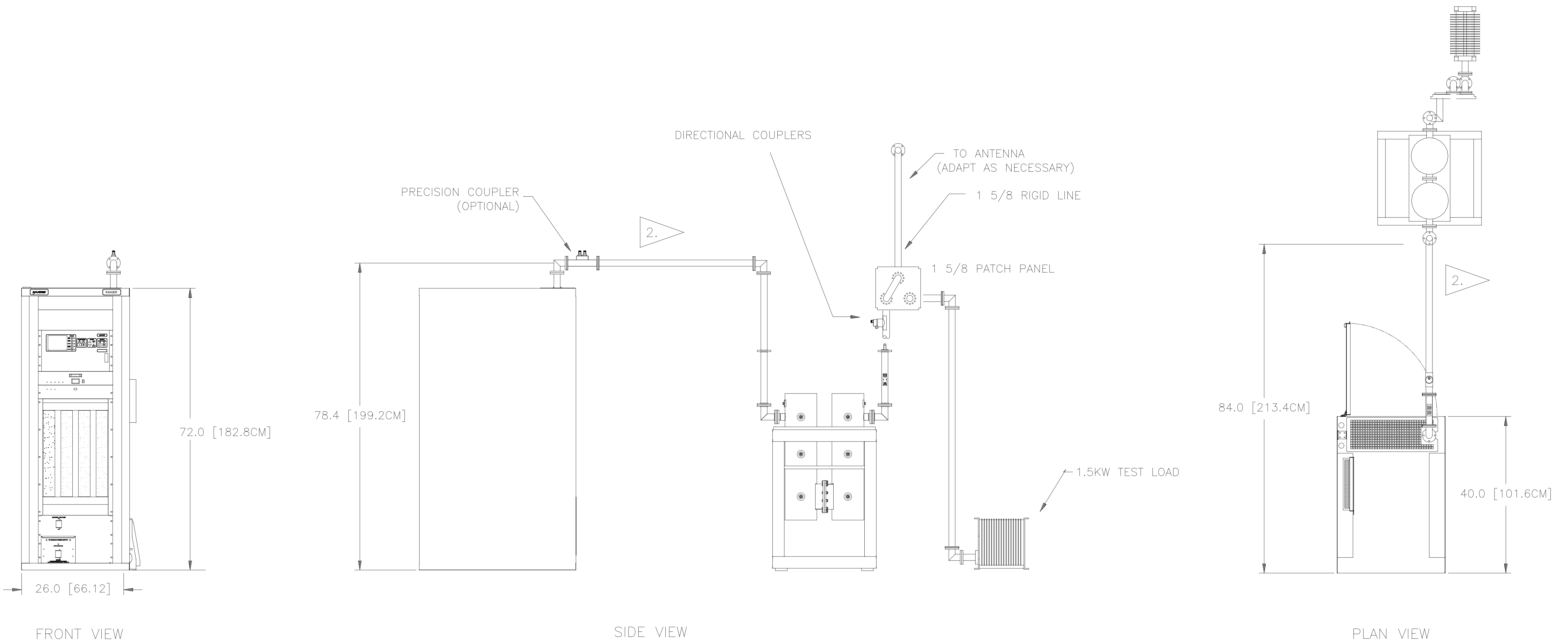


SCALE = FEET



FRONT VIEW

SIDE VIEW

PLAN VIEW

NOTES:

- 1. MIN DIMENSION REQUIRED FOR MAINTENANCE. INCREASE FOR EASE OF MAINTENANCE PER SITE RESTRICTIONS.
- 2. INTERCONNECTING TRANSMISSION LINE, PATCH PANEL, TEST LOAD, AND DIRECTIONAL COUPLER WILL BE REQUIRED, REFER TO HARRIS PROPOSAL FOR DETAILED INFORMATION. HANG AND SUPPORT TRANSMISSION LINE AND PATCH PANEL AS REQUIRED PER SITE RESTRICTIONS.

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECD NBR

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HOLE	QTY	DESCRIPTION
TOLERANCES UNLESS NOTED		ALL DIMENSION IN INCHES UNLESS OTHERWISE NOTED
.X ± .030 .XX ± .015		MUST COMPLY WITH WORKMANSHIP STANDARDS SPEC 817-1152-001
.XXX ± .005 ANGLES ± 1 DEG		
ALL √ INDICATES 125 MICRO INCH		
DRAWN BY	L STRUBE	TITLE
DATE	NOV 21, 02	LAYOUT, RF EQUIPMENT, RANGER 1000L
ENG CHK	L STRUBE	EXTERNAL D MASK FILTER
PROJ ENG	C NEAL	
MFG ENG		
D	SHEET 1 OF 1	DWG NO. 843 5560 108
		REV A



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REVISIONS										
Rev:	Date:	Dftm:	Eng:	ECN Number:	Rev:	Date:	Dftm:	Eng:	ECN Number:	
C	07/28/03	CLL	CLL	P22911.	B	6/19/03	CLL	CLL	P22240	
					CHANGES IN FIELD					
APPROVALS										
Drawn By:	C. LUCKHAUPT 2003	Eng:	C. LUCKHAUPT 2003	Proj:	B. KLESNER 2003	Mfg:	M THOMPSON 2003			

Rs-232 Communication Protocol
For Remote Serial Controller 992-9511-500 with 817-2435-970
software installed
Rev. C



Scope

The purpose of this document is to provide the necessary information to access the REMOTE SERIAL CONTROLLER (9929511500) with basic Rs-232 software installed (8172435970)

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- I. Request Packet Format 3
- II. Response Packet Format 3
- III. Packets 8
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 - III. Reset Packet..... 8
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- Table 2 Baud Rate4
- Table 3 Packet ID's5



I. Request Packet Format

Data transmission rate is selectable from 115200,57600,19200,9600 bps. Communication format is 8 data bits, no parity bits, and one stop bit. The data packet structure is defined below. Note that the 'Packet ID' byte uniquely identifies each packet. The CRC value is used to verify that valid data has been received.

