

Command Equipment

Emhiser Research, Inc. designs and manufactures a line of airborne and ground-based command equipment designed specifically for harsh military environments.

Ground-based command designs are available in standard 19" rack mount package sizes with a variety of panel colors, chassis slide designs, and power supply specifications. Additional options such as remote frequency control, remote deviation control, power meter, built-in test ports, and multiple output ports are available where applicable.

Listed below are some of our more common products. All units are available in both airborne and rackmount configurations. If these products do not meet your specifications, please call us to discuss your requirements.

- Command Encoder, up to 20 IRIG tones
- Command Decoder, up to 20 IRIG tones
- Command Transmitter, 1 mW to 50 W
- Command Transmitter/Encoder, 1 mW to 100 W, up to 20 IRIG Tones
- Command Exciter, 1 mW to 50 W
- Command Receiver
- Command Receiver/Decoder, up to 20 IRIG Tones



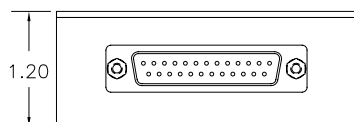
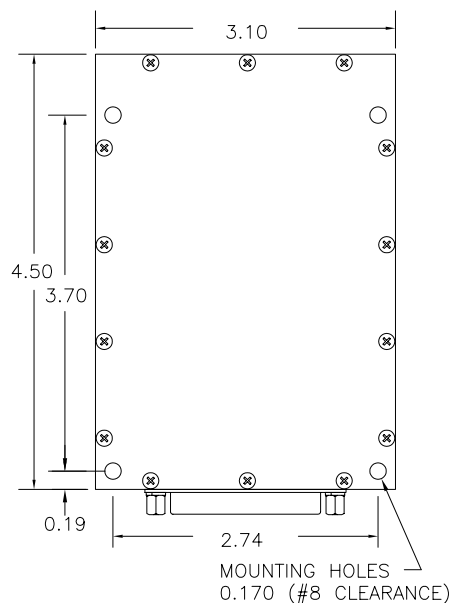
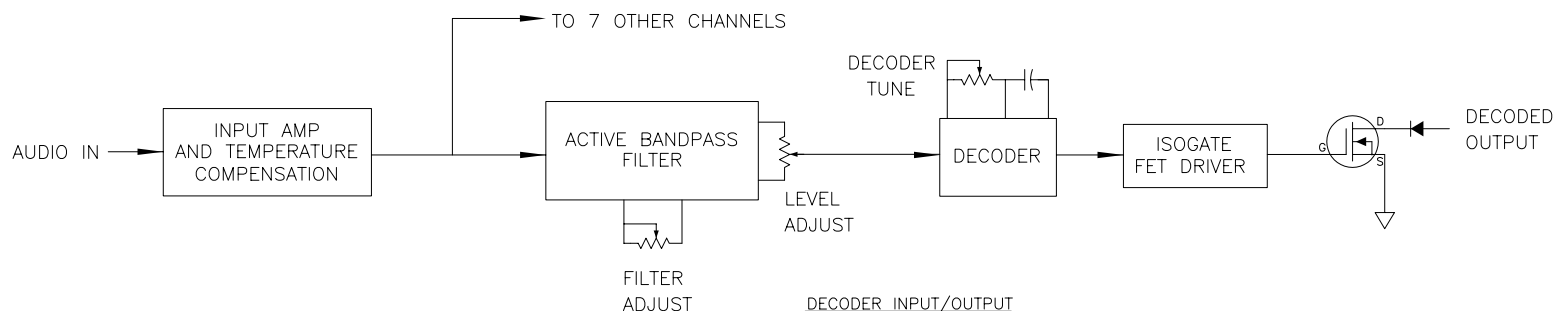
2705 Old Highway 40 West
P.O. Box 189
Verdi, Nevada 89439-0189

Phone: (775) 345-2705
Fax: (775) 345-2484
E-mail: info@emhiser.com
Web: www.emhiser.com

Command Decoder Model ECTD-17 Series

17 Cubic Inches Up to 8 IRIG Tones

Isolated Outputs 28 VDC



- J1-PIN FUNCTION
- 1: +28 VDC
 - 2: SPARE
 - 3: 28 VDC COMMON
 - 4: SPARE
 - 5: AUDIO INPUT
 - 6: CASE GROUND
 - 7: SPARE
 - 8: SPARE
 - 9: SPARE
 - 10: SPARE
 - 11: 1ST CHANNEL (SPECIFY)
 - 12: 2ND CHANNEL (SPECIFY)
 - 13: 3RD CHANNEL (SPECIFY)
 - 14: 4TH CHANNEL (SPECIFY)
 - 15: 5TH CHANNEL (SPECIFY)
 - 16: 6TH CHANNEL (SPECIFY)
 - 17: 7TH CHANNEL (SPECIFY)
 - 18: 8TH CHANNEL (SPECIFY)
 - 19: SPARE
 - 20: SPARE
 - 21: SPARE
 - 22: SPARE
 - 23: SPARE
 - 24: DIGITAL GROUND
 - 25: DIGITAL GROUND

DECODER INPUT/OUTPUT

DECODED CHANNELS:

RESPONSE TIME:

BANDWIDTH:

ADJACENT CHANNEL REJECTION:

NOISE IMMUNITY:

SIMULTANEOUS TONES:

INPUT IMPEDANCE:

SIGNAL ISOLATION:

INPUT THRESHOLD LEVEL:

OUTPUT CURRENT:

OUTPUT VOLTAGE DROP:

OUTPUT REVERSE POLARITY:

OUTPUT LEAKAGE CURRENT:

POWER REQUIREMENTS

INPUT VOLTAGE:

INPUT CURRENT:

POWER ISOLATION:

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE:

ALTITUDE:

VIBRATION:

SHOCK:

ACCELERATION:

TEMPERATURE ALTITUDE:

HUMIDITY:

PHYSICAL CHARACTERISTICS

DIMENSIONS:

WEIGHT:

Up to 8 IRIG Channels (Specify)

Less than 25 Milliseconds

2 dB at $\pm 1\%$ Minimum; 20 dB at $\pm 4\%$ Maximum

With 10 VPk-Pk to any Selected Channel,

No Activation on any Non-Selected Channels

a. No Activation with 1 VRMS Gaussian Noise over 100 Hz to 100 KHz

b. Correct Activation with Any Tone at 0.25 VRMS Combined with Above

a. With any Four Channels Activated with 2 VPk-Pk,

Only Those Selected Channels will Activate

b. With any Four Channels Activated with 0.60 to 0.62 VPk-Pk

Only Those Selected Channels will Activate

c. With any Four Tones Applied at 0.40 to 0.42 VPk-Pk,

No Channels will Activate

50 Kohms Minimum Shunted by 50 pF Maximum

Signal Grounds are Isolated from Power Grounds and Chassis

On at 0.50 VPk-Pk; Off at 0.45 VPk-Pk

1 Amp Minimum Sinking

Less than 0.8 VDC at 100 Milliamps

No Damage at -32 VDC for Indefinite Period

Less than 10 Microamps

+28 ± 4 VDC: Reverse Polarity Protected

500 Milliamps Maximum with 4 Channels Activated

Power is Isolated from Chassis Ground

Operating: -20°C to +70°C; Storage -54°C to +125°C

Unlimited

Per MIL-STD-810, Method 514.2, Category D.1, Procedure IIA

Per MIL-STD-810, Method 516.2, Procedure 1, 20 G's, 11 ms.

Per MIL-STD-810, Method 513.2, Procedure II

Per MIL-STD-810, Method 504.1, Category 7

Per MIL-STD-810, Method 507.1, Procedure 1

Per Outline Drawing

16 Ounces Maximum

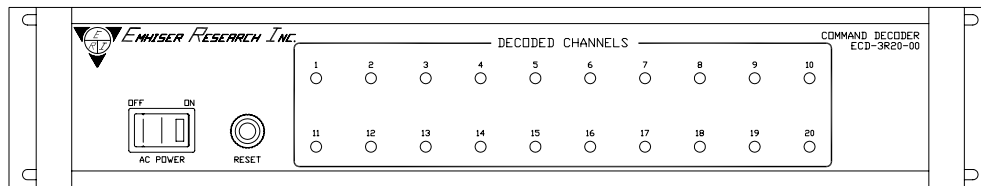
DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		COMMAND DECODER UP TO 8 IRIG TONES ISOLATED OUTPUTS
CAGE CODE IDENT NO.	60666	MODEL NO. ECTD-17 SERIES

