privacy Zones. When switched on privacy zones are enabled.

7.11.4 Motor Drive, Continued

SW3-3 Auto Home

If this option is enabled, the PTZ will return to the preset position of view 0 after one minute of no operation. Note that View 0 must be set before this function can operate.

SW3-4 Pan/Tilt Inversion

Allows the camera to be invert-mounted on the pan/tilt unit. Setting this switch ON will reverse pan left/right and tilt up/down outputs from the RD-378, so that the camera can be invert mounted, yet maintaining the wiring connections as per connection data.

SW3-5 Focus/Zoom Inversion

Manufacturers of lenses vary the use of +ve or –ve for in/out lens functions. This switch is set to ensure the button function on the keyboard matches the actual operation performed. This must be set correctly for the pan/tilt dynamic speed control from zoom position to operate.

SW3-6 I/O Fitted

If the optional IO-378 board is fitted, then this switch must be switched ON. This allows for seven additional alarm inputs and eight voltage free contact control outputs to operate at the site as well as manual iris control.

SW3-7 and SW3-8 Speed Control

These switches are set depending on the type of pan/tilt unit being used. Their use is described in the following table.

DESCRIPTION	SW3-7	SW3-8
STANDARD DC PTZ (Less than 40° /sec) Full variable speed from analogue joystick, and auto two speed (medium/fastest) from normal joystick. Graded pan/tilt speed depending on lens zoom.	OFF	OFF
STANDARD DC PTZ (Less than 40° /sec) Full variable speed from analogue joystick, and auto two speed (medium/fastest) from normal joystick. Graded P/T speed depending on zoom in position. Additional Step/pause/run allows small increments of manual position placement.	ON	OFF
HIGH SPEED DC PTZ (Greater than 40° /sec, i.e. Fast domes) Full variable speed from analogue joystick, and auto two speed (slowest/medium) from normal joystick. Graded pan/tilt speed depending on lens zoom. Includes fine position incremental placement of view calls.	OFF	ON
HIGH SPEED DC PTZ (Greater than 40° /sec i.e. Fast domes) Full variable speed from analogue joystick, and auto two speed (slowest/medium) from normal joystick. Graded P/T speed depending on zoom in position. Includes fine position incremental placement of view calls and Step/pause/run for small increments of manual position placement.	ON	ON

7.11.5 Motor Time Out

For all types of pan/tilt drives a motor time-out exists in software, i.e. should a pan/tilt run to the end stop and the limit switch not shut the unit off, the software will stop the drive after a period of four (4) minutes for any direction.

7.11.6 Tamper Alarm Input

The tamper alarm input can be used to secure the control cabinet and/or the camera housing. The connections are made at PL10, and an open circuit between the two terminals indicates an alarm condition. This will be detected by the motor control micro-controller, which will pass a message to the CC-2000 communications controller. This in turn sends a message to the MAXPRO-Net Server.

7.11.7 Installation Notes

After all connections are made and the dip switches are set, the pan/tilt unit must be manually controlled and the limit switches on the pan and tilt functions set. This is done inside the pan/tilt unit itself and is not a site receiver function. With the limit switches set the unit must be driven from stop to stop in every direction to allow the preset pots to clutch into the correct position.

After all these mechanical and electrical settings have been done, press the initialize button labeled SW1. The PTZ will then go through an initializing phase that operates all the PTZ functions. This allows the site receiver to measure the direction of voltage tracking for the presets and make auto reversals if required. If the site detects presets, then the lens will track “fully zoom in” and “fully zoom out” then return to the spot it was set at previously. This is to range the zoom for auto speed control, and this auto set-up may take up to 10 seconds.

CAUTION: All directional control settings and lens controls must be set and tested to be correct from one of the system keyboards prior to this final RESET being pressed. i.e. SW3-4 and SW3-5 must be set correctly.

7.11.8 Suitable cable sizing for PTZ heads when connecting to Site Receivers

As it is not unusual for Pan-Tilt heads to operate on relatively high current, it is imperative that cable with adequate conductor size is installed between the PTZ site receiver and the PTZ head.

The following table indicates the recommended cable conductor size based on cable feed distance.

Cable Feed Distance	Cross Sectional Area of Conductor
5m	1.0mm (17 AWG)
10m	1.0mm (17 AWG)
15m	1.5mm (15 AWG)
20m	1.5mm (15 AWG)
30m	2.5mm (10 AWG)

7.11.9 RD378 PRIVACY ZONES

Introduction

Privacy zones are a method of restricting operator access of pan, tilt and zoom operations. They allow supervisors to define areas that surveillance operators can and cannot view. For example in residential areas, it would not be suitable to allow operators to zoom into windows etc.

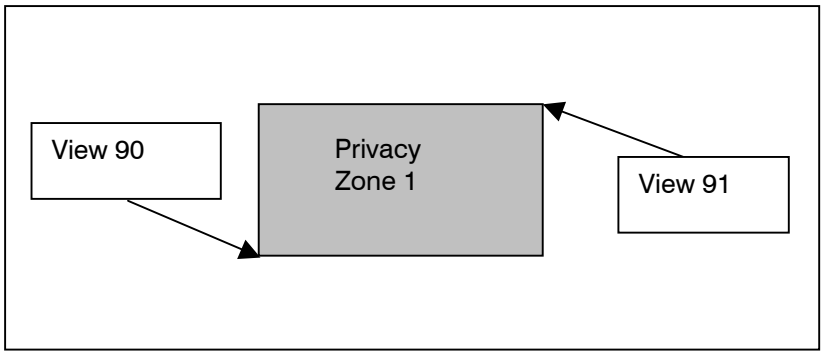
With the RD-378 site receiver (firmware V2.00 and above) privacy zones can be defined by setting views from the operator keyboard. In this way they can be easily defined and changed by supervisors as required.

To enable privacy zones on the RD-378, set DIP switch SW3-2 ON.

CAUTION: When using the IO-378 module, the Privacy Zones option is not available.

Setting Privacy Zones

The RD-378 can have up to 5 privacy zones defined at any time. The zones are defined by setting views 90 through 99. For the first zone (privacy zone 1) views 90 and 91 define the “window” that excludes the operator from entering. Privacy zone 2 is defined by views 92 and 93 etc. See diagram below.



To set an effective privacy zone, the following procedure is followed.

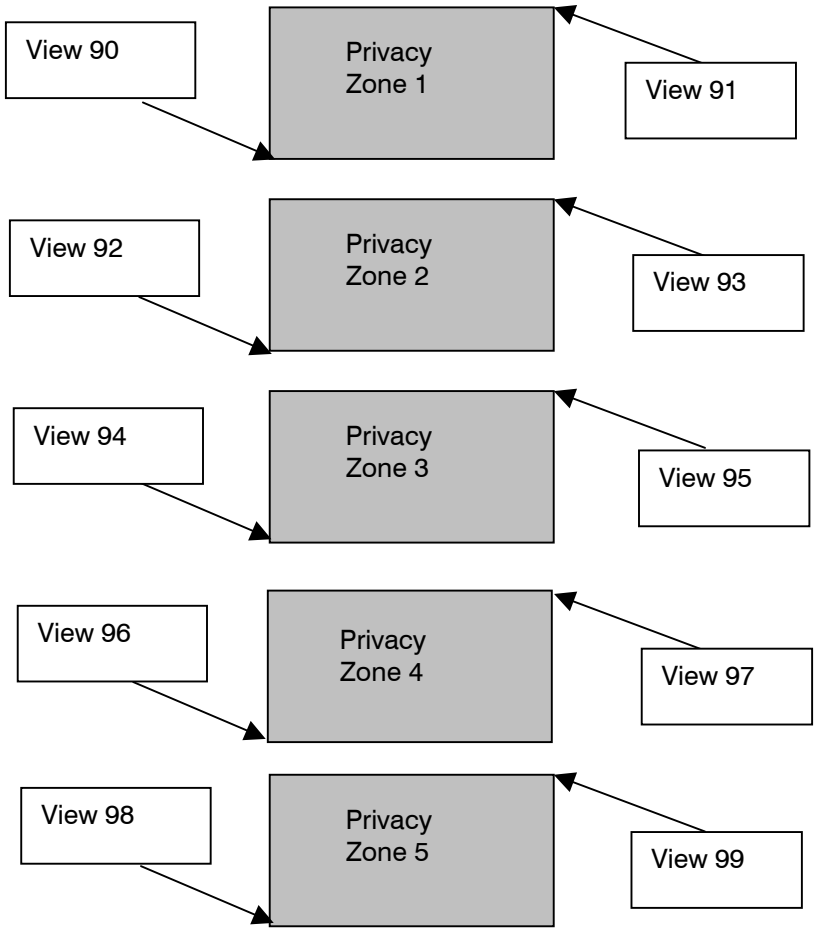
4. Set the zoom to the position required.
5. Using the keyboard move the pan/tilt so the bottom left corner of the required privacy zone is at the very top right corner of the screen.
6. At this position set view 90.
7. Move the pan/tilt so the top right corner of the required privacy zone is at the very bottom left corner of the screen.
8. At this position set view 91.

The first privacy zone has now been set and will stop the operator panning or tilting into the area.

7.11.9 RD378 Privacy Zones, Continued

When setting view 90 position, the zoom position is stored. If the operator then zooms out from this position the privacy zone is disabled. However zooming into this position or any closer enables the privacy zone and excludes the operator from panning or tilting into the area. If the operator zooms out, then pans/tilts into the zone, and then tries to zoom in, the zoom will be halted when the zoom position set at the view is reached. Pan/tilt will still be enabled to allow the operator to exit the zone. If the privacy zone is required for all zoom positions, then views 90 and 91 must be set fully zoomed out.

The same procedure is used to set the other 4 privacy zones. See diagram below.



The zoom position for each privacy zone is set when the bottom left corner of each zone is set. This means each zone will have its own privacy zoom setting.

Privacy Zone Alarms

When the operator pans, tilts or zooms into a privacy zone, as well as that action being halted, an alarm message is sent back to the MAXPRO-Net system. This can be used to output a message to the screen identifying the privacy zone reached. Privacy zone 1 corresponds to alarm 1, zone 2 to alarm 2 etc. Note that this function means the alarm inputs on the optional IO-378 board cannot be used, as the message sent to the MAXPRO-Net on an alarm condition will be the same as if a privacy zone has been reached.

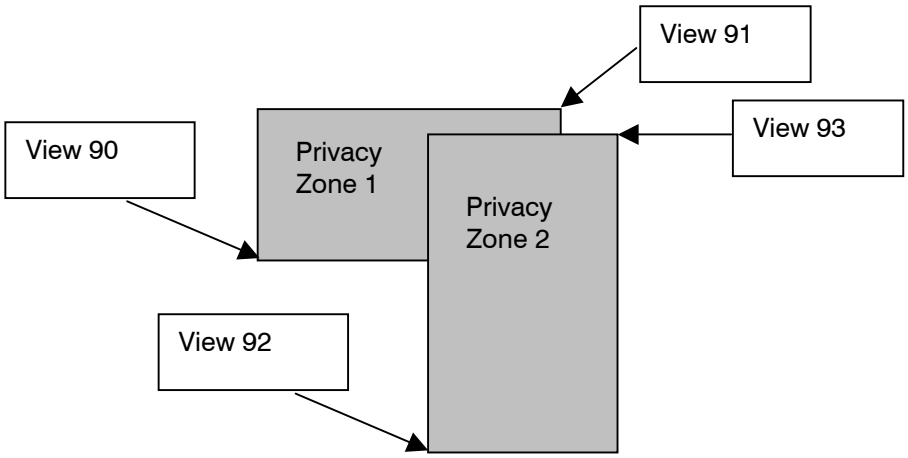
7.11.9 RD378 Privacy Zones, Continued

Disabling Privacy Zones

To disable a privacy zone, simply set the required views at the same position. Only if the view positions are different will the zone be enabled. Similarly, if the view for the top right corner of the privacy zone is set to the left or below the bottom left corner of the zone, the privacy zone will be disabled.

Combining Privacy Zones

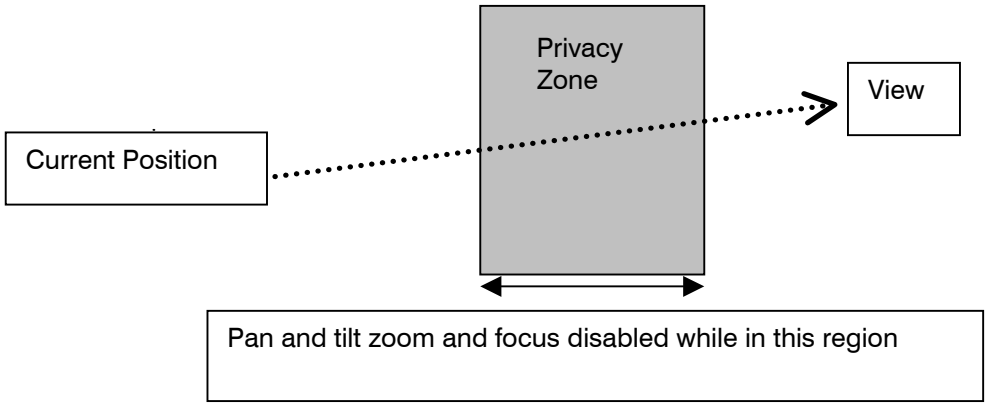
Privacy zones with shapes other than rectangles can be created by combining 2 or more zones. See diagram below.



When combining privacy zones it is best to keep the zoom settings of the bottom left corner views (90 and 92 in the above diagram) the same. In this way when zooming out, both privacy zones will be disabled together, and conversely when zooming in both will be enabled together.

Privacy Zones and Views

When recalling views, it is possible a privacy zone is between the current position and view setting. If this is the case, as the pan/tilt reaches the edge of the privacy zone all pan, tilt, zoom and focus operations from the keyboard (for that camera) are disabled until the pan/tilt reaches the other side of the privacy zone. See diagram below.



7.11.9 RD378 Privacy Zones, Continued

This is done because a view recall is usually terminated when any pan/tilt control input is received from the keyboard. Therefore an operator could perform a view recall, and then cancel it whilst in the middle of a privacy zone. By disabling pan, tilt and zoom functions while passing through the privacy zone, this problem is avoided. The privacy zone alarm messages are sent as normal when the privacy zone is reached.

The RD-378 does not allow views to be set on the edge of an existing privacy zone. Therefore move away from any privacy zones before setting views. There may occasionally be a requirement for a view to be set up within privacy zones. In this case, set the view first, and then set the privacy zone.

MAXPRO-Net Information

- The default number of views accessible in MAXPRO-Net is 10. To enable the full 100 views (and therefore allow privacy zones to be set), a key intercept is required from the <VIEW> key. (Refer to MAXPRO-Net commissioning manual regarding intercepting keyboard keys). The key replacement macro required for 100 views is v (lower case).
- Obviously it is important to ensure only supervisors have the specific access privilege to set views (Refer to MAXPRO-Net commissioning manual regarding Keyboard Operators). Otherwise, operators would easily be able to re-position or disable privacy zones.

7.11.10 IO-378 Optional I/O Expansion Board

The IO-378 plugs into the 20-way boxed header (J1) on the RD-378 via a ribbon cable. The board is supported by stand-offs. The IO-378 provides relay output contacts, alarm inputs and lens iris control.

NOTE: On the RD-378 set switch SW3-6 ON. This enables the RD-378 to control the IO-378.

NOTE: Always remove the right-angle connectors from the RD-378 PCB prior to fitting the IO-378, otherwise the board will not fit correctly.

Relay Outputs

Eight separate relay output contacts are provided. Six of these outputs are rated at 1A @30V. Outputs 7 and 8 have a higher rating of 2A @30V and are intended for wash and wipe motors respectively. When enabled in the MAXPRO-Net software, four of the outputs are utilized for special functions. These are:

- Relay 5 Manual Iris open.
- Relay 6 Manual Iris close
- Relay 7 Wash control
- Relay 8 Wipe Control

7.11.10 IO-378 Optional I/O Expansion Board, Continued

The power required for these or any other auxiliary devices must be provided separately and cannot be powered from the site receiver power supply circuit. Each relay output has an associated LED (L1 to L8) that lights up when that output contact is closed.

Remote Alarm Inputs

There are 7 alarm inputs on the IO-378. Each can be individually DIP switch selected for either digital or analogue mode. In the digital mode, standard open circuit and closed circuit conditions are expected. In an analogue mode, a normal input state requires a total loop resistance of 10K. The DIP switch settings are as follows.

DIPSWITCH SETTINGS

SW1	DESCRIPTION	ON	OFF
1	Alarm 1 mode	Analogue	Digital
2	Alarm 2 mode	Analogue	Digital
3	Alarm 3 mode	Analogue	Digital
4	Alarm 4 mode	Analogue	Digital
5	Alarm 5 mode	Analogue	Digital
6	Alarm 6 mode	Analogue	Digital
7	Alarm 7 mode	Analogue	Digital
8	Alarm Test	Test	Normal

The MAXPRO-Net software allows these remote alarm inputs to be utilized in exactly the same way, as are those from a RD-400 alarm input card.

The alarm test facility (SW1-8) automatically echoes the current alarm input state, back to the relay outputs. Using the output LEDs the alarm input can be locally tested and verified. Alarm inputs 1→7 are echoed to relay outputs 1→7. The tamper input on the RD-378 is echoed to relay output 8. Note that this test facility should be disabled during normal system operation.

Manual Iris Control

This output provides +ve and –ve voltages for manual iris control. This output is from PL16 on the IO-378 board. There are 2 links associated with this output, that select between 6 volt or 12 volt iris motors.

- LK1 and LK2 both off for 12V iris motors.
- LK1 and LK2 both on for 6V iris motors.

These link positions do not affect the zoom or focus motor voltages.

7.11.11 RL-378 Optional I/O Expansion Board with 240V Relays.

The RL-378 plugs into the 20-way boxed header (J1) on the RD-378 via a ribbon cable. The RL-378 provides relay output contacts, alarm inputs and lens iris control. The RL-378 cannot be mounted inside the RD-378 case, so the ribbon cable supplied is long enough to allow the RL-378 to be mounted externally.

Note: On the RD-378 set, switch SW3-6 ON. This enables the RD-378 to control the RL-378.

Relay Outputs

Four separate relay output contacts are provided. These are rated at 10A @240V AC. When enabled in the MAXPRO-Net software, the relays are controlled by the following outputs.

- Output 1 (relay 1)
- Output 2 (relay 2)
- Output 7 (relay 3) Wash control
- Output 8 (relay 4) Wipe Control

The power required for any other auxiliary devices must be provided separately and cannot be powered from the site receiver power supply circuit. Each relay output has an associated LED that lights up when the output contact is closed.

Control of 240V AC Pan Tilt Units using the RL-378

The RL-378 can be used to control 240V AC pan/tilt units by programming the MAXPRO-Net system to intercept keyboard joystick commands and issuing relay output control commands to the RD-378. The following example assumes that relay 1 is connected to Tilt Up, relay 2 to Tilt Down, relay 3 to Pan Left, and relay 4 to Pan Right.

Key Replacement Macros – MAXPRO-Net

Within Setmax, edit the Intercept Keyboard Keys data as shown.

Key	Key Replacement Macro	Key Release Macro
96 (tilt up)	[C@C=^11]	[C@C=^21,C@C=^22]
97 (tilt down)	[C@C=^12]	[C@C=^22,C@C=^21]
98 (pan left)	[C@C=^17]	[C@C=^27,C@C=^28]
99 (pan right)	[C@C=^18]	[C@C=^28,C@C=^27]

The key replacement macros switch the required control outputs on, at the currently selected camera, when joystick commands are received. When the joystick is released the outputs are switched off by the key release macros.

7.11.11 RL-378 Optional I/O Expansion Board with 240V Relays, Continued.

Remote Alarm Inputs

There are 7 alarm inputs on the RL-378. Each can be individually DIP switch selected for either digital or analogue mode. In digital mode, standard open circuit and closed circuit conditions are expected. In the analogue mode, a normal input state requires a total loop resistance of 10KΩ. The DIP switch settings are as follows.

DIPSWITCH SETTINGS

SW1	DESCRIPTION	ON	OFF
1	Alarm 1 mode	Analogue	Digital
2	Alarm 2 mode	Analogue	Digital
3	Alarm 3 mode	Analogue	Digital
4	Alarm 4 mode	Analogue	Digital
5	Alarm 5 mode	Analogue	Digital
6	Alarm 6 mode	Analogue	Digital
7	Alarm 7 mode	Analogue	Digital
8	Alarm Test	Test	Normal

The MAXPRO-Net software allows these remote alarm inputs to be utilized in exactly the same way, as are those from a RD-400 alarm input card.

The alarm test facility (SW1-8) automatically echoes the current alarm input state back out the relay outputs. Using the output LEDs the alarm input can be locally tested and verified. Alarm inputs 1→7 are echoed to relay outputs 1→7. The tamper input on the RD-378 is echoed to relay output 8. Note that this test facility should be disabled during normal system operation.

Manual Iris Control

This output provides +ve and –ve voltages for manual iris control. This output is from PL12 on the RL-378 board. There are 2 links associated with this output that select between 6 volt or 12 volt iris motors.

- LK1 and LK2 both off for 12V iris motors.
- LK1 and LK2 both on for 6V iris motors.

These link positions do not affect the zoom or focus motor voltages.

7.11.12 E.M.C Compliance - Installation Requirements

The RD-378 is normally supplied with a (RITTAL) KL 1503 housing in order to ensure compliance with the European Directives on E.M.C. There is also a mandatory requirement to specify the installation parameters, in order to comply with the European Directives on E.M.C.

The RD-378 fully optioned has been installed, tested and found to comply under the following minimum requirements:

The RD-378 relies on Pulse Width Modulation to give motor drive waveforms and speed control. These waveforms have rapid rise and fall times for efficiency purposes. They are therefore rich in harmonics that lie at the audio end of the spectrum (1kHz -100kHz). A metallic shield must be provided for the cables between the RD-378 housing and the case of the pan and tilt head.

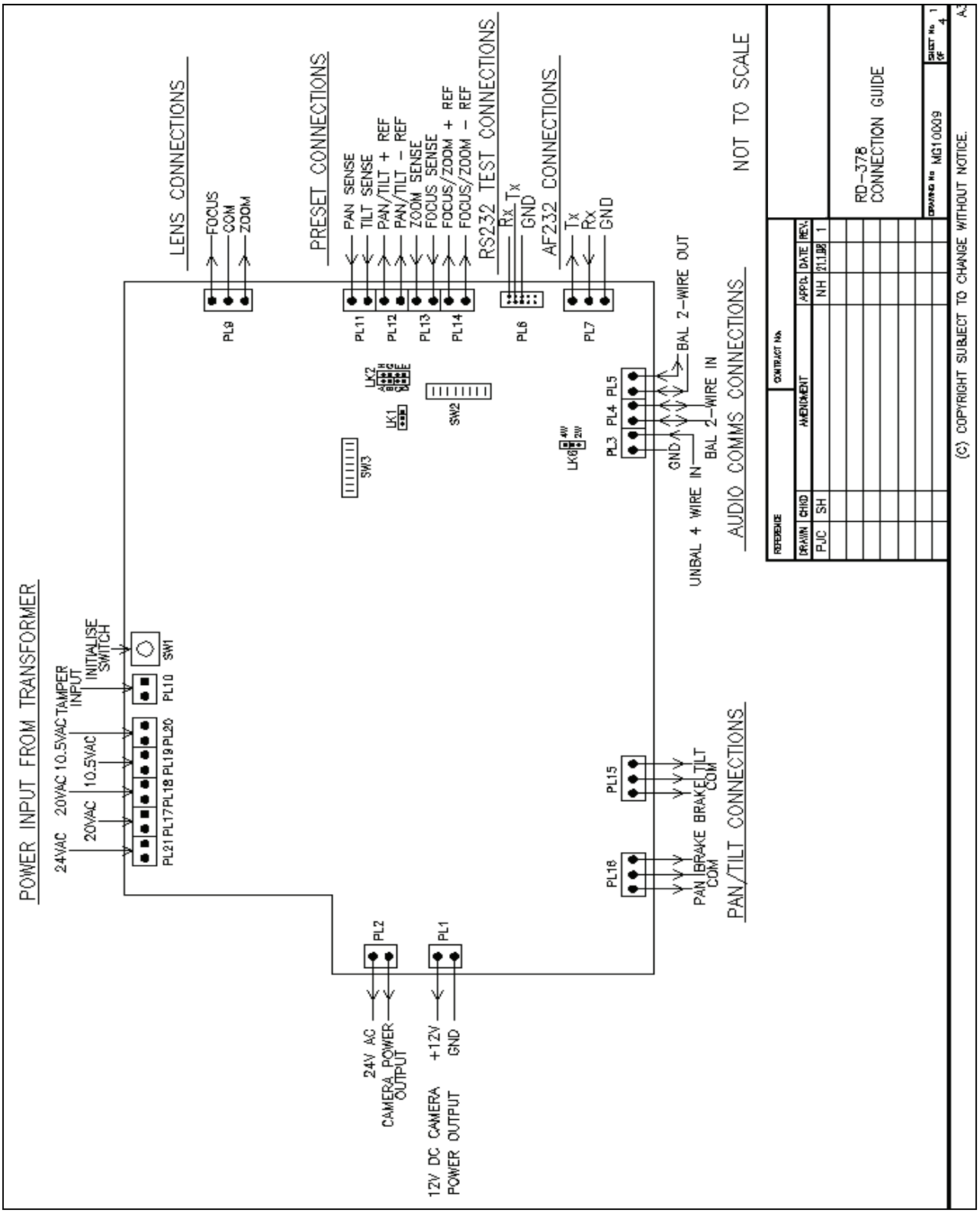
All cables between the Pan and Tilt Head and the controller, including the video cable **must** be enclosed in a metallic shield. The shield may be an overall flexible metallic conduit or individually shielded cables. In the case of individually shielded cables all cable screens **must** be bonded to ground at the entry/exit plate of the housing and at the case (enclosure) of the Pan and Tilt Head.

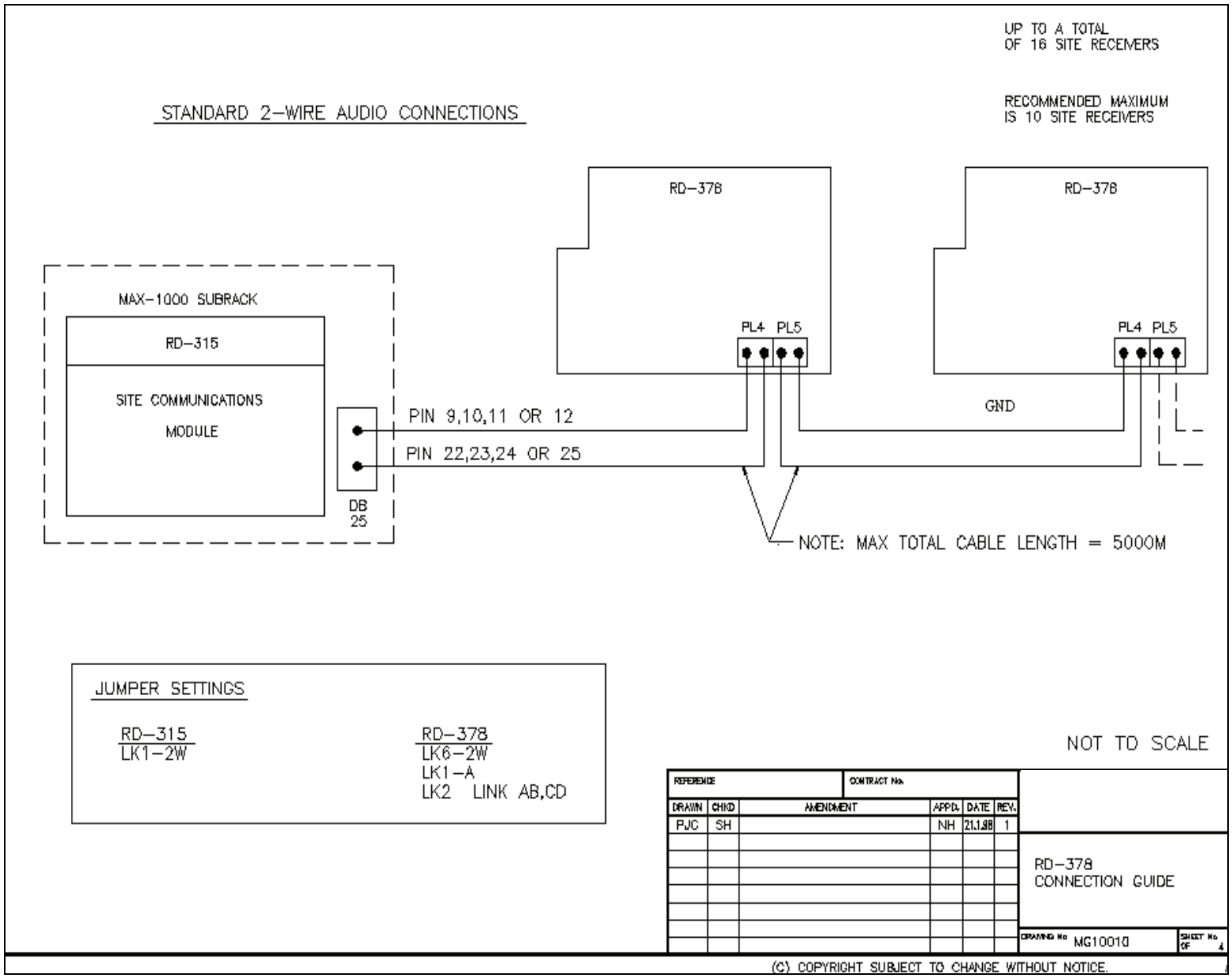
The video and control cables, from the controller housing to the MAXPRO-Net system, must be fitted with Ferrite Shielding Beads type 43-6301 or equivalent. The beads are to be located on the cables at a point just inside the enclosure. A compliance kit of Ferrite Shielding Beads is available from the supplier.

There is no requirement for Ferrite Shield Beads on the motor drive, video and position sense cables from the controller to the Pan and Tilt Head providing the shielding conduit and/or cable does not leak Radio Frequency energy. In the event of any doubt as to the effectiveness of the shielding at MF, HF and above, the shield beads should be fitted.

For the purpose of meeting the EMC Directives only CE approved cables, Cameras and Pan and Tilt Heads shall be used.

WARNING: In addition, the RD-378 must be installed in a manner, which will comply with the safety and services segregation requirements, as set out in the 16th edition of the IEE Wiring Regulations or applicable local Electrical Safety Regulations.