Packet Structure:

Byte 01:	Header Byte 1	ASCII code "H" or 72
Byte 02:	Header Byte 2	ASCII code "B" or 66
Byte 03:	Packet Address	Value: 0–63, based on Switch 1 on Board. (See Table 1)
Byte 04:	Packet ID	Value 0-32 (See Table 2)
Byte 05-XX:	Data bytes	
Byte XX + 1:	16 bit CRC, MSB	
Byte XX + 2:	16 bit CRC, LSB	

Notes:

Header Bytes are not included in CRC Calculation.

II. Response Packet Format

Data transmission rate is selectable from 115200,57600,19200,9600 bps via S1 (7-8). Communication format is 8 data bits, no parity bits, and one stop bit. The data packet structure is defined below. The CRC value is used to verify that valid data has been received.

Packet Structure:

Byte 01:	Header Byte 1	ASCII code "H" or 72
Byte 02:	Header Byte 2	ASCII code "B" or 66
Byte 03:	Packet Address	255 (Always 255)
Byte 04-XX:	Data bytes	
Byte XX + 1:	16 bit CRC, MSB	
Byte XX + 2:	16 bit CRC, LSB	

Notes:

Header Bytes are not included in CRC Calculation.



Remote Serial I/O Board Switch 1 Configuration

Table 1 Board Address

Packet Address (Dec Value)	Switch 1 #					
	#6	#5	#4	#3	#2	#1
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
4	0	0	0	1	0	0
5	0	0	0	1	0	1
*	*	*	*	*	*	*
*	*	*	*	*	*	*
63	1	1	1	1	1	1

Table 2 Baud Rate

Baud Rate	Switch 1 #	
	#8	#7
9600	0	0
19200	0	1
57600	1	0
115200	1	1

Note The Packet Address must be different for each Board



Table 3 Packet ID's

ID (HEX)	Description			Data Bytes	Response Packet
0x00	Read Data at J1 & J2 [15:0] //J1 1-8 & J2 1-8			None	2 bytes
	J#	Bit	Value		
	J1-1	8			
	J1-2	9			
	J1-3	10			
	J1-4	11			
	J1-5	12			
	J1-6	13			
	J1-7	14			
	J1-8	15	MSB		
	J2-1	0	LSB		
	J2-2	1			
	J2-3	2			
	J2-4	3			
	J2-5	4			
	J2-6	5			
	J2-7	6			
	J2-8	7			
0x01	Read Data at J3 & J4 [15:0] //J2 1-8 & J4 1-8			None	2 bytes
	J#	Bit	Value		
	J3-1	8			
	J3-2	9			
	J3-3	10			
	J3-4	11			
	J3-5	12			
	J3-6	13			
	J3-7	14			
	J3-8	15	MSB		
	J4-1	0	LSB		
	J4-2	1			
	J4-3	2			
	J4-4	3			
	J4-5	4			
	J4-6	5			
	J4-7	6			
	J4-8	7			
0x02				None	
0x03				None	
0x04				None	
0x05				None	
0x06				None	



0x07	Status register					None	2 bytes
0x08	Read Analog Data at Channel 0 J5-1					None	2 bytes
0x09	Read Analog Data at Channel 1 J5-2					None	2 bytes
0x0a	Read Analog Data at Channel 2 J5-3					None	2 bytes
0x0b	Read Analog Data at Channel 3 J5-4					None	2 bytes
0x0c	Read Analog Data at Channel 4 J5-5					None	2 bytes
0x0d	Read Analog Data at Channel 5 J5-6					None	2 bytes
0x0e	Read Analog Data at Channel 6 J5-7					None	2 bytes
0x0f	Read Analog Data at Channel 7 J5-8					None	2 bytes
0x10	Write Data at J6 & J7 [15:0] //J6 1-8 & J7 1-8					2	None
	J#	Bit	Value				
	J6-1	8					
	J6-2	9					
	J6-3	10					
	J6-4	11					
	J6-5	12					
	J6-6	13					
	J6-7	14					
	J6-8	15	MSB				
	J7-1	0	LSB				
	J7-2	1					
	J7-3	2					
	J7-4	3					
	J7-5	4					
	J7-6	5					
	J7-7	6					
	J7-8	7					
0x11	Write Data at J8 & J9[15:0] //J8 1-8 & J9 1-8					2	None
	J#	Bit	Value				
	J8-1	8					
	J8-2	9					
	J8-3	10					
	J8-4	11					
	J8-5	12					
	J8-6	13					
	J8-7	14					
	J8-8	15	MSB				
	J9-1	0	LSB				
	J9-2	1					
	J9-3	2					
	J9-4	3					
	J9-5	4					
	J9-6	5					



	J9-7	6						
	J9-8	7						
0x12	Write Data at J14 [7:0] //J14 1-8						2	None
	J#	Bit	Value					
	J14-1	0	LSB					
	J14-2	1						
	J14-3	2						
	J14-4	3						
	J14-5	4						
	J14-6	5						
	J14-7	6						
	J14-8	7	MSB					
0x13							None	None
0x14							None	None
0x15							None	None
0x16							None	None
0x17							None	None
0x18	Write Analog Data at Channel 0 J10-1						2	None
0x19	Write Analog Data at Channel 1 J10-2						2	None
0x1a	Write Analog Data at Channel 2 J10-3						2	None
0x1b	Write Analog Data at Channel 3 J10-4						2	None
0x1c	Write Analog Data at Channel 4 J10-5						2	None
0x1d	Write Analog Data at Channel 5 J10-6						2	None
0x1e	Write Analog Data at Channel 6 J10-7						2	None
0x1f	Write Analog Data at Channel 7 J10-8						2	None
0x17	Write Reset Status of FPGA						2	None
0x20	Full Data Dump						None	22 bytes (See Response Packet Below)



