# KIMDU
TECHNOLOGIES

General Description

The Kimdu Technologies COTS Synchro to Serial Interface Unit (SSIU) contains up to three independent, 16-Bit monolithic tracking Synchro-To-Digital converters. The digital outputs are translated and formatted by the embedded CPU and transmitted serially over both RS-232 and RS-422 interface ports. The serial data is tagged with header which indicates the synchro channel that the data was received on. There is an additional, dedicated RS-232 Serial Port for firmware uploads allowing field-programmable firmware updates. Both ARINC-429 and Ethernet 10/100 output options are available.

Uploading Firmware Operation
The SSIU allows for uploading firmware upgrades at your site avoiding having to send the unit back to the factory. There is an I/O connector pin that needs to be jumpered as defined in the J2 Pinout diagram. Wire an RS-232 cable to the J2 I/O connector or use a USB/RS-232 dongle adapter along with a free PC-based software utility and upload a Kimdu-supplied Hex file to the SSIU.

Optional BIT/Fault Operation
The SSIU contains BIT capabilities in both the hardware and software levels. The BIT discrete is a GROUND/OPEN type signal. The use of BIT and the conditions which activate the BIT output can be defined by the customer. Call Kimdu Technologies for details.
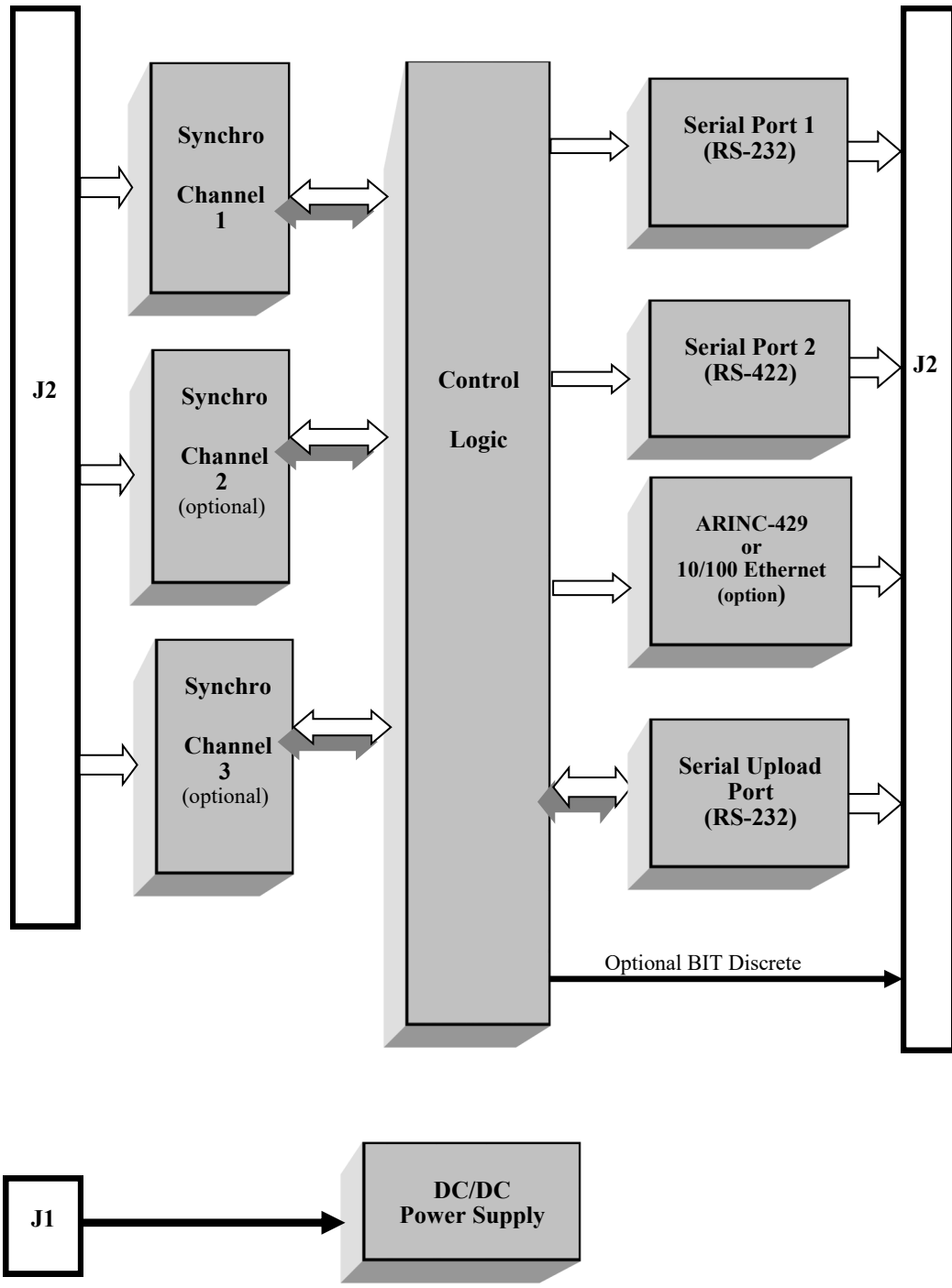
QUALITY