Command Decoder Model ECD-3R Series

Rack Mount Up to 20 IRIG Tones

115 VAC / 230 VAC / 28 VDC

FRONT VIEW



REAR VIEW

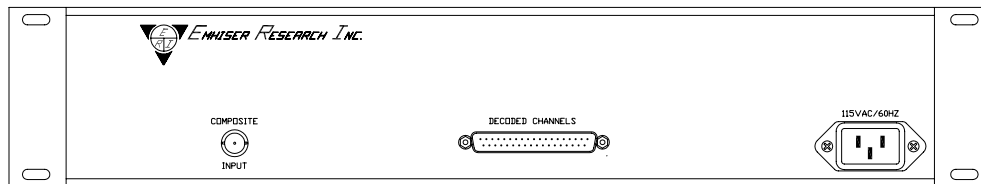


TABLE 1

PIN NO.	FUNCTION	FREQUENCY
1	CHANNEL 1	7.50
2	CHANNEL 3	9.54
3	CHANNEL 5	12.14
4	CHANNEL 7	15.45
5	CHANNEL 9	19.66
6	CHANNEL 11	25.01
7	CHANNEL 13	31.83
8	CHANNEL 15	40.49
9	CHANNEL 17	51.52
10	CHANNEL 19	65.56
11	N/C	
12	N/C	
13	N/C	
14	N/C	
15	N/C	
16	N/C	
17	N/C	
18	N/C	
19	COMMON	
20	CHANNEL 2	8.46
21	CHANNEL 4	10.76
22	CHANNEL 6	13.70
23	CHANNEL 8	17.43
24	CHANNEL 10	22.17
25	CHANNEL 12	28.21
26	CHANNEL 14	35.90
27	CHANNEL 16	45.68
28	CHANNEL 18	58.12
29	CHANNEL 20	73.95
30	N/C	
31	N/C	
32	N/C	
33	N/C	
34	N/C	
35	N/C	
36	N/C	
37	COMMON	

COMPOSITE INPUT
FREQUENCY RANGE:
IMPEDANCE:
LEVEL:

7.5 KHz to 73.95 KHz; Up to 20 IRIG Tones
600 Ohms Nominal
0.5 VPK-Pk/Tone

DECODER SECTION
CHANNEL FREQUENCIES:
CHANNEL BANDWIDTHS:

Per Table 1
Greater than $\pm 1\%$ at 0.25 VPK-Pk Input
Less than $\pm 4\%$ at 0.50 VPK-Pk Input

OUTPUT:
TYPE:

TTL Levels; Tone Detect = Logic "0",
No Tone Detect = Logic "1"
Any Combination up to 6 Total
Less than 10 milliseconds

SIMULTANEOUS CHANNELS:
RESPONSE TIME:

POWER REQUIREMENTS
INPUT VOLTAGE:

115 VAC $\pm 10\%$, 47 to 63 Hz
or 230 VAC $\pm 10\%$, 47 to 63 Hz
or Auto Select between 115 VAC & 230 VAC, $\pm 10\%$ 47 to 63 Hz
or 28 VDC ± 4 VDC, Reverse Polarity Protected
Less than 1 Amp

INPUT CURRENT:

MECHANICAL

SIZE:
WEIGHT:
CONNECTORS:

19" Rack x 3.5" H x 20" D
15 Lbs Maximum
Composite Input: Type BNC Female
Signal Outputs: 37 D Female

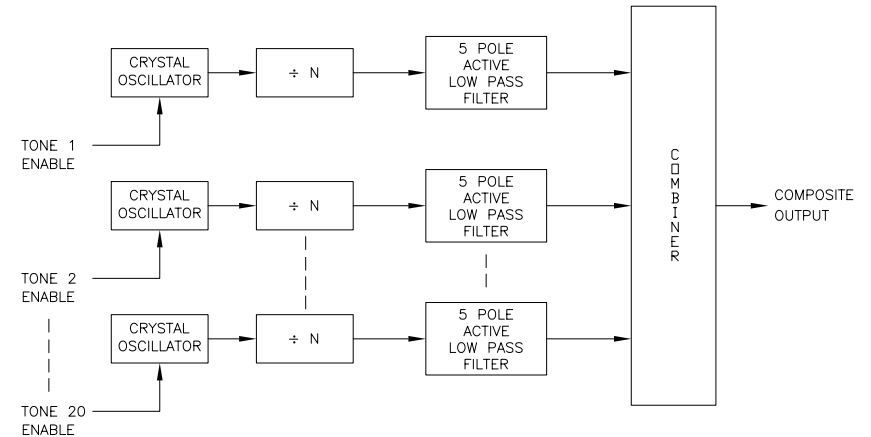
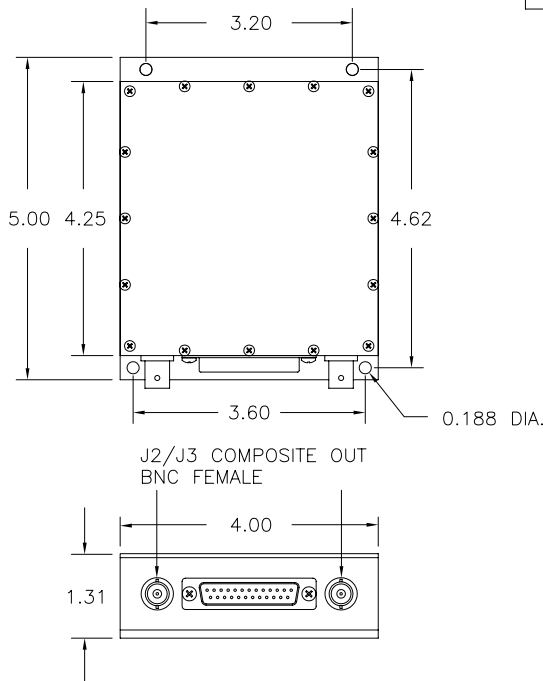
DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		COMMAND DECODER UP TO 20 IRIG CHANNELS 7.50 KHZ THRU 73.95 KHZ
CAGE CODE IDENT NO.	60666	MODEL NO. ECD-3R SERIES 

Command Tone Encoder Model ECTE-26 Series

26 Cubic Inches Up to 20 IRIG Tones

28 VDC

DB-25P ASSIGNMENTS		
PIN NO.	FUNCTION	FREQUENCY (KHz)
1	CHANNEL 1	7.50
2	CHANNEL 2	8.46
3	CHANNEL 3	9.54
4	CHANNEL 4	10.76
5	CHANNEL 5	12.14
6	CHANNEL 6	13.70
7	CHANNEL 7	15.45
8	CHANNEL 8	17.43
9	CHANNEL 9	19.66
10	CHANNEL 10	22.17
11	CHANNEL 11	25.01
12	CHANNEL 12	28.21
13	CHANNEL 13	31.83
14	CHANNEL 14	35.90
15	CHANNEL 15	40.49
16	CHANNEL 16	45.68
17	CHANNEL 17	51.52
18	CHANNEL 18	58.12
19	CHANNEL 19	65.56
20	CHANNEL 20	73.95
21	COMPOSITE	
22	N/C	
23	+28 $\pm$ 4 VDC	
24	N/C	
25	GROUND	



FUNCTIONAL CHARACTERISTICS

FREQUENCY STABILITY vs TEMPERATURE:
INPUT:

OUTPUT LEVEL:
OUTPUT AMPLITUDE VARIATION:
OUTPUT DISTORTION:
OUTPUT IMPEDANCE:
OUTPUT SIGNAL DELAY:

TURN ON STABILITY:

TOPE FREQUENCIES

POWER REQUIREMENTS

INPUT VOLTAGE:
INPUT CURRENT:

ENVIRONMENTAL

TEMPERATURE:
VIBRATION:
SHOCK:
ACCELERATION:
ALTITUDE:
HUMIDITY:

PHYSICAL CHARACTERISTICS

SIZE:
WEIGHT:

< $\pm$ 0.01%

Tone Activates with Less than 0.8 VDC Input
Tone Deactivates with Greater than 2.4 VDC Input
150 mV pk-pk $\pm$ 11.25 mV

Less than 15%
Less than 1% with any Tone Enabled
50 Ohms

Less than 5 mS from Application of Control Signal
to Stable Output (0.01%)
Frequency Stable within 0.1% after 1 second

See Table 1

28 VDC $\pm$ 4 VDC
250 Milliamps

Operating: -20°C to +70°C; Storage: -54°C to +125°C
20 G's, 20 Hz to 2 KHz, 3 Axes
1/2 Sine, 100 G's Pk, 11 mS, 3 Axes
100 G's, 3 Axes
100,000 Feet
To 95% at any Temperature forming Frost or Condensation

See Outline Drawing
24 oz. Maximum

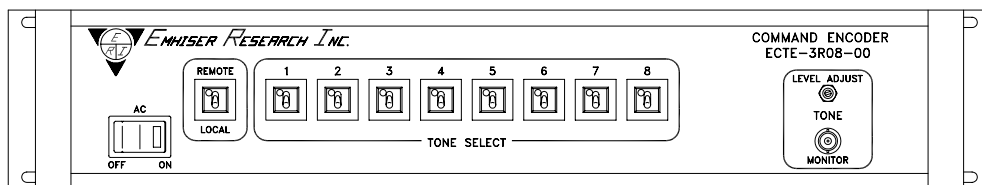
DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		
CAGE CODE IDENT NO.	60666	COMMAND TONE ENCODER UP TO 20 IRIG TONES MODEL NO. ECTE-26 SERIES