III. Packets

I. Request Packet

72 Packet Byte # 0 Header Byte # 1
66 Packet Byte # 1 Header Byte # 2
1 Packet Byte # 2 Address of "1" selectable by dipswitch on Board
32 Packet Byte # 3 CMD # 2 for Full Data Dump
1 Packet Byte # 4 High CRC
32 Packet Byte # 5 Low CRC

II. Response Packet

72 Packet Byte # 0 Header Byte # 1
66 Packet Byte # 1 Header Byte # 2
255 Packet Byte # 2 Address of 255 (Always on response packet)
255 Packet Byte # 3 Data Byte 0 == I_port_a [8-15] J2 1-8
255 Packet Byte # 4 Data Byte 1 == I_port_a [0-7] J1 1-8
255 Packet Byte # 5 Data Byte 2 == I_port_b [8-15] J4 1-8
255 Packet Byte # 6 Data Byte 3 == I_port_b [0-7] J3 1-8
0 Packet Byte # 7 Data Byte 4 == rev/status register
0 Packet Byte # 8 Data Byte 5 == rev/status register
0 Packet Byte # 9 Data Byte 6 == Channel 0
0 Packet Byte # 10 Data Byte 7 == Channel 0
0 Packet Byte # 11 Data Byte 8 == Channel 1
0 Packet Byte # 12 Data Byte 9 == Channel 1
0 Packet Byte # 13 Data Byte 10 == Channel 2
0 Packet Byte # 14 Data Byte 11 == Channel 2
0 Packet Byte # 15 Data Byte 12 == Channel 3
0 Packet Byte # 16 Data Byte 13 == Channel 3
0 Packet Byte # 17 Data Byte 14 == Channel 4
0 Packet Byte # 18 Data Byte 15 == Channel 4
0 Packet Byte # 19 Data Byte 16 == Channel 5
0 Packet Byte # 20 Data Byte 17 == Channel 5
0 Packet Byte # 21 Data Byte 18 == Channel 6
0 Packet Byte # 22 Data Byte 19 == Channel 6
0 Packet Byte # 23 Data Byte 20 == Channel 7
0 Packet Byte # 24 Data Byte 21 == Channel 7
* Packet Byte # 25 High CRC
* Packet Byte # 26 Low CRC

III. Reset Packet

72 Packet Byte # 0 Header Byte # 1
66 Packet Byte # 1 Header Byte # 2
1 Packet Byte # 2 Address of "1" selectable by dipswitch on Board
23 Packet Byte # 3 Reset Status Bit
0 Value Zero Always
0 Value Zero Always
81 Packet Byte # 4 High CRC
231 Packet Byte # 5 Low CRC

This command will set Bit 0 of Packet Byte #7 Data Byte #5 to 0



Example for Analog Channels

Channel (0) Calculation=(Data Byte [6]*256+ Data Byte [7]); 0 to 255 == 0 to 5v full scale

Packet ID = CMD *16 + Port #

IV. CMD

- 0= Read Data @ Port # (16 Bits) Total Number of Bytes is 2
- 1= Write Data @ Port # (16 Bits) Total Number of Bytes is 0 (no return packet)
- 2= Full Data Dump. Response is 22 bytes:
 - Analog = 16 bytes (8 channels at 2 bytes each)
 - Digital = 4 bytes (32 bits)
 - Rev/Status = 2 Bytes
- 3=
- 4=
- 5=
- 6=
- 7=