SUPPORT
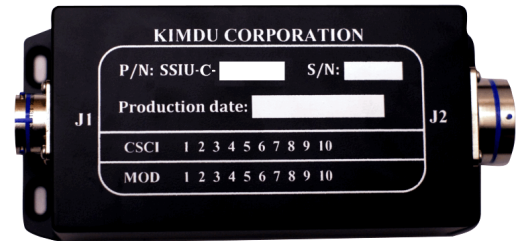
FEATURES:

♦ **Up to Three Synchro Channels**

♦ **Outputs : RS-232/422 and ARINC-429 (option), Ethernet 10/100 (option)**

♦ **Ruggedized, Qualified Unit**

♦ **Choice of Synchro Accuracies**
◊ **1-Minute**
◊ **2-Minute**
◊ **4-Minute**

♦ **16-bit S/D Converter Resolution**

♦ **MIL-C-26482 Connectors**

♦ **Mil-Std-704 28vDC Power Supply**

♦ **BIT Testing with Discrete Output (option)**

♦ **Firmware Uploader Included**
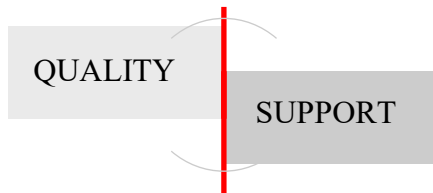
KIMDU TECHNOLOGIES INC.

Plainview, New York 11803

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E-mail: sales@kimducorp.com

J2

Synchro Channel 1

Synchro Channel 2 (optional)

Synchro Channel 3 (optional)

Control Logic

Serial Port 1 (RS-232)

Serial Port 2 (RS-422)

ARINC-429 or 10/100 Ethernet (option)

Serial Upload Port (RS-232)

J2

Optional BIT Discrete

J1

DC/DC Power Supply

FUNCTIONAL BLOCK DIAGRAM

SSIU Operation:

The SSIU can be ordered with up to three Synchro channels and with accuracies from 1 minute to 4 minute accuracy. Note that the SSIU comes with input isolation /step down transformers. These transformers affect the accuracy of the synchro conversion with a nominal loss of one minute. The SSIU can be ordered with 90v or 11.8v input compatibility. The Reference input requires 115v @ 400hz. The Reference input is common to all synchro channels.

The three Synchro channels are named: Channel 1 or "CH1", Channel 2 or "CH2", Channel 3 or "CH3".

DATA UPDATE RATE

The SSIU transmits synchro data over the serial ports at a 1Hz rate to be in line with NMEA/GPS timing. If you need a faster update rate, versions have been supplied with 50Hz update rate, as well. Contact Kimdu for details.

SERIAL PORTS

The SSIU can transmit the converted data on either RS-422 or RS-232 ports. The SSIU can also simultaneously transmit data on both RS-232 and RS-422 ports. This is the default condition.

The default properties for both ports are:

baud rate: 115.2k.
Number of bits: 8
Parity: No
Number of Stop bits: 1
Flow control: None

The default output data structure is in NMEA format with some exceptions:

"Synchro Channel", "Angle" "*" "CRC"

The data output for a three channel SSIU would look like this:

        CH1,269.41*43
        CH2,269.41*40
        CH3,269.41*41

ERRORS

The SSIU verifies the validity of the Synchro signals.
This includes:
        Loss of Synchro Signal
        Loss of Reference
        180 degrees phase error on input Reference. The SSIU attempts to correct for this condition

In the event that one of these error conditions occur, the SSIU replaces the angle value with the ASCII string "BIT FAIL". The example below is transmitted when a validity error occurs on Synchro Channel #1.
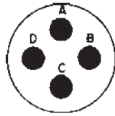
CH1,BIT FAIL*28

ARINC-429 OUTPUT (optional)

The SSIU has an optional ARINC-429 output port. The Synchro data can be transmitted at either Hi or Lo Speed bit rate. ARINC Labels can be defined by the customer. Contact Kimdu for details.