Command Encoder Model ECTE-3R08 Series

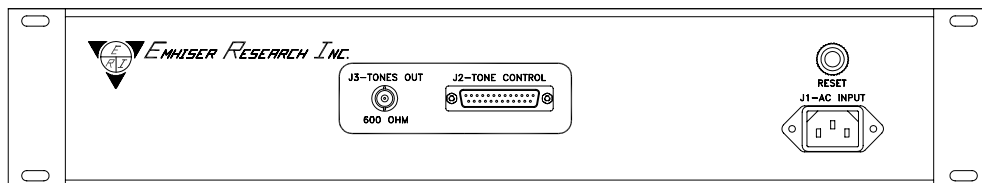
Rack Mount Up to 8 IRIG Tones

115 VAC / 230 VAC / 28 VDC

FRONT PANEL



REAR PANEL



AUDIO TONES

FREQUENCIES:
ACTIVATION:

TONE INDICATORS:
MONITOR OUTPUT IMPEDANCE:
REMOTE/LOCAL SELECTION:
REMOTE/LOCAL MONITOR:
ACTIVATION TIME:
STABILITY:
COMPOSITE AMPLITUDE:
OUTPUT IMPEDANCE:
HARMONIC DISTORTION:
EMI:

Per IRIG TONES Table (Any Eight)
Via Front Panel Switches (Local) or
Rear Panel 25 Pin D-Sub Connector (Remote)
Front Panel LED's Indicate Keyed Channel(s)
600 Ohms Nominal
Via Front Panel Switch
Via Rear Panel 25 Pin D-Sub Connector
Less than 1 Millisecond
Within +0.01%
Front Panel Adjustable from 0 to 2 Volts Pk-Pk
600 Ohms Nominal
Less than 1%
Per MIL-STD-461 and IRIG 106-96

POWER REQUIREMENTS

INPUT VOLTAGE:

115 VAC $\pm$ 10%, 47 to 63 Hz
or 230 VAC $\pm$ 10%, 47 to 63 Hz
or Auto Select between 115 VAC & 230 VAC, $\pm$ 10% 47 to 63 Hz
or 28 VDC $\pm$ 4 VDC, Reverse Polarity Protected
Less than 1 Amp

INPUT CURRENT:

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE:

HUMIDITY:

0°C to +55°C
<90%

PHYSICAL

DIMENSIONS:

WEIGHT:

CONNECTORS:

19.00" Rack x 3.50" High x 16.00" Deep
20 lbs Maximum
Tones Out; BNC Female
Tone Monitor: BNC Female
Tones Control: DB-25P

IRIG TONES			
CHANNEL	FREQ. (KHz)	CHANNEL	FREQ. (KHz)
1	7.50	11	25.01
2	8.46	12	28.21
3	9.54	13	31.83
4	10.76	14	35.90
5	12.14	15	40.49
6	13.70	16	45.68
7	15.45	17	51.52
8	17.43	18	58.12
9	19.66	19	65.56
10	22.17	20	73.95

DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		
CAGE CODE IDENT NO. 60666		COMMAND ENCODER UP TO 8 IRIG TONES 115 VAC / 230 VAC / 28 VDC MODEL NO. ECTE-3R08-Series

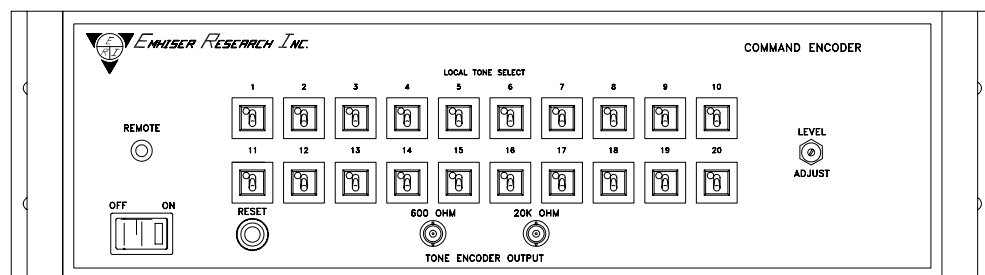


Command Encoder Model ECTE-5R Series

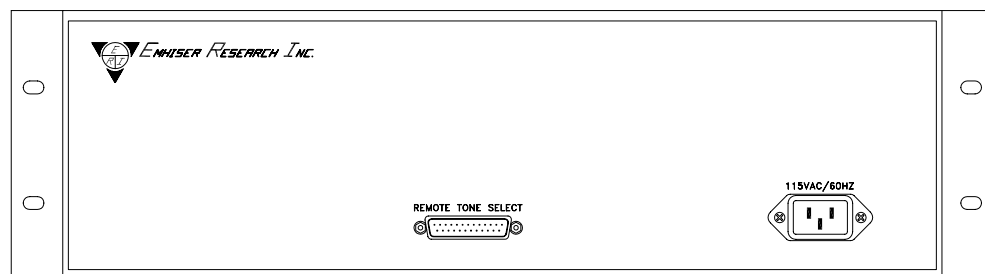
Rack Mount Up to 20 IRIG Tones

115 VAC / 230 VAC / 28 VDC

FRONT VIEW



REAR VIEW



IRIG TONES			
CHANNEL	FREQ. (KHz)	CHANNEL	FREQ. (KHz)
1	7.50	11	25.01
2	8.46	12	28.21
3	9.54	13	31.83
4	10.76	14	35.90
5	12.14	15	40.49
6	13.70	16	45.68
7	15.45	17	51.52
8	17.43	18	58.12
9	19.66	19	65.56
10	22.17	20	73.95

AUDIO TONES

FREQUENCIES:

FREQUENCY:

ACTIVATION:

TONE MONITOR:

ACTIVATION TIME:

STABILITY:

COMPOSITE AMPLITUDE:

HARMONIC DISTORTION:

Up to 20 IRIG Tones

Within $\pm 0.01\%$

Via Front Panel Switches (Local) or
Rear Panel 25 Pin D-Sub Connector (Remote)

Front Panel LED's Indicate Keyed Channel(s)

Less than 1 Millisecond

Within $\pm 0.01\%$

Front Panel Adjustable from 0 to 2 Volts Pk-Pk

Less than 1%

POWER REQUIREMENTS

INPUT VOLTAGE:

115 VAC $\pm 10\%$, 47 to 63 Hz

or 230 VAC $\pm 10\%$, 47 to 63 Hz

or Auto Select between 115 VAC & 230 VAC, $\pm 10\%$ 47 to 63 Hz

or 28 VDC ± 4 VDC, Reverse Polarity Protected

Less than 1 Amp

INPUT CURRENT:

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE:

0°C to +55°C

HUMIDITY:

<90%

PHYSICAL

DIMENSIONS:

19" Rack X 5.25" H X 10" D

WEIGHT:

30 lbs (13.6 Kg) Maximum

CONNECTORS:

Remote Tone Select: DB-25P

Composite Outputs: BNC Female

DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN		
APVD		COMMAND ENCODER UP TO 20 IRIG TONES 115 VAC / 230 VAC / 28 VDC
QC		
CAGE CODE IDENT NO.	60666	MODEL NO. ECTE-5R SERIES 

Command Exciter Model ECEC-5RB2 Series

Rack Mount 1 mW to 20 Watts

AC Coupled Channelized 115 VAC / 230 VAC / 28 VDC

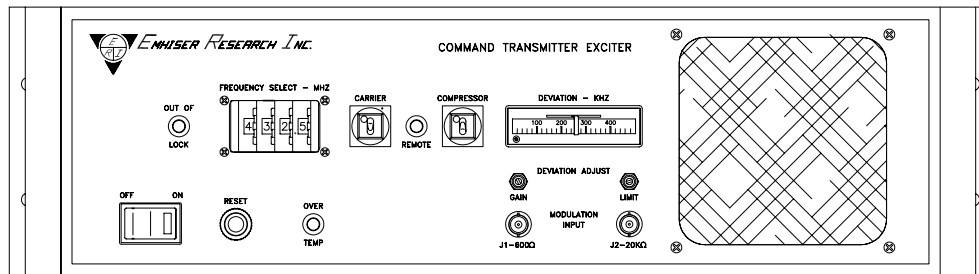
Protected by One or More of the following Patents:

US: 5,091,706, 5,097,230, 5,311,152, 5,497,509, 5,802,462, 6,404,292, 6,411,237, 6,417,738, 6,650,180, 6,683,499, 6,690,238, 6,747,517, and 6,771,133.

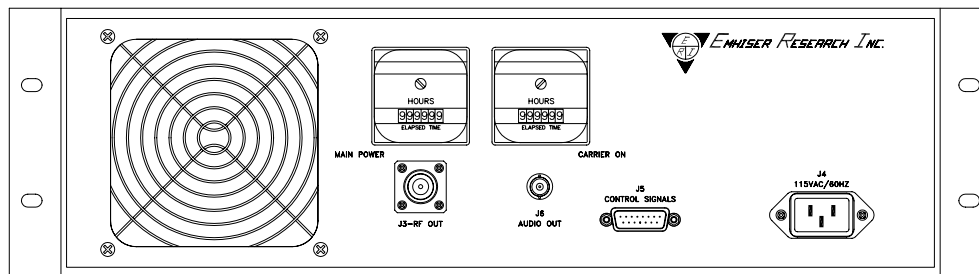
Canadian: 2,033,861, 2,033,878, 2,080,013, 2,097,042, 2,235,091, and 2,308,209.