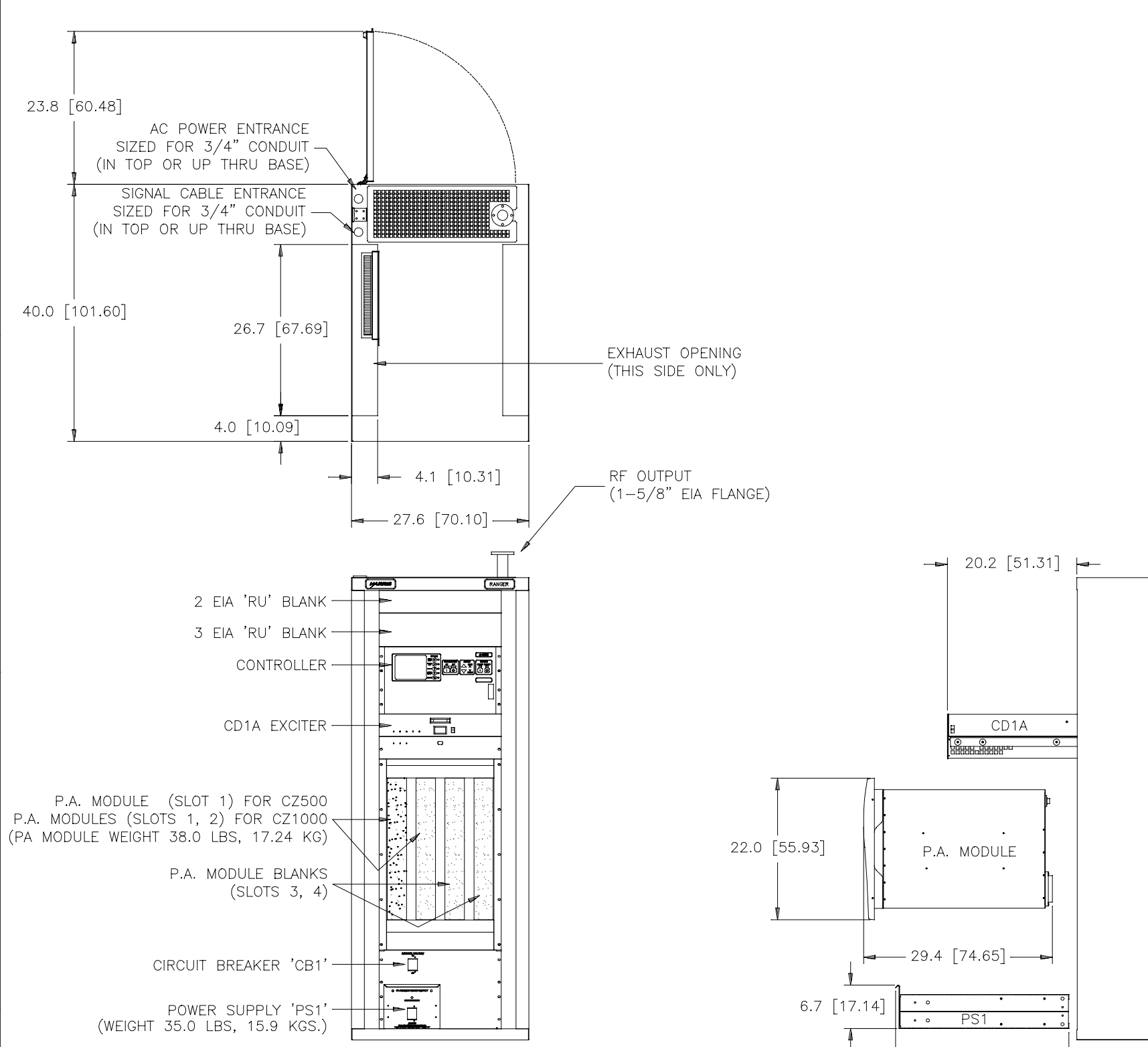
V. Ports

- 0= Port A [15:0]
- 1= Port B [15:0]
- 2= Port C [7:0] (8-15 unused)
- 3=
- 4=
- 5=
- 6=
- 7 = rev/status register:
 - Rev:
 - Bits [15-12] = Major revision
 - Bits [11-8] = Minor revision
 - (e.g. Rev 4.1 = "0100 0001 0000 0000")
 - Status:
 - Bits [7-1] = unused
 - Bit [0] = reset status ('1' = board was reset, e.g. by power failure)
- 8-15 (Analog)
- 8 = Channel 0
- 9 = Channel 1
- 10 = Channel 2
- 11 = Channel 3
- 12 = Channel 4
- 13 = Channel 5
- 14 = Channel 6
- 15 = Channel 7

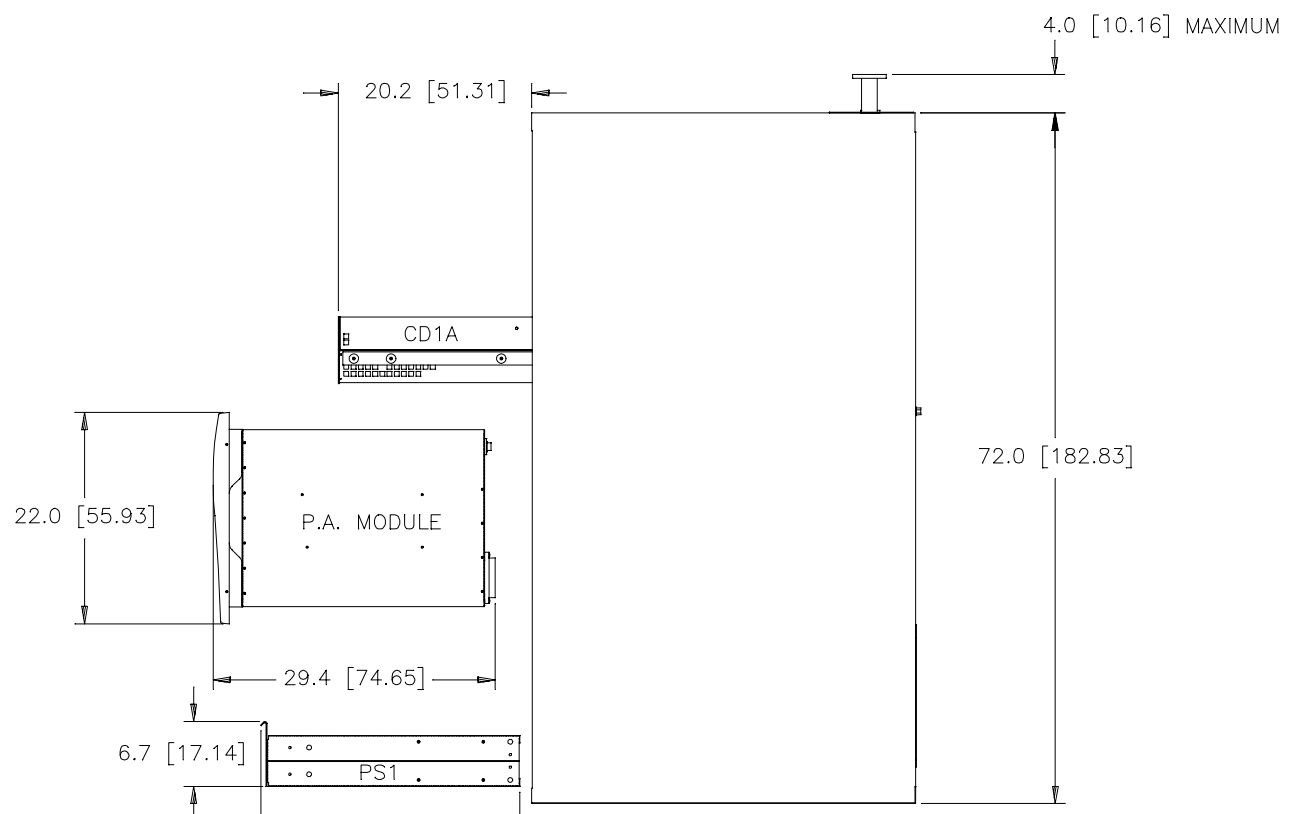


Date of Revision	Drawing Revision	Description of Changes
02/21/03	REV A	FIRST RELEASE OF DOCUMENT
06/19/03	REV B	MSB and LSB were backwards on table 3
07/28/03	REV C	Added Reset Command to Document. Clarified how to calculate the PACKET ID