POWER INPUT FROM TRANSFORMER
24VAC
20VAC
20VAC
10.5VAC
10.5VAC
TAMPER INPUT
INITIALISE SWITCH
PL21 PL17 PL18 PL19 PL20
PL10
SW1
LENS CONNECTIONS
FOCUS
COM
ZOOM
PL9
PRESET CONNECTIONS
PAN SENSE
TILT SENSE
PAN/TILT + REF
PAN/TILT - REF
ZOOM SENSE
FOCUS SENSE
FOCUS/ZOOM + REF
FOCUS/ZOOM - REF
PL11
PL12
PL13
PL14
RS232 TEST CONNECTIONS
Rx
Tx
GND
PL6
AF232 CONNECTIONS
Tx
Rx
GND
PL7
LK2
LK1
SW2
SW3
LK6
4W
2W
PL3
PL4
PL5
GND
BAL 2-WIRE OUT
BAL 2-WIRE IN
UNBAL 4 WIRE IN
AUDIO COMMS CONNECTIONS
NOT TO SCALE
PL15
PL16
PAN
BRAKE
TILT COM
PAN/TILT CONNECTIONS
PL2
PL1
24V AC
CAMERA POWER OUTPUT
+12V
GND
12V DC CAMERA POWER OUTPUT
REFERENCE
CONTRACT No.
DRAWN
CHKD
AMENDMENT
APP'D
DATE
REV.
PJC
SH
NH
21.1.98
1
RD-378
CONNECTION GUIDE
DRAWING No MG10009
SHEET No 1 OF 4
(C) COPYRIGHT SUBJECT TO CHANGE WITHOUT NOTICE
A3


UP TO A TOTAL
OF 16 SITE RECEIVERS
RECOMMENDED MAXIMUM
IS 10 SITE RECEIVERS
STANDARD 2-WIRE AUDIO CONNECTIONS
RD-378
RD-378
MAX-1000 SUBRACK
RD-315
SITE COMMUNICATIONS
MODULE
PL4 PL5
PL4 PL5
PIN 9,10,11 OR 12
PIN 22,23,24 OR 25
GND
DB
25
NOTE: MAX TOTAL CABLE LENGTH = 5000M
JUMPER SETTINGS
RD-315
LK1-2W
RD-378
LK6-2W
LK1-A
LK2 LINK AB,CD
NOT TO SCALE
REFERENCE
CONTRACT No.
DRAWN CHKD AMENDMENT APPD. DATE REV.
PJC SH NH 21.1.98 1
RD-378
CONNECTION GUIDE
DRAWING No MG10018
SHEET No OF 4
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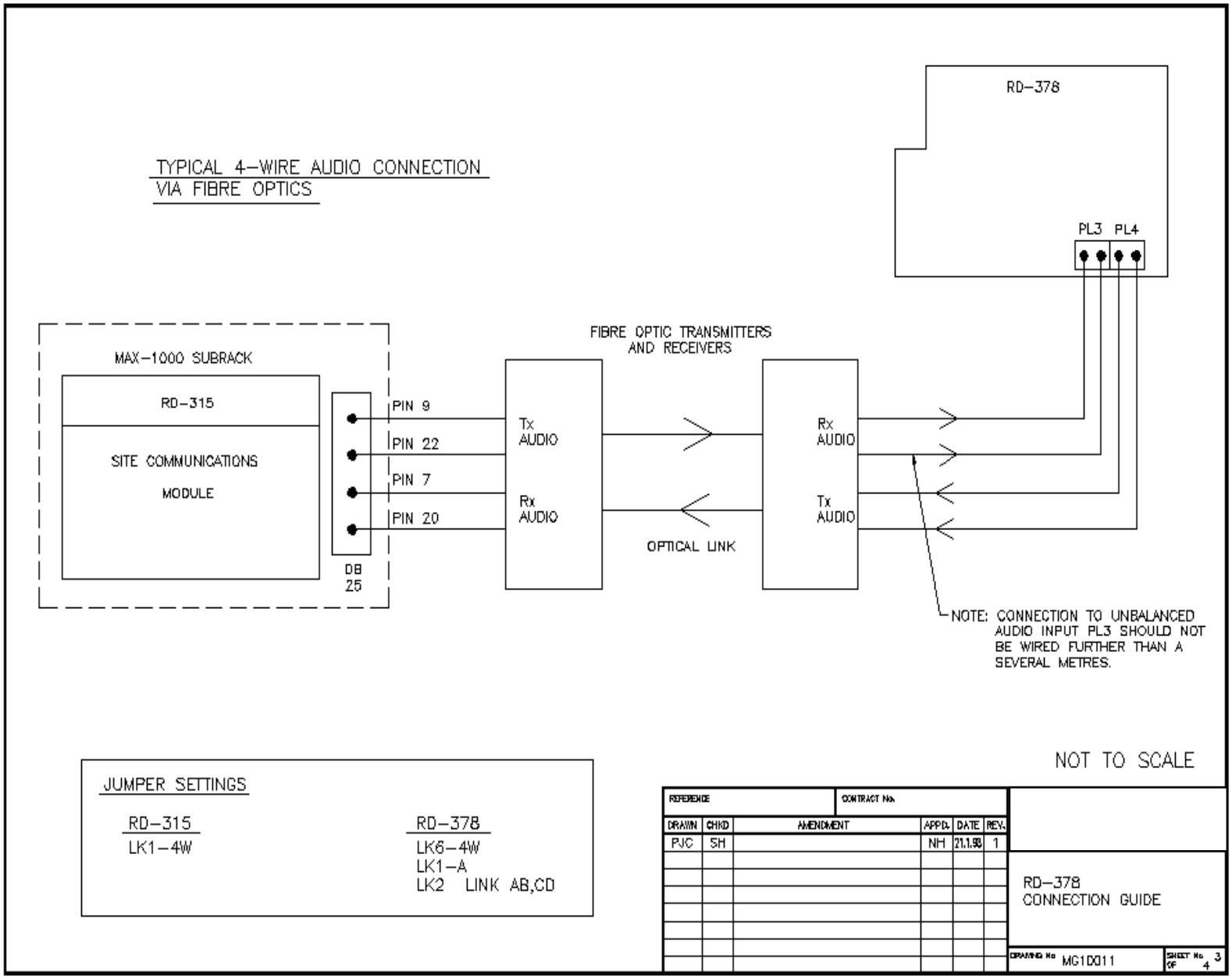

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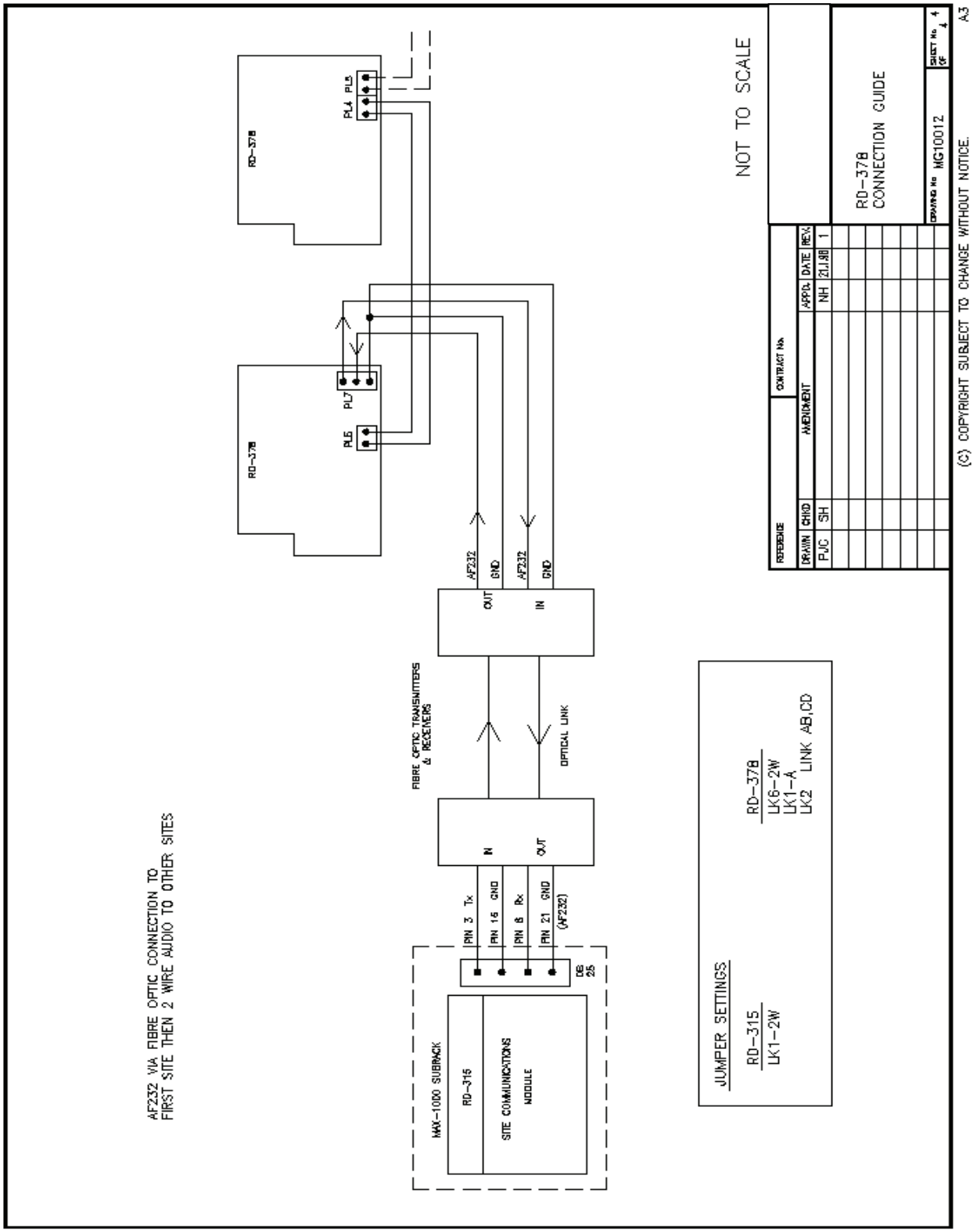
A3


AF232 VIA FIBRE OPTIC CONNECTION TO
FIRST SITE THEN 2 WIRE AUDIO TO OTHER SITES
MAX-1000 SUBRACK
RD-315
SITE COMMUNICATIONS
MODULE
DB
25
PIN 3 Tx
PIN 15 GND
PIN 8 Rx
PIN 21 GND
(AF232)
IN
OUT
FIBRE OPTIC TRANSMITTERS
& RECEIVERS
OPTICAL LINK
AF232
GND
AF232
GND
OUT
IN
RD-378
PL7
PL6
RD-378
PL4
PL5
RD-378
JUMPER SETTINGS
RD-315
LK1-2W
RD-378
LK6-2W
LK1-A
LK2 LINK AB,CD
NOT TO SCALE
REFERENCE
CONTRACT No.
DRAWN
CHKD
AMENDMENT
APPD.
DATE
REV.
PJC
SH
NH
21JAN
1
RD-378
CONNECTION GUIDE
DRAWING No MG10012
SHEET No. 4
OF 4
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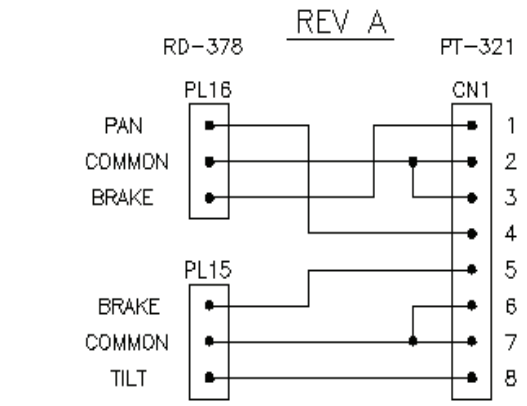

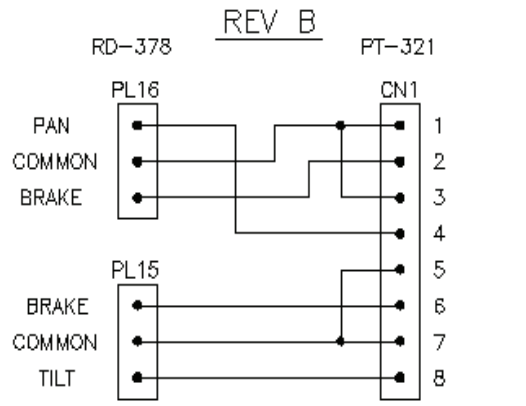

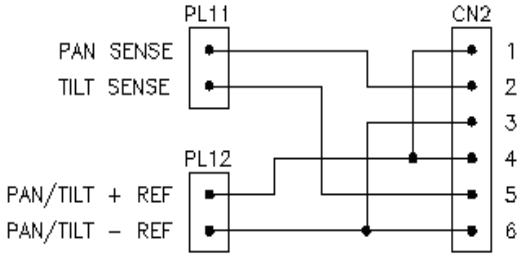

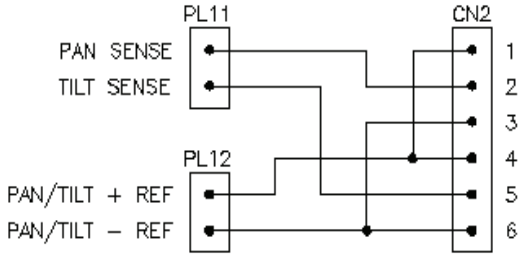

NOTE: IF PANTILT HEAD IS INCORRECTLY WIRED AS A REV A OR B THE SYMPTOM IS THAT THE PAN TILT HEAD WILL RUN ON BECAUSE NO BRAKE IS APPLIED OR THE BRAKE WILL NOT RELEASE IMMEDIATLEY WHEN IT PANS IN THE OPPOSITE DIRECTION. SOLUTION: CHANGE REV WIRING OVER.

NOT TO SCALE

REFERENCE		CONTRACT No.			
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.
PJC	AG		NH	3.2.98	1

PT-321
SITE RECEIVER
COMMUNICATIONS–
INTERCONNECTIONS

DRAWING No MG10006 | SHEET No. 1 OF 1

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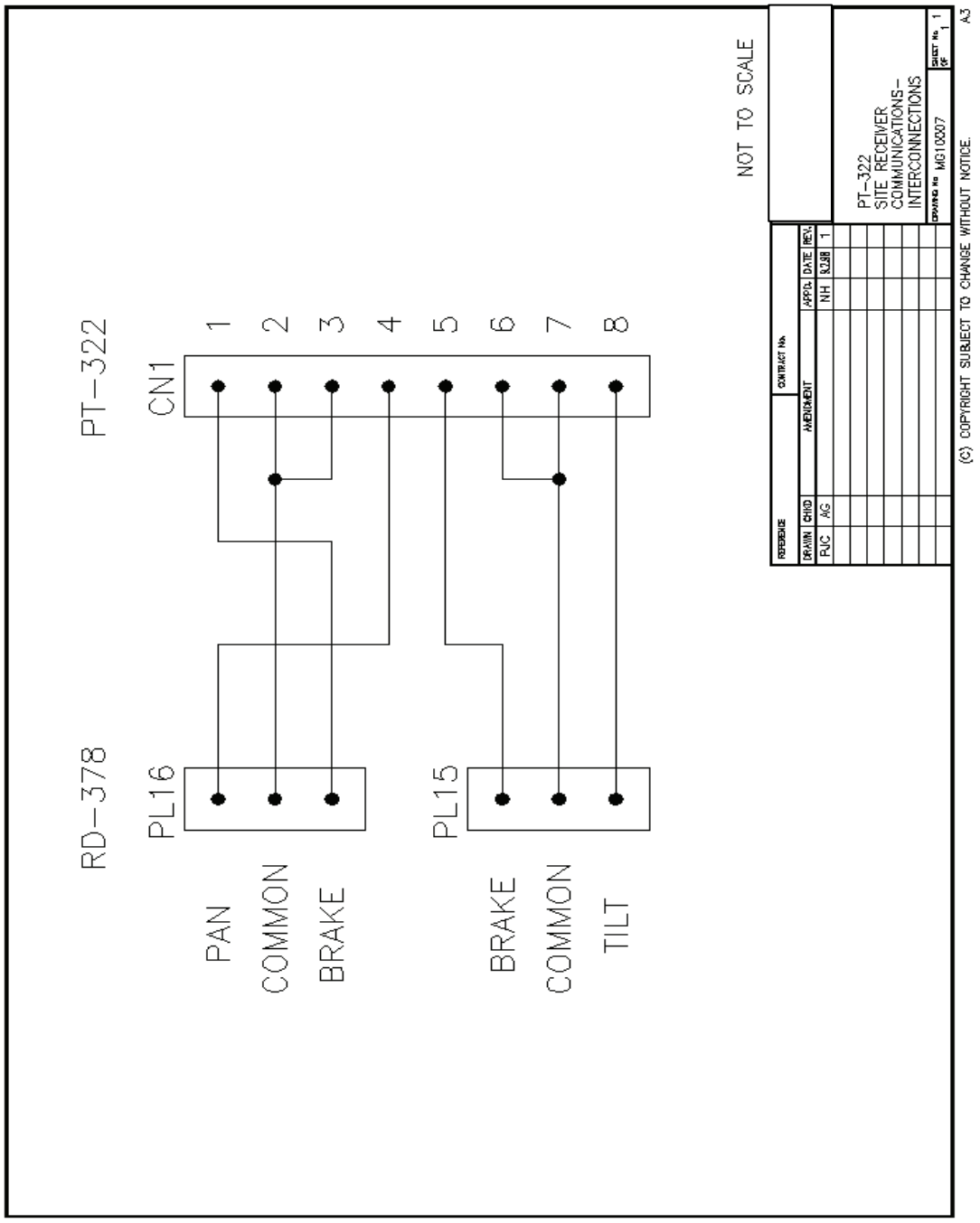
RD-378
PT-322
PL16
CN1
PAN
COMMON
BRAKE
PL15
BRAKE
COMMON
TILT
1
2
3
4
5
6
7
8
NOT TO SCALE
REFERENCE
CONTRACT No.
AMENDMENT
APPD. DATE
REV.
DRAWN
CHKD
PJC
AG
NH
1
PT-322
SITE RECEIVER
COMMUNICATIONS-
INTERCONNECTIONS
DRAWING No. MG100007
SHEET No. 1
OF 1
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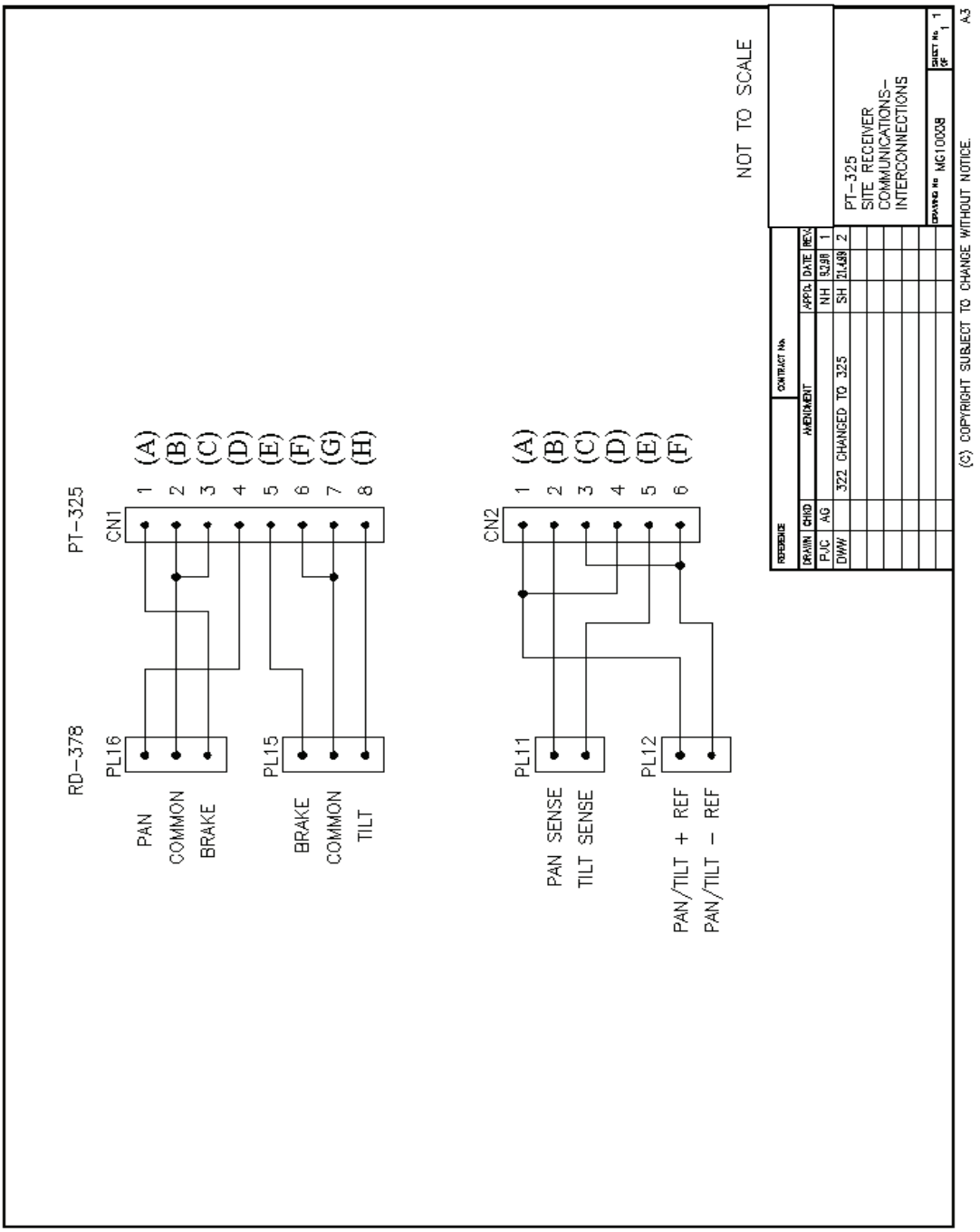
PT-325
CN1
(A) 1
(B) 2
(C) 3
(D) 4
(E) 5
(F) 6
(G) 7
(H) 8
RD-378
PL16
PAN
COMMON
BRAKE
PL15
BRAKE
COMMON
TILT
CN2
(A) 1
(B) 2
(C) 3
(D) 4
(E) 5
(F) 6
PL11
PAN SENSE
TILT SENSE
PL12
PAN/TILT + REF
PAN/TILT - REF
NOT TO SCALE
REFERENCE
CONTRACT No.
AMENDMENT
APPD. DATE REV.
322 CHANGED TO 325
NH 8.2.98 1
SH 21.4.98 2
DRAWN PJC
CHKD AG
DWW
PT-325
SITE RECEIVER
COMMUNICATIONS-
INTERCONNECTIONS
DRAWING No. MG100038
SHEET No. 1
OF 1
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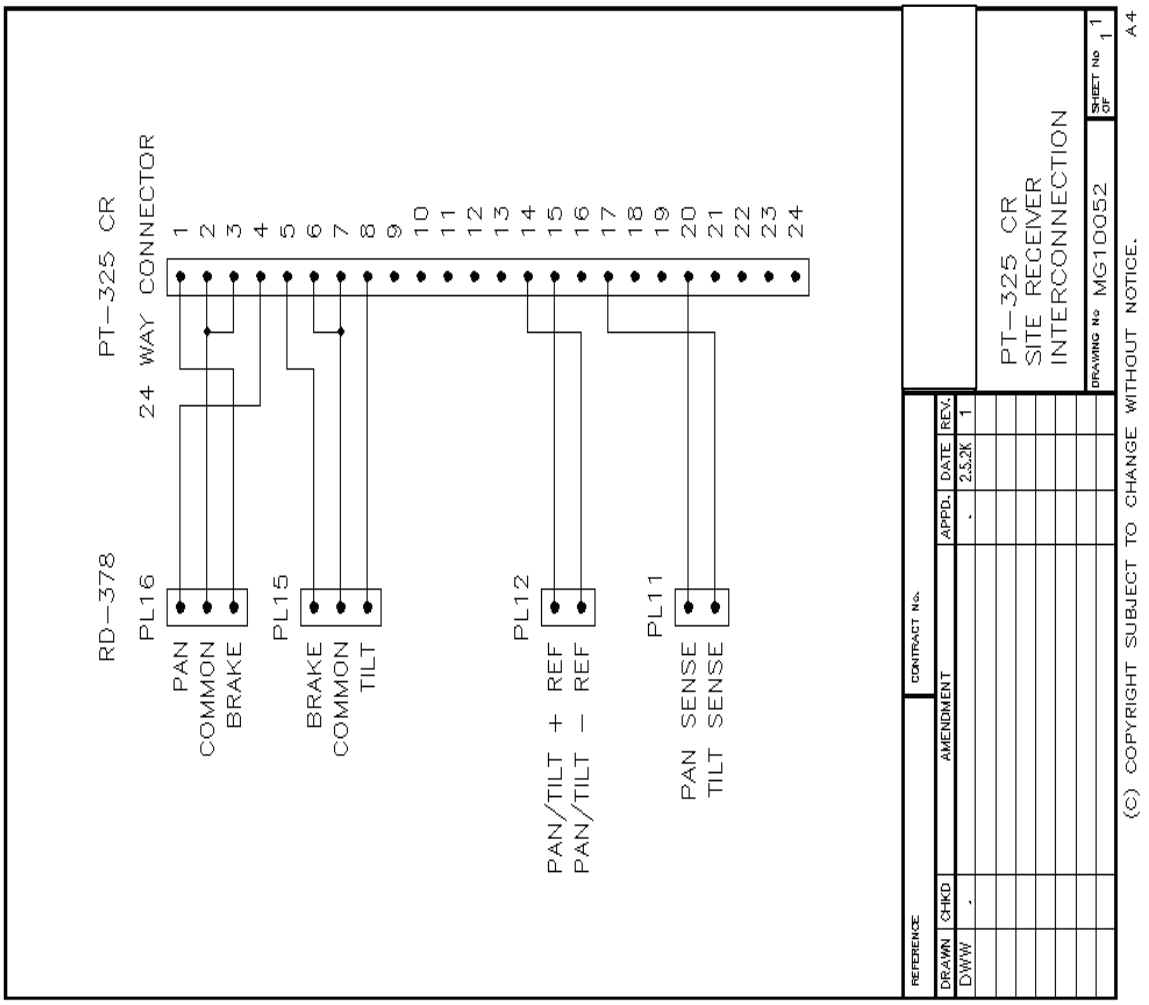
RD-378
PT-325 CR
24 WAY CONNECTOR
PL16
PAN
COMMON
BRAKE
PL15
BRAKE
COMMON
TILT
PL12
PAN/TILT + REF
PAN/TILT - REF
PL11
PAN SENSE
TILT SENSE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
REFERENCE
CONTRACT No.
DRAWN
CHKD
AMENDMENT
APPD.
DATE
REV.
DWW
2.5.2K
1
PT-325 CR
SITE RECEIVER
INTERCONNECTION
DRAWING No MG10052
SHEET No 1 OF 1
A4
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7.12 RD379 PTZ SITE RECEIVER

7.12.1 Features

The RD379 is an intelligent pan/tilt/lens controller for use at a remote camera site. Its primary function is to operate the pan/tilt unit and zoom/focus lens controls.

Features include:

- All communication to/from the RD379 site receiver is via a common two-wire line providing simultaneous control of up to 16 site receivers per network. All data traffic is managed by a RD315 two-wire transmitter module located in the equipment subrack. 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.
- Capable of controlling any 24V AC pan/tilt unit, some at variable speeds, and the lens functions at two speeds.
- Capable of retaining and subsequent re-positioning of up to 100 separate PTZ views (presets).
- When a view is selected, pan tilt unit slows as the required position is approached.
- Pan and tilt speeds vary with the zoom position of the lens.
- A site tamper alarm input for securing the control cabinet, the alarm being sent to the main System Controller.
- Communication options including synchronous bit stream at RS-232 levels known as AF-232.
- Direct RS-232 from a RD315 control card to one RD379 over networks where normal RS-232 asynchronous protocol is required.
- Mixed modes of communication can also be used. Fiber optic cables can be used to the first site and then two-wire lines to the successive sites. Or perhaps two-wire to the first site, and then fiber optic cables continuing to the successive sites.
- If the optional I/O expansion board (IO-378) is fitted, then an additional seven direct contact or current-loop sensing alarm inputs are available. The board also provides eight separate relay output contacts, and an iris output for control of motorized manual iris lenses.

7.12.2 Power Supply

The site receiver is supplied with AC mains power via the IEC connector mounted on the PCB support bracket. This connector contains fuses rated at 1A (@220VAC). The IEC socket is connected under the support bracket to the torroidal transformer primary. The transformer's secondaries provide the following voltages to the site receiver and have the associated fuses installed.

- 2×20V/5A via PL17 and PL18. F1 and F2 are rated at 5A. With the fuses in place, the resulting unregulated $\pm$28V DC will light LED's L18 and L19. Used for pan/tilt motor drive.
- 2×10.5V/2A via PL19 and PL20. F3 and F4 are rated at 2A. With the fuses in place the resulting unregulated $\pm$12V DC will light LED's L2 and L3, and the regulated 5V will light L1. Used to provide power for lens drive, 12V DC camera power, and to supply the micro-controllers and associated circuits with regulated 5V.
- 1×24V/1A via PL2. F5 is rated at 1A. With the fuse in place LED L20 will light. Used for AC camera power.
- The 24V used to power an AC camera is output from the board at PL2. This supply is isolated above ground. Alternatively if a 12V DC camera is used, power is supplied from PL1.

7.12.3 Communications

The RD379 site receiver communications are controlled by the CC-2000 micro-controller. This section details the switch and jumper settings needed for the required mode of communications.

Balanced Two Wire Audio

The normal connection to the site receiver is a two-wire type cable that carries AFSK control information from a RD315 communications module. For this mode of operation the cable is connected into PL4, and LK6 must be in position "2W". In addition LK2 must have jumpers to link "A→B" and "C→D" to link the communications processor to the motor control processor. (Factory default).

Four Wire Audio

In some situations, a 4 wire audio connection may be more suitable. For example if an optical fiber AF channel is being used. The receive data is an unbalanced input at PL3, while transmit data is via balanced two-wire at PL4. Audio sing around or feedback can be avoided using this type of connection. The receive data cable should not be wired further than a few meters and must be shielded as it is a high impedance input. LK6 must be in position "4W". In addition, LK2 must have jumpers to link "A→B" and "C→D" to link the communications processor to the motor control processor.

CAUTION: The UNBAL-INPUT should not be wired further than a few meters and must be shielded, as it is a high impedance input.

AF-232

The RD379 also supports AFSK data at RS-232 levels, known as AF-232. For this format, use connector PL7, and LK6 must be in position “2W”. LK1 is used to select “Echo on” (B) or “Echo off” (A) for data. In Position “A” the site receiver’s own data is transmitted in AF-232 format. This is also sent in position “B”, but in addition, the receive data is also transmitted.

Note: The RD315 communications modules used to control the RD379 have a similar link, and only one end can be used in the “echo on” mode. AF-232 communications contain full protocol for multi drop applications and is suitable for optical fiber TX/RX. A multi drop ring loop fiber data system can be used to communicate with up to 16 PTZ sites. Another option is to run optical fiber to the first PTZ site and then normal 2-wire connection continues onto other sites.

DIP Switch Settings

The use of the communications DIP switch SW2 is summarized in the table below. Following is more details of the functions of each switch.

SW2	DESCRIPTION	ON	OFF	FACTORY
1	Mode Select	Master	Slave	OFF
2	Destination	Slave	Master	OFF
3	Poll Mode	Enabled	Disabled	ON
4	Not Used			*ON
5	Site ID No	Ref table page		
6	Site ID No	Ref table page		
7	Site ID No	Ref table page		
8	Site ID No	Ref table page		

*SW2/4 MUST be set to the ON position.

SW2-1 Mode Select (master or slave)

The RD379 should have this switch set to off to select slave mode.

SW2-2 Destination Type (master or slave)

The RD379 should always have this switch set to off to select a destination of master.

SW2-3 Polling mode

The polling mode on all RD379 site receivers and RD315 control card on the communications network should be set to the same (ON or OFF). Usually polling is switched ON and in this mode the RD315 control module will sequentially communicate with all known slave locations (PTZ site receivers) in the network on a continuous basis. If the RD379 does not respond to this polling, then this change will be reported to the MAXPRO-Net system.

