U.N. OPEN 6 DIGIT SELCALL - TYPE: CCIR 493-4 / UN - SOURCE: UNITED NATIONS

The following provides some details of the HF open-standard 6-digit selcall protocol as defined in the United Nations Working Group on Emergency Telecommunications inter agency standards specifications. This is applicable primarily to HF SSB land mobile radio communications.

The HF open-standard 6-digit selcall protocol has unrestricted release to all manufacturers and vendors of HF equipment and provides the following selcall features:

1. Selcall	8. Pagecall (SMS)
2. Group Call [1]	9. GPS Send
3. Sub-Group Call [1]	10. GPS Request
4. All Call [1]	11. Status Request (Net. Diagnostics) [3]
5. Beacon Call	12. Emergency Selcall with GPS
6. Telcall	13. Emergency Selcall without GPS
7. Hang Up Call	14. Transceiver Lock (Stun) Facility [2]

[1] Diagrams for (i) All Call, (ii) Group Call, and (iii) Sub-Group Call facilities are not provided. These features are a simple variant of the main selcall feature as follows:

4 DigIt Calling	**6 Digit Calling**
All Call is XOOO	All Call is XXXOOO
Group Call is XXOO	Group Call is XXXXOO
Sub-Group Call is XXXO	Sub-Group Call is XXXXXO

[2] The transceiver lock (stun) facility is a security feature whereby remote transceivers can be disabled using a selcall derivative. It is essential that this facility is PIN protected with each transceiver having a unique and programmable PIN code (of 8 components or more) to prevent unauthorized use of this feature. Similarly, the enabling of a locked transceiver must require the input of the transceivers unique PIN code via the front panel or programming software.

[3] Desirable parameters are serial number, firmware version, supply voltage, s/n ratio, VSWR

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Dot Pattern

'Mark' = 1870Hz

0	1	0	1	0	1	0	1

'Space' = 1700Hz

Phasing Preamble

Sync Character

125	125	125	125	125	125
109	108	107	106	105	104

Count

Selective Call Message

126	A1	A2	A3	100	I1	I2	I3	117	117	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	117

6 Digit Selcall Format

NOTE:- THE DOT PATTERN AND PHASING PREAMBLE IS STANDARD FOR ALL SELECTIVE CALLING MESSAGES.

ALL DATA TRANSMITTED AS BINARY DIGITS. - EACH BIT IS TRANSMITTED FOR 10ms.

LEGEND:

A1, A2 , A3 = 3 BYTES OF DESTINATION ID.
I1, I2 , I3 = 3 BYTES OF CALLERS SELF ID.
PV1 = CALCULATED VERTICAL PARITY FOR TOP LINE OF DATA.
PV2 = CALCULATED VERTICAL PARITY FOR BOTTOM LINE OF DATA.
N = NUMBER OF DIGITS IN THE TELEPHONE NUMBER SENT.
T1..T8 = 8 BYTES OF TELEPHONE NUMBER DATA. (16 DIGITS)
S1..S10 = 10 BYTES OF TRANSCEIVER STATUS BYTES.
D1..D32 = 32 BYTES OF PAGING INFORMATION

One Character

D0	D1	D2	D3	D4	D5	D6	D7	P2	P1	P0

7 Data Bits — 3 Parity Bits

100mSec

a) Selcall

126	A1	A2	A3	100	I1	I2	I3	117	117	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	117

b) Hangup call

126	A1	A2	A3	100	I1	I2	I3	104	105	117	117	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	104	105	117

c) Telephone Format

126	A1	A2	A3	100	I1	I2	I3	102	N	T1	T2	T3	T4	T5	T6	T7	T8	PV1	117	117	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	102	N	T1	T2	T3	T4	T5	T6	T7	T8	PV1	117

d) Pagecall

126	A1	A2	A3	100	I1	I2	I3	116	D1	D2	D3	D5	D7	D9	D11	D13	D15	D17	D19	D21	D23	D25	D27	D29	D31	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	116	D4	D6	D9	D10	D12	D14	D16	D18	D20	D22	D24	D26	D28	D30	D32	117

e) GPS Request

126	A1	A2	A3	100	I1	I2	I3	125	125	117	117	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	125	125	117

f) Status Request

126	A1	A2	A3	100	I1	I2	I3	103	103	117	117	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	103	103	117

g) Beacon Call

125	A1	A2	A3	100	I1	I2	I3	117	117	117
125	125	125	125	A1	A2	A3	100	I1	I2	I3	117

UN OPEN 6-DIGIT SELCALL [GPS CALL] TYPE: CCIR 493-4 / UN INFORMATION SOURCE: UNITED NATIONS

Dot Pattern

'Mark' = 1870Hz

0	1	0	1	0	1	0	1

'Space' = 1700Hz

Phasing Preamble

Sync Character

125	125	125	125	125	125
109	108	107	106	105	104

Count

Legend:

SB - Status Byte

GDP - GPS data Parity. Calculatored by XOR'ing all GPS data bytes.
ie: D1 xor D2 xor D3 xor D4 xor D5 xor D6 xor D7 xor D8

GPS data Selcall

126	A1	A2	A3	I0	I1	I2	I3	121	SB	D1	D2	D3	D4	D5	D6	D7	D8	GDP	117	117	117
126	126	126	126	A1	A2	A3	100	I1	I2	I3	121	SB	D1	D2	D3	D4	D5	D6	D7	D8	GDP