Other US and Canadian Patents Pending.

FRONT VIEW



REAR VIEW



RF OUTPUT

CARRIER FREQUENCY:
FREQUENCY SELECTION:

406.0 to 450.0 MHz in 100 KHz Steps
Via Front Panel Thumbwheel Switches
Option: Remote Frequency Select via Rear Panel 25 Pin D-Sub
Within $\pm 0.0005\%$
1 Milli watt to 20 Watts Minimum
1.5:1 Maximum
50 Ohms Nominal
Normal Operation into any Load VSWR and Phase Angle
Internal Isolator
In Accordance with Latest IRIG Specifications
Front Panel or Remote

CARRIER STABILITY:

POWER:

VSWR:

IMPEDANCE:

LOADING:

OPEN/SHORT PROTECTION:

HARMONIC & SPURIOUS LEVEL:
CARRIER/COMPRESSOR CONTROL:

MODULATION

FREQUENCY RESPONSE:

PEAK DEVIATION:

DEVIATION SENSITIVITY:

DEVIATION CONTROL:

100 Hz to 100 KHz ± 3.0 db
 ± 300 KHz Maximum
Adjustable up to ± 300 KHz/2V Pk-Pk
Front Panel Potentiometer
Option: Deviation Select via Rear Panel 9 Pin D-Sub
1.0% Maximum for ± 300 KHz Deviation
2.0% Maximum for ± 300 KHz Deviation
5% Maximum
Separate 600 & 20K Ohm Inputs

INTERMODULATION DISTORTION:

HARMONIC DISTORTION:

INCIDENTAL AM:

INPUT IMPEDANCE:

COMPRESSION

COMPRESSION MODE:

UNCOMPRESSED MODE:

COMPRESSION CONTROL:

COMPRESSION LIMITS:

SELECTION:

Allows Tones to be Added as $20 \log(1/N)$
where N=Number of Tones
Linear Addition of Tones
Front Panel Potentiometer
Adjustable up to ± 300 KHz/2V Pk-Pk
Via Front Panel Switch or Remote Selection

POWER REQUIREMENTS

INPUT VOLTAGE:

115 VAC $\pm 10\%$, 47 to 63 Hz
or 230 VAC $\pm 10\%$, 47 to 63 Hz
or Auto Select between 115 VAC & 230 VAC, $\pm 10\%$ 47 to 63 Hz
or 28 VDC ± 4 VDC, Reverse Polarity Protected
Dependent upon Input Voltage and Output Power

INPUT CURRENT:

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE:

HUMIDITY:

0°C to +55°C
<90%

MECHANICAL

DIMENSIONS:

WEIGHT:

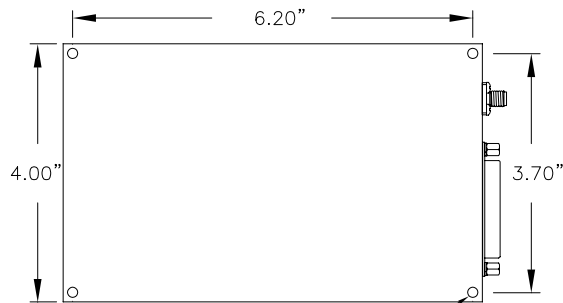
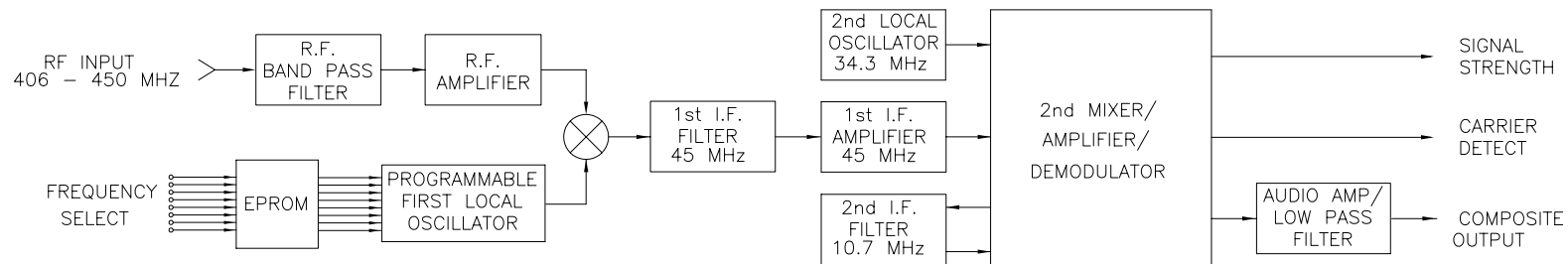
19" Rack X 5.25" H X 20" D
45 lbs (20.5 Kg) Maximum

DATE	05 06 30	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		
CAGE CODE IDENT NO.	60666	COMMAND EXCITER; 1mW TO 20 WATTS CHANNELIZED, AC COUPLED 406.0 TO 450.0 MHZ MODEL NO. ECEC-5RB2 SERIES

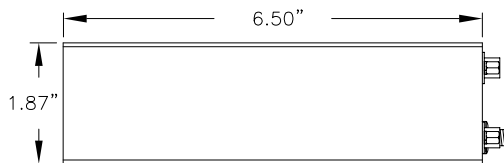
Command Receiver Model ECRC-49B2 Series

49 Cubic Inches Signal Strength

AC Coupled Channelized 28 VDC



MOUNTING HOLES
4 x 40 (4ea)



J2-POWER/FUNCTIONS
DB-25P

- PIN #1: +28 VDC
2: CHASSIS GND
3: N/C
4: OUT OF BAND LED
5: OUT OF BAND LED POWER
6: THRESHOLD LED
7: THRESHOLD LED POWER
8: POWER ON LED
9: GROUND
10: N/C
11: THRESHOLD MONITOR
12: N/C
13: N/C
14: GROUND
15: METER DRIVE
16: GROUND
17: COMPOSITE OUT 50 OHMS
18: GROUND
19: N/C
20: COMPOSITE OUT 600 OHMS
21: GROUND
22: N/C
23: SIGNAL STRENGTH MONITOR
24: GROUND
25: N/C

J3-FREQUENCY SELECT
DB-25S

- PIN #1: BCD 8
2: BCD 4
3: BCD 2
4: BCD 1
5: BCD 0.8
6: BCD 0.4
7: BCD 0.2
8: BCD 0.1
9: GND
10: GND
11: GND
12: N/C
13: BCD 10
14: BCD 20
15: BCD 40
16: BCD 80
17: GND
18: GND
19: GND
20: N/C
21: N/C
22: N/C
23: GND
24: GND
25: GND

J1-RF INPUT
SMA FEMALE

RF INPUT

FREQUENCY RANGE:
FREQUENCY SELECTION:
IMPEDANCE:
VSWR:
POWER:
RF SIGNAL STRENGTH:

406.0 to 450.0 MHz in 100 KHz Steps
Via DB-25S Connector
50 Ohms Nominal
1.5:1 Maximum
+10 dBm Maximum without Damage
0 $\pm$ 0.25 to 5.0 $\pm$ 0.5 VDC
Monotonic from -110 dBm to -50 dBm
0 VDC = Carrier Present; 12 VDC = No Carrier
Approximately -110 dBm
4 dB Maximum

LO'S/IF'S

STABILITY:
1ST I.F.:
2ND I.F.:
IF BANDWIDTH:
HARMONIC AND SPURIOUS LEVEL:

Within $\pm$ 0.002% over -20°C to +70°C
45 MHz
10.7 MHz
240 KHz Nominal
-60 dB Maximum

DEMODULATED OUTPUT

LEVEL:
FREQUENCY RESPONSE:

0.5 VPk-Pk/ $\pm$ 30 KHz Deviation into 600 Ohms
7.5 KHz to 75 KHz $\pm$ 1.5 dB

POWER REQUIREMENTS

INPUT VOLTAGE:
INPUT CURRENT:

28 $\pm$ 4 VDC, Reverse Polarity Protected
300 mA Maximum

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE:
VIBRATION:
SHOCK:
ACCELERATION:
ALTITUDE:
HUMIDITY:

Operating: -20°C to +70°C; Storage: -54°C to +125°C
14 G's, Random, Standard Haystack, 20 Hz to 2KHz, 3 Axes
1/2 Sine, 100 G's Pk, 11 ms, 3 Axes
100 G's, 3 Axes
Unlimited
To 95% at any Temperature forming Frost or Condensation

PHYSICAL CHARACTERISTICS

DIMENSIONS:
WEIGHT:

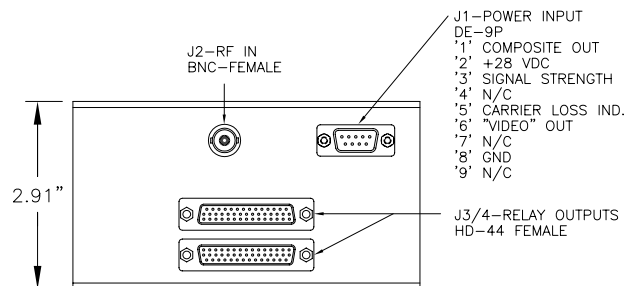
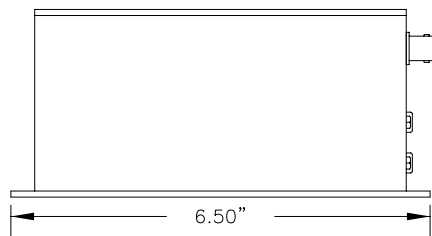
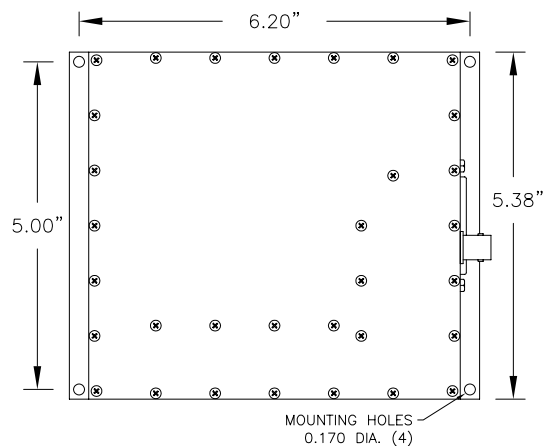
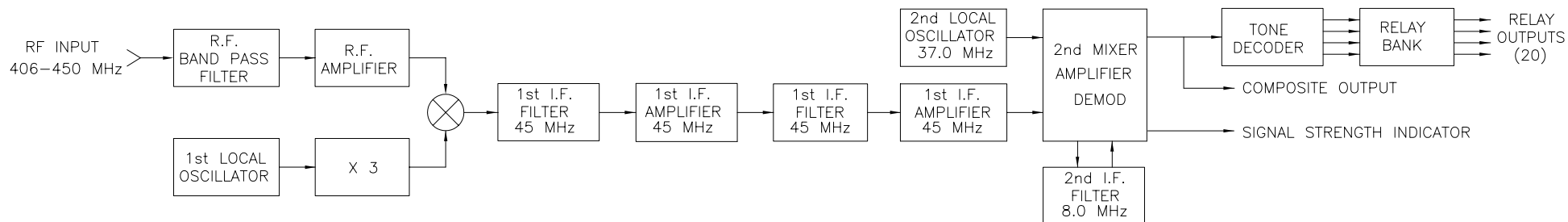
Per Outline Drawing
32 oz. Maximum

DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		
CAGE CODE IDENT NO. 60666		COMMAND RECEIVER/SIGNAL STRENGTH CHANNELIZED, AC COUPLED 406.0 TO 450.0 MHZ MODEL NO. ECRC-49B2 SERIES

Command Receiver/Decoder Model ERD-99B2A-Series

99 Cubic Inches Up to 20 IRIG Tones Signal Strength

Single Frequency 28 VDC



RF INPUT
FREQUENCY: 406.0 - 450.0 MHz (Specify)
POWER: +10 dBm Maximum Non-Destructive RF Input
VSWR: 2:1 Maximum
IMPEDANCE: 50 Ohms Nominal
OPERATING STABILITY: ±0.005%
IF BANDWIDTH: -3 dB=600 KHz Minimum; -60 dB=2 MHz Maximum
IMAGE REJECTION: 60 dB Minimum
SPURIOUS RESPONSE REJECTION: 60 dB Minimum
DYNAMIC RANGE: 80 dB Minimum
THRESHOLD SENSITIVITY: -96 dBm Maximum For Channel Activation

DECODER SECTION
NUMBER OF CHANNELS: 20 IRIG Command Channels
SIMULTANEOUS USABLE TONES: 10
RF DEVIATION REQUIRED FOR PROPER RELAY OPERATION (EACH CHANNEL):
CHANNEL BANDWIDTH: 30 KHz Peak ±3 KHz
 > ± 0.5% Of Channel Frequency And
 < ± 3.5% Of Channel Frequency At
 20 dB Quieting And 15 KHz Peak Deviation
ADJACENT CHANNEL REJECTION: 34 dB Minimum
RELAY ACTIVATION TIME: < 25 mSec
NOISE IMMUNITY: Output Will Not Activate On White Noise Or Upon "Turn On" Or "Turn Off"
TYPE OF OUTPUT: Double Pole Double Throw Relay

POWER REQUIREMENTS
INPUT VOLTAGE: +28 ±4 Vdc; Reverse Polarity Protected
INPUT CURRENT: 300 mA Maximum Total Under All Functional Conditions At +28 Vdc For 10 Channels

ENVIRONMENTAL SPECIFICATIONS
TEMPERATURE: Operating: -20°C TO +70°C
VIBRATION: 14 G's, Random, Standard Haystack, 20 Hz to 2 KHz, 3 Axes
SHOCK: 1/2 Sine, 100 G's Peak, 11ms, 3 Axes
ACCELERATION: 100 G's, 3 Axes
ALTITUDE: Unlimited
HUMIDITY: To 95% at any Temp. Forming Frost or Condensation

MECHANICAL
DIMENSIONS: See Outline Drawing
WEIGHT: 40 Ounces Maximum

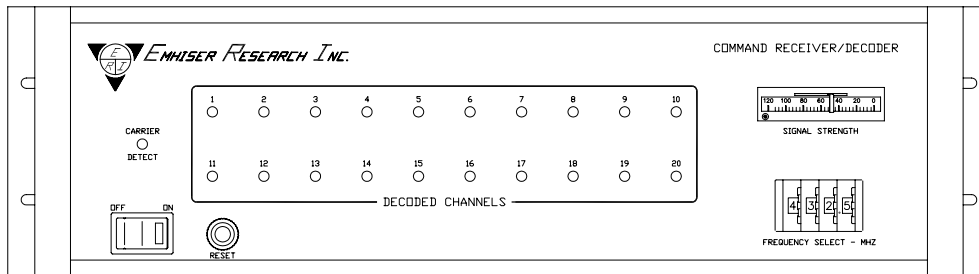
DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		
CAGE CODE IDENT NO. 60666		COMMAND RECEIVER / DECODER SINGLE FREQUENCY, UP TO 20 TONES 406.0 TO 450.0 MHZ MODEL NO. ERD-99B2A-SERIES

Command Receiver/Decoder Model ERDC-5R Series

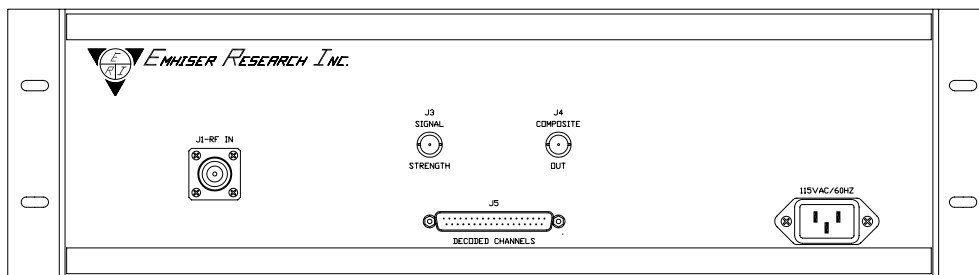
Rack Mount Up to 20 IRIG Tones

AC Coupled Channelized 115 VAC / 230 VAC / 28 VDC

FRONT VIEW



REAR VIEW



RF INPUT

FREQUENCY RANGE:
FREQUENCY SELECTION:

POWER:

VSWR:

IMPEDANCE:

OPERATING STABILITY:

IF BANDWIDTH:

IMAGE REJECTION:

SPURIOUS RESPONSE REJECTION:

DYNAMIC RANGE:

NOISE FIGURE:

L.O. RERADIATION:

406.0 to 450.0 MHz in 100 KHz Steps
Via Front Panel Thumbwheel Switches
Option: Remote Frequency Select via Rear Panel 25 Pin D-Sub
+10 dBm Maximum Non-Destructive RF Input
2:1 Maximum
50 Ohms Nominal
 $\pm 0.002\%$
-3 dB = 1 MHz Minimum; -60 dB = 4 MHz Maximum
60 dB Minimum
60 dB Minimum
+12 dBm to -90 dBm Minimum
Less than 4 dB
Less than -60 dBm

DECODER SECTION

CHANNEL FREQUENCIES:

CHANNEL BANDWIDTHS:

OUTPUT:

TYPE:

SIMULTANEOUS CHANNELS:

RESPONSE TIME:

SIGNAL STRENGTH:

Per Table 1
Greater than $\pm 1\%$ at ± 15 KHz Deviation
Less than $\pm 4\%$ at ± 30 KHz Deviation
SPST 2 Amp Relays Thru Rear Panel 37 D Female Connector
Any Combination up to 6 Total
Less than 10 milliseconds
Monotonic From -110 dBm to -10 dBm
Option: Bit Output for Built in Test via SMA Female Front Panel
Option: 2nd IF Output via BNC Female Rear Panel

POWER REQUIREMENTS

INPUT VOLTAGE:

115 VAC $\pm 10\%$, 47 to 63 Hz
or 230 VAC $\pm 10\%$, 47 to 63 Hz
or Auto Select between 115 VAC & 230 VAC, $\pm 10\%$ 47 to 63 Hz
or 28 VDC ± 4 VDC, Reverse Polarity Protected
Less than 1 Amp

INPUT CURRENT:

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE:

HUMIDITY:

0°C to +55°C
<90%

MECHANICAL

DIMENSIONS:

WEIGHT:

CONNECTORS:

19" Rack x 5.25" H x 20" D
20 Lbs Maximum
RF Input; Type N Female
Signal Outputs; 37 D Female
Signal Strength; BNC Female
Composite Out: BNC Female

TABLE 1

PIN NO.	FUNCTION	FREQUENCY
1	CHANNEL 1	7.50
2	CHANNEL 3	9.54
3	CHANNEL 5	12.14
4	CHANNEL 7	15.45
5	CHANNEL 9	18.66
6	CHANNEL 11	25.01
7	CHANNEL 13	31.83
8	CHANNEL 15	40.49
9	CHANNEL 17	51.52
10	CHANNEL 19	65.56
11	N/C	
12	N/C	
13	N/C	
14	N/C	
15	N/C	
16	N/C	
17	N/C	
18	N/C	
19	COMMON	8.46
20	CHANNEL 2	10.76
21	CHANNEL 4	13.70
22	CHANNEL 6	17.43
23	CHANNEL 8	22.17
24	CHANNEL 10	28.21
25	CHANNEL 12	35.90
26	CHANNEL 14	45.68
27	CHANNEL 16	58.12
28	CHANNEL 18	73.95
29	N/C	
30	N/C	
31	N/C	
32	CARRIER	
33	N/C	
34	N/C	
35	N/C	
36	N/C	
37	COMMON	

DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN	L3	
APVD		
QC		
CAGE CODE IDENT NO. 60666		COMMAND RECEIVER/DECODER CHANNELIZED, AC COUPLED, 406.0 TO 450.0 MHz, 20 IRIG TONES MODEL NO. ERDC-5R SERIES



Command Transmitter/Encoder Model ECTC-5RB2 Series

Rack Mount Up to 20 IRIG Tones 1 mW to 20 Watts

AC Coupled Channelized 115 VAC / 230 VAC / 28 VDC

Protected by One or More of the following Patents:

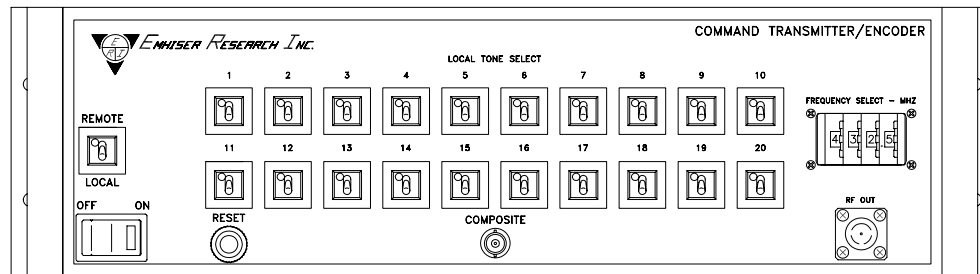
US: 5,091,706, 5,097,230, 5,311,152, 5,497,509, 5,802,462, 6,404,292, 6,411,237, 6,417,738, 6,650,180, 6,683,499, 6,690,238, 6,747,517, and 6,771,133.

Canadian: 2,033,861, 2,033,878, 2,080,013, 2,097,042, 2,235,091, and 2,308,209.

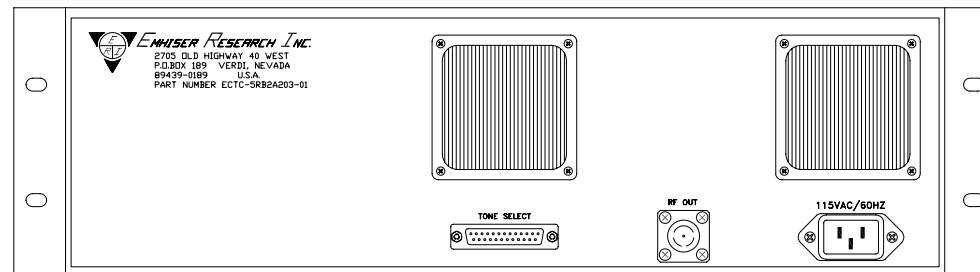
Other US and Canadian Patents Pending.

IRIG TONES			
CHANNEL	FREQ. (KHz)	CHANNEL	FREQ. (KHz)
1	7.50	11	25.01
2	8.46	12	28.21
3	9.54	13	31.83
4	10.76	14	35.90
5	12.14	15	40.49
6	13.70	16	45.68
7	15.45	17	51.52
8	17.43	18	58.12
9	19.66	19	65.56
10	22.17	20	73.95

FRONT VIEW



REAR VIEW



RF OUTPUT

CARRIER FREQUENCY: 406.0 to 450.0 MHz in 100 KHz Steps
Option: Carrier On/Off via Enable/Standby Switch Front Panel
Option: Carrier On LED Indicator Front Panel
FREQUENCY SELECTION: Via Front Panel Thumbwheel Switches
Option: Remote Frequency Select via Rear Panel 25 Pin D-Sub
CARRIER STABILITY: Within $\pm 0.005\%$
POWER: 1 Milliwatt to 20 Watts
IMPEDANCE: 50 Ohms Nominal
DEVIATION LEVEL: Set to ± 30 KHz per Tone
Option: Bit Output for Built in Test via SMA Female Front Panel

AUDIO TONES

See Table 1
TONE FREQUENCIES: Front Panel LEDs Indicate Keyed Channel
TONE MONITOR: Via Front Panel Switches (Local)
ACTIVATION: or Rear Panel (Remote) 25 Pin Connector
Less than 1 Millisecond
ACTIVATION TIME: Within $\pm 0.01\%$
STABILITY: Set for Deviation of ± 30 KHz per Tone
AMPLITUDE: Option: Deviation Indication Meter Front Panel
Option: Remote Deviation Select via 9 Pin D-Sub Rear Panel
HARMONIC DISTORTION: Less than 1%

POWER REQUIREMENTS

INPUT VOLTAGE: 115 VAC $\pm 10\%$, 47 to 63 Hz
or 230 VAC $\pm 10\%$, 47 to 63 Hz
or Auto Select between 115 VAC & 230 VAC, $\pm 10\%$ 47 to 63 Hz
or 28 VDC ± 4 VDC, Reverse Polarity Protected
INPUT CURRENT: Dependent upon Input Voltage and Output Power

MECHANICAL

DIMENSIONS: 19" Rack X 5.25" H X 20" D
WEIGHT: 25 Lbs. Maximum
CONNECTORS: RF Output; Type N Female (Front and Rear Panels)
Front and Back Up to 1W or Front or Rear Up to 20W
Remote Tone Select; Cannon DB25S
Composite; BNC Female

DATE	05 06 30	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN		
APVD		
QC		
CAGE CODE IDENT NO.	60666	COMMAND TRANSMITTER/ENCODER CHANNELIZED, AC COUPLED 406.0 to 450.0 MHz, UP TO 20 IRIG TONES
		MODEL NO. ECTC-5RB2 SERIES 

Command Transmitter/Encoder Model ECTC-7R Series

Rack Mount Up to 20 IRIG Tones 1 mW to 100 Watts

DC Coupled Channelized 115 VAC / 230 VAC / 28 VDC

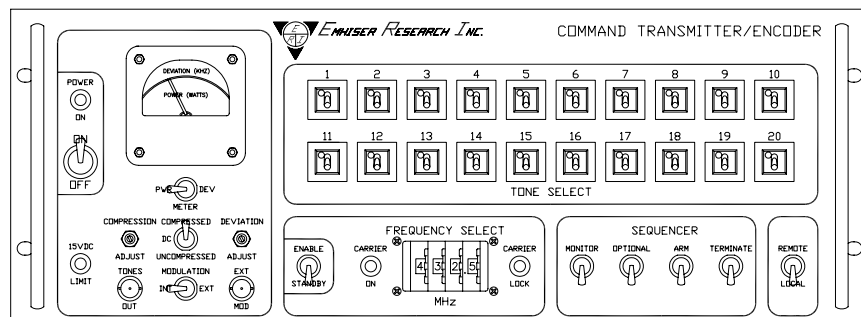
Protected by One or More of the following Patents:

US: 5,091,706, 5,097,230, 5,311,152, 5,497,509, 5,802,462, 6,404,292, 6,411,237, 6,417,738, 6,650,180, 6,683,499, 6,690,238, 6,747,517, and 6,771,133.