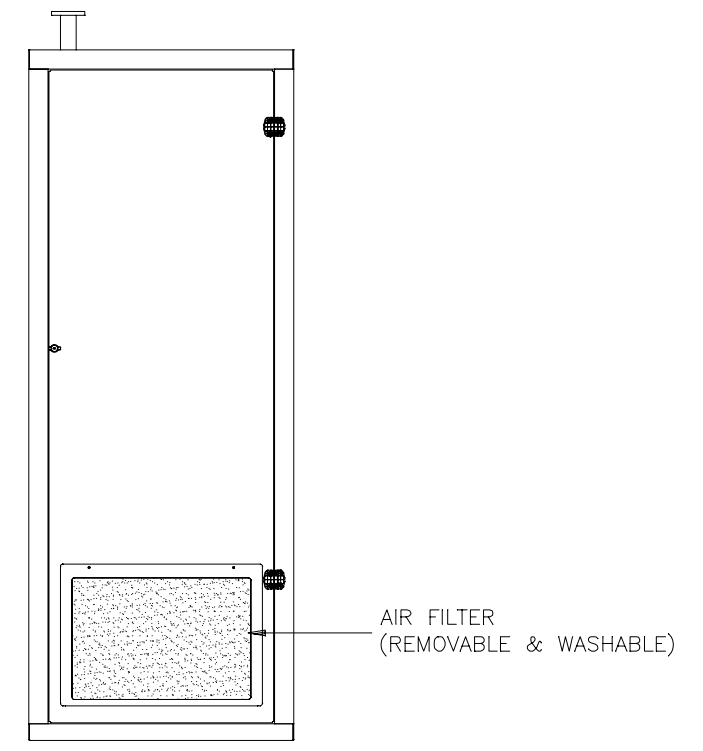
	TRANSMITTER MODEL	
	CZ500	CZ1000
RF POWER		
OUTPUT POWER AFTER MASK FILTER (WATTS)	460	900
CABINET OUTPUT POWER (WATTS)	540	1050
NUMBER OF P. A. MODULES	1	2
NUMBER OF P.A. POWER SUPPLIES	1	1
AC POWER (TRANSMITTER ONLY)		
SINGLE PHASE AC INPUT VOLTAGE (50/60Hz)	220-240	220-240
REAL AND REACTIVE POWER DISSIPATION (kVA), TYPICAL	.	.
REAL POWER DISSIPATION (kW), TYPICAL	.	.
POWER FACTOR (TYPICAL)	.	.
POWER FACTOR (MINIMUM)	.	.
CURRENT (A) AT 230 VAC INPUT	.	.
AIR COOLING		
OPERATIONAL AMBINET TEMPERATURE (DEGREE C), (SEE NOTE 1)	0-45	0-45
TRANSMITTER HEAT LOAD TO ROOM (kW) (TRANSMITTER CABINET ONLY)	2.5	4.8
MISCELLANEOUS		
SOUND PRESSURE LEVEL (dBA) (SEE NOTE 2)	.	.
TOTAL TRANSMITTER WEIGHT (LBS) (SEE NOTE 3)	560	600



FRONT VIEW



SIDE VIEW



REAR VIEW

- NOTES
- 1) DERATE 2 DEGREES C PER 1000 FEET AMSL
 - 2) SOUND PRESSURE LEVEL MEASURED ON THE 'A' WEIGHTED SCALE OF A STANDARD SOUND PRESSURE LEVEL METER AT SLOW RESPONSE. THE METER IS POSITIONED 3 FEET FROM THE FRONT AND 3 FEET FROM THE FLOOR OF THE TRANSMITTER.
 - 3) WEIGHT DOES NOT INCLUDE ANY OPTIONAL ACCESSORIES.
 - 4) DIMENSIONS SHOWN ARE: INCHES [CENTIMETER]