Connector Definitions :
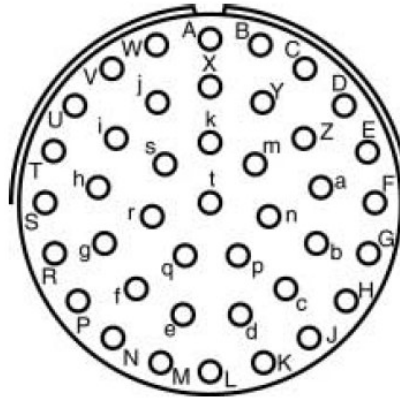
Connector Type: MIL-C-26482 Series 2

P1 - POWER	P2 Connector

14-4

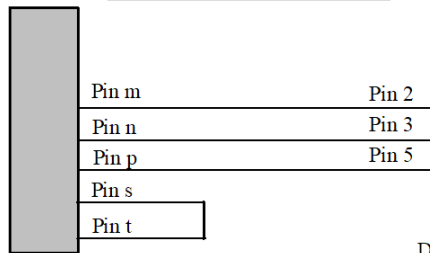| PIN	FUNCTION
A	+28VDC Logic
B	+28vDC Heater *
C	28VDC RTN
D	28VDC Heater RTN *

Mating Connector:
MS3475L14-4S

20-41

Mating Connector:
MS3475L20-41P

Optional Internal Heaters Power connections. If this option is not ordered, Pin B must be connected to 28vDC and pin D must be connected to 28v RTN.

Upload Cable Drawing

J2		ASIU Side	PC Side

Pin m ———— Pin 2
Pin n ———— Pin 3
Pin p ———— Pin 5
Pin s
Pin t

DB-9 Female

Notes:
(1) Mating connectors are not included. They can be ordered through Kimdu Corp. Contact us for details.
(2) Pins "s" and "t" must be shorted on the mating connector for the unit to be in the "Upload" mode. For normal, running mode, pin "s" must be left unconnected.

P2 – SIGNAL I/O

PIN	FUNCTION	
A	RHi	Reference input Hi
B	RLo	Reference input Low
C		Unused
D	CH1 - S1	Synchro input S1 CH 1
E	CH1 - S2	Synchro input S2 CH 1
F	CH1 - S3	Synchro input S3 CH 1
G		Unused
H	CH2 - S1	Synchro input S1 CH 2
J	CH2 - S2	Synchro input S2 CH 2
K	CH2 - S3	Synchro input S3 CH 2
L		unused
M		unused
N	CH3 - S1	Synchro input S1 CH 3
P	CH3 - S2	Synchro input S2 CH 3
R	CH3 - S3	Synchro input S3 CH 3
S		unused
T		unused
U		unused
V	422 TX +	RS-422 TX +
W	422 TX -	RS-422 TX -
X		unused
Y		unused
Z	232 TX	RS-232 TX
a	232 GND	RS-232 GND
b		unused
c		unused
d	ARINC TX+	ARINC-429 TX + Output
e	ARINC TX -	ARINC-429 TX - Output
f	ETH TX+	Ethernet TX+
g	ETH TX-	Ethernet TX-
h	ETH RX+	Ethernet RX+
i	ETH RX-	Ethernet RX-
j	BIT	Bit Discrete Output
k	GND	GND
m	232 TX UL	RS-232 TX UPLOAD
n	232 RX UL	RS-232 RX UPLOAD
p	232 UGND	RS-232 GND
q		unused
r	GND	GND
s	UL Jumper	UPLOAD (see note 2)
t	GND	GND