Polling is usually only switched OFF when the communications link is limited to simplex only and no return data is expected.

SW2-4 Not Used

This switch is currently not used. It must always be set to the ON position.

SW2-5 to SW2-8 Site ID Number

These switches set the ID number of the site receiver. Refer to the table below to set required ID number.

SITE ID	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

LED Indicators

There are two LEDs associated with the communications micro-controller. L4 is the site communications indicator and lights when the RD379 is polled or receives valid control data. L5 is the TX data indicator and lights when the RD379 transmits valid data back to the system. This would usually be to indicate a change of state of alarm inputs.

7.12.4 Motor Drive

The second micro-controller on the RD379 receives data from the CC-2000 communications chip, and generates the appropriate control waveforms for pan, tilt and lens motors.

Connections

Connections for pan and tilt motors are made at PL16 and PL15 respectively. The motor speed is varied using pulse-width modulation. The motor drive and brake outputs are protected with a current limit of 10A. Should a current spike pass this threshold, the output drive will switch off until a new output is generated from the motor drive processor. In addition re-settable fuses are used to protect the output. These become open circuit after a few seconds if excess current (but less than 10A) is drawn from either motor drive output. After a few seconds these fuses automatically reset.

The zoom and focus drive is output from PL9. Speed is again controlled using pulse-width modulation, and this time the output is current limited to 80mA.

Preset Connections

If the pan/tilt motors and lenses used are fitted with position pots, up to 100 preset views can be programmed into the RD379 site receiver. The board provides a 5V reference that is output to the pan/tilt pots at PL12, and to the focus/zoom pots at PL14. The return voltage is then dependant on the position of the associated pot, and is input at PL11 for pan/tilt and PL13 for focus/zoom. The views are set and recalled from the system keyboard.

LED Indicators

The motor, brake and lens outputs each have a pair of LED's to indicate when the output is driving either +ve or –ve. These are listed below.

LED	INDICATION
L6	Focus –ve
L7	Focus +ve
L8	Zoom –ve
L9	Zoom +ve
L10	Tilt Up (-ve half cycle)
L11	Tilt Up (+ve half cycle)
L12	Tilt Down (-ve half cycle)
L13	Tilt Down (+ve half cycle)
L14	Pan Right (-ve half cycle)
L15	Pan Right (+ve half cycle)
L16	Pan Left (-ve half cycle)
L17	Pan Left (+ve half cycle)

7.12.4 Motor Drive, Continued

Switch Settings

The use of the motor drive switch SW3 is summarized in the table below. Following is a more detailed description of the use of each switch.

SW3	DESCRIPTION	ON	OFF	FACTORY
1	Lens Voltage	6 Volt	12 Volt	ON
2	Not Used			OFF
3	Auto Home	Enabled	Disabled	OFF
4	Pan/Tilt inversion	Inverted	Normal	OFF
5	Focus/Zoom inversion	Inverted	Normal	OFF
6	I/O fitted	Enabled	Disabled	OFF
7	Speed 1	Ref to table		
8	Speed 2	Ref to table		

SW3-1 Lens Voltage

This switch sets the voltage required to control zoom, focus and manual iris on the camera lens.

SW3-2 Not Used

SW3-3 Auto Home

If this option is enabled, the PTZ returns to the preset position of view 0 after one minute of no operation. Note that View 0 must be set before this function can operate.

SW3-4 Pan/Tilt Inversion

Allows the camera to be invert mounted on the pan/tilt unit. Setting this switch ON will reverse pan left/right and tilt up/down outputs from the RD379, so that the camera can be invert mounted, yet maintaining the wiring connections as per connection data.

SW3-5 Focus/Zoom Inversion

Manufacturers of lenses vary the use of +ve or –ve for in/out lens functions. This switch is set to ensure the button function on the keyboard matches the actual operation performed. This must be set correctly for the pan/tilt dynamic speed control from zoom position to operate.

SW3-6 I/O Fitted

If the optional IO-378 board is fitted, then this switch must be switched ON. This allows for seven additional alarm inputs and eight voltage free contact control outputs to operate at the site as well as manual iris control.

7.12.4 Motor Drive, Continued

SW3-7 and SW3-8 Speed Control

The factory setting for speed control is SW3-7 OFF and SW3-8 OFF. This provides a fixed output of 50Hz. If speed control is required on normal 24V AC pan/tilt units, some on-site trial may be required to establish the best setting for the particular unit in use. If the pan/tilt unit has internal phase shift capacitors connected, a single-phase setting should be selected. Some units can be modified to remove the internal phase shift capacitors to allow the Bi-Phase speed ranges to be used.

WARNING: Speed control is not possible on all AC pan tilt units.

DESCRIPTION	SW3-7	SW3-8
SINGLE PHASE 50Hz ONE SPEED All speed commands run at speed 5 only	OFF	OFF
SINGLE PHASE FULL SPEED RANGE Bottom speed 27Hz Top speed 62Hz Auto two-speed from normal joystick. Graded slow P/T depending on zoom position.	ON	OFF
BI PHASE FULL SPEED RANGE Bottom speed 35Hz Top speed 83Hz Auto two-speed from normal joystick. Graded slow P/T depending on zoom position.	OFF	ON
BI PHASE FULL SPEED RANGE Bottom speed 16 Hz Top speed 125 Hz Auto two-speed from normal joystick. Graded slow P/T depending on zoom position	ON	ON

7.12.5 Motor Time Out

For all types of pan/tilt drives a motor time-out exists in software, i.e. should a pan/tilt run to the end stop and the limit switch not shut the unit off, the software will stop the drive after a period of four (4) minutes for any direction.

7.12.6 Tamper Alarm Input

The tamper alarm input can be used to secure the control cabinet and/or the camera housing. The connections are made at PL10, and an open circuit between the two terminals indicates an alarm condition. This will be detected by the motor control micro-controller, which will pass a message to the CC-2000 communications controller. This in turn sends a message to the MAXPRO-NetSystem Controller.

7.12.7 Installation Notes

After all connections are made and the dip-switches are set, the pan/tilt unit must be manually controlled and the limit switches on the pan and tilt functions set. This is done inside the pan/tilt unit itself and is not a site receiver function. With the limit switches set the unit must be driven from stop to stop in every direction to allow the preset pots to clutch into the correct position.

After all these mechanical and electrical settings have been done, press the initialize button labeled SW1. The PTZ will then go through an initializing dance, which operates all the PTZ functions. This allows the site receiver to measure the direction of voltage tracking for the presets and make auto reversals if required. If the site detects presets, then the lens will track “fully zoom in” and “fully zoom out” then return to the spot it was set at previously. This is to range the zoom for auto speed control, and this auto set-up may take up to 10 seconds.

CAUTION: All directional control settings and lens controls must be set and tested to be correct from one of the system keyboards prior to this final RESET being pressed. i.e. SW3/4 and SW3/5 must be set correctly.

7.12.8 Suitable cable sizing for PTZ heads when connecting to Site Receivers

As it is not unusual for Pan-Tilt heads to operate on relatively high current, it is imperative that cable with adequate conductor size is installed between the PTZ site receiver and the PTZ head.

The following table indicates the recommended cable conductor size based on cable feed distance.

Cable Feed Distance	Cross Sectional Area of Conductor
5m	1.0mm (17 AWG)
10m	1.0mm (17 AWG)
15m	1.5mm (15 AWG)
20m	1.5mm (15 AWG)
30m	2.5mm (10 AWG)

7.12.9 IO-378 Optional I/O Expansion Board

The IO-378 plugs into the 20-way boxed header (J1) on the RD378/379 via a ribbon cable. The board is supported by stand-offs. The IO-378 provides relay output contacts, alarm inputs and lens iris control.

Note: On the RD378/379 set switch SW3-6 ON. This enables the RD378/379 to control the IO-378.

Note: Always remove the right-angle connectors from the RD378/379 PCB prior to fitting the IO-378, otherwise the board will not fit correctly.

Relay Outputs

Eight separate relay output contacts are provided. Six of these outputs are rated at 1A @30V. Outputs 7 and 8 have a higher rating of 2A @30V and are intended for wash and wipe motors respectively. When enabled in the MAXPRO-Net software, four of the outputs are utilized for special functions. These are:

- Relay 5 Manual Iris open.
- Relay 6 Manual Iris close
- Relay 7 Wash control
- Relay 8 Wipe Control

The power required for these or any other auxiliary devices must be provided separately and cannot be powered from the site receiver power supply circuit. Each relay output has an associated LED (L1 to L8), which lights up when that output contact is closed.

Remote Alarm Inputs

There are 7 alarm inputs on the IO-378. Each can be individually DIP switch selected for either digital or analogue mode. In digital mode, standard open circuit and closed circuit conditions are expected. In analogue mode a normal input state requires a total loop resistance of 10K. The dip-switch settings are as follows.

DIP-SWITCH SETTINGS

SW1	DESCRIPTION	ON	OFF
1	Alarm 1 mode	Analogue	Digital
2	Alarm 2 mode	Analogue	Digital
3	Alarm 3 mode	Analogue	Digital
4	Alarm 4 mode	Analogue	Digital
5	Alarm 5 mode	Analogue	Digital
6	Alarm 6 mode	Analogue	Digital
7	Alarm 7 mode	Analogue	Digital
8	Alarm Test	Test	Normal

7.12.9 IO-378 Optional I/O Expansion Board, Continued

The MAXPRO-Net software allows these remote alarm inputs to be utilized in exactly the same way, as are those from a RD400 alarm input card.

The alarm test facility (SW1-8) automatically echoes the current alarm input state back out the relay outputs. Using the output LED's the alarm input can be locally tested and verified. Alarm inputs 1→7 are echoed to relay outputs 1→7. The tamper input on the RD378/379 is echoed to relay output 8. Note this test facility should be disabled during normal system operation.

Manual Iris Control

This output provides +ve and –ve voltages for manual iris control. This output is from PL16 on the IO-378 board. There are 2 links associated with this output, that select between 6 volt or 12 volt iris motors.

- LK1 and LK2 both off for 12V iris motors.
- LK1 and LK2 both on for 6V iris motors.

These link positions do not affect the zoom or focus motor voltages.

7.12.10 RL-378 Optional I/O Expansion Board with 240V Relays.

The RL-378 plugs into the 20-way boxed header (J1) on the RD378/379 via a ribbon cable. The RL-378 provides relay output contacts, alarm inputs and lens iris control. The RL-378 cannot be mounted inside the RD378/379 case, so the ribbon cable supplied is long enough to allow the RL-378 to be mounted externally.

Note: On the RD378/379 set switch SW3-6 ON. This enables the RD378/379 to control the RL-378.

Relay Outputs

Four separate relay output contacts are provided. These are rated at 10A @240V AC. When enabled in the MAXPRO-Net software, the relays are controlled by the following outputs.

- Output 1 (relay 1)
- Output 2 (relay 2)
- Output 7 (relay 3) Wash control
- Output 8 (relay 4) Wipe Control

The power required for any other auxiliary devices must be provided separately and cannot be powered from the site receiver power supply circuit. Each relay output has an associated LED, which lights when that output contact is closed.

Remote Alarm Inputs

There are 7 alarm inputs on the RL-378. Each can be individually DIP switch selected for either digital or analogue mode. In digital mode, standard open circuit and closed circuit conditions are expected. In analogue mode a normal input state requires a total loop resistance of 10KΩ. The dip-switch settings are as follows.

7.12.10 RL-378 Optional I/O Expansion Board with 240V Relays, Continued.

DIP-SWITCH SETTINGS

SW1	DESCRIPTION	ON	OFF
1	Alarm 1 mode	Analogue	Digital
2	Alarm 2 mode	Analogue	Digital
3	Alarm 3 mode	Analogue	Digital
4	Alarm 4 mode	Analogue	Digital
5	Alarm 5 mode	Analogue	Digital
6	Alarm 6 mode	Analogue	Digital
7	Alarm 7 mode	Analogue	Digital
8	Alarm Test	Test	Normal

The MAXPRO-Net software allows these remote alarm inputs to be utilized in exactly the same way, as are those from a RD400 alarm input card.

The alarm test facility (SW1-8) automatically echoes the current alarm input state back out the relay outputs. Using the output LED's the alarm input can be locally tested and verified. Alarm inputs 1→7 are echoed to relay outputs 1→7. The tamper input on the RD378/379 is echoed to relay output 8. Note this test facility should be disabled during normal system operation.

Manual Iris Control

This output provides +ve and –ve voltages for manual iris control. This output is from PL12 on the RL-378 board. There are 2 links associated with this output that select between 6 volt or 12 volt iris motors.

- LK1 and LK2 both off for 12V iris motors.
- LK1 and LK2 both on for 6V iris motors.

These link positions do not affect the zoom or focus motor voltages.

7.12.11 E.M.C Compliance - Installation Requirements

The RD379 is normally supplied with a (RITTAL) KL 1503 housing in order to ensure compliance with the European Directives on E.M.C. There is also a mandatory requirement to specify the installation parameters, in order to comply with the European Directives on E.M.C.

The RD379 fully optioned has been installed, tested and found to comply under the following minimum requirements:

The RD379 relies on Pulse Width Modulation to give motor drive waveforms and speed control. These waveforms have rapid rise and fall times for efficiency purposes. They are therefore rich in harmonics, which lie at the audio end of the spectrum (1kHz - 100kHz). A metallic shield must be provided for the cables between the RD379 housing and the case of the pan and tilt head.

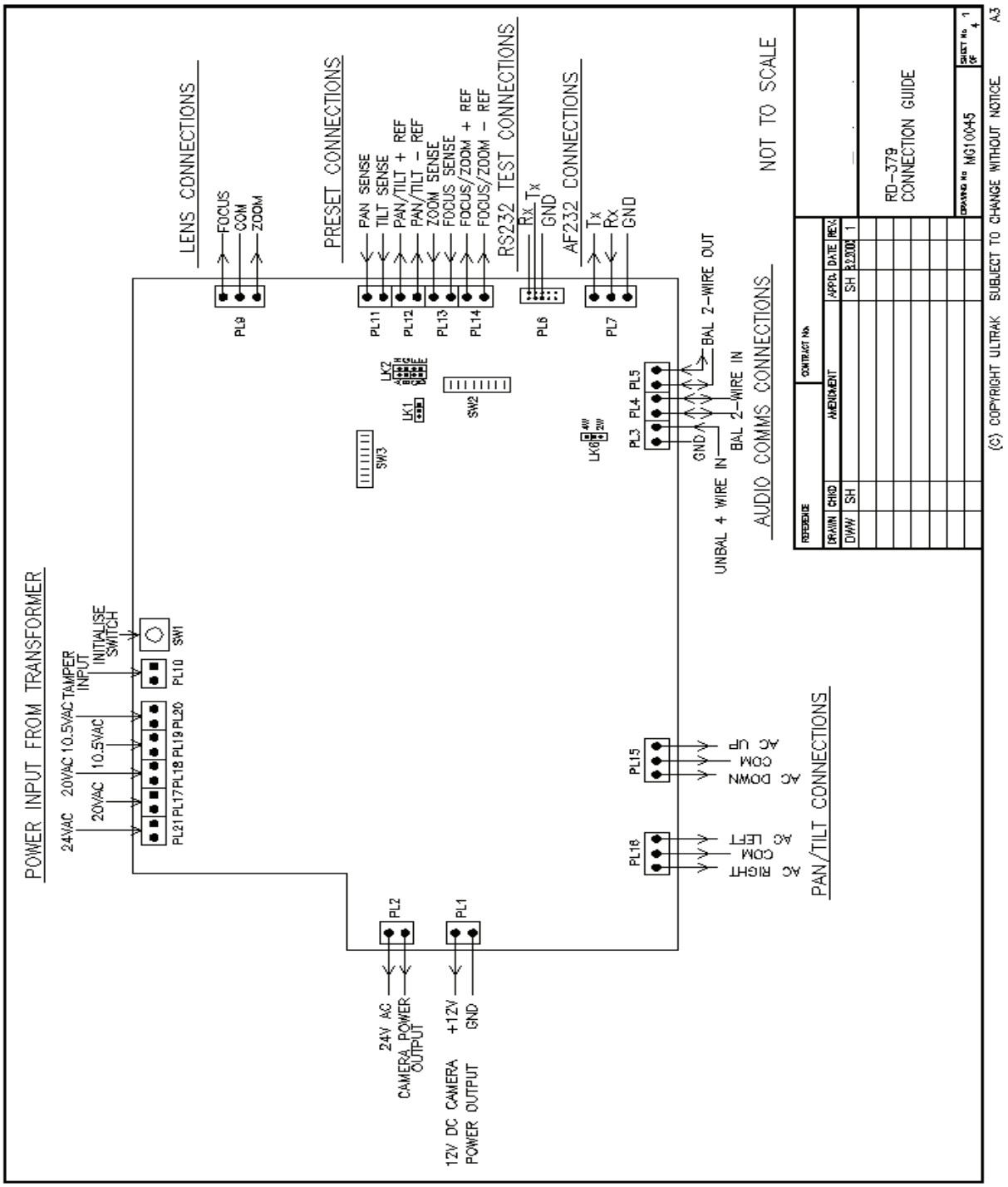
All cables between the Pan and Tilt Head and the controller, including the video cable **must** be enclosed in a metallic shield. The shield may be an overall flexible metallic conduit or individually shielded cables. In the case of individually shielded cables all cable screens **must** be bonded to ground at the entry/exit plate of the housing and at the case (enclosure) of the Pan and Tilt Head.

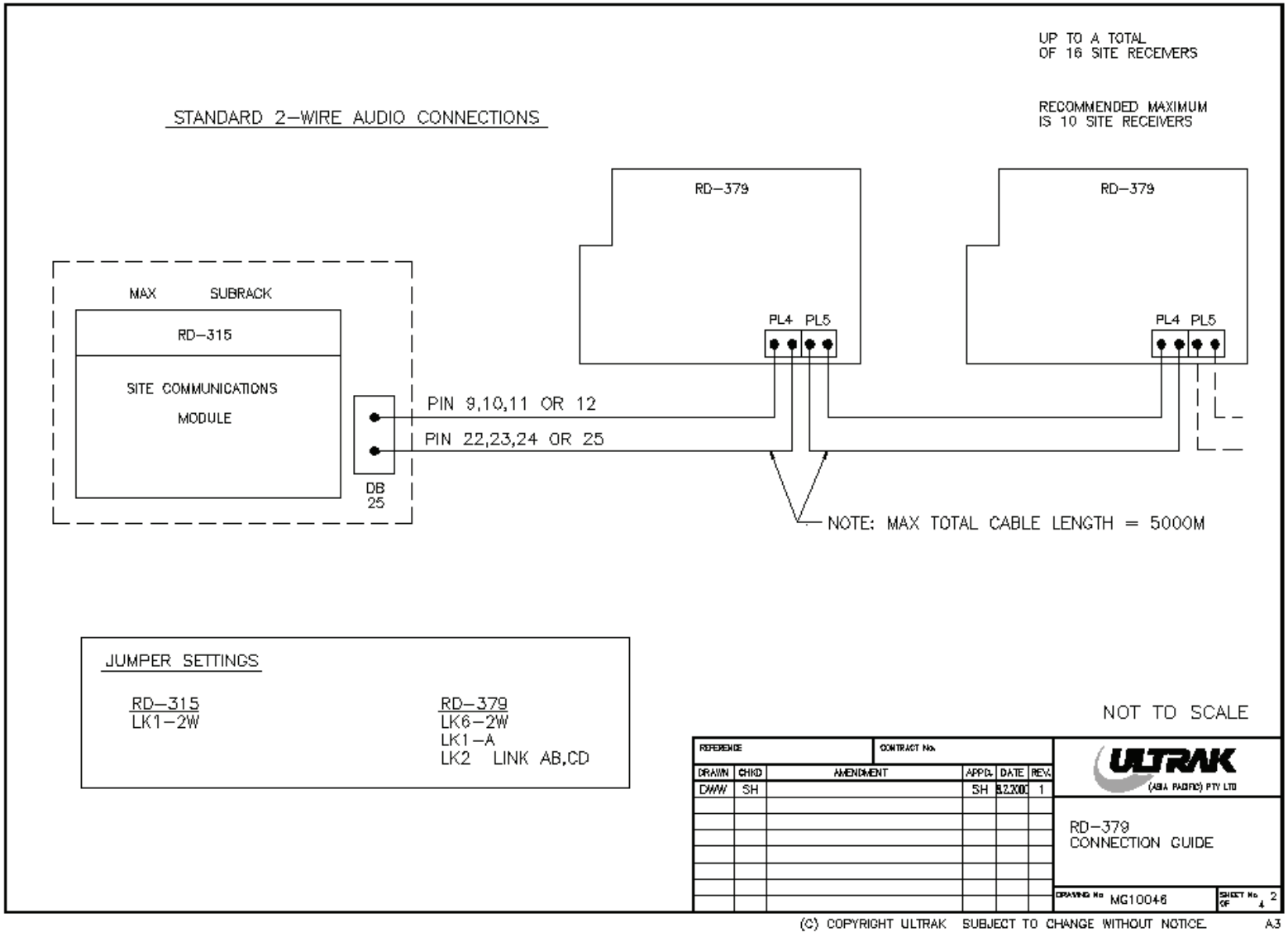
The video and control cables, from the controller housing to the MAXPRO-Net system, must be fitted with Ferrite Shielding Beads type 43-6301 or equivalent. The beads are to be located on the cables at a point just inside the enclosure. A compliance kit of Ferrite Shielding Beads is available from the supplier.

There is no requirement for Ferrite Shield Beads on the motor drive, video and position sense cables from the controller to the Pan and Tilt Head providing the shielding conduit and/or cable does not leak Radio Frequency energy. In the event of there being any doubt as to the effectiveness of the shielding at MF, HF and above, shield beads should be fitted.

For the purpose of meeting the EMC Directives only CE approved cables, Cameras and Pan and Tilt Heads shall be used.

CAUTION: In addition the RD379 must be installed in a manner that will comply with the safety and services segregation requirements as set out in the 16th edition of the IEE Wiring Regulations or applicable local Electrical Safety Regulations.


POWER INPUT FROM TRANSFORMER
24VAC 20VAC 10.5VAC TAMPER INPUT
INITIALISE SWITCH
20VAC 10.5VAC
PL21 PL17 PL18 PL19 PL20
PL10 SW1
LENS CONNECTIONS
FOCUS
COM
ZOOM
PL9
PRESET CONNECTIONS
PAN SENSE
TILT SENSE
PAN/TILT + REF
PAN/TILT - REF
ZOOM SENSE
FOCUS SENSE
FOCUS/ZOOM + REF
FOCUS/ZOOM - REF
PL11 PL12 PL13 PL14
RS232 TEST CONNECTIONS
Rx Tx
GND
PL6
AF232 CONNECTIONS
Tx
Rx
GND
PL7
LK2
LK1
SW2
SW3
LK6
4W 2W
PL3 PL4 PL5
BAL 2-WIRE OUT
GND
BAL 2-WIRE IN
UNBAL 4 WIRE IN
AUDIO COMMS CONNECTIONS
NOT TO SCALE
PL15
AC DOWN
COM
UP
PL16
AC RIGHT
COM
AC LEFT
PAN/TILT CONNECTIONS
PL2
PL1
24V AC
CAMERA POWER OUTPUT
12V DC CAMERA POWER OUTPUT
+12V
GND
REFERENCE
CONTRACT No.
DRAWN CHKD
DWW SH
AMENDMENT
APPD. DATE REV.
SH 8.12.06 1
RD-379
CONNECTION GUIDE
DRAWING No. M010045
SHEET No. 1 OF 4
A3
(C) COPYRIGHT ULTRAK SUBJECT TO CHANGE WITHOUT NOTICE


UP TO A TOTAL
OF 16 SITE RECEIVERS
RECOMMENDED MAXIMUM
IS 10 SITE RECEIVERS
STANDARD 2-WIRE AUDIO CONNECTIONS
RD-379
RD-379
MAX SUBRACK
RD-315
SITE COMMUNICATIONS
MODULE
PL4 PL5
PL4 PL5
PIN 9,10,11 OR 12
PIN 22,23,24 OR 25
DB
25
NOTE: MAX TOTAL CABLE LENGTH = 5000M
JUMPER SETTINGS
RD-315
LK1-2W
RD-379
LK6-2W
LK1-A
LK2 LINK AB,CD
NOT TO SCALE
REFERENCE
CONTRACT No.
DRAWN CHKD AMENDMENT APPD. DATE REV.
DWW SH SH 8.2.X00 1
ULTRAK
(ASIA PACIFIC) PTY LTD
RD-379
CONNECTION GUIDE
DRAWING No MG10046
SHEET No. OF 4 2
(C) COPYRIGHT ULTRAK SUBJECT TO CHANGE WITHOUT NOTICE.
A3

TYPICAL 4-WIRE AUDIO CONNECTION
VIA FIBRE OPTICS
MAX SUBRACK
RD-315
SITE COMMUNICATIONS MODULE
DB 25
PIN 9
PIN 22
PIN 7
PIN 20
Tx AUDIO
Rx AUDIO
FIBRE OPTIC TRANSMITTERS AND RECEIVERS
OPTICAL LINK
Rx AUDIO
Tx AUDIO
RD-379
PL3 PL4
NOTE: CONNECTION TO UNBALANCED AUDIO INPUT PL3 SHOULD NOT BE WIRED FURTHER THAN A SEVERAL METRES.
NOT TO SCALE
JUMPER SETTINGS
RD-315
LK1-4W
RD-379
LK6-4W
LK1-A
LK2 LINK AB,CD
RD-379
CONNECTION GUIDE
(C) COPYRIGHT ULTRAK SUBJECT TO CHANGE WITHOUT NOTICE
A3

AF232 VIA FIBRE OPTIC CONNECTION TO
FIRST SITE THEN 2 WIRE AUDIO TO OTHER SITES
NOT TO SCALE
RD-379
CONNECTION GUIDE
RD-379
LK6-2W
LK1-A
LK2 LINK AB,CD
RD-315
LK1-2W
JUMPER SETTINGS
(C) COPYRIGHT ULTRAK SUBJECT TO CHANGE WITHOUT NOTICE

PT-323
CN1
1
2
3
4
5
6
7
RD-379
PL15
PL16
AC UP
COMMON
AC DOWN
AC LEFT
COMMON
AC RIGHT
CN2
PL11
PL12
PAN SENSE
TILT SENSE
PAN/TILT + REF
PAN/TILT - REF
NOT TO SCALE
REFERENCE
CONTRACT No.
AMENDMENT
APPD.
DATE
REV.
DRAWN
CHKD
DWW
SH
8.2.2006
1
PT-323 TO
RD-379 SITE RECEIVER
INTERCONNECTIONS
DRAWING No. MG10049
SHEET No. 1
OF 1
A3
(C) COPYRIGHT ULTRAK SUBJECT TO CHANGE WITHOUT NOTICE

NOTES:

7.13 RD400 ALARM INPUT MODULE

WARNING: The following data refers to RD400 modules of revision-6 hardware and above.

The RD400 alarm input module is an eight (8) input alarm sensing card developed for use in the MAXPRO-Net I/O subrack equipment. The RD400 module has its own microprocessor that is designed to simultaneously monitor all eight input circuits and report any change of state to the subrack controller microprocessor.

7.13.1 Contact Closure or End-Of-Line Modes

RD400 modules with revision 6 hardware onwards are DIP switch selectable between open/short circuit sensing, and 10KΩ EOL resistor sensing. Set SW1-1 OFF for contact closure mode, and ON for 10KΩ end-of-line mode.

CC Mode

When configured in the CC mode the RD400 will detect contact state changes accordingly to the NO/NC setting as defined in the Alarm Input table in SETMAX.

EOL Mode

In the EOL mode (end-of-line) a setting of NC in SETMAX will cause an alarm to become active when the alarm loop becomes either open or short circuit (unsealed), conversely in the NO mode the alarm will become active when the loop is in the “sealed” position.

7.13.2 Sensing

Each input is checked in approximately 2 μsec, so even with all input circuits enabled an alarm condition can be recognized in less than 16 μsec. There is an alarm de-bounce period of 20μsec, so an alarm input has to stay unchanged for this period before the alarm condition is reported.

The LED indicators on the front edge of the alarm input module indicate an ACTIVE ALARM state, not the actual input logic level. Only enabled alarm inputs will display on the LED indicators.

7.13.3 Wiring Connections

DB25 Pin	Description
5	Input 1 Return
18	Input 1 Active
6	Input 2 Return
19	Input 2 Active
7	Input 3 Return
20	Input 3 Active
8	Input 4 Return
21	Input 4 Active
9	Input 5 Return
22	Input 5 Active
10	Input 6 Return
23	Input 6 Active
11	Input 7 Return
24	Input 7 Active
12	Input 8 Return
25	Input 8 Active

7.13.4 DIP Switch Settings

SW1	Description	ON	OFF
1	Open/Short, EOL	EOL	Open/Short
2	Not Used	-	Disabled
3	Not Used	-	Disabled
4	Not Used	-	Disabled

7.14 HMX440 RELAY OUTPUT MODULE

The HMX440 relay-contact output module is a general-purpose eight (8) output circuit card, developed for use in the MAXPRO-Net I/O subrack equipment. Each output circuit provides one normally open relay contact closure. All output circuits are isolated from each other.

An output circuit on the HMX440 module is a normally open RELAY CONTACT. The relay contact is completely floating with respect to earth.

An output circuit will tolerate an applied open-circuit voltage of 50 volts and a closed-circuit loop current not exceeding 0.6 amps. As it is a true switch contact the HMX440 is suitable for switching AC supplies. As all eight output circuits are isolated from each other, different polarity and/or reference supply rails can be used for each output circuit on the one MX- 440 module.

Eight LED indicators are located on the front edge of the HMX440 module. Each LED shows the current status of its respective output circuit. The top LED corresponds to the first output circuit.

LK1

LK1 is used to determine whether the relay outputs are energized “constantly” **(“C”** position), or “pulsed” **(“P”** position). Although programmed to activate, if LK1 is in the “P” position the output will energize momentarily. When in the “C” position, the output will energize until programmed to by the MAXPRO-Net to de-energize.

RV1

RV1 is used to determine the energized period of the outputs when using the “pulse” mode via LK1. The time variable is approximately 0.2second minimum, to approximately 1 second maximum.

7.14.1 Wiring Connections

Pin No's	Description
5, 18	RELAY OUTPUT 1
6, 19	RELAY OUTPUT 2
7, 20	RELAY OUTPUT 3
8, 21	RELAY OUTPUT 4
9, 22	RELAY OUTPUT 5
10, 23	RELAY OUTPUT 6
11, 24	RELAY OUTPUT 7
12, 25	RELAY OUTPUT 8

7.14.2 Function Cross Reference Table For Direct Control

Pin No's	Description	VCR Control	PTZ Control
5, 18	RELAY OUTPUT 1	Record	Zoom In
6, 19	RELAY OUTPUT 2	Play	Zoom Out
7, 20	RELAY OUTPUT 3	Rewind	Focus Near
8, 21	RELAY OUTPUT 4	Fast Forward	Focus Far
9, 22	RELAY OUTPUT 5	Slow	Tilt Down
10, 23	RELAY OUTPUT 6	Pause	Tilt Up
11, 24	RELAY OUTPUT 7	Aux	Pan Right
12, 25	RELAY OUTPUT 8	Stop	Pan Left

7.15 RD490 UNIVERSAL PERIPHERAL INTERFACE

WARNING: This information is for RD490 modules fitted with V4.02 firmware and hardware or above. If you require information for an earlier RD490 version, please contact your MAXPRO-Net dealer or Honeywell.