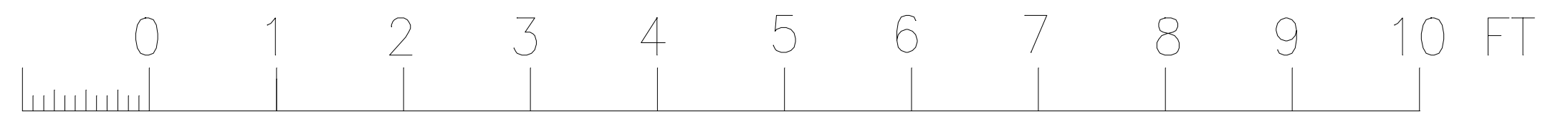
REVISION	LTR	ZONE	DATE	DFTM	ENG	ECD NBR
A	NEW DWG



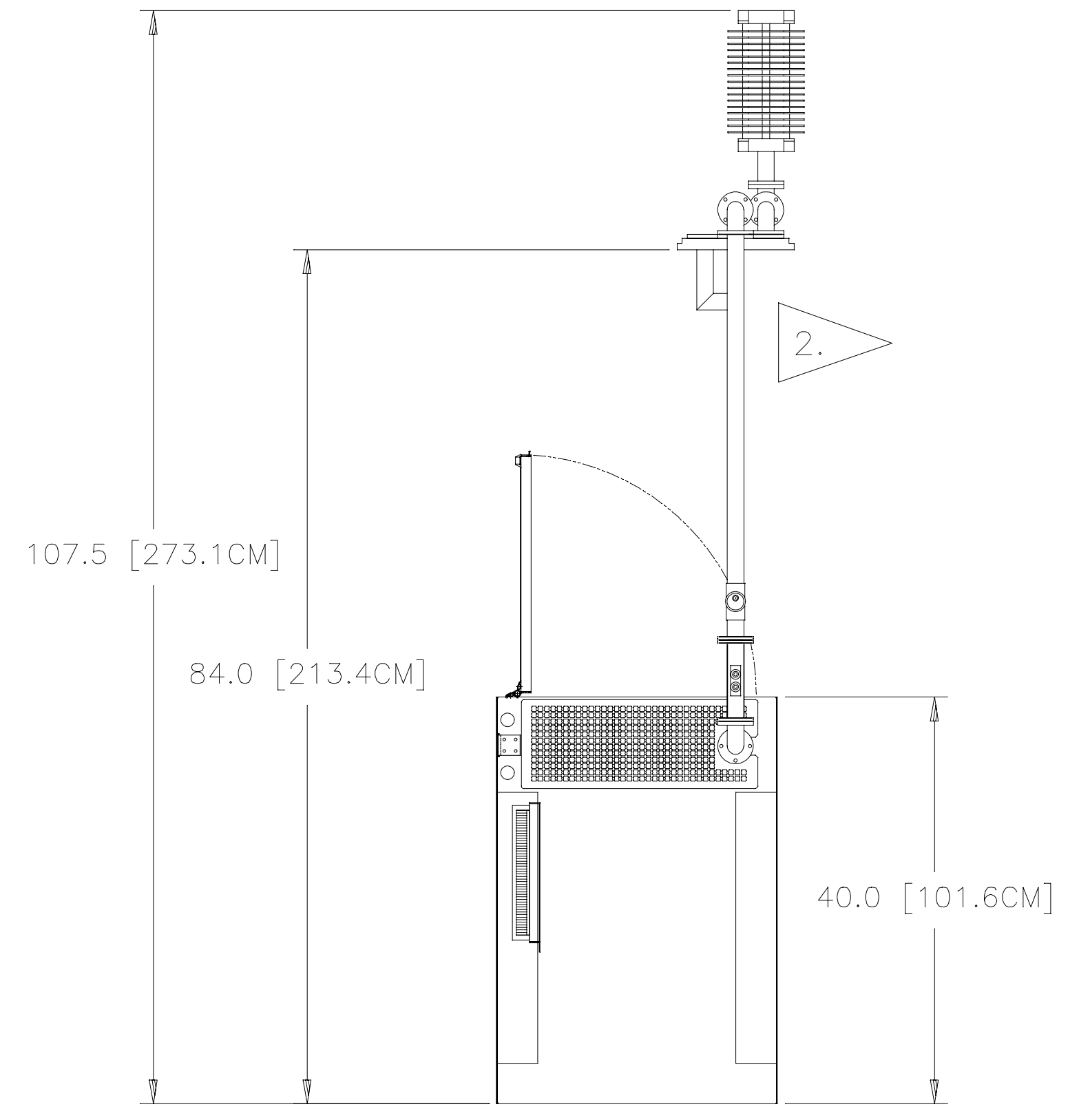
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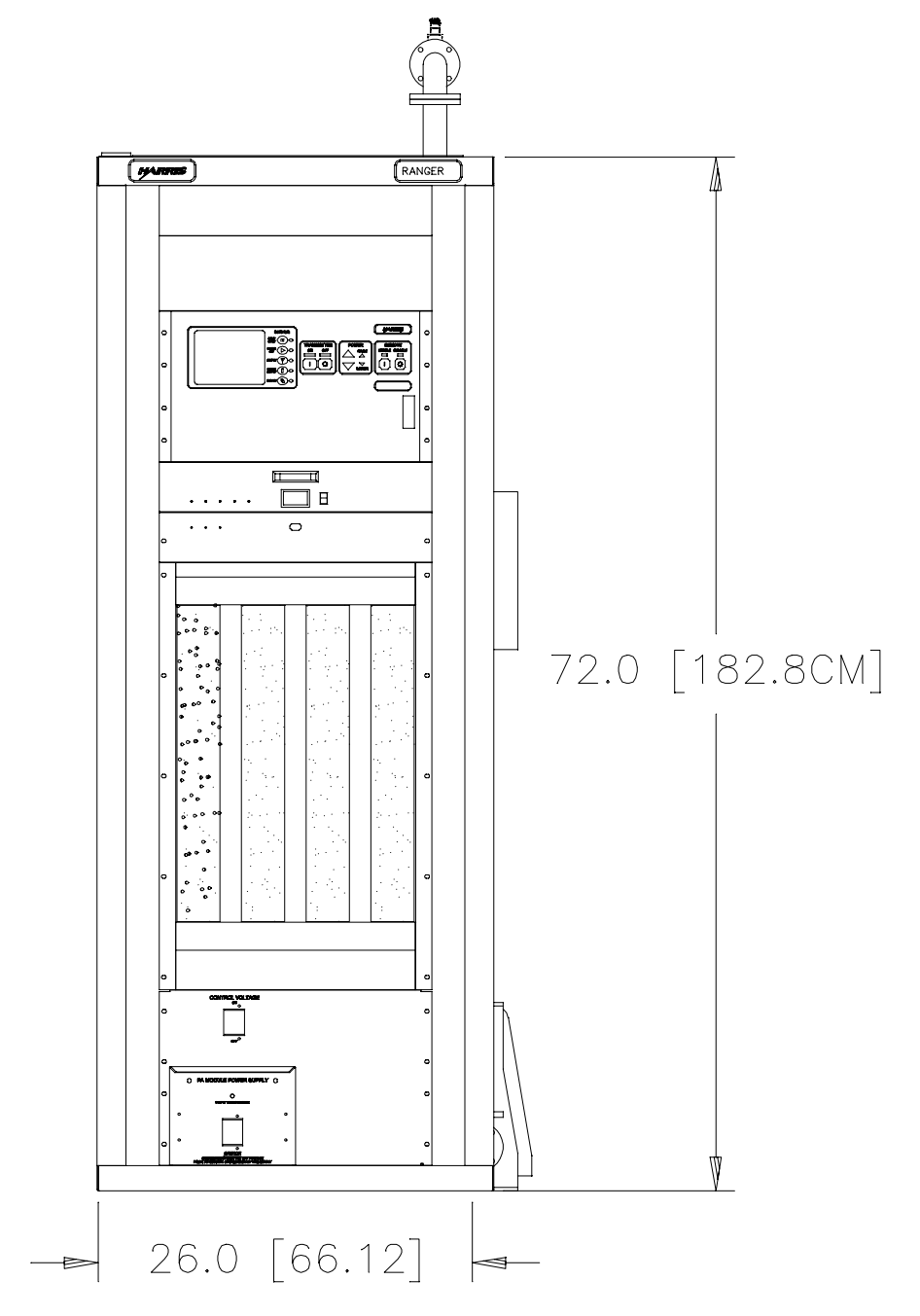
HOLE	QTY	DESCRIPTION
		TOLERANCES UNLESS NOTED .X ± .030 .XX ± .015 .XXX ± .005 ANGLES ± 1 DEG ALL √ INDICATES 125 MICRO INCH
		ALL DIMENSION IN INCHES UNLESS OTHERWISE NOTED MUST COMPLY WITH WORKMANSHIP STANDARDS SPEC 817-1152-001
DRAWN BY	L WISEMAN	TITLE
DATE	DEC 15, 01	OUTLINE, RANGER TRANSMITTER
ENG CHK	L WISEMAN	TRANSMITTER A & E DATA
PROJ ENG	J MALEC	-
MFG ENG	M RUSSELL	DWG NO.
D	SHEET 1 OF 1	843-5560-071
		REV A