Specifications

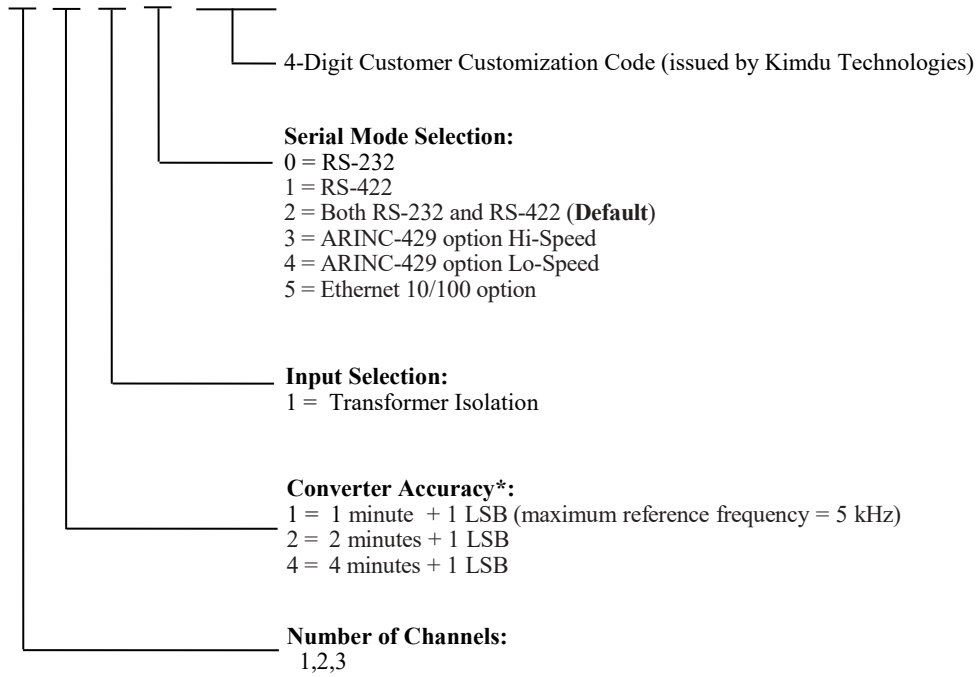| Parameter	Value	Units
Synchro Converter Accuracy *	1, 2, 4 +/- 1 LSB	Minutes
Synchro Converter input type	Isolated Transformer	
Synchro Input Voltage	90v or 11.8v	AC
Synchro Converter Resolution	16	bits
Number of Synchro Channels (max)	3	-
Reference Voltage Input	26v -115v @ 400Hz	AC
Number of Serial Channels (max)	3	-
Serial Port Baud Rate (default)	115.2K	Baud - see note(1)
Band Width (BW)	40	Hz - see note(2)
Tracking Rate	3	RPS - see note(2)
Serial Output for Synchro Ch#1 to #3	RS-232, RS-422	-
ARINC-429 Data Rate	12.5 or 100	kbps
Serial Data Format	NMEA 0183	see note(3)
Max. Delay from Power-On to Normal Operation (Boot/Loader + BIT delays)	8	Seconds
Power Supply		
- Nominal Input Voltage	28V (nominal) +/-20%	Vdc
- Surge / Voltage Range	per Mil-Std-704E for 28vDC operation	
- Logic Supply Current (nom.)	50	mA
- Heater Supply Current (Max) - Note: When operating <-40°c	1.5	A - see note (5)
- EMI	Designed to meet Mil-461	
Enclosure		
- Environmental	IP65	
- Weight	570 gm	
Connectors		
- Type	MIL-C-26482	
Operating Temperature	-40 to +71 (see note 4,5)	°C
Storage Temperature	-55 to +125	°C

Notes:
(1) Other rates can be supplied.
(2) Based upon a Reference Frequency of 400Hz and 16-bit resolution mode
(3) Modified NMEA. Raw Data Output also available.
(4) Contact Kimdu Sales for details
(5) Operating temperature can be screened to +85°C. Contact factory.

Top View of Assembly

178.50
[7.028]

A

70.00
[2.756]

B

83.10
[3.272]

B

140.00
[5.512]

A

Flanged Lid

SECTION A-A
End View of Assembly

50.40
[1.984]

75.79
[2.984]
(Inner Box Width)

SECTION B-B
Side View of Assembly

Flanged Lid

Box

145.69
[5.736]
(Inner Box Length)

Top View Looking Inside Box

64.20
[2.528]

78.10
[3.075]

148.00
[5.827]

134.30
[5.287]

153.00
[6.024]

Flanged Lid

4.65
[.183]

Ø4.00
[.157]

C

10.70
[.421]

74.10
[2.917]

145.90
[5.744]

51.00
[2.008]
(Center Distance)

10.00
[.394]

1.70
[.067]

C

165.00
[6.496]

SECTION C-C
Side of Slot

98.6°

16.05
[.632]

5.50
[.217]

1.50
[.059]

Dimensions:
mm
[inches]

SSIU

DWG141106

Rev 2

Ordering Information

SSIU-C- X - X - X - X - XXXX

4-Digit Customer Customization Code (issued by Kimdu Technologies)

Serial Mode Selection:
0 = RS-232
1 = RS-422
2 = Both RS-232 and RS-422 (**Default**)
3 = ARINC-429 option Hi-Speed
4 = ARINC-429 option Lo-Speed
5 = Ethernet 10/100 option

Input Selection:
1 = Transformer Isolation

Converter Accuracy*:
1 = 1 minute + 1 LSB (maximum reference frequency = 5 kHz)
2 = 2 minutes + 1 LSB
4 = 4 minutes + 1 LSB

Number of Channels:
1,2,3

* Accuracy: The accuracy option refers to the internal synchro converter accuracy. The internal isolation transformers, however, adds up to a 1 minute error to the Accuracy selected.

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