7.15.1 General

The RD490 Module is compatible with a broad range of VCRs, Quads, Monitors, Frame Stores and Video Printers. The Module has the capability to support 1 peripheral device by means of its RS-232 port, or up to 8 peripheral devices simultaneously via the 8 PPM IR drive ports.

The module also features 8 level sensing alarm inputs, the input threshold being Dip Switch selectable. An I.R. sensor is provided to enable the module to "learn" user defined I.R. functions.

7.15.2 Operation

The RD490 Module can be installed in any I/O Subrack location. Connection to the RD490 is via the 25 pin D connector associated with the subrack slot. Full D connector pin-out defaults are as per Table 1.

In the RS-232 mode of operation, connection to peripheral equipment is achieved by connection to the RS-232 port on the 25 pin D connector to the peripheral device (non standard RS-232 pin outs). When interfacing via the IR PPM mode the module is capable of driving IR LED's directly. This enables an IR LED to be located in close proximity to the receiver on the peripheral device, control over the peripheral device is thus achieved without physical connection.

The alarm inputs are configurable as level sensing inputs, the input threshold voltage is adjustable to 3, 6, 9 or 12V by means of dip switches (refer to table 2). The detection logic may also be inverted, and a self-biasing option is also available. The options allow for virtually any peripheral device to be interfaced with ease.

The RD490 module is pre-programmed with IR data for a range of standard VCR types. Should a function or sequence be required which is not available in the standard selections then the "learn" mode can be utilized to user define the functions. RS-232 control sequences are also readily programmed into the module.

The RD490 module features a comprehensive test mode and error display function to enable users to rapidly identify and resolve any difficulties that may arise.

7.15.3 Connector Details

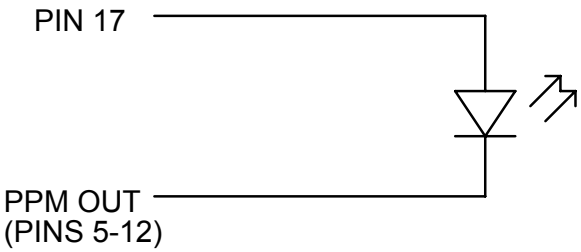
All connections to the RD490 module are via the male DB25 connector located on the rear panel of the I/O subrack for the slot position being used. It can be wired for PPM Infrared control (of eight devices) or RS-232 control of one device.

D25 CONNECTOR	FUNCTION
1	RS-232 Receive Data
2	RS-232 Transmit Data
3	Common Ground
4	Common Ground
5	PPM output 1
6	PPM output 2
7	PPM output 3
8	PPM output 4
9	PPM output 5
10	PPM output 6
11	PPM output 7
12	PPM output 8
13	Common Ground
14	RS-232 Ground
15	RS-232 Ground
16	+9V out
17	+5V out
18	Sense input 1
19	Sense input 2
20	Sense input 3
21	Sense input 4
22	Sense input 5
23	Sense input 6
24	Sense input 7
25	Sense input 8

7.15.4 Infra-red LED wiring

The LED PPM drive outputs are active LOW and must connect to the cathode side of the LED. All of the Anode ends of the LED's must connect to the +5v supply provided on pin 17.

IR LED CONNECTION DETAILS



CAUTION: The center frequency of the LED PPM drive output has been factory-set to 36KHz. This is suitable for most VCR types. If VCR control problems are experienced, try adjusting RV1, which will vary this center frequency. (Check wiring and dip switch settings BEFORE adjusting RV1).

7.15.5 Installation Aid – L12

The RD490 module is fitted with an LED (green) to indicate that IR data is being transmitted from the IR ports on the module. When an infrared LED is correctly connected to the RD490 Module (as detailed above), L12 will momentarily light as IR data is transmitted. This feature is extremely helpful when fault finding IR remote controlled peripheral devices connected to the RD490. L12 is connected in series with the output drive so if remote IR LED's are not correctly connected, or cabling is open-circuit, this LED will not light during IR transmission.

7.15.6 DIP Switch Settings

The RD490 module can be used to provide Infra-red (PPM) control of VCR equipment or send commands to ONE only RS-232 serial communications device, such as a time-lapse VCR or multiplexer. Although support of the earlier MAX-1000 Version- 3 systems is possible, usually only version-4 modes would be selected. Use of the PPM and RS-232 user defined modes can also be selected. Refer to the section in this document titled, IR LEARN MODE.

7.15.6 DIP Switch Settings, Continued.

Operating Mode (SW2, 8-way DIP switch)

Operating Mode	SW-5	SW-6	SW-7	SW-8
(IR) PPM (8) output, MAX V4	OFF	OFF	OFF	OFF
* (IR) PPM user defined mode, MAX V4	OFF	ON	OFF	OFF
* (IR) PPM user defined, LEARN MODE	OFF	ON	OFF	ON
RS-232 serial output, MAX V4	ON	OFF	OFF	OFF
* RS-232 USER serial output, MAX V4	ON	ON	OFF	OFF
* Upload/Download USER DATA via RS-232	ON	ON	OFF	ON

***** Requires USER490.exe from the MAX-TOOLS disk supplied with each HMXAT200 System Controller.

(IR) PPM Operating Mode (SW2, 8-way DIP switch)

Device Description	SW-1	SW-2	SW-3	SW-4
PANASONIC VCR Generic	OFF	OFF	OFF	OFF
MITSUBISHI VCR Generic	ON	OFF	OFF	OFF
JVC VCR Generic	OFF	ON	OFF	OFF
SHARP VCR Generic	ON	ON	OFF	OFF
SONY VCR Generic	OFF	OFF	ON	OFF
AKAI VCR Generic	ON	OFF	ON	OFF
SAMSUNG VCR Generic	OFF	ON	ON	OFF
NEC VCR Generic	ON	ON	ON	OFF
PHILIPS VCR Generic	OFF	OFF	OFF	ON

CAUTION: Other device selections are not defined and will return a FATAL-ERROR display of (2)...Device Not Found.

CAUTION: Honeywell makes no representation and offers no warranties as to the accuracy and/or suitability of third party protocols and command formats. Such protocols and command formats are based upon information supplied to Ultrak by third party manufacturers/suppliers at the time of implementation.

7.15.6 DIP Switch Settings, Continued.

RS-232 Operating Mode (SW2, 8-way DIP switch)

Device Description	SW-1	SW-2	SW-3	SW-4
PANASONIC TIME-LAPSE VCR	OFF	OFF	OFF	OFF
MITSUBISHI TIME-LAPSE VCR	ON	OFF	OFF	OFF
JVC TIME-LAPSE VCR	OFF	ON	OFF	OFF
DEDICATED MICROS MULTIPLEXER	ON	ON	OFF	OFF

CAUTION: Other device selections are not defined and will return a FATAL-ERROR display of (2)...Device Not Found.

CAUTION: For RD490 modules with the earlier V3.01 firmware, the JVC time-lapse VCR is not supported. The Dedicated Micros Multiplexer mode was defined in that position of the operating mode DIP switch table (i.e. SW1=OFF, SW2=ON, SW3=OFF, SW4=OFF).

The RS-232 communication protocol for the DEDICATED MICROS MULTIPLEXER is **9600 baud**, NO parity, 8 data bits and 1 stop bit. For all other RS-232 devices the communications protocol is **1200 baud**, NO parity, 8 data bits and 1 stop bit.

7.15.7 Alarm Sense Setup (SW1 4-way DIP switch)

The RD490 module provides eight individual alarm sense inputs, one for each device being controlled. Generally these alarm inputs are used to wire connect to the VCR to detect a NO-RECORD or END-OF TAPE status condition.

Threshold Level

To detect the changing voltage levels (representing the status condition required) will need a threshold voltage to be set. A lower voltage that the threshold would be one logic state, while a voltage greater than the threshold setting would be the other logic state.

For detecting 5 volt logic signals, use the threshold setting of 3 volts. For detecting a 12 volt supply rail, use the 6 volt threshold setting. The threshold setting used should be as close to the middle of the voltage swing provided by the signal being detected.

Threshold level	SW-1	SW-2
3 volt	OFF	OFF
6 volt	ON	OFF
9 volt	OFF	ON
12 volt	ON	ON

7.15.7 Alarm Sense Setup (SW1 4-way DIP switch), Continued

Detection Logic

Once the status required is detected it is necessary to set the required ALARM ACTIVE state. Sometimes this is for a high voltage swing and sometimes for a low.

In the NORMAL setting a high swing is detected as the alarm active condition. In the INVERTED setting, a low voltage swing is detected as the alarm active.

Detection Logic	SW-3
Normal	OFF
Inverted	ON

Input Type

Some time-lapse VCRs provide an open-collector output, or dry contact output (relay). To detect these contact closure conditions, it is necessary to bias the contact.

Select CONTACT CLOSURE to enable self-biasing of a dry contact alarm output circuit. Select LEVEL SENSING for normal voltage level threshold detection.

Input Type	SW-4
Contact Closure (Self Biasing)	OFF
Level Sensing	ON

NOTE: For CONTACT CLOSURE input type, always set the THRESHOLD LEVEL to 12V (SW1-1 and SW1-2 to ON), as the internal self-biasing voltage is 5 volts.

7.15.8 Error Display

If a setup error, invalid DIP switch setting or function control error should occur, the RD490 will flash the eight indicator LED's (at 0.5sec) to display the appropriate error status.

All eight LEDs flashing in phase will indicate an error zero. Errors (1) to (8) are indicated by all LEDs flashing with one LED out of phase corresponding to the error level.

Error Definitions

0	General error
1	Invalid Mode Selection
2	Device not found
3	User mode not defined
4	Incorrect type of user data
5	EEPROM write error
6	EEPROM overflowed
7	Format error in INTEL-HEX data
8	Not used

CAUTION: Once an error is displayed the RD490 module must be reset. Usually the module would be removed to make DIP switch adjustments. Replacing the module in the subrack causes it to be reset.

7.15.9 Description of Control Functions

The MAXPRO-Net system sends individual function numbers to the RD490 module instructing it to generate each particular control command (e.g. stop, play etc). The following table details a general list of all available control functions. For RS-232 mode up to 32 functions can be used.

FUNCTION NUMBER	ALL IR-PPM VCR DEVICES	RS-232 PANASONIC VCR	RS-232 MITSUBISHI VCR	DEDICATED MICROS MULTIPLEXER RS-232
1	Stop	Stop	Stop	Camera (1) key
2	Play	Play	Play	Camera (2) key
3	Fast-Fwd	Fast Forward	Fast Forward	Camera (3) key
4	Rewind	Rewind	Rewind	Camera (4) key
5	Pause	Pause ON	Pause ON	Camera (5) key
6	Slow Play	Pause OFF	Pause OFF	Camera (6) key
7	Frame-Advance	Frame Advance	Frame Advance	Camera (7) key
8	Record	Record	Record	Camera (8) key
9	Preview (Fwd-Play-x2)	Preview (Fwd-search-x7)	Preview (Skip-Fwd-search)	Camera (9) key
10	Review (Rew-Play-x2)	Review (Rew-search-x7)	Review (Skip-Rew-search)	Camera (10) key
11	Power ON/OFF	Power ON/OFF	Power ON/OFF	Camera (11) key
12	Tape Eject	Tape Eject	Tape Eject	Camera (12) key
13	Zero Back (Memory Stop)	Counter Memory Stop	Counter Memory Stop	Camera (13) key
14	Counter Reset	Counter Reset	Counter Reset	Camera (14) key
15	Index Search Forward	Set Coarse Search	Index Search Forward	Camera (15) key
16	Index Search Reverse	Set Fine Search	Index Search Reverse	Camera (16) key
17	(unavailable)	Real-time (3h) mode	Real-time (3h) mode	Full-Screen key
18	(unavailable)	Time-lapse (12h) mode	Time-lapse (12h) mode	Quad-Screen key
19	(unavailable)	Time-lapse (24h) mode	Time-lapse (24h) mode	Multi-Screen key
20	(unavailable)	Time-lapse (48h) mode	Time-lapse (48h) mode	Picture-in-Picture key
21	(unavailable)	Time-lapse (72h) mode	Time-lapse (72h) mode	Spot key

7.15.9 Description of Control Functions, Continued.

FUNCTION NUMBER	ALL IR-PPM VCR DEVICES	RS-232 PANASONIC VCR	RS-232 MITSUBISHI VCR	DEDICATED MICROS MULTIPLEXER RS-232
22	(unavailable)	Time-lapse (120h) mode	Time-lapse (120h) mode	Activity key
23	(unavailable)	Time-lapse (180h) mode	Time-lapse (168h) mode	Encode key
24	(unavailable)	Time-lapse (240h) mode	Time-lapse (240h) mode	Decode key
25	(unavailable)	Time-lapse (480h) mode	Time-lapse (480h) mode	VCR key
26	(unavailable)	Alarm Active	(unavailable)	Sequence key
27	(unavailable)	Alarm clear	(unavailable)	Hold (freeze) key
28	(unavailable)	(unavailable)	(unavailable)	Up-arrow key
29	(unavailable)	(unavailable)	(unavailable)	Down-arrow key
30	(unavailable)	(unavailable)	(unavailable)	Left-arrow key
31	(unavailable)	(unavailable)	(unavailable)	Right-arrow key
32	(unavailable)	Set Time (3:00am)	Set Time (3:00am)	Set Time (3:00am)

CAUTION: IR-PPM devices are limited to only 16 control functions (1 to 16). RS-232 devices support a maximum of 32 control functions.

7.15.10 I.R. Learn Mode

The RD490 module has the capability to "learn" IR control sequences. This is of particular value should the control be required for a device for which no generic device mode exists or where functions other than those which are pre-programmed in the generic modes are required.

I.R. Learn Mode Procedure

1. Select learn mode on Dip Switch 2 (6, 8 on; 5, 7 off).

2. Plug in the card, after reset press the learn button (at the top front edge of the PCB board. Note that LED's 1, 3, 5, 7 will flash.

3. Direct the IR remote control towards the IR sensor at a distance of approximately 35mm (approx. 1"). Press any key and then release, LED's 2, 4, 6, 8 will now flash.

4. Press the remote control key again and release (after about 0.5sec). Note LED 1 will now flash.

7.15.10 I.R. Learn Mode

5. Press the remote control key for function 1 and release, LED 1 will momentarily be steady and then flash again. To verify that the function has been correctly analyzed, the RD490 module immediately regenerates the same function on the IR PPM (1) output. The VCR device fitted to this output should respond. When you are happy with the remote key analyzed, press the learn button again to store the last analyzed IR remote control key. Note that LED 2 will now flash indicating that the function has been stored and the RD490 is ready to learn function 2.

6. Repeat the process for each of the sixteen functions as listed in the function table. LED's 1-8 will progressively cycle as each function is learnt. The LED's will cycle twice. The first time the LEDs represent functions 1 to 8, while the second time though represents functions 9 to 16.

7. To skip a function that is not required press the learn button. The RD490 will mark that function as undefined and step on to the next one.

8. When all 8 functions have been addressed, all 8 LED's will be flashing. Remove the module from the subrack and select the DIP switches to one of the user-defined modes (SW2). Replace the module back into the subrack and re-boot the system.

CAUTION: If the IR remote control is moved away from the IR sensor on the RD490 board while learning, a GENERAL ERROR may be reported, terminating the learn sequence. Be careful to hold the remote control accurately near the IR sensor (35mm or 1.5") and begin the learn process again.

7.15.11 Workshop Test Mode

Workshop test modes are used to perform a complete hardware test of the RD490 module.

Hold-pressed LEARN-BUTTON during power-on RESET and hold for one (1) second. All LED's will flash for the usual 0.5 sec and then remain OFF until the LEARN-BUTTON is released. The card will use its RS-232 comms. output to firstly identify the MODEL and VERSION of the software installed. Test level (1) will begin immediately. To move on to the next test level, press the LEARN-BUTTON again (hold for approx. 0.5 sec). A text message is written via the RS-232 comms. output to indicate the TEST LEVEL that is currently running.

TEST LEVEL (1)

This is an individual and sequential LED test, cycling from the top LED to the bottom. It also activates the PPM DRIVE outputs from output (1) to output (8).

7.15.11 Workshop Test Mode, Continued.

TEST LEVEL (2)

NOTE: This test echoes SW2 (8 way) DIP-switch to the LEDs. Each DIP-switch can be verified to operate properly.

TEST LEVEL (3)

This test echoes SW1 (4 way) DIP switch to the LEDs (1 to 4 only). Again, each DIP switch can be verified to operate properly.

TEST LEVEL (4)

This test enables ALL alarm inputs. By setting SW1 DIP switch to it's various modes (as per the tables above), the correct operation of all alarm inputs can be verified. Alarm ACTIVE/CLEAR data is also generated on the subrack BUS, thus generating a MAX PROTOCOL alarm command from the RD105 subrack controller to the MAXPRO-Net system.

TEST LEVEL (5)

This test automatically tests memory in the E2PROM used for storing USER DEVICE DATA. Beginning from the bottom LED the E2PROM is completely filled with a specific byte pattern. As the column of LED's decreases every location is read and verified. This test will cycle. If an error is detected in the memory, all LED's will flash continuously, halting this test level.

TEST LEVEL (6)

This is the (Infrared) PPM test mode. Similar to the IR Learn mode, this test mode begins by ANALYSING the first (2) keypresses from the IR remote control. Once this is done, the following keypresses are read and re-written out of a PPM output (selected by SW1) for direct equipment control verification. Pressing the LEARN BUTTON will restart TEST LEVEL (6).

Notes:

7.16 RD494 RESISTIVE LADDER PERIPHERAL UNIVERSAL INTERFACE MODULE

WARNING: Users should consult the manufacturers' manual with regards to the maximum cable lengths for remote control devices when using the RD494 module.

This information is for the RD494 V2.04 firmware revision. If you require information for an earlier RD494 version, please contact your MAXPRO-Net dealer or Honeywell.

7.16.1 General

The RD494 Module is compatible with a broad range of VCRs, Quads, Monitors, Frame Store Units, Video Printers and other devices. The module has the capability to support 1 peripheral device by means of its RS-232 port, or up to 8 peripheral devices simultaneously via the eight (8) resistor ladder control ports.

The module also features 8 level sensing alarm inputs, the input threshold being DIP-switch selectable.

7.16.2 Operation

The RD494 can operate in 2 modes. In resistive mode, it will simulate resistive values normally presented to a peripheral device from a "wire-line" type remote control. In the RS-232 mode, connection to peripheral equipment is simply achieved by connection to the RS-232 port (non-standard RS-232 pin outs).

When configured as level sensing, the alarm inputs detect whether a voltage is above or below a pre-set threshold of 3, 6, 9, or 12V. The alarm logic may also be inverted. A self-biasing option is also available for contact closure alarms.

The RD494 is pre-programmed to suit a range of VCR and Multiplexer types, which can be selected by SW2.

7.16.2 Operation, Continued

The RD494 features comprehensive test mode and error display functions to enable users to easily identify and resolve any difficulties that may arise.

The RD494 module can be installed in any I/O Subrack location. Connection to the RD494 is via the 25 pin D connector, or RJ11 connectors associated with the subrack slot. Full D connector pin-out defaults are detailed in Table 1.

Alternatively multiple machines may be connected via a RJ to D25 interface module (RD-9005 or RD-9022).

7.16.3 Connector Details

D25 CONNECTOR	FUNCTION
1	RS-232 Receive Data
2	RS-232 Transmit Data
3	Common Ground
4	Common Ground
5	Control output 1
6	Control output 2
7	Control output 3
8	Control output 4
9	Control output 5
10	Control output 6
11	Control output 7
12	Control output 8
13	Common Ground
14	RS-232 Ground
15	RS-232 Ground
16	+9V out
17	+5V out
18	Sense input 1
19	Sense input 2
20	Sense input 3
21	Sense input 4
22	Sense input 5
23	Sense input 6
24	Sense input 7
25	Sense input 8

Operating Mode (SW2, 8-way DIP switch)

Operating Mode	SW-5	SW-6	SW-7	SW-8
Resistive Mode	OFF	OFF	OFF	OFF
RS-232 serial output, MAX V4	ON	OFF	OFF	OFF
RS-232 USER serial output, MAX V4	ON	ON	OFF	OFF
Upload/Download USER DATA via RS-232	ON	ON	OFF	ON

Resistive Mode Device Selection
(SW2, 8-way DIP Switch)

Device Description	Firmware Version	SW-1	SW-2	SW-3	SW-4
SONY/SANYO GENERIC	V1.00	OFF	OFF	OFF	OFF
MITSUBISHI GENERIC	V1.00	ON	OFF	OFF	OFF
PANASONIC GENERIC	V1.00	OFF	ON	OFF	OFF
SONY YS-DX316P MULTIPLEXER	V1.01	ON	ON	OFF	OFF
PHILIPS LTC3991	V1.03	OFF	OFF	ON	OFF
SANYO SRC-850/DSR-M800	V2.08	ON	OFF	ON	OFF

SW-5 to SW-8 must all be set to OFF

NOTE: The Sony YS-DX316P multiplexer has 2 resistive ladder inputs. Therefore 2 outputs from the RD494 are required to control a single multiplexer.

NOTE: Other device selections are not defined and will return a FATAL-ERROR display of (2)...Device Not Found.

NOTE: Honeywell makes no representation and offers no warranties as to the accuracy and/or suitability of third party protocols and command formats. Such protocols and command formats are based upon information supplied to Honeywell by the third party manufacturers/suppliers at the time of implementation.

NOTE: RS-232 operating mode is supported in the RD494 V2.04 firmware revision onwards.

RS-232 Operating Mode (SW2, 8-way DIP switch)

Device Description	Firmware Version	SW-1	SW-2	SW-3	SW-4
PANASONIC TIME-LAPSE VCR	V2.04	OFF	OFF	OFF	OFF
MITSUBISHI TIME-LAPSE VCR	V2.04	ON	OFF	OFF	OFF
JVC TIME-LAPSE VCR	V2.04	OFF	ON	OFF	OFF
DEDICATED MICROS MULTIPLEXER	V2.04	ON	ON	OFF	OFF
ULTRAK KX1610/11CP MULTIPLEXER	V2.04	OFF	OFF	ON	OFF
MULTIVISION PRO ROBOT MULTIPLEXER	V2.04	ON	OFF	ON	OFF
ULTRAK KQ7300/01 CP QUAD	V2.04	OFF	ON	ON	OFF

SW-5 must be set ON and SW-6 to SW-8 must be set to OFF

Alarm Sense Setup (SW1 4-way DIP switch)

Threshold Level

Threshold level	SW-1	SW-2
3 volt	OFF	OFF
6 volt	ON	OFF
9 volt	OFF	ON
12 volt	ON	ON

Detection Logic

Detection Logic	SW-3
Normal	OFF
Inverted	ON

Input Type

Input Type	SW-4
Contact Closure (Self Biasing)	OFF
Level Sensing	ON

NOTE: For CONTACT CLOSURE input type, always set the THRESHOLD LEVEL to 3V (SW1-1 and SW1-2 to OFF), as the internal self-biasing voltage is 5 volts.

NOTE: Once an error is displayed the RD494 module must be reset. Usually the module would be removed to make DIP switch adjustments. Replacing the module in the subrack causes it to be reset.

7.16.4 Description of Control Functions

The MAXPRO-Net system sends individual functions numbers to the RD494 module instructing it to generate each particular control command (e.g. stop, play etc). The following table details a general list of all available control functions. For RS-232 mode up to 32 functions can be used.

FUNCTION NUMBER	ALL RESISTIVE VCR DEVICES	PANASONIC VCR RS-232	MITSUBISHI VCR RS-232	JVC VCR RS-232
1	Stop	Stop	Stop	Stop
2	Play	Play	Play	Play
3	Fast-Fwd	Fast Forward	Fast Forward	Fast Forward
4	Rewind	Rewind	Rewind	Rewind
5	Pause	Pause ON	Pause ON	Pause ON
6	Slow Play	Pause OFF	Pause OFF	(unavailable)
7	Frame-Advance	Frame Advance	Frame Advance	Frame Advance
8	Record	Record	Record	Record
9	Preview	Preview (Fwd-search-x7)	Preview (Skip-Fwd-search)	Preview
10	Review	Review (Rew-search-x7)	Review (Skip-Rew-search)	Review
11	Power ON/OFF*	Power ON/OFF	Power ON/OFF	Power ON
12	Tape Eject	Tape Eject	Tape Eject	Tape Eject
13	AV-Input Select	Counter Memory Stop	Counter Memory Stop	Counter Memory Stop
14	Display Clear	Counter Reset	Counter Reset	Counter Reset
15	Time Lapse, 24 Hour or LP	Set Coarse Search	Index Search Forward	Index Search Forward
16	Real Time, 3HR or SP	Set Fine Search	Index Search Reverse	Index Search Reverse
17	(unavailable)	Real-time (3h) mode	Real-time (3h) mode	Real-time (3h) mode
18	(unavailable)	Time-lapse (12h) mode	Time-lapse (12h) mode	Time-lapse (12h) mode
19	(unavailable)	Time-lapse (24h) mode	Time-lapse (24h) mode	Time-lapse (24h) mode
20	(unavailable)	Time-lapse (48h) mode	Time-lapse (48h) mode	Time-lapse (48h) mode
21	(unavailable)	Time-lapse (72h) mode	Time-lapse (72h) mode	Time-lapse (72h) mode
22	(unavailable)	Time-lapse (120h) mode	Time-lapse (120h) mode	Time-lapse (120h) mode
23	(unavailable)	Time-lapse (180h) mode	Time-lapse (168h) mode	Time-lapse (168h) mode
24	(unavailable)	Time-lapse (240h) mode	Time-lapse (240h) mode	Time-lapse (240h) mode
25	(unavailable)	Time-lapse (480h) mode	Time-lapse (480h) mode	Time-lapse (480h) mode
26	(unavailable)	Alarm Active	(unavailable)	Rec check
27	(unavailable)	Alarm clear	(unavailable)	Alarm Clear
28	(unavailable)	(unavailable)	(unavailable)	(unavailable)
29	(unavailable)	(unavailable)	(unavailable)	(unavailable)
30	(unavailable)	(unavailable)	(unavailable)	(unavailable)
31	(unavailable)	(unavailable)	(unavailable)	(unavailable)
32	(unavailable)	Set Time (3:00am)	Set Time (3:00am)	(unavailable)

➡ Denotes – table continues over the page.

*Record – stop for Sanyo DRS-M800

(Continuation of table from previous page)

FUNCTION NUMBER	DEDICATED MICROS MULTIPLEXER RS-232	ULTRAK MULTIPLEXER RS-232	MULTIVISION PRO ROBOT MULTIPLEXER RS-232	ULTRAK QUAD RS-232
1	Camera (1) key	Camera (1) key	Camera (1) key	Camera (1) key
2	Camera (2) key	Camera (2) key	Camera (2) key	Camera (2) key
3	Camera (3) key	Camera (3) key	Camera (3) key	Camera (3) key
4	Camera (4) key	Camera (4) key	Camera (4) key	Camera (4) key
5	Camera (5) key	Camera (5) key	Camera (5) key	(unavailable)
6	Camera (6) key	Camera (6) key	Camera (6) key	(unavailable)
7	Camera (7) key	Camera (7) key	Camera (7) key	(unavailable)
8	Camera (8) key	Camera (8) key	Camera (8) key	(unavailable)
9	Camera (9) key	Camera (9) key	Camera (9) key	(unavailable)
10	Camera (10) key	Camera (10) key	Camera (10) key	(unavailable)
11	Camera (11) key	Camera (11) key	Camera (11) key	(unavailable)
12	Camera (12) key	Camera (12) key	Camera (12) key	(unavailable)
13	Camera (13) key	Camera (13) key	Camera (13) key	(unavailable)
14	Camera (14) key	Camera (14) key	Camera (14) key	(unavailable)
15	Camera (15) key	Camera (15) key	Camera (15) key	(unavailable)
16	Camera (16) key	Camera (16) key	Camera (16) key	(unavailable)
17	Full-Screen key	Full-Screen key	Live	(unavailable)
18	Quad-Screen key	2 x 2 screen	2 x 2 screen	Quad-Screen
19	Multi-Screen key	3 x 3 screen	3 x 3 screen	(unavailable)
20	Picture-in-Picture	Picture-in-Picture	Picture-in-Picture	Picture-in-Picture
21	Spot	4 x 4 screen	4 x 4 screen	(unavailable)
22	Activity	Zoom	Full Screen / Zoom	(unavailable)
23	Encode	Select	Select	Select
24	Decode	Live Record	(unavailable)	(unavailable)
25	VCR	VCR	VCR	VCR
26	Sequence	Sequence	Sequence	Sequence
27	Hold (freeze)	Hold (freeze)	Function + Zoom	Hold (freeze)
28	Up-arrow	Up-arrow	Function + Up-arrow	Up-arrow
29	Down-arrow	Down-arrow	Function + Down-arrow	Down-arrow
30	Left-arrow	Left-arrow	Function + Left-arrow	Left-arrow
31	Right-arrow	Right-arrow	Function + Right-arrow	Right-arrow
32	Set Time (3:00am)	Menu	Function	Menu

7.16.5 Workshop Test Mode

Workshop test modes are used to perform a complete hardware test of the RD494 module.

Press and hold the TEST-BUTTON (on the front edge of the circuit board) during power-on/reset for one (1) second. The card will output on its RS-232 comms. port the MODEL and VERSION of the software installed and the current TEST LEVEL.

Test Level 1 will begin immediately. To move on to the next test level hold, the Test Button in for approximately 0.5sec.

TEST LEVEL (1)

This is an individual and sequential LED test, cycling from the top LED to the bottom.

TEST LEVEL (2)

This test echoes SW2 (8-way) dip-switch to the LEDs. Each dip-switch can be verified to operate properly.

TEST LEVEL (3)

This test echoes SW1 (4-way) DIP switch to the LEDs (1 to 4 only). Again, each DIP switch can be verified to operate properly.

TEST LEVEL (4)

This test enables ALL alarm inputs. By setting SW1 DIP switch to its various modes, the correct operation of all alarm inputs can be verified. Alarm ACTIVE/CLEAR data is also generated on the subrack BUS, thus generating a MAX PROTOCOL alarm command from the RD-105 subrack controller to the MAXPRO-Net system.

7.16.5 Workshop Test Mode, Continued

TEST LEVEL (5)

This test is not applicable to RD494.

TEST LEVEL (6)

This test mode is used to test the resistor ladder network used to synthesize the various resistance values required for the different control functions.

Set SW1(1234) to OFF OFF OFF OFF to allow testing of output 1 (DB25 Pin5) resistance to Ground (DB25 Pin 13).

LEDs on the front edge of the card then indicate the Function Number 1 to 16 (see above table).

The Test Button at the top front of the card when held down presents the resistance to Output 1.

Releasing the button steps to the next function where again holding down the button, switches the resistance to the output.

This sequence continues through all 16 functions as 2 groups of 8.

The sequence returns to Function 1 after the completion of Function 16.

FINISH TESTING

To exit the workshop test mode, the RD494 module must be powered-down (or removed from the subrack). When power is applied again, the RD494 module will resume normal operation.

7.16.5 Workshop Test Mode, Continued

Error Displays

The eight LEDs display the error status on the RD494 module. All eight LEDs flashing in phase indicates an error zero. Errors 1-8 are indicated by all LEDs flashing with one LED out of phase, which corresponds to the error level.