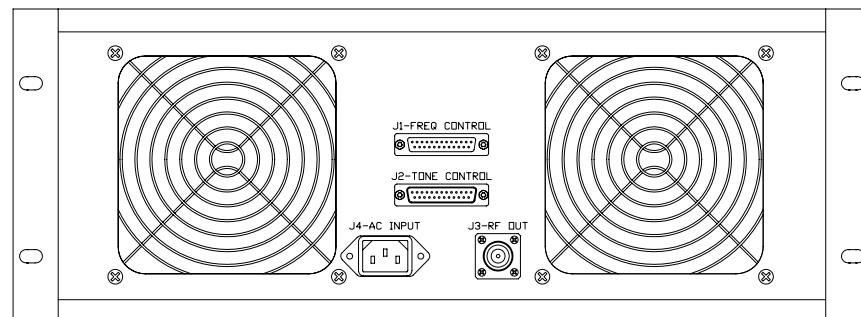
Canadian: 2,033,861, 2,033,878, 2,080,013, 2,097,042, 2,235,091, and 2,308,209.

Other US and Canadian Patents Pending.

FRONT PANEL



REAR PANEL



RF OUTPUT

CARRIER FREQUENCY:
FREQUENCY SELECTION:
CARRIER STABILITY:
POWER:
IMPEDANCE:
DEVIATION LEVEL:
INPUT COUPLING:

406.0 to 450.0 MHz in 100 KHz Steps
Via Front Panel Switches (Local) or Rear Panel (Remote)
Within $\pm 0.002\%$
1 Milliwatt to 100 Watts Minimum
50 Ohms Nominal
 ± 300 KHz Maximum
AC, DC, AC Compressed

MODULATION INPUTS

FREQUENCY RESPONSE:
PEAK DEVIATION:
DEVIATION SENSITIVITY:
INCIDENTAL AM:
INCIDENTAL FM:
INPUT IMPEDANCE:

AC: 100 Hz to 150 KHz 3dB; DC: 0 Hz to 150 KHz 3dB
 ± 300 KHz Maximum
Adjustable up to ± 300 KHz/2V Pk-Pk
5% Maximum
5 KHz Maximum
600 Ohms

AUDIO TONES

tone FREQUENCIES:
TONE MONITOR
ACTIVATION:
ACTIVATION TIME:
STABILITY:
HARMONIC DISTORTION:

See Table 1
Front Panel LEDS Indicate Keyed Channel(s)
Via Front Panel Switches (Local) or Rear Panel (Remote)
Less than 1 millisecond
Within $\pm 0.01\%$
Less than 1%

POWER REQUIREMENTS

INPUT VOLTAGE:

115 VAC $\pm 10\%$, 47 to 63 Hz
or 230 VAC $\pm 10\%$, 47 to 63 Hz
or Auto Select between 115 VAC & 230 VAC, $\pm 10\%$ 47 to 63 Hz
or 28 VDC ± 4 VDC, Reverse Polarity Protected
Less than 1 Amp

INPUT CURRENT:

MECHANICAL

DIMENSIONS:
WEIGHT:
CONNECTORS:

19" Rack X 7.0" H X 20" D
35 Lbs Maximum
RF Output; Type N Female
RF Frequency Control; DB-25S
Tone Control; DB-25P
Composite Output; BNC Female
External Modulation Input; BNC Female

IRIG TONES

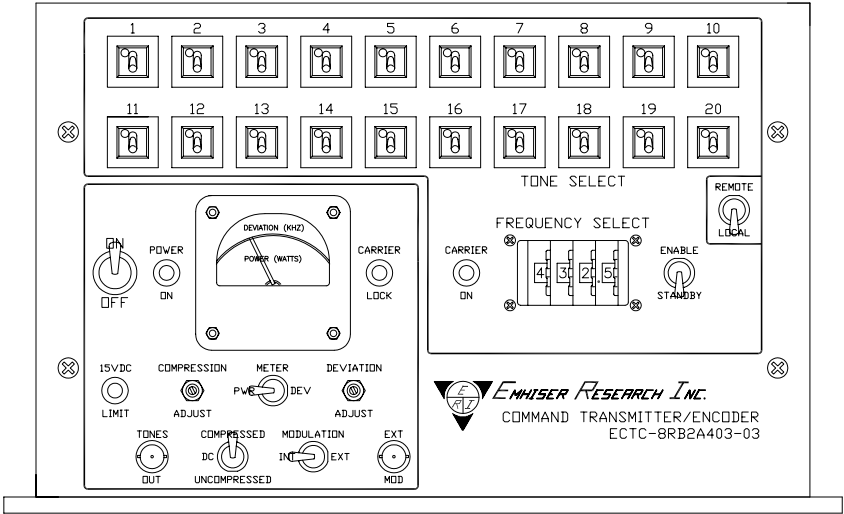
CHANNEL	FREQ. (KHz)	CHANNEL	FREQ. (KHz)
1	7.50	11	25.01
2	8.46	12	28.21
3	9.54	13	31.83
4	10.76	14	35.90
5	12.14	15	40.49
6	13.70	16	45.68
7	15.45	17	51.52
8	17.43	18	58.12
9	19.66	19	65.56
10	22.17	20	73.95

DATE	05 07 11	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
DWN		
APVD		
QC		
CAGE CODE IDENT NO. 60666		COMMAND TRANSMITTER/ENCODER CHANNELIZED, DC COUPLED 406.0 TO 450.0 MHz, UP TO 20 IRIG TONES MODEL NO. ECTC-7R SERIES

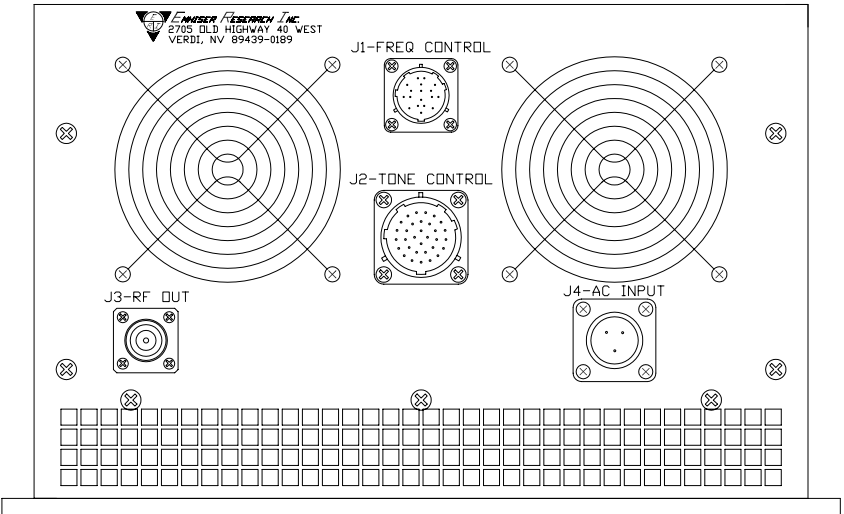


Command Transmitter/Encoder Model ECTC-8RB2A403-03 Series
Base Mount Airborne Up to 20 IRIG Tones 40 Watts
Channelized 28 VDC

FRONT PANEL



REAR PANEL



Protected by One or More of the following Patents:
US: 5,091,706, 5,097,230, 5,311,152, 5,497,509, 5,802,462, 6,404,292, 6,411,237, 6,417,738, 6,650,180, 6,683,499, 6,690,238, 6,747,517, and 6,771,133.
Canadian: 2,033,861, 2,033,878, 2,080,013, 2,097,042, 2,235,091, and 2,308,209.
Other US and Canadian Patents Pending.