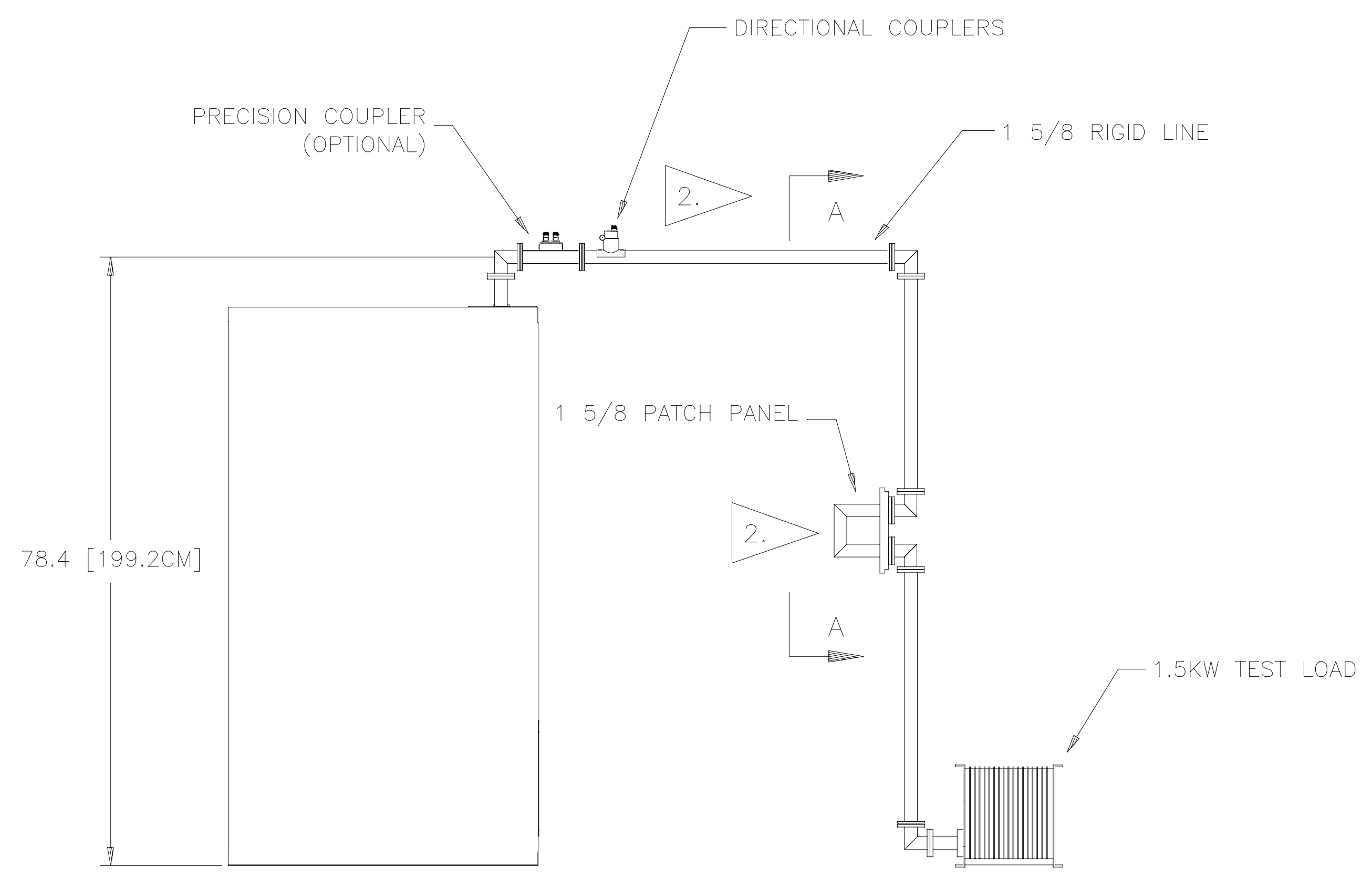
SCALE = FEET



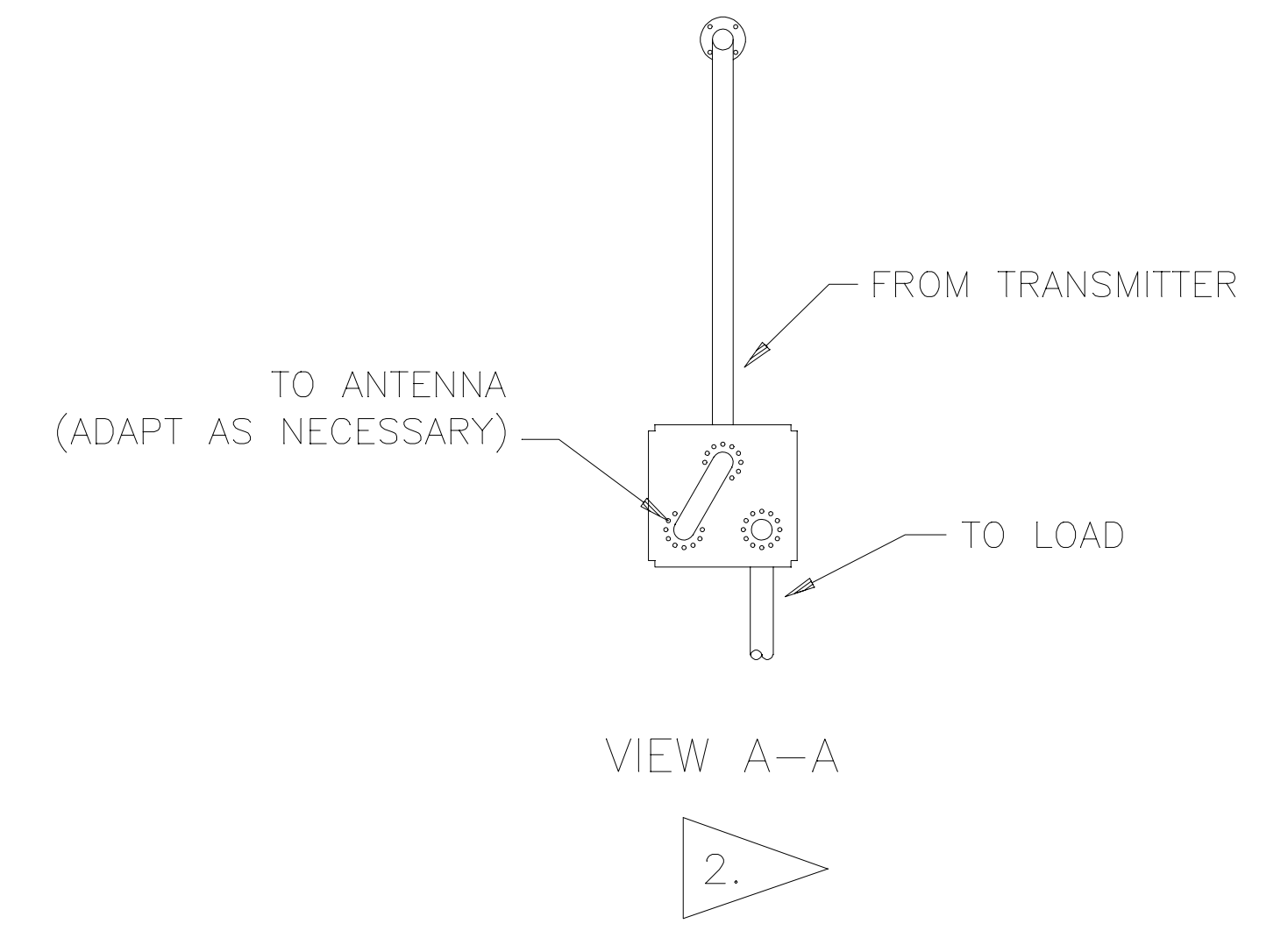
PLAN VIEW



FRONT VIEW



SIDE VIEW



VIEW A-A

- NOTES:
- 1. MIN DIMENSION REQUIRED FOR MAINTENANCE. INCREASE FOR EASE OF MAINTENANCE PER SITE RESTRICTIONS.
 - 2. INTERCONNECTING TRANSMISSION LINE, PATCH PANEL, TEST LOAD, AND DIRECTIONAL COUPLER WILL BE REQUIRED, REFER TO HARRIS PROPOSAL FOR DETAILED INFORMATION. HANG AND SUPPORT TRANSMISSION LINE AND PATCH PANEL AS REQUIRED PER SITE RESTRICTIONS.

REV	DATE	BY	CHK	DESCRIPTION
C	JUN 12, 02	LW		REVISE BACK TO 1-5/8" RF LINE
B	3/29/02	KAG	KWB	REVISED PATCH PANEL FROM 1 5/8" TO 7/8" ADDED NOTE 1, 2

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.XXX ± .005 ANGLES ± 1 DEG		
ALL √ INDICATES 125 MICRO INCH		
DRAWN BY	S ROSENBALM	TITLE
DATE	MARCH 05, 02	LAYOUT, RF EQUIPMENT, RANGER
ENG CHK	S ROSENBALM	
PROJ ENG	J MALEC	
MFG ENG	M RUSSELL	
D	SHEET 1 OF 1	DWG NO. 843 5560 097 . REV C