Error Definitions

ERROR NUMBER	DESCRIPTION
0	General Error
1	Invalid Mode Selection
2	Device Not Found
3	User Mode Not Defined
4	Incorrect Type of User Data
5	Not Used
6	Not Used
7	Not Used
8	Not Used

7.17 HEGS5300 Keyboard

7.17.1 Setup Mode

HEGS5300 (and version 2 and above RD-530 keyboards) are setup using the keyboard keys. There are 3 user-defined settings. These are:

- Keyboard ID – valid IDs 1 to 99. (Default = ID 1).
- Baud Rate – 19K2 or 9600. (Default = 19K2. Data format is fixed at 7 data bits, 1 stop bit, even parity).
- Joystick speed range – There are 2 ranges of pan/tilt speeds from the analogue joystick. The default is a range of 5 speeds (0=STOP to 5=Maximum speed). The alternative is a range of 26. As before 0=STOP, but the speeds generated are from A (slowest) through to Z (fastest. Speed Z is equivalent to speed 5, in that it is generated when the joystick is at its maximum pan or tilt position.

To enter SETUP MODE, hold down the <**MENU**> key or the ⇑ key (to the right-hand-side of the LCD) as the keyboard is powered up.

Note: When some custom keyboard overlays are fitted to keyboards, the MENU key may be located in a different position. Therefore using the ⇑ key next to the LCD is always a preferred option.

Note: The ⇑ key option is only available on keyboards with firmware revisions 2.02 and above.

Once in setup mode, the LCD prompts the user to enter the required information using the numeric keypad. Pressing the <**ENTER**> key or the ⇓ key moves to the next stage. Pressing the ⇑ key goes back to the previous setup screen.

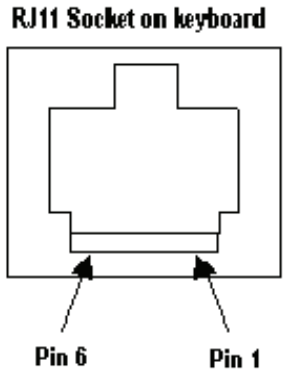
When the keyboard ID, baud rate and joystick speed range has been entered, the final setup stage will store the settings and the joystick reference position. The keyboard should be flat on the desk when pressing the <**ENTER**> key at this final stage to ensure the joystick is zeroed. Setup information is stored in non-volatile memory so the settings will be retained if the keyboard is unplugged.

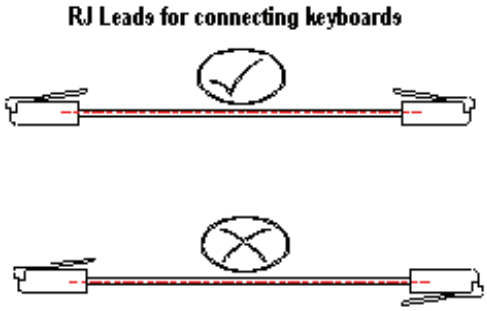
7.17.2 3-Dimensional Joystick

The HEGS5300 keyboard is fitted with a 3-dimensional joystick. This allows zoom-in and zoom-out functions to be performed by twisting the top of the joystick either clock-wise (zoom-in) or anti-clockwise (zoom-out). The “ZOOM IN” and “ZOOM-OUT” buttons located on the keyboard still operate as normal.

7.17.3 Wiring Connections

RJ11 Socket on rear of keyboard	RJ11 Socket on rear of MXAT200
Pin 1 – Power GND	Pin 6 – Power GND
Pin 2 – TX Data	Pin 5 – RX Data
Pin 3 – Signal GND	Pin 4 – Signal GND
Pin 4 – RX Data	Pin 3 – TX Data
Pin 5 – N/C	Pin 2 – N/C
Pin 6 – 12Vdc	Pin 1 – 12Vdc





D15 Terminations

FUNCTION	PIN NO.
Power GND	15
Tx Data	2
Signal GND	5
Rx Data	3
12VDC	8

7.17.4 Keycode Table

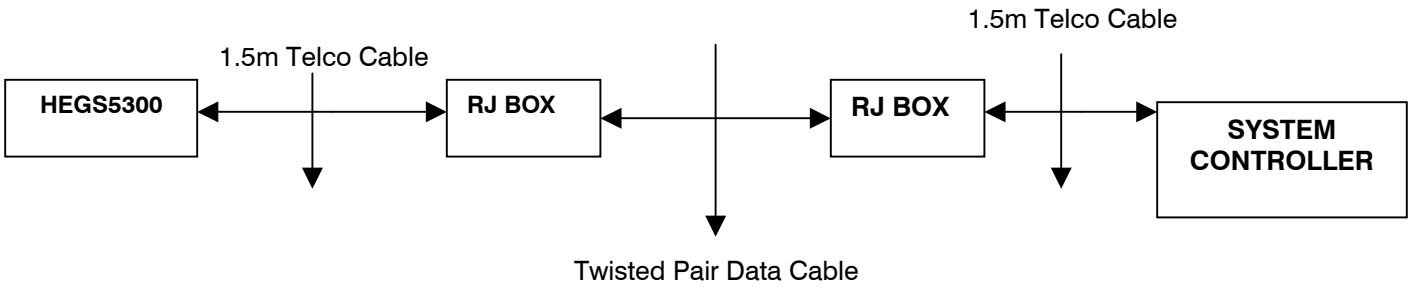
Keycode	Key Name	Command		Keycode	Key Name	Command
#001	Full screen			#049		
#002	Quad screen			#050	Mux	Q
#003				#051	Auto record	
#004	Clear alarms	A		#052	Auto print	
#005				#053		
#006	Left arrow	<		#054	F6	
#007	Right arrow	>		#055	F7	
#008	Scan select	S		#056	F8	
#009				#057	F9	
#010	Alternate key			#058	F10	
#011	Multi screen			#059		
#012	Picture in pic			#060	VCR	R
#013				#061	Mon	M
#014	Next alarm			#062	1	1
#015				#063	2	2
#016	Insert			#064	3	3
#017	Delete			#065	Up arrow	+
#018	Pause			#066	4	4
#019				#067	5	5
#020	Misc.			#068	6	6
#021	Freeze frame			#069	Down arrow	-
#022	Live			#070	7	7
#023				#071	8	8
#024	User macro	U		#072	9	9
#025				#073	Camera	C
#026	Set	T		#074	View	V
#027	Grab			#075	0	0
#028	Scan halt	H		#076	Enter	.
#029				#077	VCR stop	s
#030	Menu	?		#078	VCR play	p
#031	Sequence			#079	VCR record	r
#032	Spot			#080	VCR rewind	w
#033				#081	VCR pause	u
#034				#082	VCR forward	f
#035				#083	VCR eject	E
#036				#084	VCR slow	l
#037				#085	Text	B
#038				#086	Zoom in	g
#039				#087	Zoom out	h
#040				#088	Focus far	b
#041	Active			#089	Focus near	a
#042	Aux open			#090	Iris open	i
#043				#091	Iris close	e
#044	F1			#092	Wash	n
#045	F2			#093	Wipe	m
#046	F3			#094	Light	
#047	F4			#095	Flashback	Z
#048	F5			#096	Tilt up	k

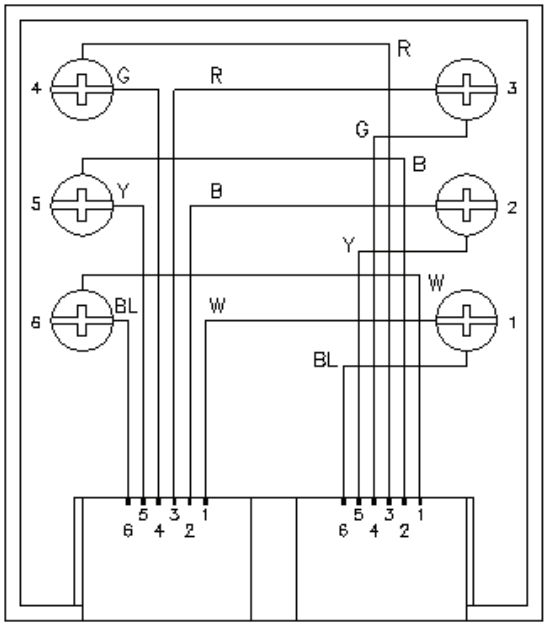
7.17.4 Keycode Table (contd.)

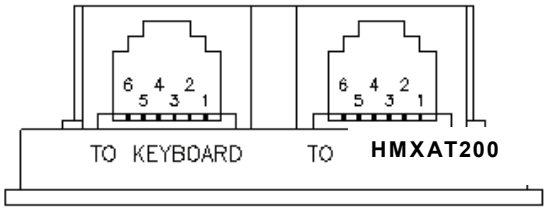
Keycode	Key Name	Command		Keycode	Key Name	Command
#097	Tilt down	j		#100	Scroll up	
#098	Pan left	d		#101	Scroll down	
#099	Pan right	c		#102	PTZ aux	x

7.17.5 Cable Lengths

Please note: The HEGS5300 Keyboard is supplied with a standard 1.5m flat ribbon cable. It is strongly recommended that twisted pair data cable be used from the RJ11 Termination Box when long cable lengths are required to eliminate any data problems. Any cable length in excess of RS-232 standards should be fitted with line driver units (Honeywell part number LD102).







KEYBOARD RJ11 CONNECTOR	
PIN 1 WHITE	12V
PIN 2 BLACK	NC
PIN 3 RED	Tx
PIN 4 GREEN	SIG. GND
PIN 5 YELLOW	Rx
PIN 6 BLUE	PWR GND

MX–AT200 RJ11 CONNECTOR	
PIN 1 WHITE	PWR GND
PIN 2 BLACK	Tx
PIN 3 RED	SIG. GND
PIN 4 GREEN	Rx
PIN 5 YELLOW	NC
PIN 6 BLUE	12V

REFERENCE | CONTRACT No.

DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.
DWW	.		DM	12.2.01	1
	.				

Honeywell

MAXPRO-Net
KEYBOARD
RJ11 TWO-WAY
JUNCTION BOX
(0365-0009)

DRAWING No. MG10075 | SHEET No. 1 OF 1

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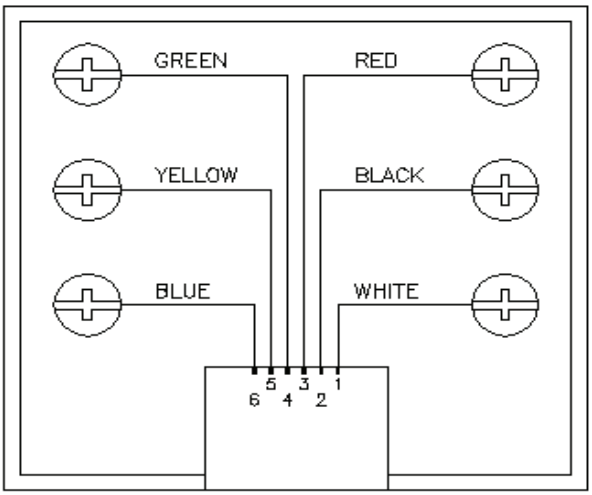

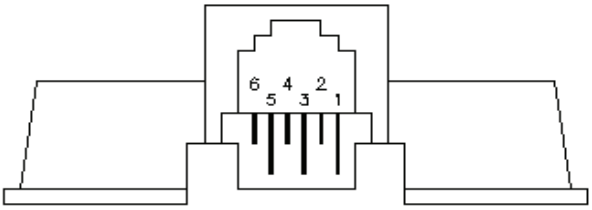

RJ12		D15	
PIN 1 WHITE	12V	PIN 8	12V
PIN 2 BLACK	NC		NC
PIN 3 RED	Tx	PIN 3	Tx
PIN 4 GREEN	SIG. GND	PIN 5	SIG. GND
PIN 5 YELLOW	Rx	PIN 2	Rx
PIN 6 BLUE	PWR GND	PIN 15	PWR GND

REFERENCE		CONTRACT No.			
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.
DWW	.		SH	10.6.99	1

Honeywell

MAXPRO-Net
KEYBOARD RJ12
TERMINAL BOX
PIN UTILIZATION

DRAWING No MG10023

SHEET No 1 OF 1

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7.17.6 E.M.C. Compliance - Installation Requirements

The HEGS5300 keyboard, supplied, includes a one meter standard length of interface cable. Should there be a need, for a longer cable, an extension kit is available from the supplier.

This kit has two Amidon Associates FB-43-6301 Shielding Beads and interconnect cable (Beldon 8723 or equivalent) cut to the required length.

As the HEGS5300 is supplied as an O.E.M. component, there is therefore a mandatory requirement, to specify the installation parameters, in order to comply with the European Directives on E.M.C.

The HEGS5300 keyboard has been installed, tested and found to comply under the following conditions:

1. With the standard lead attached to the System Controller.

2. With the standard lead attached to an approved telecommunications modem and with the power requirements supplied by a CE approved Plug Pack.

3. With the standard lead attached to an Optic Fiber Transmitter and with the power requirements supplied by a CE approved Plug Pack.

4. With a passive extension (not exceeding 50m total) using the cable and Shield Beads, defined above, and with the Shield Beads fitted adjacent to the connectors.

WARNING: It should be noted that any variation to the above conditions may not comply with the European Directives on E.M.C. and therefore must be cleared with the supplier before implementation.

7.17.7 Special Notes - Previous Versions of RD-530

For previous versions of RD-530 keyboards fitted with dip-switches, the following tables are a guide to the setup. Please contact your MAXPRO-Net distributor for further information if required.

7.17.8 DIP Switch Settings

The Keyboard Identity Number is a binary encoded number. Examples are shown below.

Keyboard Identity Settings

FUNCTION	SW 1	SW 2	SW 3	SW 4	SW 5	SW6
KEYBOARD 1	ON	OFF	OFF	OFF	OFF	OFF
KEYBOARD 2	OFF	ON	OFF	OFF	OFF	OFF
ID'S 3-62		~	~	~	~	~
KEYBOARD 63	ON	ON	ON	ON	ON	ON
KEYBOARD 64	OFF	OFF	OFF	OFF	OFF	OFF

Baud Rate and Joystick Speed Range

FUNCTION	7	8
19.2K BAUD	-	OFF
9600 BAUD	-	ON
5 JOYSTICK PAN/TILT SPEEDS (DEFAULT)	OFF	-
26 JOYSTICK PAN/TILT SPEEDS	ON	

Data format – 7 data, 1 stop, even parity

D15 CONNECTOR PIN ALLOCATIONS

Pin	Function	Description
2	TX	RS-232 Transmit Data (Primary)
5	S.GND	RS-232 Signal Ground
3	RX	RS-232 Receive Data
8	+VDC	+12VDC (External Power)
15	GND	Ground (External Power)

7.18 HMXPS9 SYSTEM POWER SUPPLY

WARNING: Please ensure 1RU of rack space is left above each HMXPS9 when installed into system racks to allow for ventilation.

MAINS INPUT FUSES HMXPS9

240 Volts	2A Slow Blow
110 Volts	4A Slow Blow

WARNING: Please ensure that the correct fuses are installed prior to installation.

7.18.1 Output Protection For HMXPS9

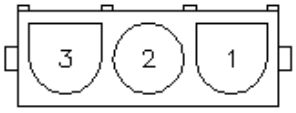
The HMXPS9 power supply is fitted with 5 Amp self-resetting switches (fuses) to all outputs. Therefore, apart from the mains input fuses, there are no parts/devices in the HMXPS9 that require replacement by on-site personnel. Care should be taken to ensure individual outputs are not overloaded, or bordering on overload, as this may result in the self-resetting switches activating periodically.

The HMXPS9 unit is manufactured for standard 19-inch rack mounting. Each HMXPS9 rack mount chassis requires 3.5" of rack space. The mounting holes are in accordance with EIA RS-310 standard. The mounting holes are for #10 mounting screws.

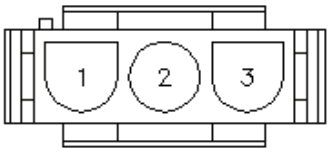
WARNING: Whilst the HMXPS9 has four output sockets, care must be taken to avoid overloading the power supply due to multiple heavy loads. No more than two fully populated 6RU video subracks, including text outputs, (e.g. HMX32128 or similar) should be connected to a single HMXPS9.

7.18.2 Interconnecting HMXPS9 to Canon Style Sockets

Where a subrack, RD-18, RD-9016 or similar is to be connected to a HMXPS9 and is fitted with a CANON style connector, it will be necessary to remove this connector and fit a MATE-N-LOK style. The following illustration (MG10043) details the corresponding pin connections to assist in changing the connector.



SUBRACK / POWER SUPPLY CONNECTOR



CABLE CONNECTOR

PIN ALLOCATION
1. +VE
2. GND
3. –VE

PIN CONNECTION WITH MAXPRO-NET DEVICE FITTED WITH CANON 3 PIN PLUG (SUBRACK ETC) TO MAKE-N-LOK ONMX-PS9

CANON Pin No's	Description	MATE-N-LOK Pin No's
1	+9.5 VDC	1
2	-9.5 VDC	3
3	GROUND	2

REFERENCE		CONTRACT No.			
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.
DWW	WR		NH	11.11.99	1

Honeywell

HMX SERIES

MX SERIES
POWER INTERCONNECTION
PIN UTILISATION

DRAWING No MG10043

SHEET No 1 OF 1

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7.19 RD9021 I/O INTERFACE MODULE

7.19.1 General

The RD9021 I/O Interface Module is designed to expand D25 connections from the rear of MAXPRO-Net I/O subracks to easy-to-use screw terminals on a PCB module.

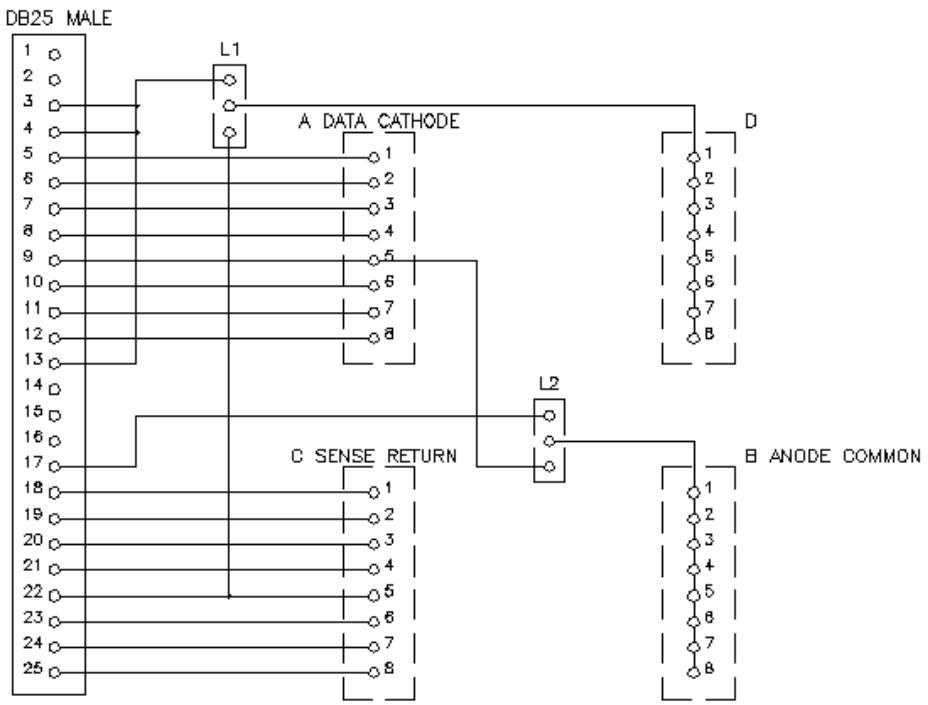
This module can be used on any of the MAXPRO-Net “MX” range of I/O subracks such as the HMX1132, HMX1600, and the HMX1676.

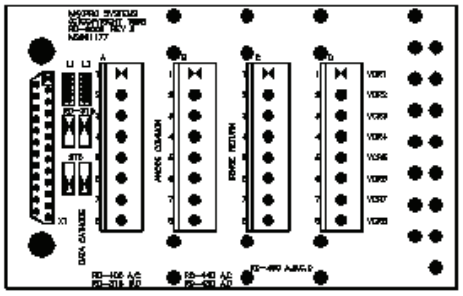
MAXPRO-Net I/O Modules compatible with the RD9021 are RD315, RD316, RD400, MX440, RD490 and RD494.

7.19.2 Installation

The module simply plugs into the female D25 connector on the rear of the subrack and immediately provides easy-to-use screw terminals for field cable terminations.

Two links (L1 and L2) are provided on-board to alter the type of termination from the D25 connector to terminal strips B & D. Refer to the illustration overleaf for full termination details.





NOT TO SCALE

REFERENCE		CONTRACT No.			
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.
DWW	NH	D25 CHANGE TO MALE	NH	22.7.98	2

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RD-9021
MAX1000 I/O INTERFACE
CIRCUIT DIAGRAM

DRAWING No MS001177 | SHEET No 1 OF 1

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7.20 HMX1676 TEXT INSERTION SUBRACK WITH VCR CONTROL SUBRACK

7.20.1 General

The HMX1676 is a Text Insertion and VCR control subrack combined. It provides 16 video slots suitable for MX205 or RD220 Text Modules, and 2 I/O slots suitable for RD490 or RD494 Peripheral Interface Modules.

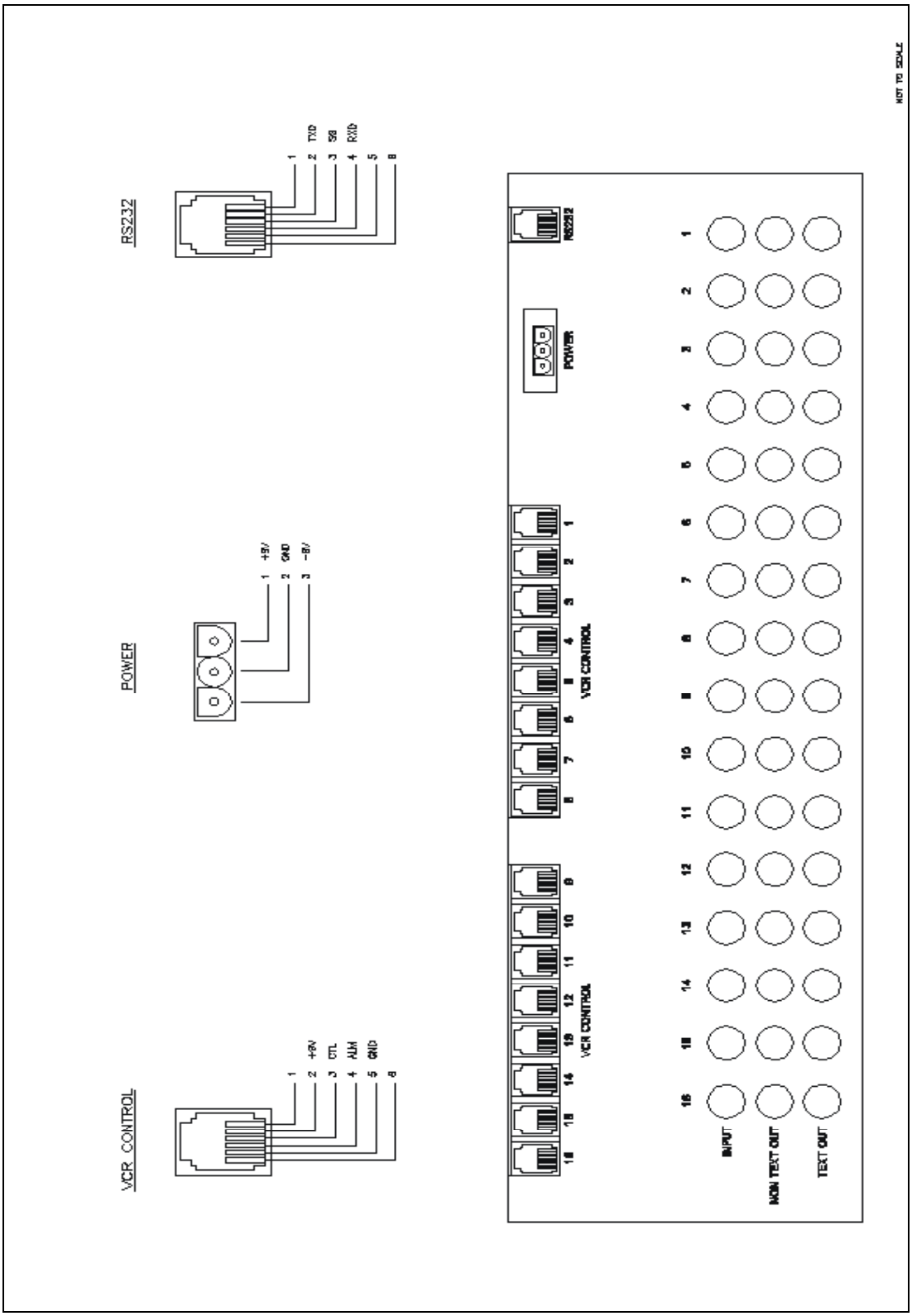
7.20.2 Video Slots

Slots 1 to 16 are used for text overlay modules. Both a loop-through video output and an output with text are provided from each slot.

7.20.3 I/O Slots

Slots 17 and 18 are used for VCR control. Each slot is designed for a RD-490 module for IR VCR control, or a RD494 module for resistive ladder control. The card in slot 17 controls VCR outputs 1-8, and slot 18 controls VCR outputs 9-16. Refer to the diagram on the next page for connection details.

WARNING: The HMX1676 does not provide support for RS-232 VCR control.


RS232
1 2 TXD 3 SG 4 RXD 5 6
POWER
1 +8V 2 GND 3 -8V
VCR CONTROL
1 2 +8V 3 CTL 4 ALM 5 GND 6
VCR CONTROL
POWER
RS232
INPUT
NON TEXT OUT
TEXT OUT
NOT TO SCALE

CHAPTER 8:
DIAGRAMS

8.1 INTRODUCTION

This section comprises of the diagrammatic information for individual products and is often supplied with each individual unit when shipped. Due to improvements and new products, the information on these pages may become incomplete. Always verify that diagrams supplied with your units are not of a later version than those in this section, before discarding.

8.2 SUBRACK CONNECTIONS

With the introduction of RJ11 style connectors to all new subracks, or enhanced subracks in the MAXPRO-Net product range, it is sometimes necessary to adapt the older style subracks from “D” style sub-connectors to “RJ11” style connectors.

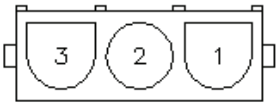
The following table lists the pin-to-pin detail for each type of “D” connector to “RJ” style.

Adaptor	“D” Pin	RJ11 pin
D25F	2	3
	3	5
	7	4
D25M	2	4
	3	2
	7	3
D9F	2	5
	3	3
	5	4
D9M	2	2
	3	4
	5	3

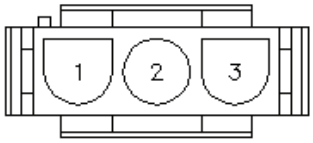
8.2 SUBRACK CONNECTIONS, CONTINUED

The RJ11 style products in the MAXPRO-Net range have been designed to accept a standard four-wire telephone style RJ11 lead.

When assembling cables, the crimp-on RJ11 connectors always mount on the same side of the flat cable. i.e. no distinction between ends.