RF OUTPUT

CARRIER FREQUENCY: 406.0 to 450.0 MHz in 100 KHz Steps
FREQUENCY SELECTION: Via Front Panel Switches (Local) or Rear Panel (Remote)
CARRIER STABILITY: Within $\pm 0.002\%$
POWER: 40 Watts Minimum
IMPEDANCE: 50 Ohms Nominal
DEVIATION LEVEL: ± 300 KHz Maximum
INPUT COUPLING: AC, DC, AC Compressed

MODULATION INPUTS

FREQUENCY RESPONSE: 100 Hz to 150 KHz ± 2 dB
PEAK DEVIATION: ± 300 KHz Maximum
DEVIATION SENSITIVITY: Adjustable up to ± 300 KHz/1V Pk-Pk
INCIDENTAL AM: 5% Maximum
INCIDENTAL FM: 5 KHz Maximum
INPUT IMPEDANCE: 600 Ohms

AUDIO TONES

TONE FREQUENCIES: See Table 1
TONE MONITOR: Front Panel LEDs Indicate Keyed Channel(s)
ACTIVATION: Via Front Panel Switches (Local) or Rear Panel (Remote)
ACTIVATION TIME: Less than 1 millisecond
STABILITY: Within $\pm 0.01\%$
HARMONIC DISTORTION: Less than 1%

POWER REQUIREMENTS

INPUT VOLTAGE: +28 ± 4 VDC Reverse Polarity Protected
INPUT CURRENT: 6 Amps Maximum

MECHANICAL

SIZE: 13.00"W X 13.25"D X 8.00"H excluding Connectors and Switches
WEIGHT: 35 Lbs Maximum
CONNECTORS: RF Output; Type N Female
DC Power Input; MS3102A-10P
RF Frequency Control; PT02A14-18S
Tone Control; PT02A20-27P
Composite Output; BNC Female
External Modulation Input; BNC Female

TABLE 1	
CHANNEL	FREQUENCIES (KHz)
1	7.50
2	8.46
3	9.54
4	10.76
5	12.14
6	13.70
7	15.45
8	17.43
9	19.66
10	22.17
11	25.01
12	28.21
13	31.83
14	35.90
15	40.49
16	45.68
17	51.52
18	58.12
19	65.56
20	73.95

DATE	 EMHISER RESEARCH, INC. 2705 OLD HIGHWAY 40 WEST TEL: 775-345-2705 P.O. BOX 189 VERDI, NEVADA FAX: 775-345-2484 89439-0189 U.S.A. EMAIL: INFO@EMHISER.COM
05 06 30	
DWN	
APVD	
QC	
COMMAND TRANSMITTER/ENCODER CHANNELIZED in 100 KHz STEPS 406.0 to 450.0 MHz	
CAGE CODE IDENT NO. 60666	MODEL NO. ECTC-8RB2A403-03



EMHISER RESEARCH, INC.

Rackmount Appearance Options

Overall Size:

Racks are available in any combination of 3.5", 5.25" or 7" heights (H) and 10", 16" and 20" Depths (D) with a standard width of 19". Not all sizes are available for some products.

Instrument Panel Finish:

Front and rear instrument panels have a standard polished aluminum finish. Custom paint colors can be requested with specified paint chip numbers.

Silkscreen Color:

Front and rear instrument panels have standard black epoxy ink silkscreening. Custom ink colors may be requested with specified color numbers.

Black



Blue

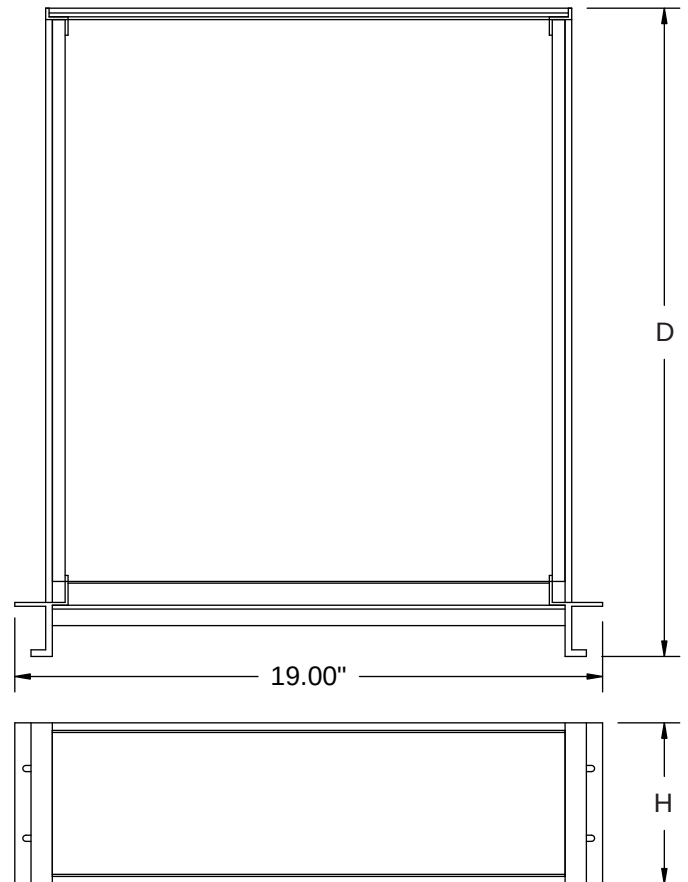


Teakwood



Rack Color:

Vinyl side bands and covered top panels are available in Black, Blue and Teakwood



Options

Height (Please choose one)

- ☐ 3.5"
- ☐ 5.25"
- ☐ 7.0"

Depth (Please choose one)

- ☐ 10"
- ☐ 16"
- ☐ 20"

Rack Color (Please choose one)

- ☐ Black
- ☐ Blue
- ☐ Teakwood

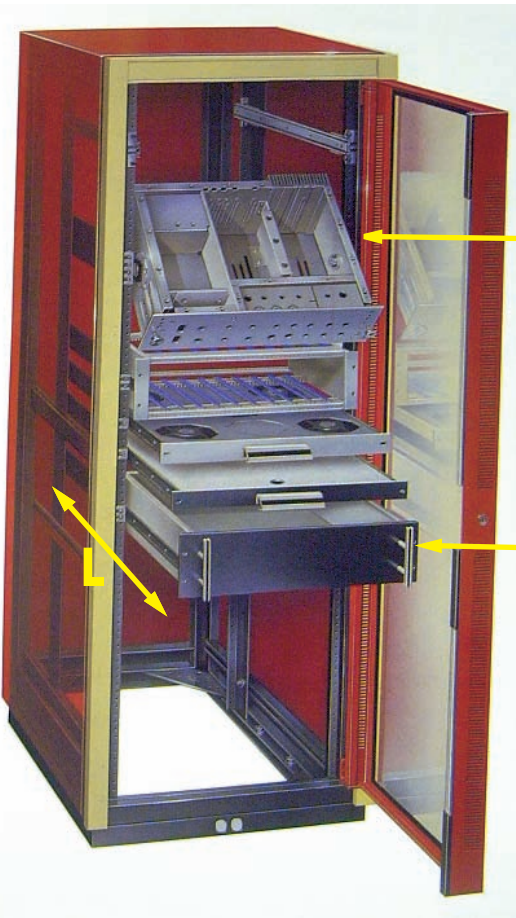
Custom Requests

- ☐ Instrument Panel Finish (Specify) _____ (Additional charge may apply)
- ☐ Silkscreen Color (Specify) _____ (Additional charge may apply)



EMHISER RESEARCH INC.

Rackmount Chassis Slide Options



Pivoting Chassis Slides:

Fully extendable slides are designed to fit any enclosure.
Pivots up or down and locks in position with positive detent action.
Quick-disconnect system permits the chassis to be removed quickly and easily.
Designed to lock in the extended position.
Available in 20", 22" and 24" lengths (L).

Non-Pivoting Chassis Slides:

Fully extendable slides are designed to fit any enclosure.
Quick-disconnect system permits the chassis to be removed quickly and easily.
Designed to lock in the extended position.
Available in 20", 22" and 24" lengths (L).

Options (Please choose One)

Pre-installed Chassis Slides by Emhiser

Pivot Chassis Slides

20" 22" 24"

Non-Pivot Chassis Slides

20" 22" 24"

Provision for Chassis Slides (pre-drilled holes only)

Pivot Chassis Slides

20" 22" 24"

Non-Pivot Chassis Slides

20" 22" 24"

No Chassis Slides

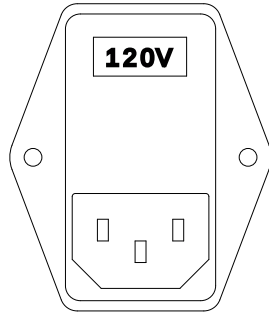
Other (Specify) _____ (Additional charge may apply)

Authorizing Signature _____ Date _____ PO# _____



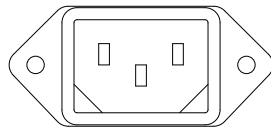
EMHISER RESEARCH, INC.

Rackmount Power Input Options



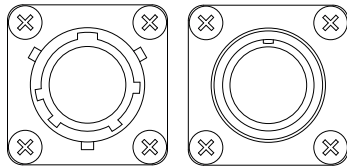
AC Input Fuseable Connector:

RFI Power Line Filter
Up to 6 Amps
120 or 220 VAC Selectable
Accepts 1/4x1-1/4 Fuse



AC Input Connector:

RFI Power Line Filter
Up to 15 Amps
120 or 220 VAC



DC Input Connector:

Military Standard Circular Connectors
Any standard shell, case size and pins available
Specify MS Number

Options (Please choose One)

- ☐ 115 VAC +/- 10% 47-440 Hz
 - ☐ AC Input Connector
 - ☐ AC Input Fuseable Connector
- ☐ 230 VAC +/- 10% 47-440 Hz
 - ☐ AC Input Connector
 - ☐ AC Input Fuseable Connector
- ☐ Auto Select Between
115 VAC +/- 10% 47-440 Hz
or 230 VAC +/- 10% 47-440 Hz
 - ☐ AC Input Fuseable Connector
- ☐ 28 +/- 4 VDC With DC Input Connector
Please Specify MS number _____
- ☐ Other (Specify) _____

(Additional charge may apply)