Example:
Lat: 32 05.714 South
Long: 115 48.037 East

78 78 00 78 00 78 00 00 64 00 0C 00 22 64 38 0C 7A 22 02 38 03 7A 14 02 39 03 0E 14 0B 39 36 0E 50 0B 24 36 6B 50 75 24 75 6B 75 75

	BCD	Dec
A1=	00	00
A2=	00	00
A3=	00	00
I1=	0C	12
I2=	22	34
I3=	38	56
SB=	02	
D1=	03	03
D2=	14	20
D3=	39	57
D4=	0E	14
D5=	0B	11
D6=	39	57
D7=	50	80
D8=	24	37

SB - STATUS BYTE (8 bit)

7	6	5	4	3	2	1	0
-	-	NF	NR	SC	GC	WE	SN

Where:
- => not implemented

NF =>	0 = OK	1 = GPS unit not fitted in destination
NR =>	0 = OK	1 = No reponse from destination GPS unit
SC =>	0 = OK	1 = Selcall checksum error
GC =>	0 = OK	1 = GPS data checksum error
WE =>	0 = West	1 = East
SN =>	0 = South	1 = North

UN OPEN 6-DIGIT SELCALL [EMERGENCY SELCALL] **TYPE: CCIR 493-4 / UN** **INFORMATION SOURCE: UNITED NATIONS**

Dot Pattern

'Mark' = 1870Hz

0	1	0	1	0	1	0	1

'Space' = 1700Hz

Phasing Preamble

Sync Character

125	125	125	125	125	125
109	108	107	106	105	104

Count

a) Emergency Selcall without GPS data

126	A1	A2	A3	100	I1	I2	I3	119	119	119	119
126	126	126	A1	A2	A3	100	I1	I2	I3	119	119

Legend:

SB - Status Byte

GDP - GPS data Parity. Calculatored by XOR'ing all GPS data bytes.
ie: D1 xor D2 xor D3 xor D4 xor D5 xor D6 xor D7 xor D8

b) Emergency Selcall with GPS data

126	A1	A2	A3	10	I1	I2	I3	122	SB	D1	D2	D3	D4	D5	D6	D7	D8	GDP	117	117	117
126	126	126	A1	A2	A3	100	I1	I2	I3	122	SB	D1	D2	D3	D4	D5	D6	D7	D8	GDP	

Example:

Lat: 32 05.714 South
Long: 115 48.037 East

78 78 00 78 00 78 00 00 64 00 0C 00 22 64 38 0C 7A 22 02 38 03 7A 14 02 39 03 0E 14 0B 39 36 0E 50 0B 24 36 6B 50 75 24 75 6B 75 75

	BCD	Dec
A1=	00	00
A2=	00	00
A3=	00	00
I1=	0C	12
I2=	22	34
I3=	38	56
SB=	02	
D1=	03	03
D2=	14	20
D3=	39	57
D4=	0E	14
D5=	0B	11
D6=	39	57
D7=	50	80
D8=	24	37

SB - STATUS BYTE (8 bit)

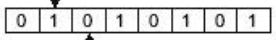
7	6	5	4	3	2	1	0
-	-	NF	NR	SC	GC	WE	SN

Where:
- => not implemented
NF => 0 = OK 1 = GPS unit not fitted in destination
NR => 0 = OK 1 = No reponse from destination GPS unit
SC => 0 = OK 1 = Selcall checksum error
GC => 0 = OK 1 = GPS data checksum error
WE => 0 = West 1 = East
SN => 0 = South 1 = North

UN OPEN 6-DIGIT SELCALL [TRANSCEIVER LOCK CALL] TYPE: CCIR 493-4 / UN INFORMATION SOURCE: UNITED NATIONS

Dot Pattern

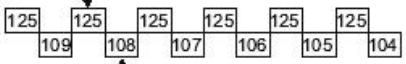
'Mark' = 1870Hz



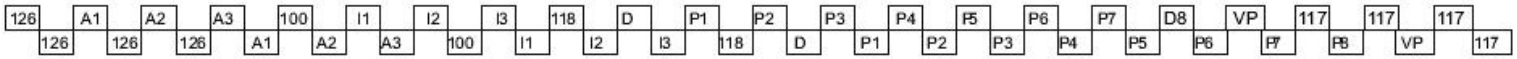
'Space' = 1700Hz

Phasing Preamble

Sync Character



Data



Where:

A1A2A3	=	Destination ID
I1I2I3	=	Source ID
D	=	Length of Transceiver Pin (08 by default)
P1..P8	=	Encrypted Pin Digits (only P1,P2,P3 and P4 are used)

Pin encryption is:

E 1 = (A1 xor A2 xor A3) xor (I1 xor I2 xor I3) (Assume E1 is a seed)
P1 = E1 xor (BCD of PIN first 2 digits)
P2 = P1 xor (BCD of PIN second 2 digits)
P3 = P2 xor (BCD of PIN third 2 digits)
P4 = P3 xor (BCD of PIN fourth 2 digits)

E.g. A1A2 = 123456 (bcd is 0c2238)
I1I2 = 654321 (bcd is 412b15)
PIN = 12345678 (bcd is 0c22384e)
Data encryption is :
E1 = 69 (hex)
P1 = (69) xor (0c) = 65
P2 = (65) xor (22) = 47
P3 = (47) xor (38) = 7f
P4 = (7f) xor (4e) = 31

VP = Vertical Parity byte