SUBRACK / POWER SUPPLY CONNECTOR



CABLE CONNECTOR

PIN ALLOCATION
1. +VE
2. GND
3. −VE

PIN CONNECTION WITH MAXPRO-NET DEVICE FITTED WITH CANON 3 PIN PLUG (SUBRACK ETC) TO MAKE-N-LOK ONMX-PS9

CANON Pin No's	Description	MATE-N-LOK Pin No's
1	+9.5 VDC	1
2	-9.5 VDC	3
3	GROUND	2

REFERENCE		CONTRACT No.			
DRAWN	CHKD	AMENDMENT	APPD.	DATE	REV.
DWW	WR		NH	11.11.99	1

HONEYWELL

HMX SERIES

POWER INTERCONNECTION PIN UTILISATION

DRAWING No. MG10043 SHEET No. 1 OF 1

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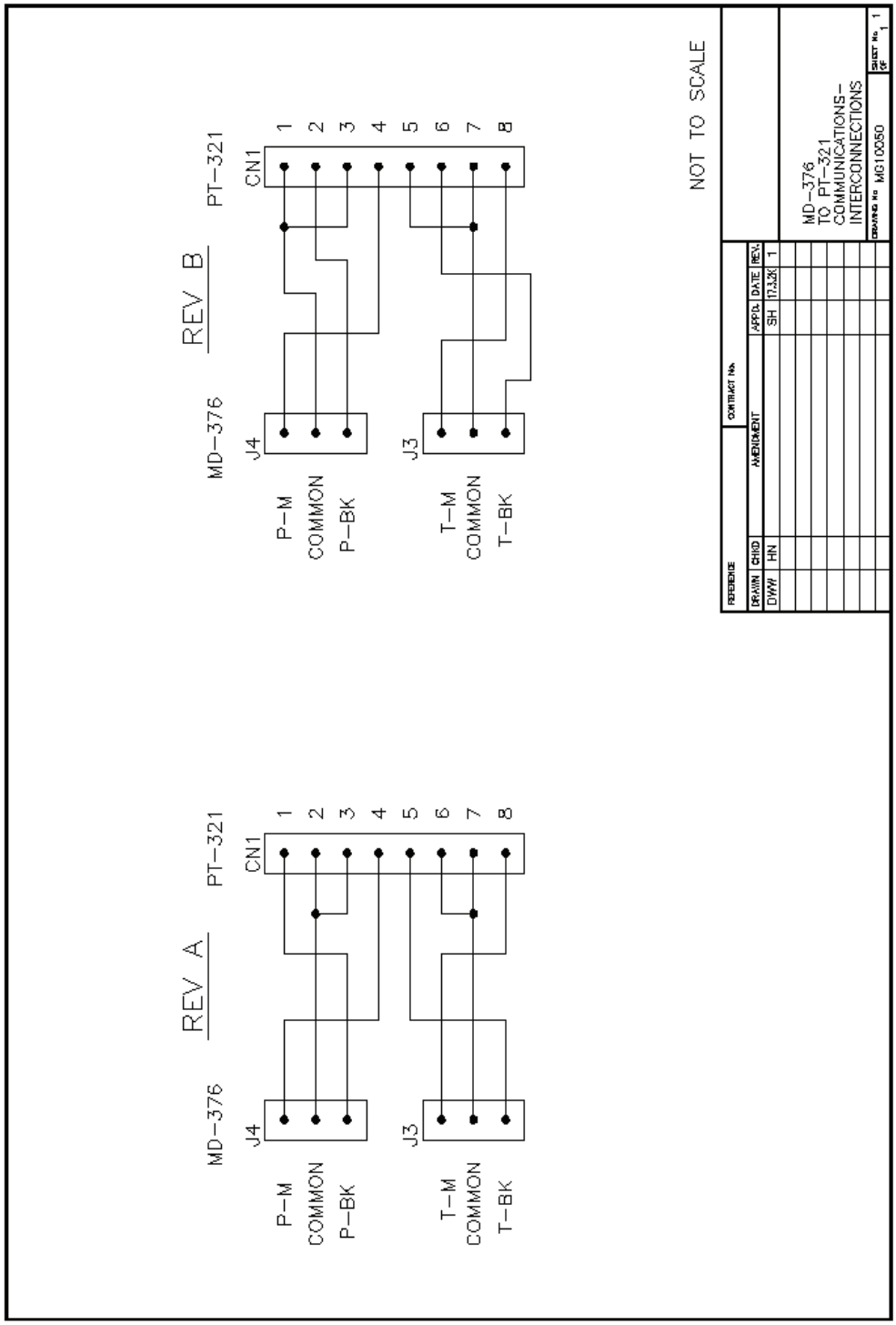
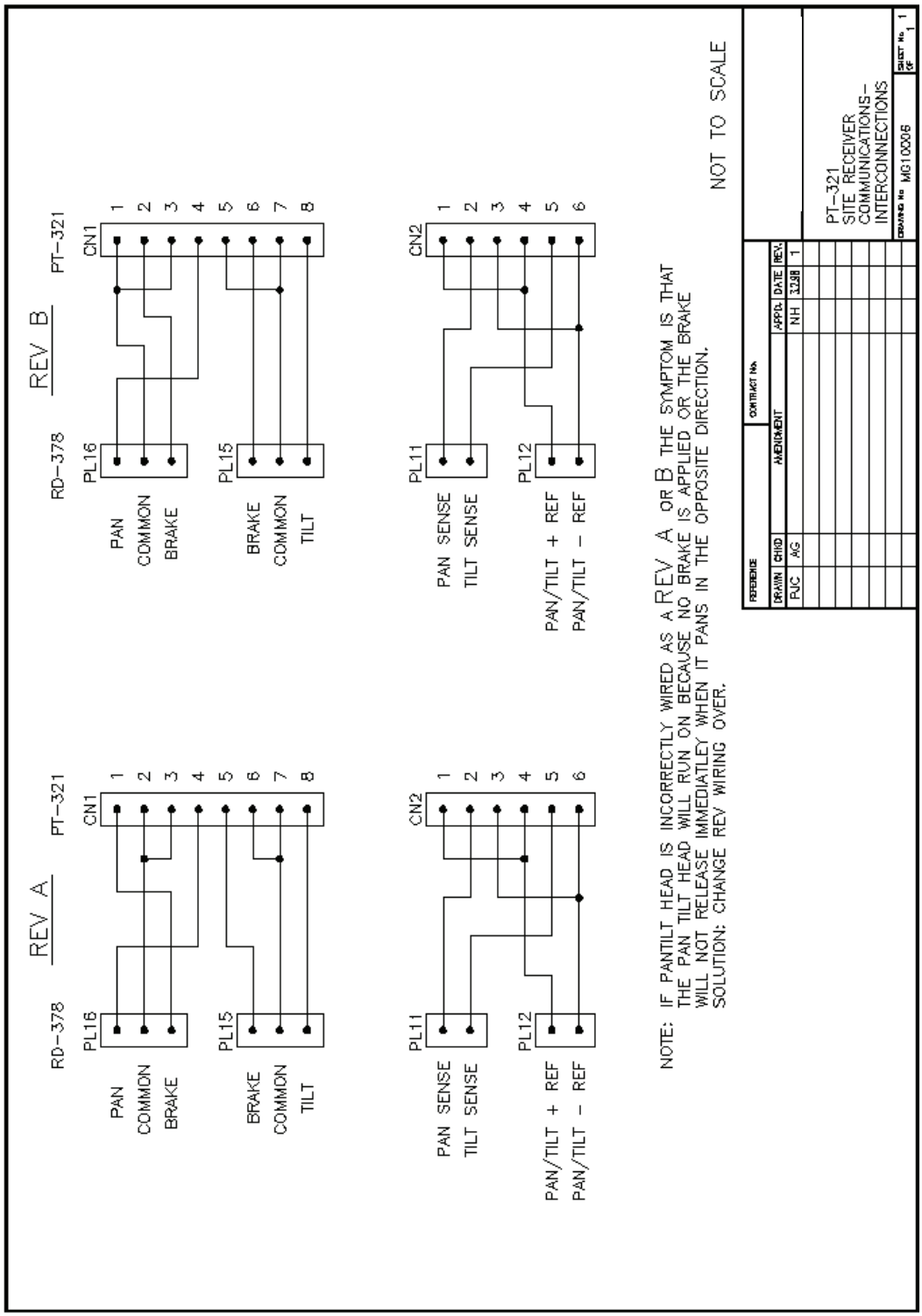
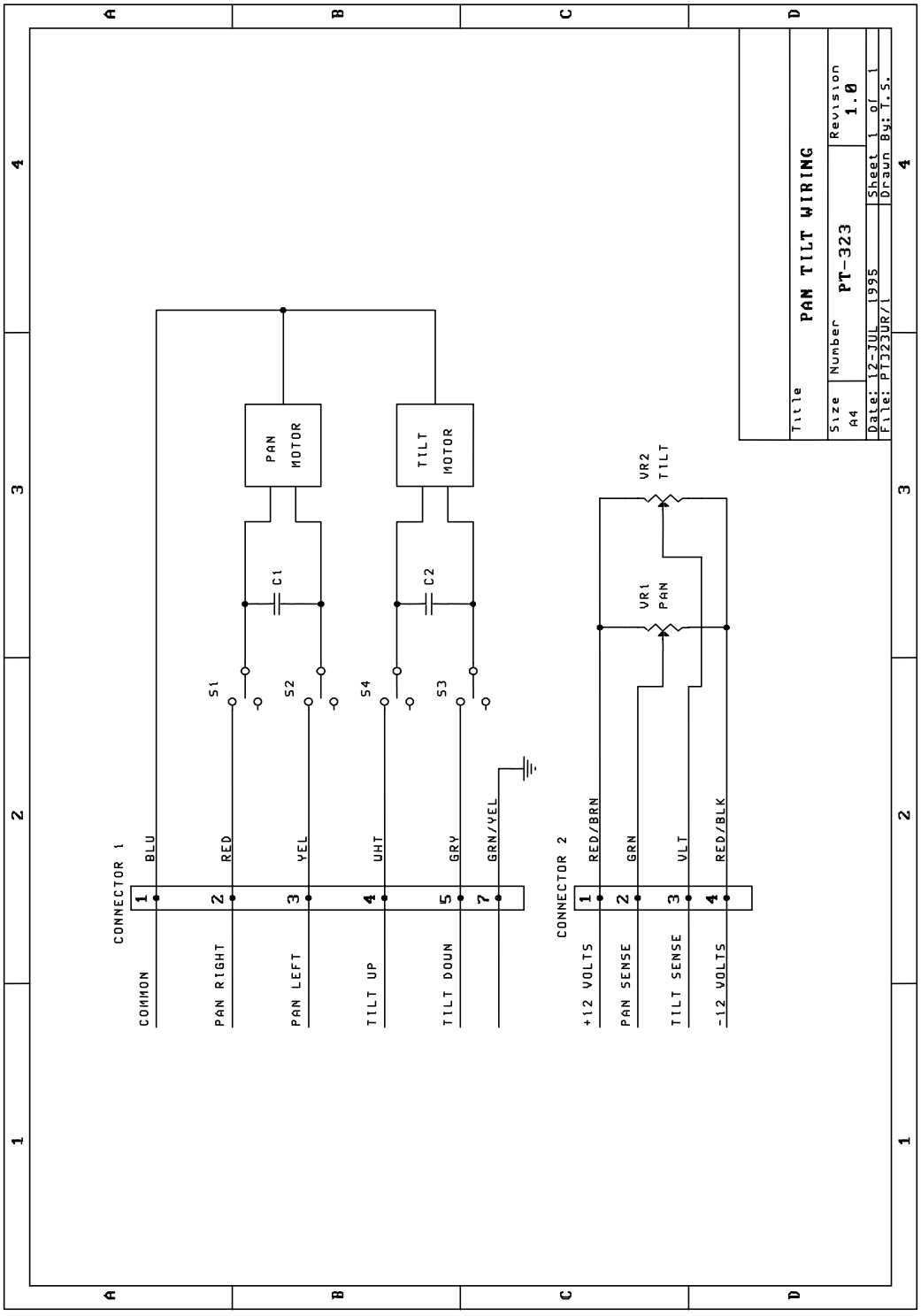
8.3 PT321 CONNECTIONS



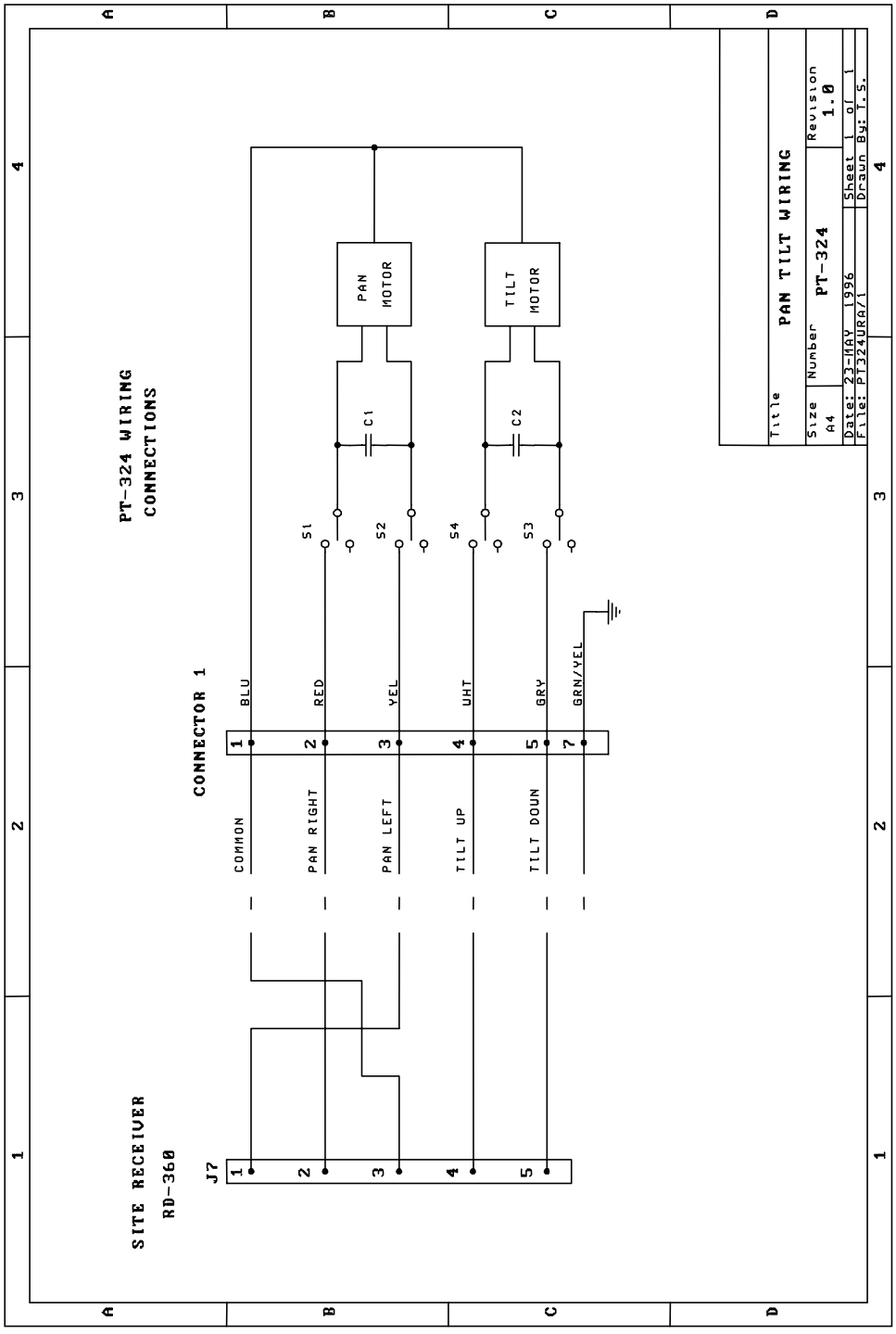
8.3 PT321 CONNECTIONS, CONTINUED



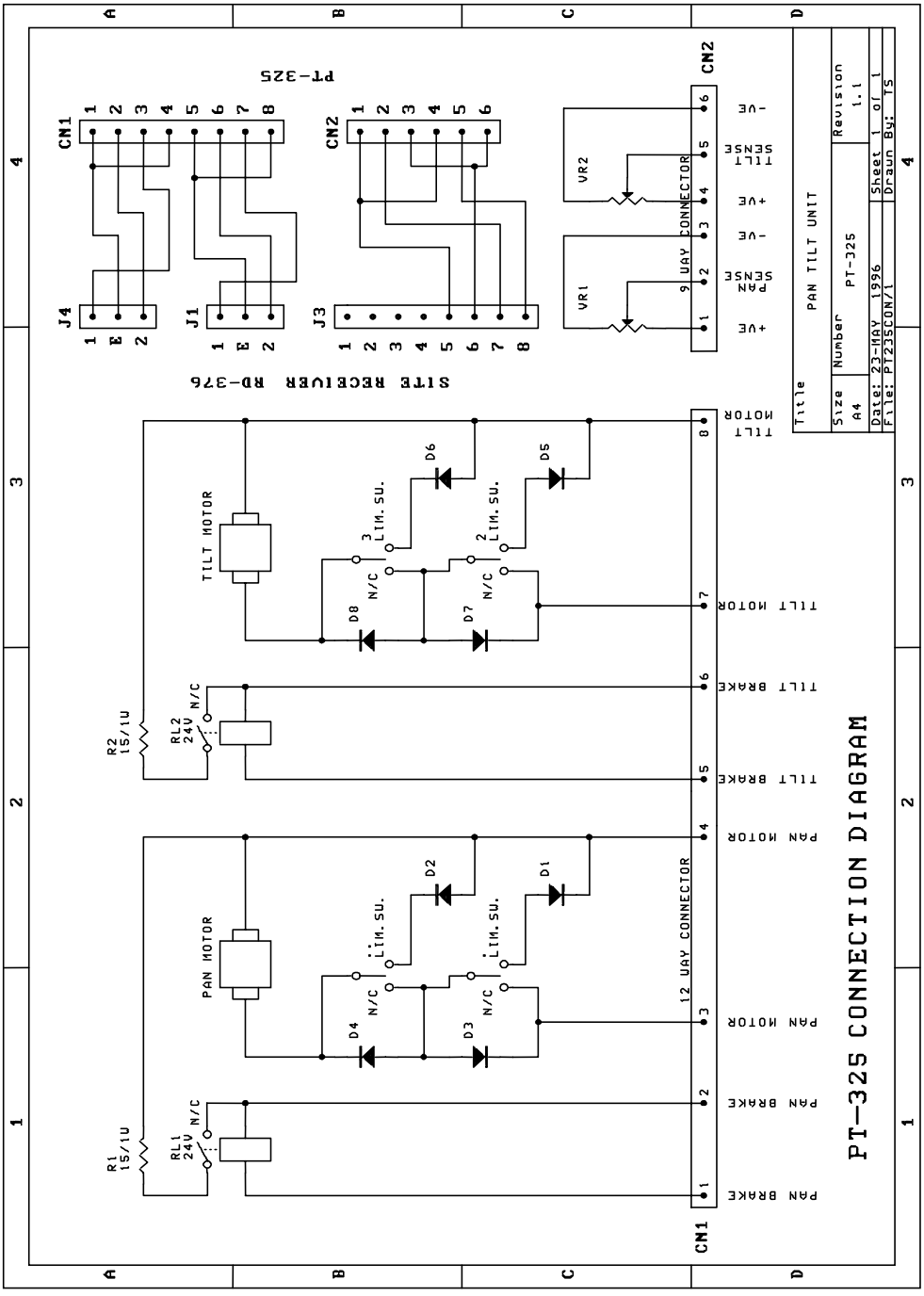
8.4 PT323 CONNECTIONS



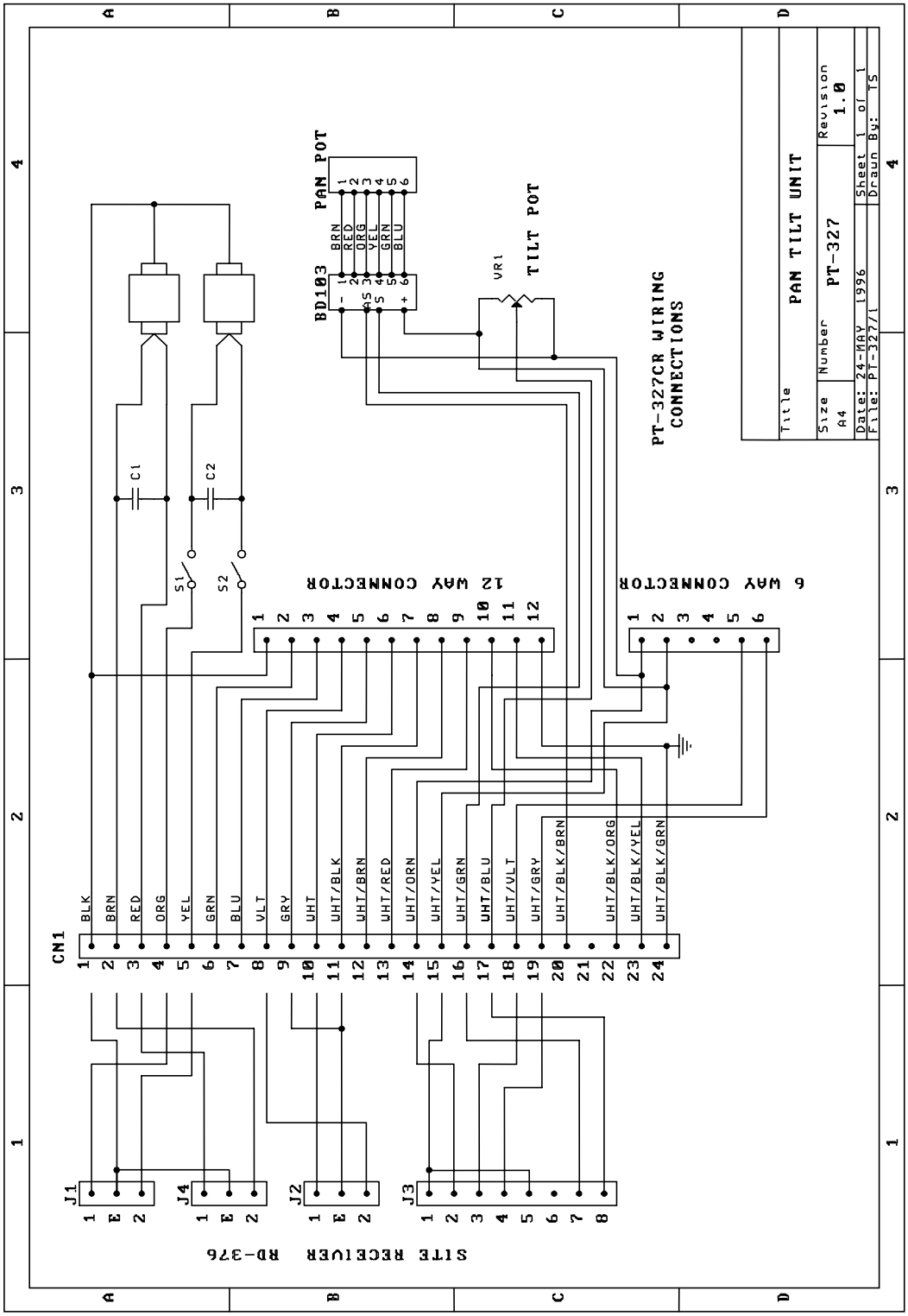
8.5 PT324 CONNECTIONS



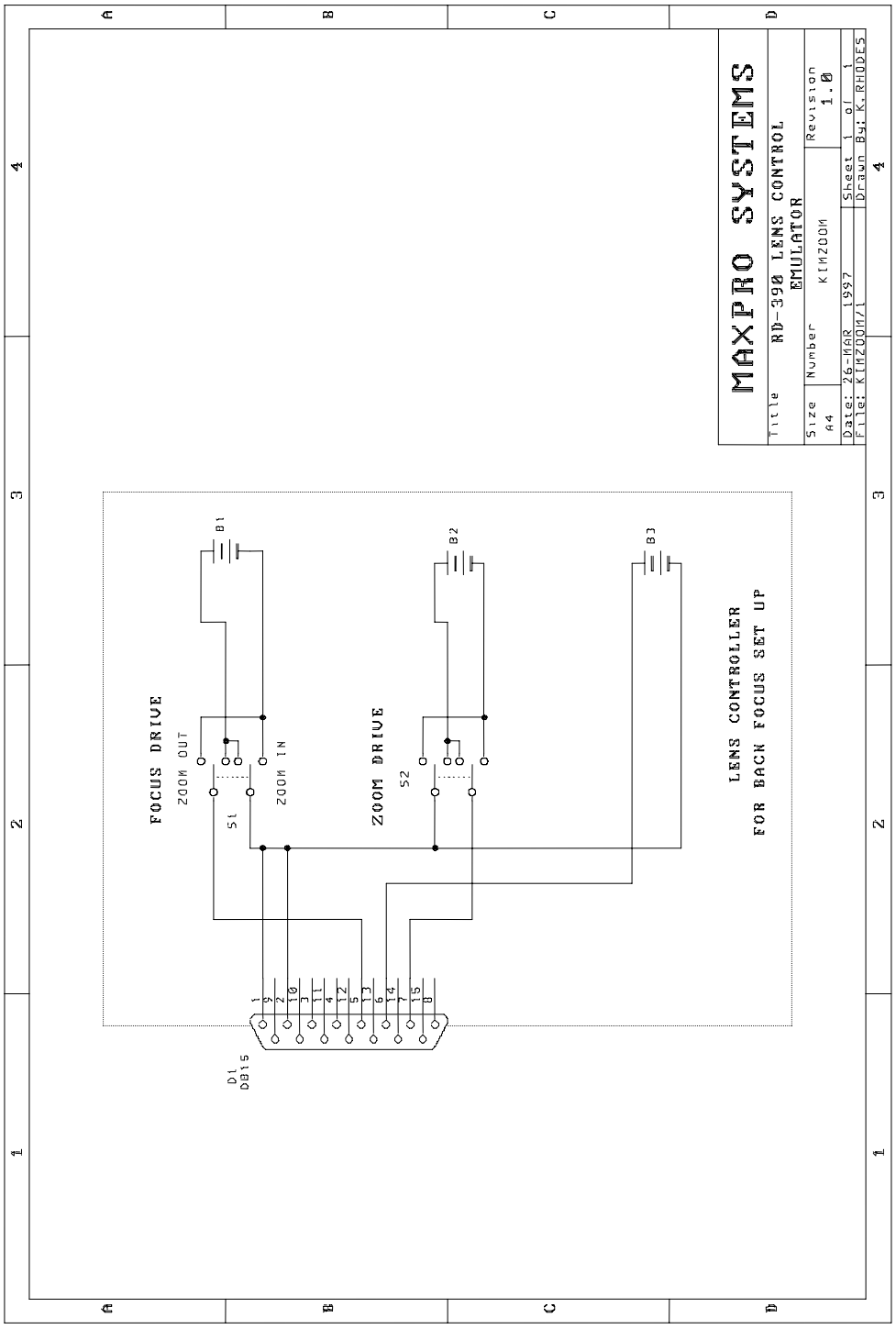
8.6 PT325 CONNECTIONS



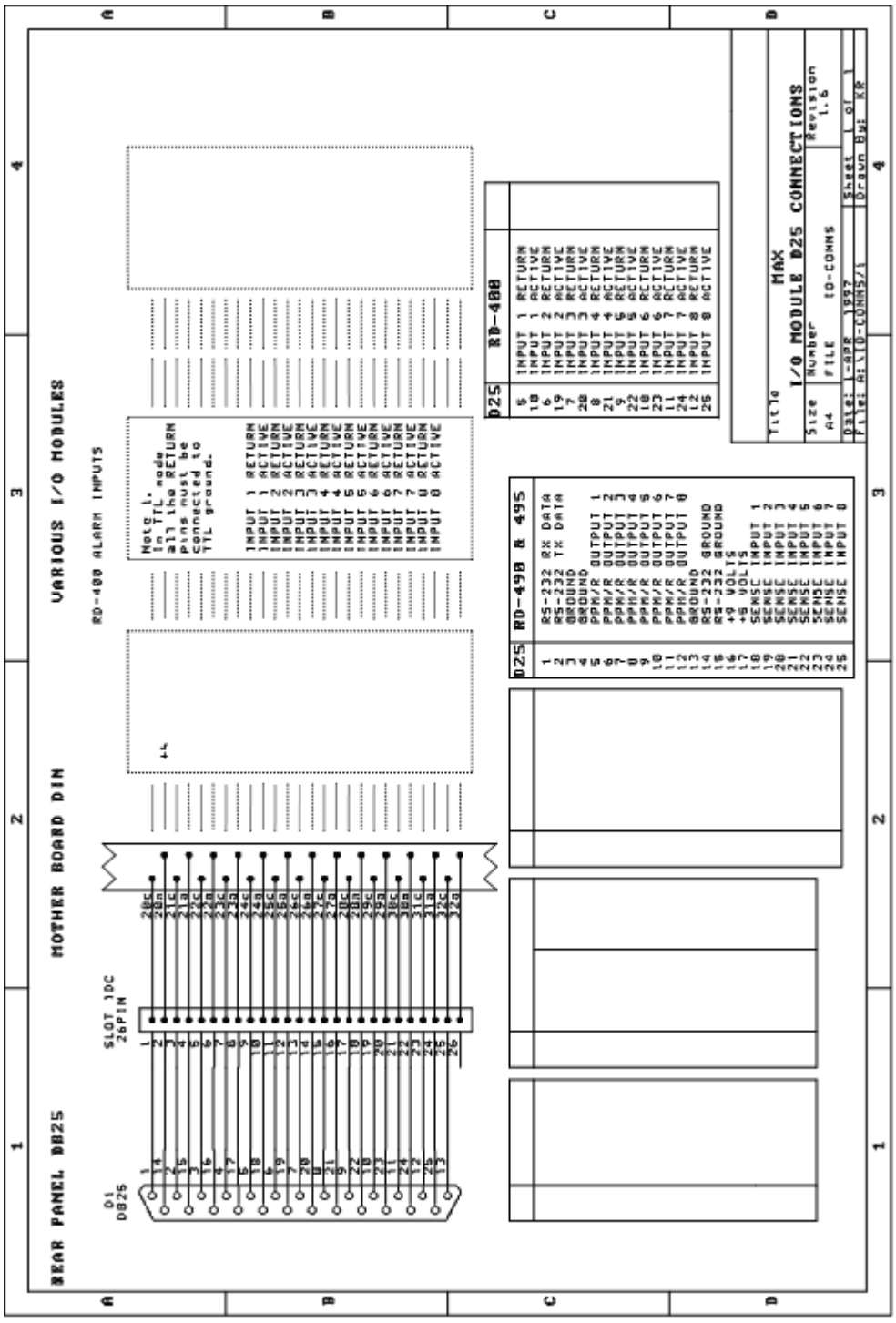
8.7 PT327 CONNECTIONS

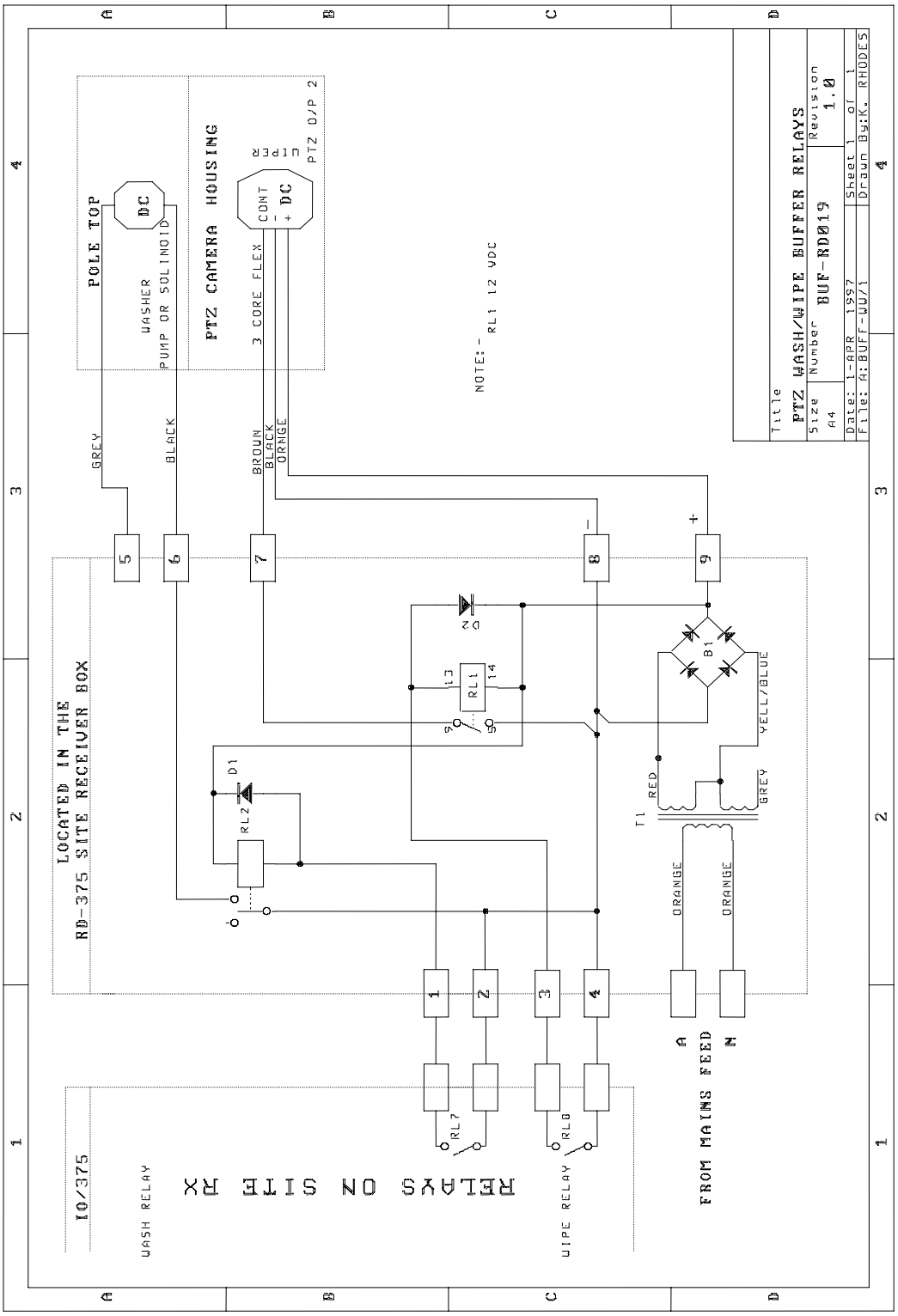


8.8 RD390 LENS CONTROL EMULATOR CONNECTIONS



8.9 I/O MODULE D25 CONNECTIONS




POLE TOP
DC
WASHER
PUMP OR SOLINOID
PTZ CAMERA HOUSING
3 CORE FLEX
CONT
- DC
+ DC
PTZ O/P 2
GREY
BLACK
BROWN
BLACK
ORNGE
NOTE:- RL1 12 VDC
LOCATED IN THE
RD-375 SITE RECEIVER BOX
D2
B1
RL1
RL2
D1
T1
RED
YELL/BLUE
GREY
ORANGE
ORANGE
RELAYS ON SITE RX
IO/375
WASH RELAY
WIPE RELAY
FROM MAINS FEED
Title
PTZ WASH/WIPE BUFFER RELAYS
Size A4
Number BUF-RD015
Revision 1.0
Date: 1-APR 1997
File: A:BUFF-WW/1
Sheet 1 of 1
Drawn By:K. RHODES

CHAPTER 9 :
SPECIALIST DOCUMENTATION

9.1 MAXPRO-Net UPGRADE INSTALLATION (From MAX-1000)

WARNING: The equipment required to be modified in the following procedure is static sensitive. Please ensure anti-static precautions are taken.

MAXPRO-Net runs on a standard windows CPU with serial port outputs. The serial devices to MAX-1000 should be connected in the same order to MAXPRO-Net Serial ports. The following items will be required to perform the hardware upgrade of the MAXPRO-Net Server from MAX-1000 systems

- Medium Philips head screw driver
- Small flat bladed screw driver
- Anti-static work station with anti-static strap
- Fine side cutters
- Soldering iron and solder

9.1.1 Directions

Ensure that power is disconnected from all equipment before commencing the upgrade.

RD500 Operator Keyboards

Remove the RD500 operator keyboard bottom panel screws. This will allow the front cover of the keyboard to be removed. Take the cover off the keyboard and lift the keyboard up from the rear to the front. Looking at the bottom of the keyboard printed circuit board ensure the unit is fitted with an 8 way dip-switch before proceeding. If a 4 way dip-switch is fitted to the unit, this keyboard cannot be upgraded to operate with MAXPRO-Net Server.

Remove the four Philips head screws holding the printed circuit board to the bottom of the case. Carefully lift the circuit board and keyboard plate and place upside down (take care not to damage joystick). Remove U4 IC from the board and replace with the replacement processor (RD500 V4.XX). Ensure anti-static precautions are taken. Move dip-switch number 6 to the OFF position to enable version 4 operation. Re-assemble keyboard and connect to MAXPRO-Net Server.

9.1.1 Directions, Continued

RD100 Subrack Controller Modules

Remove RD100 subrack controller module/s from subrack/s. Using anti-static precautions remove U6 IC from the board and replace with the IC labeled “RD100 V4.31” or higher. Ensure anti-static precautions are taken. Replace RD100 subrack controller module/s.

RD105 Subrack Controller Modules

Remove RD105 subrack controller module/s from subrack/s. Using anti-static precautions remove U6 IC from the board and replace with the IC labeled “RD105 V1.04” or higher. Ensure anti-static precautions are taken. Replace RD105 subrack controller module/s.

RD200 Text Insertion Modules

All RD200 text insertion modules require the following modifications to be made to LK2 (Link 2) located adjacent to U21. With the side cutters, cut the link between the centre pin and the "B" pin. Turn the printed circuit board over and with the soldering iron place a "solder bridge" between the centre pin and the "A" pin. Replace all RD200 modules back into relevant subrack/s.

9.2 RS-232 BASICS

The MAXPRO-Net equipment uses XON and XOFF signaling protocol and therefore does not require hardware handshake signals to be wired. Only 3 wires - TX Data, RX Data and Signal ground are required.

Using your RS-232 test box, even quite high-speed data can be seen clearly as the LED indicators flash quickly. This will indicate that data is being generated but does not indicate its speed or other characteristics.

After connecting all equipment, ensure that a light is displayed on a Data Breakout Box for each direction. This means the TX Data line is connected. If using a multimeter to determine the transmit pin, its voltage should be between -9V and -15V with reference to the ground pin.

Transmit Data (TX) pins must always be connected to Receive Data (RX) pins.

RS-232 is not balanced or transformer isolated and is generally not suitable for wiring between buildings or locations where the ground potentials are different.

While most RS-232 drivers and receivers will tolerate short circuits and accidental connection to voltages within the normal signal range, they are still subject to Electrostatic Discharge.

9.2 RS-232 BASICS, CONTINUED

The cable distances that can be used are dependent on both the speed of transmission and the type of cable used. Reducing the data rate increases the distance available as does low capacitance cable. If long distances are required use RS-232 line drivers. These line drivers convert from RS-232 to other formats such as RS-485 or Fiber Optic that are better suited to long distance data transmission. At the other end the data is converted back to RS-232 format.

AF-232 as used by MAXPRO-Net PTZ communications is not the same as RS-232. Only the signal levels are the same, the data format is incompatible with normal multiplexing and packet switching methods. AF-232 can be used where the equipment supports RS-232 signal levels but imposes no protocol & timing restrictions on the data. A typical example of this would be an RS-232 link over Optical Fiber modems where the documentation states only data rates between two baud rates, but no format or timing information.

9.3 VCR CONNECTIONS USING THE RD9022

9.3.1 Cable Manufacture

When manufacturing cables the RJ-11 male connectors must both be on the same side of the cable. This is the same standard used in telephone cables (which may be used if necessary). The flat cable usually has a rib, colored line or marking on one side that can be used as a reference.

The cable that connects between the RD9022 (previous version is the RD9005) and the VCR is normally Male-to-Male. This is because most VCRs are terminated with a socket. At some sites the VCRs are terminated to a plug and connect to the cable with a female-to-female adapter. Care must be taken with these adapters as some reverse the conductors internally, while others do not. Check for this with a meter and make the cables appropriately.

9.4 SINGLE SYSTEM JUNCTIONS (SPLIT MATRICES)

This document is intended for MAXPRO SYSTEMS trained engineers. It is expected that the reader is familiar with the use of the MAXPRO-Net SETMAX configuration software and associated tools.

Purpose

To provide the low level details on how to configure Split Matrices with interconnections. The steps involved will be outlined to the SETMAX field entry level.

Pre-reading

MAXPRO-Net System Commissioning Manual Section 3.7 (Networking and Trunking) and the Network examples in Chapter 7.

9.4 SINGLE SYSTEM JUNCTIONS (SPLIT MATRICES), CONTINUED

Definition

Where multiple matrices are controlled by one MAXPRO-Net System Controller & are interconnected via Trunklines.

The 'A' matrix will be the matrix importing the video signals exported from the 'B' matrix.

Step 1.

In special parameters set the Network Node Id to a number from 1 to 99 and set your preferred STEAL-MODE.

Step 2.

Define video inputs in the 'A' matrix noting the source group. The *net-source* field is left empty.

Step 3.

Define video inputs in the 'B' matrix, but use a different source group to the 'A' Matrix. Place the word LINK in the *net-source* field.

Step 4.

Define the network video inputs. As these do not have direct physical connections to the system, do not fill any fields that may indicate that this is the case. If the device requires control, copy the control attributes of the exported device. The source group is set to the same as the for video inputs on the 'A' matrix. Place the description of the redirected resource in the *net-source* field. The format of this description is *NodeId:DeviceIdentifier* e.g. #01:C25

Step 5.

Define the trunk inputs on the 'A' matrix using the same source group as the 'B' matrix. The *net-source* field is set to the *NodeId* e.g. #01

Step 6.

Define the trunk outputs on the 'B' matrix providing access to the 'B' matrix source group. You may also need to redefine the slot numbers. The *net-device* field is left empty.

If all the steps have been followed and the physical configuration matches the software configuration the system will now allow access to remote cameras, VCRs etc. It is vital that Trunk 1 output is connected to Trunk 1 input etc. or the system will not work correctly. See the MAXPRO-Net Commissioning Manual for details on restrictions when using trunked systems.

9.5 RECOMMENDED SIGNAL CABLES

To maintain equipment performance, signal quality and EMC compliance, only the cables listed below should be used. If other cables are selected you must ensure that they meet (or surpass) the specifications given in these tables.

9.5.1 Video cable

For video signals always use 75 ohm coax cable with properly matching terminations to prevent electrical reflections within the cable. Such reflections could be seen in the displayed picture as a GHOST image.

To prevent radiation and reduce susceptibility of electromagnetic interference never use coax cable that has less than a 95% braided shield.

Do not use foil shielded coax cables as the flexing of such cables at (or near) the physical connector termination may fracture the shield causing an intermittent earth connection for the video signal.

Cable Type	Conductor Size (AWG) Material (mm)	Dielectric Type Size (mm)	Shield Type	Jacket Type Size (mm)	Nominal Impedance ohms	Nominal Capacitance pF/m	Nominal Attenuation @200MHz db/100m
RG11/U	14 (solid) .95 CCS	CPE 7.24	95% bare Copper braid	Black PE 10.29	75	56.8	7.2
RG59B/U	23 (solid) .58 CCS	PE 3.71	95% bare Copper braid	Black NPVC 6.15	75	67.3	16.1

Select the BNC connectors specifically for the coax cable being used. The center pin must match the inner conductor size, dielectric diameter, overall cable diameter and Nominal impedance. Your cable supplier should recommend the correct 75 ohm BNC connectors for their cable.

CAUTION: Never use a 50 ohms BNC connectors. The center pin on 50 ohms male BNC connectors is slightly smaller in diameter, which has the potential for intermittent connection when plugged into a 75 ohm socket.

9.5.2 Audio (telemetry) cable

The audio telemetry data signals used for PTZ site receiver control requires a minimum of a single pair of balanced conductors (in two-wire mode), with an overall screen or shield.

This shield must be grounded at the subrack equipment end of the cable to prevent radiation and reduce susceptibility of electromagnetic interference.

CAUTION: To prevent potential earth loop problems, do not ground the shield at the PTZ camera site.

Cable Type	Number of Pairs	Wire Conductors	Nominal Outside Diameter (mm)	Nominal Capacitance pF/m (between conductors)
Belden 8723	2	22 Gauge Stranded Tinned copper (7x30)	4.19	116

The recommended cable has individually screened pairs in an aluminum-polyester shield with a 24AWG stranded tinned copper drain wire. The cables are covered with a PVC jacket. The wire conductors are polypropylene insulated providing a rating of 300V at 60°C.

WARNING: It is advisable to use a cable that contains two pairs of balanced wires. The cost difference (to a single pair cable) is usually minimal. The second pair would be required if four wire communications is used or simply as a spare wire pair for on-going system maintenance.

9.5.3 RS-232 and RS-422/485 cable

The EIA RS-232 standard is an unbalanced signal transmission standard. This means that the data signal levels (+10v or -10v DC) are inserted and measured with respect to a single SIGNAL-GROUND wire, common to both the receive and transmit data wires. This limits the distance over which it can reliably be used (approx. 30m at 19.2Kb on 100pF/m cable). Although lower capacitance cables can increase the distances possible, caution should be observed with regard to earth loop potential difference between the equipment.

Generally RS-232 direct wire connections should be restricted to equipment within the same local area and powered from a common main power source (having the same earth path).

Cable Type	Number of Pairs	Wire Conductors	Nominal Outside Diameter (mm)	Nominal Capacitance pF/m (between conductors)
Beldon 8723	2	22 Gauge Stranded Tinned copper (7x30)	4.19	116

The recommended cable has individually screened pairs in an aluminum-polyester shield with a 24AWG stranded tinned copper drain wire. The cables are covered with a PVC jacket. The wire conductors are polypropylene insulated providing a rating of 300V at 60°c.

The EIA RS-422 and RS-485 standards use a balanced wire pair to send or receive data signal levels (+5v and -5v DC). This means that the inserted signal is across the pair and not with respect to ground. When measured at the receiving end it is the difference across the wire pair that indicates the data bit being transferred. There can be AC or DC potential difference to ground and not affect the recovery of the transferred data.

Cable Type	Number of Pairs	Wire Conductors	Nominal Outside Diameter (mm)	Nominal Capacitance pF/m (between conductors)
Beldon 9829	2	24 Gauge Stranded Tinned copper (7x32)	7.73	51

The recommended cable has individually screened pairs in an aluminum-polyester shield with an overall tinned copper braid shield (65% coverage). The cable is covered with a PVC jacket. The wire conductors are polypropylene insulated providing a rating of 30V at 60°c. The nominal impedance of the cable is 100 ohms.

9.5.4 Keyboard Extension Cable

The HEGS5300 keyboards, as supplied, include a one-meter standard length of interface cable. Should there be a need, for a longer cable, an extension kit is available from the supplier. This kit has a male DB15 plug and a female DB15 socket, two Amidon Associates FB-43-5621 Shielding Beads and interconnect cable (Beldon 8732 or equivalent) cut to the required length.

9.6 POWER DISTRIBUTION

WARNING: Always disconnect the mains power supply before accessing the equipment to be serviced.

WARNING: All mains powered equipment should be connected via a locally mounted switched GPO outlet. Direct mains connection is illegal.

WARNING: When servicing equipment, the use of SERVICE TAGS should be employed at switchboards, circuit breakers, fuses and/or mains outlets to warn other personnel that the distributed power feed has been isolated.

WARNING: All precautions should be observed to prevent ELECTRICAL SHOCK.

Power distribution is a confusing and difficult area to estimate. Choosing the correct cable conductor is of major importance to minimize systems costs while maintaining power requirements for the equipment used. Minimum power requirements of PTZ site receivers, cameras, and other remote equipment must be observed with respect to total load on the power feed and voltage fluctuations caused by varying load demands of the equipment (PTZ operation etc). This should NOT be calculated on an average consumption basis. Maximum (worst case) conditions should always be assumed.

9.6 POWER DISTRIBUTION, CONTINUED

Below are three tables aimed to help with the estimation of conductor diameters required. The variables are stated as follows:

9. 1. DISTANCE required in Meters.
10. 2. MAXIMUM LOAD current in Amps.
11. 3. MINIMUM CONDUCTOR diameter in Square Millimeters (mm^2, surface area).
12.

Supply = 24v AC @ 10%

Max Load / Max Distance	**2.0 Amps**	**1.5 Amps**	**1.0 Amps**	**0.5 Amps**
50m	2.5mm^2	1.0mm^2	1.0mm^2	1.0mm^2
75m	4.0mm^2	2.5mm^2	1.5mm^2	1.0mm^2
100m	4.0mm^2	2.5mm^2	2.5mm^2	1.0mm^2
150m	6.0mm^2	6.0mm^2	4.0mm^2	1.5mm^2
200m	10mm^2	6.0mm^2	4.0mm^2	2.5mm^2
250m	10mm^2	10mm^2	6.0mm^2	4.0mm^2
300m	-	10mm^2	6.0mm^2	4.0mm^2
350m	-	10mm^2	10mm^2	4.0mm^2
400m	-	-	10mm^2	4.0mm^2
450m	-	-	10mm^2	6.0mm^2
500m	-	-	10mm^2	6.0mm^2

Supply = 24v AC @ 10%

Max Load / Max Distance	**4.0 Amps**	**8.0 Amps**
5m	1.0mm^2	1.0mm^2
10m	1.0mm^2	1.5mm^2
15m	1.5mm^2	2.5mm^2
20m	1.5mm^2	4.0mm^2
30m	2.5mm^2	6.0mm^2

9.6.1 Mains Power Distribution

Mains Supply Power distribution is equally important and raises a second concern for ELECTRICAL SAFETY. In most countries, the power utilities company will state that any power circuit must deliver a minimum current capacity of 10amps (13amps in some countries) at a switched GPO outlet. The safety and work practice standards in your country for mains power distribution must be observed at all times.

The following table should be used as a guide only to help understand how power distribution requirements affect the minimum conductor diameter size.

Supply = 240v AC @ 5%

Max Load / Max Distance	1 Amp	2 Amps	4 Amp	6 Amp	8 Amp	10 Amp
50m	1.0mm²	1.0mm²	1.0mm²	1.5mm²	1.5mm²	2.5mm²
100m	1.0mm²	1.0mm²	1.5mm²	2.5mm²	4.0mm²	4.0mm²
150m	1.0mm²	1.5mm²	2.5mm²	4.0mm²	6.0mm²	6.0mm²
200m	1.0mm²	1.5mm²	4.0mm²	6.0mm²	6.0mm²	10mm²
300m	1.5mm²	2.5mm²	6.0mm²	-	-	-
400m	1.5mm²	4.0mm²	6.0mm²	-	-	-
500m	1.5mm²	4.0mm²	-	-	-	-
600m	2.5mm²	6.0mm²	-	-	-	-

9.7 SUBRACK IDENTIFICATION

Subrack	Description	Rack Height	I/O slots	Video slots	Video Inputs	Video Outputs	Cascade Inputs
HMX1132	General purpose video selection and I/O	3 RU	5	11	32	11	11
RD1616	General purpose video selection and I/O	6 RU	16	16	32	16	16
RD1632	Video pre-selection	3 RU	-	16	32	16	16
RD1664	Video pre-selection	6 RU	-	32	64	16	16
RD2264	General purpose video selection and I/O	6 RU	10	22	64	11	11
RD3232	Video pre-selection	6 RU	-	32	32	32	32
RD6464R/U	Video pre-selection	6 RU	-	16	64	64	-
RD6464R/L	Video pre-selection	6 RU	-	16	64	64	-
RD1601	General text insertion	3 RU	-	16	-	16	16
RD3201	General text insertion	6 RU	-	32	-	32	32
RD3275	Pre-text insertion with video fail detection	6 RU	-	32	-	32	32
RD3276	Loop-thru pre-text insertion with video fail detection	6 RU	-	32	-	32	32
RD16C05	Video combiner	3 RU	-	16	16*5	16	-
RD32C05	Video combiner	6 RU	-	32	32*5	32	-
RD16C10U	Video combiner with text insertion	6 RU	-	32	16*10	16	-
RD16C10U/L	Video combiner with text insertion	6+6 RU	-	32+32	16*10 + 16*10	32	-
RD16C20U	Video combiner with text insertion	6 RU	-	32	16*20	16	-
RD16C20U/L	Video combiner with text insertion	6+6 RU	-	32+32	16*20 + 16*20	32	-
RD16C32R	Video combiner	3 RU	-	16	16*32	16	-
RD32C32R	Video combiner	6 RU	-	32	32*32	32	-
RD1678	VDA and equalization	3 RU	-	16	16	48	-
HMX1600	I/O only	3 RU	16	-	-	-	-
RD3200	I/O only	6 RU	32	-	-	-	-

9.8 SUBRACK CURRENT CONSUMPTION

Subrack	Description	Video modules		I/O modules	Total
		Part Numbers	Qty	Qty	Current
HMX1132	General purpose video selection and I/O	RD85/89/200	11	5	1.3 amps
RD1616	General purpose video selection and I/O	RD85/89/200	16	16	2.8 amps
RD1632	Video pre-selection	RD85/89/200	16	-	2.1 amps
RD1664	Video pre-selection	RD85/89/200	32	-	4.0 amps
RD2264	General purpose video selection and I/O	RD85/89/200	22	10	2.5 amps
RD3232	Video pre-selection	RD85/89/200	32	-	3.1 amps
RD6464R/U	Video pre-selection	RD84	16	-	5.0 amps
RD6464R/L	Video pre-selection	RD84	16	-	3.5 amps
RD1601	General text insertion	RD200	16	-	1.2 amps
RD3201	General text insertion	RD200	32	-	2.2 amps
RD3275	Pre-text insertion with video fail detection	RD200	32	-	2.2 amps
RD3276	Loop-thru pre-text insertion with video fail detection	RD85/89/200	32	-	2.7 amps
RD16C05	Video combiner	RD85	16	-	1.1 amps
RD32C05	Video combiner	RD85	32	-	2.1 amps
RD16C10U	Video combiner with text insertion	RD85 & RD200	16+16	-	2.1 amps
RD16C10U/L	Video combiner with text insertion	RD85 & RD200	32+32	-	4.2 amps
RD16C20U	Video combiner with text insertion	RD85 & RD200	16+16	-	2.1 amps
RD16C20U/L	Video combiner with text insertion	RD85 & RD200	32+32	-	4.2 amps
RD16C32R	Video combiner	RD85	16	-	1.1 amps
RD32C32R	Video combiner	RD85	32	-	2.2 amps
RD1678	VDA and equalization	RD81	16	-	1.1 amps
HMX1600	I/O only	-	-	16	1.8 amps
RD3200	I/O only	-	-	32	3.6 amps

9.8 SUBRACK CURRENT CONSUMPTION, CONTINUED

NOTE: Total subrack's current consumption is calculated with the subrack fully populated with RD85, RD200 and RD430 modules, where applicable. Whatever warning needed.

CAUTION: The stated current consumption for subracks using I/O modules is based on using RD400 and RD430 modules. When using RD440 relay output modules, an addition 250mA (per RD440 module) must be added to the subrack total current consumption.

CAUTION: Where an RD200 is indicated, RD205 and RD220 may be used. (Add 35mA/RD205module and 70mA/RD220 to subrack current shown) Whatever warning needed.

9.9 MODULE CURRENT CONSUMPTION

CODE	FUNCTION	CURRENT +9 V Supply (idle/active)	CURRENT -9V Supply
RD81	EQ VDA	60 mA	50 mA
RD82	VDA	80 mA +12 Volts	n/a
RD84	Pre-select Switching	220 mA	170 mA
RD85	Video switching	60 mA	50 mA
RD89	Video Verification	130 mA	45
RD105	Subrack Control	85/130 mA	nil
RD200	Text Inserter	65 mA	30 mA
RD205	Text Inserter	100 mA	50 mA
RD220	Text Inserter	135 mA	50 mA
RD315	PTZ Controller (SMT)	30/60 mA	nil
RD315	Site Rx Comms.	20/60 mA	nil
RD316	RS-422/485 comms.	75/95 mA	nil
RD400	Alarm I/P	97/160 mA	45 mA
RD430	Control O/P	4/115 mA	nil
RD440	Control O/P	4/400 mA	nil
RD490	Peripheral I/Face (SMT)	40/175 mA	nil
RD490	Peripheral I/Face (SMT)	35/200 mA	Nil
RD494	Resitive Ladder	35/180 mA	nil
RD496	Wire Remote	360 mA	n/a
HEGS5300	Keyboard	500/600 mA (12 V AC/DC)	n/a
RD824	Video Bus Driver	60 mA	60 mA
RD825	Loop Though VBD	30 mA	30 mA
HMX832	HD-Video Input Card	30 mA	30 mA
MX208	HD-Text Card	950 mA	70 mA
MX108	HD-O/P No Text	65 mA	65 mA
MX116	16-Way O/P Card	105 mA	12 mA
HMX128	HD-Controller Card	430 mA	2.5 mA

CHAPTER 10 :
SYSTEM CONFIGURATION

10.1 THE SETMAX CONFIGURATOR FOR MAXPRO-Net

The SETMAX configuration editor is used to edit the MAXPRO-Net system configuration and performance specifications. Refer to the COMMISSIONING MANUAL and the MAXPRO-Net Software Configuration User Guide for more detailed information.

Notes:

CHAPTER 11:
HD-SERIES
QUICK-START GUIDE

11.1 GENERAL

Your MAXPRO-Net HD Series video switching equipment is shipped to you pre-assembled and pre-configured (where possible). To assist you in obtaining maximum functionality within the minimum time, we have provided the following Quick-Start instructions.

11.2 UNPACKING

a) Remove your MAXPRO-Net HD Series equipment from its packaging and install it according to good engineering practice.

b) Remove the MX-32128 metal front panel and cardboard support (where fitted) then replace the front panel.

11.3 CONNECTIONS

a) Connect the mains power lead(s) to your System Controller and System Power Supply. Ensure the mains voltage settings are correct.

b) Connect the supplied power cable between the MX-32128 subrack and your System Controller or MX-PS9 System Power Supply.

c) Connect the subrack data cable from the MX-32128 subrack to Port 1 of your System Controller.

d) Connect a BNC patch cable from the menu output of your System Controller to the last video input connector on your MX-32128 subrack.

e) Connect a monitor(s) to the video output connectors of your MX-32128 subrack.

f) Connect both the RD-500/530 and ‘qwerty’ keyboards to your System Controller.

g) Connect video source cables to the inputs of your MX-32128 subrack.

11.4 STARTUP

a) Insert the supplied system software (disk) into the floppy disk drive of your System Controller.

b) Apply power to your System Controller/power supply.

c) Wait for your system to boot, your system will now be operational.

11.5 BASE CONFIGURATION

As shipped, your MAXPRO-Net HD Series switcher is pre-configured as follows: -

a) All video inputs are defined as cameras with names preset to CAMERA **xx,** where **xx** is the physical input number. The only exception to the above is the final video input which has been defined as the system **menu** input.

b) All cameras have pan/tilt/zoom control defined.

c) Video fail/level testing is **disabled** (this is to prevent numerous alarms from unconnected or non-existent video sources).

d) All video outputs are configured as monitors with text, the first monitor output has been configured to display all alarms.

e) Keyboard and operator definitions have already been entered, however no password log-on/off requirement has been defined).

NOTE: QWERTY keyboards have menu access through the **"SHIFT"** and **"?"** keys when operated simultaneously.

11.6 CUSTOMIZING YOUR CONFIGURATION

System configuration details are covered in the MAXPRO-Net Commissioning Manual supplied with your system. There are, however, a number of items specific to the HD Series which are detailed below.

11.6.1 Enabling Video Fail/Level Detection.

HD Series hardware includes video fail/level detection hardware. This may be enabled by entering the appropriate value into the FSL field (Video Failed Detector Slot Number) of the video input table within the SETMAX Configurator.

Values are as follows:

Physical Input Range	Slot Number (FSL field in SETMAX)
1- 32	11
33-64	12
65- 96	13
97-128	14

NOTE: In all other respects, video fail/level detection is as detailed within the Commissioning Manual.

11.6.2 Pan/Tilt Control

As shipped, all video inputs are defined as cameras with pan/tilt control. During commissioning, it is advantageous to disable pan/tilt control for fixed cameras or other video sources not having control. (This provides for automatic operator feedback from the system if control of a fixed camera is attempted). To disable pan/tilt control for a particular camera, remove the entries from the CID, CSL and CSI fields in the ***Video Input*** table within the SETMAX Configurator.

HMX32128 subracks have 8 ports for pan/tilt control. These are divided into two groups - A & B.

Group A consists of ports 1 – 4, and group B ports 5 – 8. This allows two independent PTZ control protocols to exist. For example ports 1 – 4 could be assigned to Diamond protocol and ports 5 – 8 could be assigned to Maxpro protocol.

11.7 CONTROL CARD DIP SWITCH SETTINGS

The HMX128 controller card (the left-most card when viewing the front of the subrack) has four 8-way DIP switches. The upper switches (SW1 and SW2) control the Pan/Tilt protocol while the lower two (SW3 and SW4) control the subrack ID, baud rate, and alarm detection mode.

The upper switch (SW1) controls Pan/Tilt protocol for Group A (ports 1 to 4 on rear of HMX128 card). The lower switch (SW2) controls Pan/Tilt protocol for Group B (ports 5 to 8 on rear of MX-128 card).

Below are the DIP Switch settings for SW1 and SW2.

1	2	3	4	5	6	7	8	Protocol
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Diamond FastScan/SmartScan
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Diamond SmartScan III/KD6
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	MAXPRO RS-485
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	MAXPRO AF-485
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	Panasonic
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	Pelco AD Format
OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	Vicon Std
ON	ON	ON	OFF	OFF	OFF	OFF	OFF	Vicon Extended
OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	Star Micronics
ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	VIDEV
OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	VCL
ON	ON	OFF	ON	OFF	OFF	OFF	OFF	Pelco P Format
OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	JVC
ON	OFF	ON	ON	OFF	OFF	OFF	OFF	Speeddome
OFF	ON	ON	ON	OFF	OFF	OFF	OFF	Kalatel
ON	ON	ON	ON	OFF	OFF	OFF	OFF	Baxall 7000 Series
OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	Panasonic 850 Series 19K2 Baud
ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	Panasonic 850 Series 9600 Baud
OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	Forward Vision MIC1-300
ON	ON	OFF	OFF	ON	OFF	OFF	OFF	Pelco Coaxitron
OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	VST1

1 MX302 firmware, version 2.06 or higher.

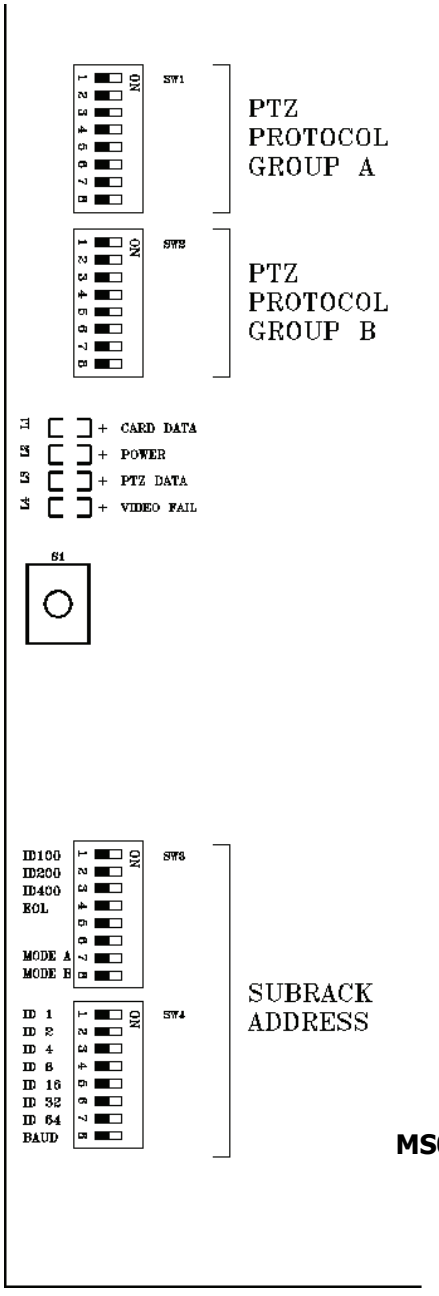
11.7 CONTROL CARD DIP SWITCH SETTINGS, CONTINUED

As shipped pan/tilt control is defined in SETMAX Configurator as follows: -

Physical Input	Port CSL	PTZ Site No. CSI
1 – 16	1	1 - 16
17 – 32	2	1 - 16
33 – 48	3	1 - 16
49 – 64	4	1 - 16
65 – 80	5	1 - 16
81 – 96	6	1 - 16
97 – 112	7	1 - 16
113 – 128	8	1 - 16

The above default configuration may be modified to suit cabling and/or protocol requirements.

HMX128 LAYOUT



MS001310 PCB and later revisions

[S1] This is a system reset button for the HMX128 Control Card. This is used only for commissioning and troubleshooting.

11.8 SUBRACK ADDRESSING

The subrack address is set up by SW3 and SW4. SW4 sets the binary subrack address in the range 1 – 99. SW3 sets the 100's group.

e.g. SW3 - ALL OFF
SW4 - 1 and 3 ON

= subrack address 5

e.g. SW3 - 2 ON
SW4 - 4 ON

= subrack address 208

11.9 SUBRACK BAUD RATE

This is set SW4 / 8. The default is 19.2K OFF.

11.10 SUBRACK DATA PORTS

When using 2 or 3 HMX32128 subracks, use ports 1, 2 & 3 respectively on your System Controller. The default baud rate for the subrack is 19.2K, however this can be changed to 9600bps using DIP switch 4, position 8 on the HMX128 Controller Card.

11.11 ALARM DETECTION MODE

If the optional HMX4248 I/O board is fitted, the alarm detection mode may be switched between contact closure mode, and end-of-line resistor mode via SW3 / 4.

11.12 HD-SERIES SUBRACKS AS COMBINERS

The HMX32128 subracks can be used as combiners, with 3 operating modes selectable by DIP switch number 3, positions 7 & 8.

Normal operating mode is selected by SW3 / 7 and SW3 / 8 in the OFF position. Other operating modes are shown below.

When creating a 32C08 combiner by using a 16C08(A) and a 16C08(B) both subracks share the same ID.

MX-128 Mode	Switch 3/7	Switch 3/8
Standard	OFF	OFF
32C04	ON	OFF
16C08(A)	OFF	ON
16C08(B)	ON	ON

11.13 INSTALLATION TIP

If operating the HD Series switcher with the front cover removed, the input and output cards (HMX832, MX108, MX208, MX116) may have a tendency to move forward slightly when coaxial connectors are being installed on the rear. Before testing your HD Series switcher, ensure all cards are seated correctly. It is for this reason that it is a good idea to leave the front panel on until you are ready to commission/test.

11.14 TECHNICAL NOTES

11.14.1 Hardware Mapping

The subrack ID as setup on the HMX128 card defines the ID for all functions of the HMX32128 subrack, i.e. when defining pan/tilt control or text attributes the subrack ID fields will be as per the HMX128 setting.

As the MAXPRO-Net HD series incorporates all of is functionality via one subrack ID it was necessary to “map” this to “slot” numbers which may then be entered via SETMAX, the MAXPRO-Net® configuration editor.

The hardware mappings are as follows: -

a. Video Fail/Level Detection

Physical Input	Slot (FSL field in SETMAX)
1 - 32	11
33 – 64	12
65 – 96	13
97 - 128	14

b. Pan/Tilt Control Ports

Physical Outputs on Control Card	Slot (CSL field in SETMAX)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

c. Text

Text	Slot (TSL field in SETMAX)
Output Card 1	1 – 8
Output Card 2	9 – 16
Output Card 3	17 – 24
Output Card 4	25 – 32

11.14.1 Hardware Mapping, Continued

d. Alarm Inputs

Alarm Input	Slot (ASL field in SETMAX)
1 – 8	15
9 – 16	16
17 – 24	17

e. Control Outputs

Output Number	Slot (OSL field in SETMAX)
1 – 8	1

11.14.2 Vertical Interval Switching

The reference input for vertical interval timing is physical input 1 (this is a hardware function and is not user changeable).

11.14.3 Black Pause Switching

Black pause switching is activated on the MX208 module by the fitting of a jumper across the black pause header pins (PB) located adjacent to pin 6 of the 48-way communications header. This enables the functionality for all 8 channels.

The MX208 performs clamp to black as a secondary function to text insertion. Where multiple switching and text commands are processed simultaneously (as would be the case with synchronized scanning on multiple monitors) the effectiveness of clamp to black in hiding visible frame roll may be reduced.

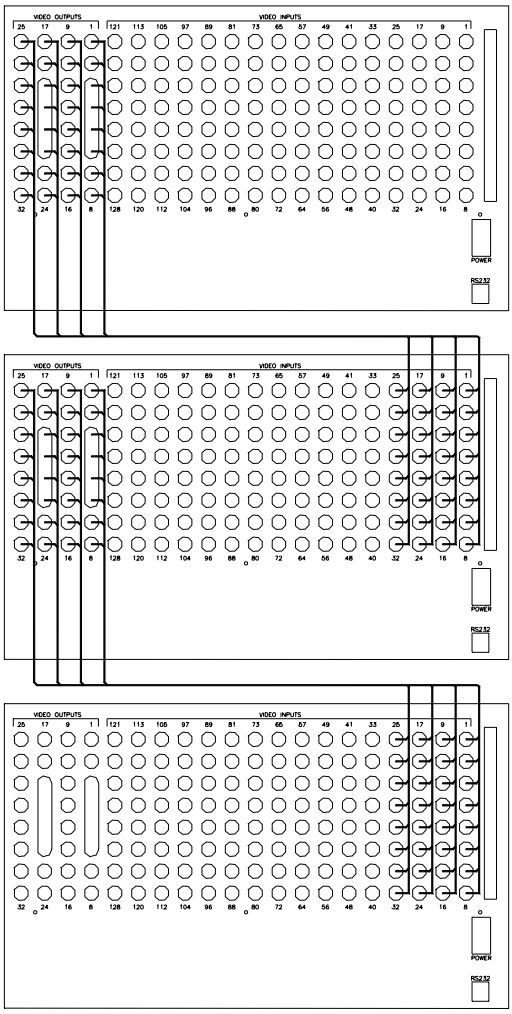
11.14.4 PAL/NTSC Determination

MX-208 cards perform automatic PAL/NTSC standard determination in order to accurately synchronize screen text updates. Each MX-208 acts independently and utilizes source video from its channel 1 as the reference for determination.

11.14.5 Cascading Multiple HMX32128 Subracks

The HMX32128 subracks in spite of not having a dedicated cascade input, may still be chained together to form switchers with greater than 128 inputs.

A maximum of three HMX32128 subracks may be cascaded. The method of interconnection is as detailed on the following diagram. Note that the outputs of the first MX-32128 are patched to the inputs of the second MX-32128 on a one-to-one basis, i.e. output 1 connects to input 1 and so on. This procedure is repeated for the third MX-32128. Programming for cascading is as per that detailed in the Commissioning Manual.



11.15 HMX4248 I/O MODULE FOR HMX32128

11.15.1 General

The HMX4248 module is an I/O (Input/Output) expander for the HD Series MAXPRO-Net® Subrack. The unit features twenty-four alarm inputs, which may be configured as either contact closure or end-of-line resistor sensing (dip switch selectable on the MX-128 controller card), and eight relay outputs.

11.15.2 Installation

a) Fit the MX-4248 to the rear of the MX-32128 subrack utilizing the mounting stand-off posts and screws supplied.

b) Connect the MX-4248 to the MX-128 using the supplied ribbon cable (take care not to dislodge the MX-128 when seating the connector).

3) Select the required operating mode on the MX-128 (dip switch 3, position 4 – OFF = contact closure mode, ON = end-of-line resistor mode).

4) Connect field cabling to input/output connectors.

11.15.3 Contact Closure, or End-Of-Line Modes

CC (Contact Closure) Mode

When configured in the CC mode, the HMX4248/HMX128 will detect contact state changes accordingly to the NO/NC setting as defined in the *Alarm Input* table in SETMAX.

EOL (End-Of-Line) Mode

In the EOL mode a setting of NC in SETMAX will cause an alarm to become active when the alarm loop becomes either open or short circuit (unsealed). Conversely, in the NO mode the alarm will become active when the loop is in the “sealed” position.

11.15.4 Specifications (MX-4248)

Alarm Inputs:	24
Operating Mode:	Contact Closure or End-Of-Line Resistor
	(EOL value = 10K OHM)
Maximum Input Voltage:	+ / - 20V
Noise Immunity:	6V p-p AC @ 50/60 Hz
Control Outputs:	8
Maximum Current:	1 Amp
Maximum Voltage:	50V

11.16 USING THE DIAMOND DOME CAMERA SET-UP MENU

Before You Start

Is the Dome operational and can you control it? Pan/Tilt, etc.

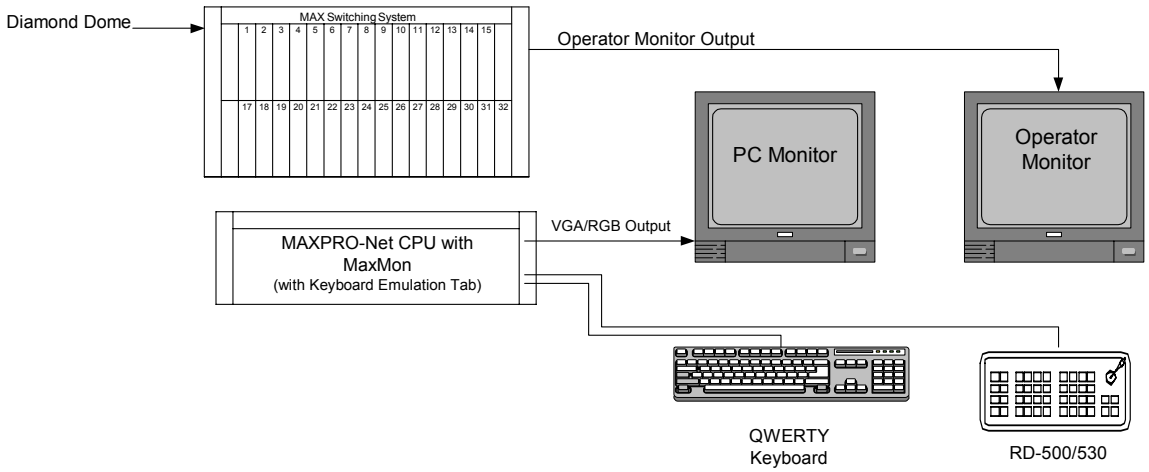
Check Firmware version

Controller Card	Firmware Version
RD316	V2.0 and later
HMX128	MX308 Chip V1.06 and later

Equipment Required

- MAXPRO-Net System
- Dome to be configured
- MaxMon Utility
- QWERTY Keyboard
- Two monitors

11.16.1 Equipment Configuration



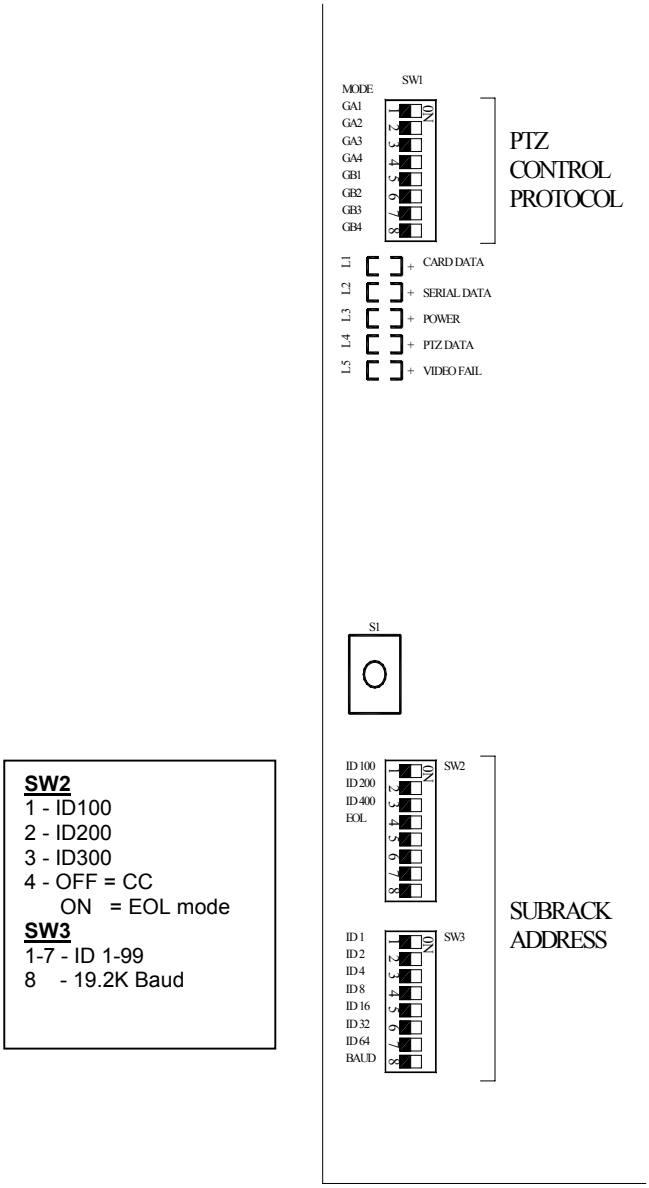
11.16 USING THE DIAMOND DOME CAMERA SET-UP MENU, CONTINUED

11.16.2 Operation

1. Log QWERTY keyboard (System Keyboard) to the Operator monitor (See MaxMon Manual For details).
2. Select the Dome being configured to the Operator monitor.
3. Select the required Set-up menu from the Test monitor in the Maxmon menu.
4. Select the required option from the menu now displayed on the Operator monitor.
5. Make the required changes.
6. Esc to exit the configuration menu on the Operator monitor.
7. Log off System Keyboard from MaxMon
8. Use the MAXPRO-Net system as normal.

11.17 HMX128 MODULES WITH 3 DIP SWITCHES (OLDER VERSIONS)

MX128 LAYOUT



SW2
1 - ID100
2 - ID200
3 - ID300
4 - OFF = CC
ON = EOL mode
SW3
1-7 - ID 1-99
8 - 19.2K Baud

SW1

GA1 or GB1	GA2 or GB2	GA3 or GB3	GA4 or GB4	Protocol
OFF	OFF	OFF	OFF	Diamond FastScan/SmartScan
ON	OFF	OFF	OFF	Diamond SmartScan III/KD6 onwards
OFF	ON	OFF	OFF	MAXPRO RS-485
ON	ON	OFF	OFF	MAXPRO AF-485
OFF	OFF	ON	OFF	Panasonic
ON	OFF	ON	OFF	Pelco AD Format
OFF	ON	ON	OFF	Vicon Std
ON	ON	ON	OFF	Vicon Extended
OFF	OFF	OFF	OFF	Star Micronics
ON	OFF	OFF	OFF	VIDEV
OFF	ON	OFF	OFF	VCL
ON	ON	OFF	ON	Pelco P Format
OFF	OFF	ON	ON	JVC
ON	OFF	ON	ON	Speeddome
OFF	ON	ON	ON	Kalatel
ON	ON	ON	ON	Baxall 7000 Series

[S1] This is a system reset button for the MX128 Control Card. This is used only for commissioning and troubleshooting.

11.18 MX826 VIDEO DISTRIBUTION MODULE

11.18.1 General

The MX826 Video Distribution Module is a two (2) channel Video Input Distribution Module with three (3) outputs per channel.

Designed specifically to enable video distribution from the MAXPRO-Net HD Series HMX32128 subrack, the module can be installed into any* of the 16 Video Input slots (1 – 16), or any* of the Video Output Slots (1 - 4) on the HMX32128 Subrack.

* Denotes – If installing MX-826 Modules into a MX-32128 Subrack they MUST NOT be installed in between or before Input Modules (MX-832 / MX-832L) so as not to break the video input bus in the Subrack.Whatever warning needed.

CAUTION: The MX826 cannot be installed in Slot 0 (most left-hand-side slot) of the HMX32128. This slot is reserved for the HMX128 Subrack Controller Module only.

If the HMX32128 is being used solely for Video Distribution (only populated with MX-826 Modules) then a MX-128 Subrack Controller Module is not required.

No programming is required within SETMAX to enable the module, so installation and operation is simple.

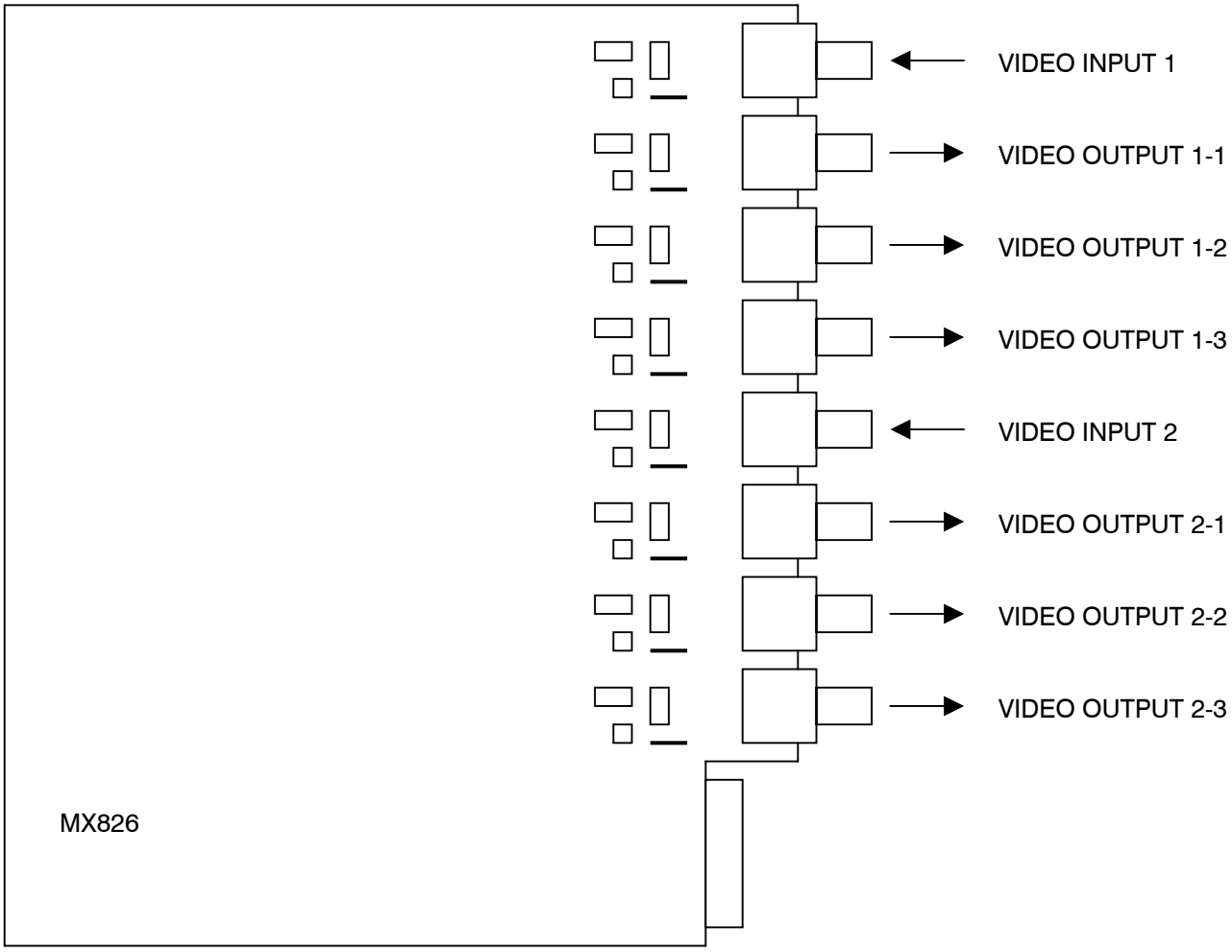
11.18.2 Operation

BNC connector number 1 (top of the module) is the first video input channel. The following three (3) BNC connectors are the distributed video signal outputs.

BNC connector number 5 is the second video input channel. The following three (3) BNC connectors (bottom 3 of the module) are the distributed video signal outputs.

11.18.3 Installation

MX-826 BNC TERMINATIONS



The 1st BNC connector at the top of the MX-826 is Video Input Number 1, with the following 3 BNC connectors providing video outputs.

The 5th BNC connector from the top of the MX-826 is Video Input Number 2, with the following 3 BNC connectors providing video outputs.

11.19 HMX832 AND HMX832L VIDEO INPUT AND SWITCHING MODULES

11.19.1 General

The HMX832 and HMX832L Video Input and Switching Modules are both 8 input Modules designed to connect video inputs to the HD-Series of Video Matrix Switches.

Either Module style can be fitted to an HMX32128 Subrack, and both can be fitted to the same subrack simultaneously. Physically they both function in the same manner. Up to 16 HMX832 or HMX832L Modules can be fitted into one HMX32128 Subrack (maximum of 16 video input slots available).

11.19.2 HMX832 Connectors

The MX-832 is fitted with 8 BNC connectors on the rear of the Module for simple connection of video inputs via industry standard coaxial cable connectors.

11.19.3 HMX832L Connectors

The HMX832L is fitted with two 16-way IDC style male connectors on the rear of the Module to allow 8 video inputs (top connector), looping to the second 16-way IDC style connector (bottom connector). This application can be used for “Looping” or “Cascading” HD-Series Matrix Switches, or simply for utilizing the MXBNC64 or MXBNC128 Video Input Plates (Patch Panels - refer to Product Data Sheets for details of these two products).

11.19.4 Operation

Both the HMX832 and HMX832L Modules are fitted with eight 3-pin jumpers (Termination 1 – Termination 8) located near the video input connectors at the rear of the Module. These jumpers are used to terminate the video on the Module at 75 ohm (if required).

CAUTION: The 3-pin Termination Jumpers are only available from board numbers MS001287 and above (HMX832 Rev. 8).

Previous versions of the hMX832L required a MX9018 Plug-in Terminator, and Audio applications could utilize the HMX832A Module (fitted with BNC connectors), which did not have the 75 ohm terminating resistors fitted.

In a “Looping” or Cascading” configuration 75 ohm terminating is not required and the jumpers should be placed in the “OFF” position (to the left).

If terminating is required or the Module is the last in a “Looping” or “Cascading” configuration, the jumpers should be placed in the “ON” position (to the right).

If the HMX832 or HMX832L Module is being used to switch Audio signals through the Matrix, 75 ohm terminating is not required and the jumpers should be placed in the “OFF” position (to the left).

11.19.5 Installation Accessories

From the factory the HMX832L is provided with one MXLCM4 cable. This cable is 400mm in length and is fitted with one 16-way IDC style female connector at each end. This cable assembly is used to connect HMX832L Modules to subsequent HMX832L Modules or to MXBNC64 or MXBNC128 Video Input Plates (Patch Panels).

An optional MXLCM8 can be ordered which is 800mm in length.

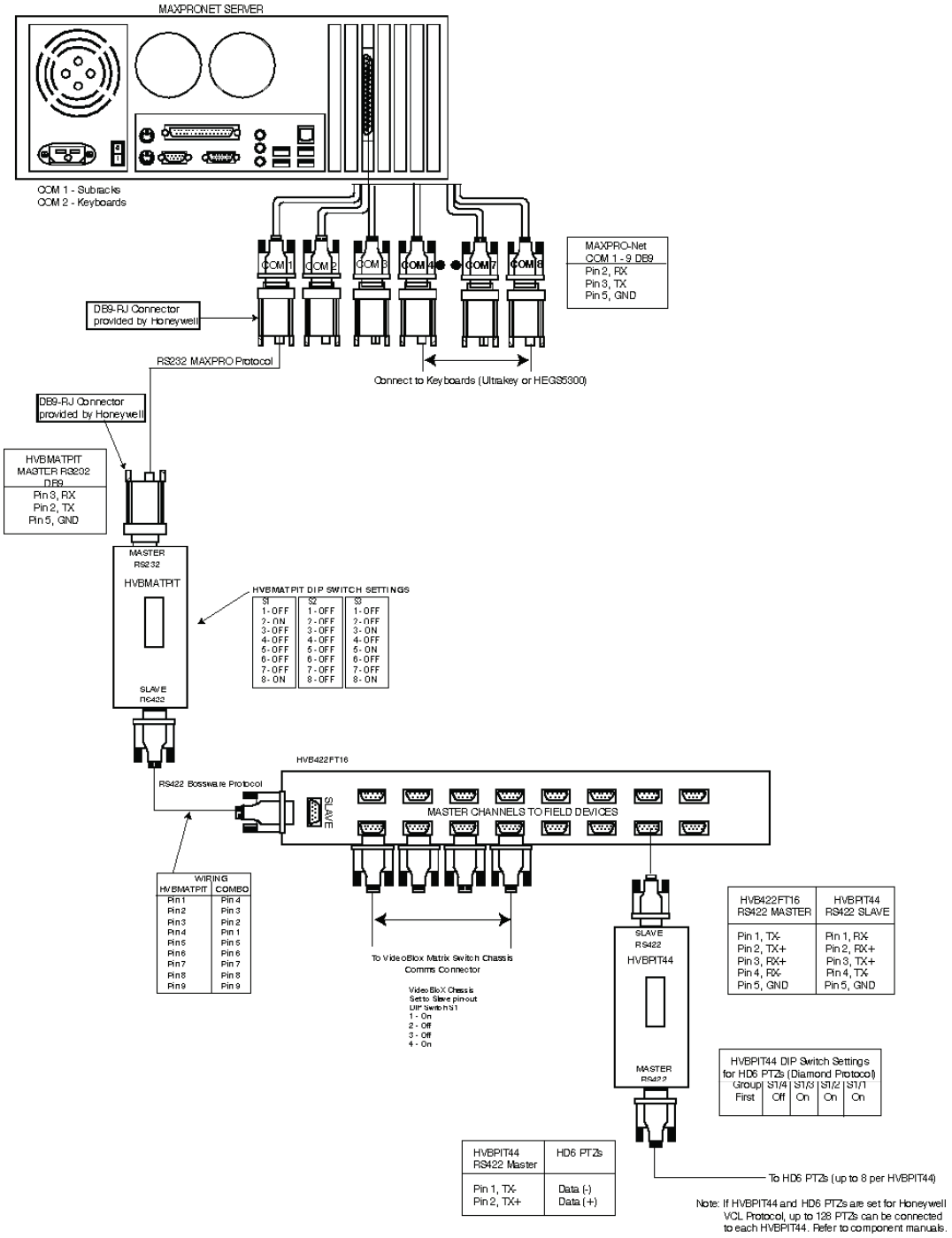
There is also a MXCCxM cable assembly (“x” denotes variables 1, 2, or 3 for 1000mm, 2000mm or 3000mm lengths), used to inter-connect MX-832L Modules to MX116 Video Output Modules in the HD-Series of Matrix Switches.

Notes:

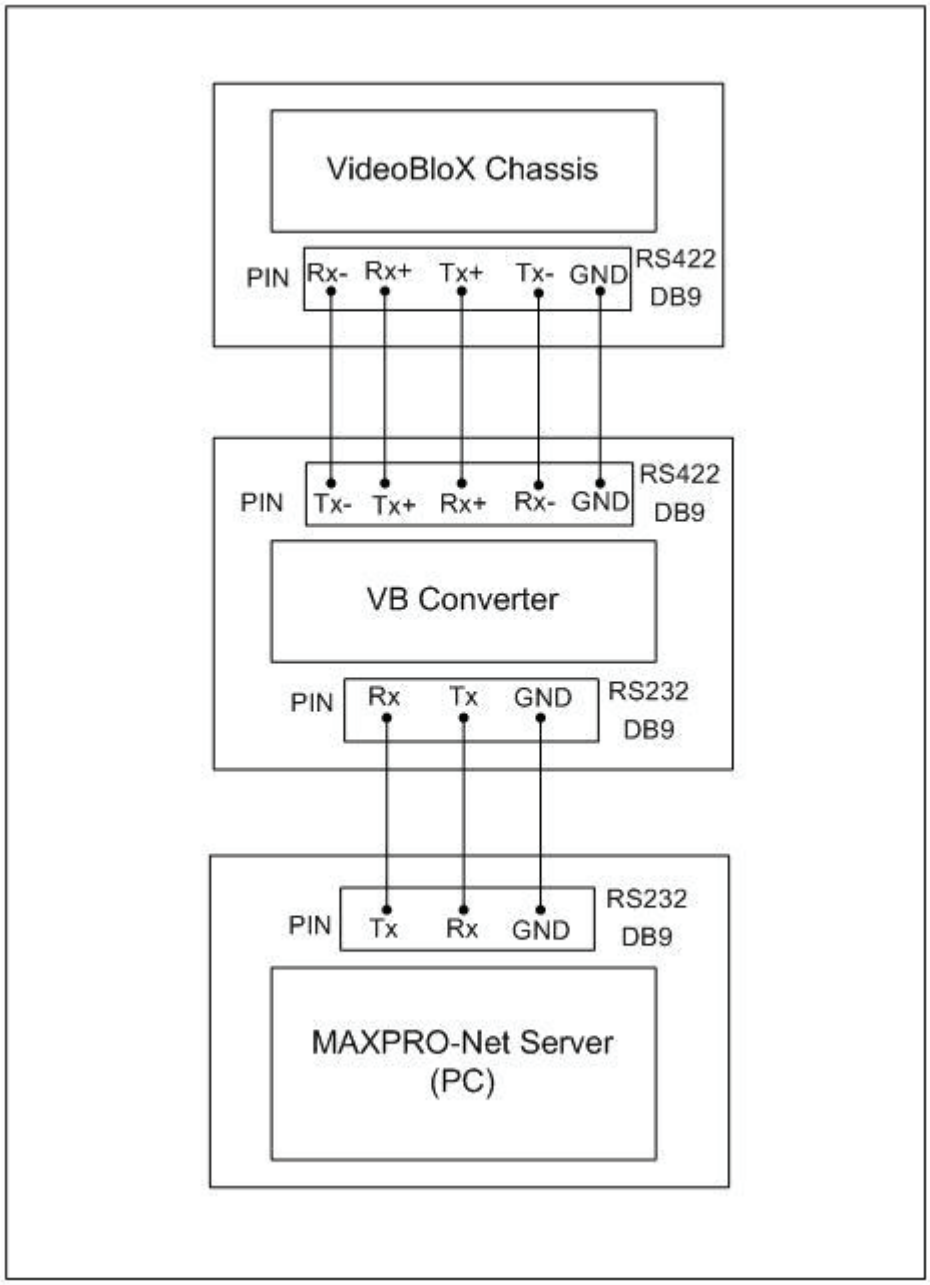
CHAPTER 12:
VIDEOBLOX INTEGRATION WITH MAXPRO-NET

12.1 CONNECTION DIAGRAMS

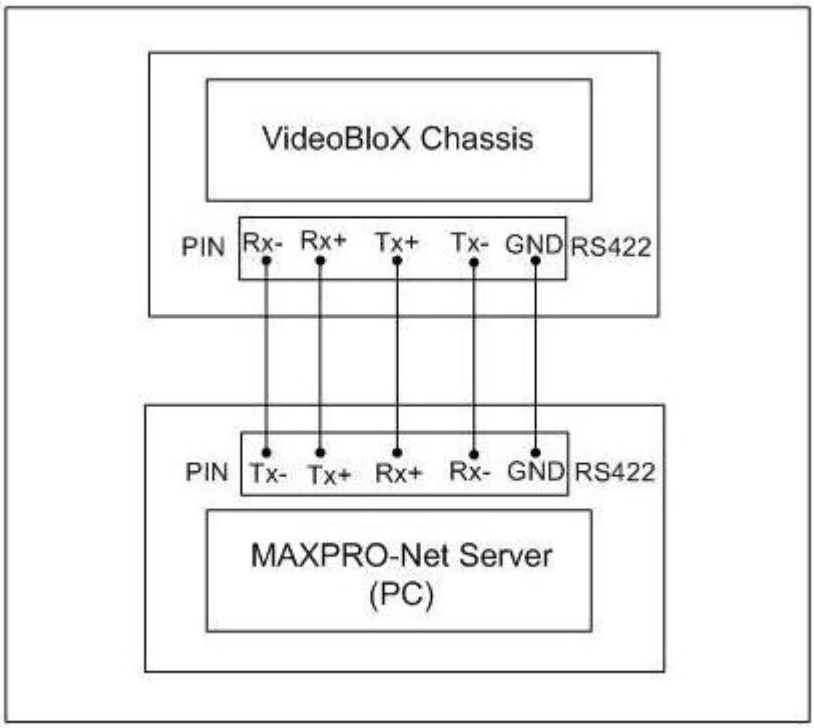
12.1.1 Connecting MAXPRO-Net Server to Videoblox Chassis through HVBMATPIT



12.1.2 Connecting MAXPRO-Net Server to Videoblox Chassis through VB Converter



12.1.3 Connecting MAXPRO-Net Server to Videoblox Chassis through RS422 PCI Card



The recommended RS422 PCI card is LAVA RS 422 PCI Card.

12.2 REFERENCES

Please refer to the following Manuals for Videoblox Integration with MAXPRO-Net:

Configuration and User Manuals of Videoblox:

- 900.0809- Videoblox User manual. This has the settings on the chassis and for the I/P, O/P cards.
- 900.0411 – VideoBloX Configuration User Manual
- 900.0403 - Auxiliary Port Expander User Manual - for Auxiliary Port Protocol and configurations

Connection Manuals of Videoblox:

- 900.0595 HVBPIT44 User Manual - PITs to PTZ domes
- 900.0730 HVBMATPIT User Manual – MAXPRO-Net to VideoBloX Chassis
- 900.0566 422 Smart Combo User Manual
- 900.0567 HVBI2C16O and HVBI2C16I User Manuals.

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