Section 19 CONTROL COMMAND

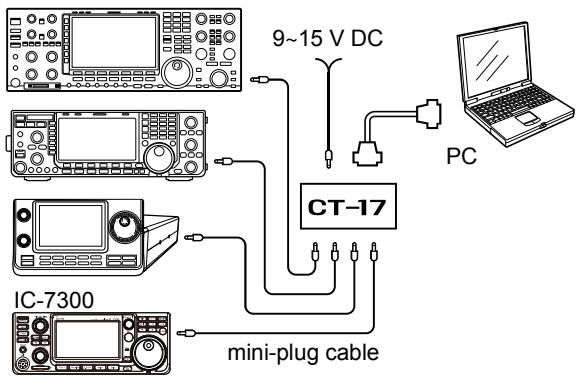
Remote control (CI-V) information

◇ CI-V connection

The transceiver's operating frequency, mode, VFO and memory selection, can be remotely controlled using a PC.
Choose your connection method from the following:

- A USB cable (A-B type, user supplied)
  The required USB driver and driver installation guide can be downloaded from the Icom web site.
  https://www.icomjapan.com/support/firmware_driver/
  ⓘThe download procedure on the web page may be changed without notice.
- The optional CT-17 CI-V LEVEL CONVERTER.
  Connects to a PC with an RS-232C port.

• Connection example (using CT-17)



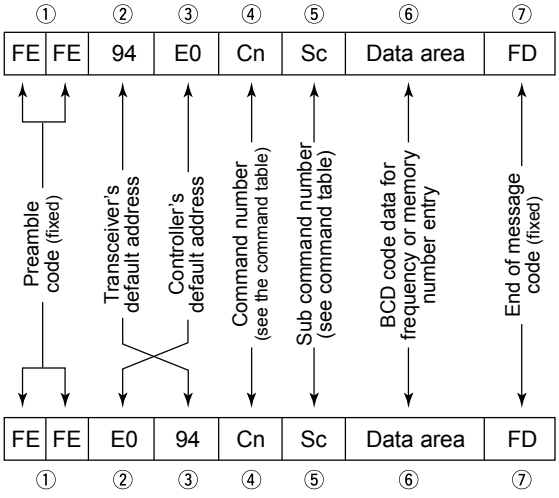
◇ Preparing

The Icom Communications Interface V (CI-V) is used for remote control.
To control the transceiver, first set its address, data communication speed, and transceive function. These settings are set in Set mode.

◇ Data format

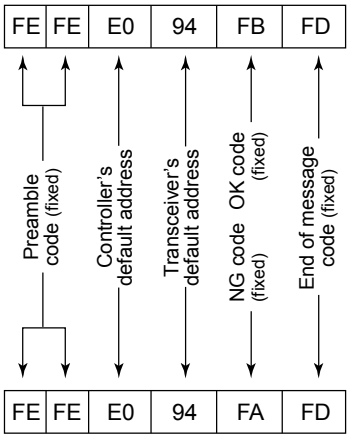
The CI-V system can be written using the following data formats. Data formats differ according to command numbers. A data area or sub command is added for some commands.

Controller to IC-7300



IC-7300 to controller

OK message to controller



NG message to controller

Remote control (CI-V) information (Continued)

◇ Command table

Cmd.	Sub cmd.	Data	Description
00		p. 19-9	Send frequency data (transceive)
01		p. 19-9	Send mode data (transceive)
02		p. 19-9	Read band edge frequencies
03		p. 19-9	Read operating frequency
04		p. 19-9	Read operating mode
05		p. 19-9	Set operating frequency
06		p. 19-9	Operating mode selection for transceive
07			Select the VFO mode
	00		Select VFO A
	01		Select VFO B
	A0		Equalize VFO A and VFO B
	B0		Exchange VFO A and VFO B
08			Select the Memory mode
		0001 to 0109	Select the Memory channel *(0001=M-CH01, 0099=M-CH99)
		0100	Select program scan edge channel P1
		0101	Select program scan edge channel P2
09			Memory write
0A			Memory copy to VFO
0B			Memory clear
0E	00		Scan stop
	01		Programmed/memory scan start
	02		Programmed scan start
	03		F scan start
	12		Fine programmed scan start
	13		Fine ⊿F scan start
	22		Memory scan start
	23		Select memory scan start
	A1		Select ⊿F scan span ±5 kHz
	A2		Select ⊿F scan span ±10 kHz
	A3		Select ⊿F scan span ±20 kHz
	A4		Select ⊿F scan span ±50 kHz
	A5		Select ⊿F scan span ±100 kHz
	A6		Select ⊿F scan span ±500 kHz
	A7		Select ⊿F scan span ±1 MHz
	B0		Set as non-select channel
	B1		Set as select channel (The previously set number by CI-V is set after turning power ON, or "1" is selected if no selection is performed.)
		01 to 03	Set as select channel *(01=SEL1, 02=SEL2, 03=SEL3)
	B2	00 to 03	Set for select memory scan *(00=ALL, 01=SEL1, 02=SEL2, 03=SEL3)
	D0		Set Scan resume OFF
	D3		Set Scan resume ON
0F		00/01	Read Split setting (00=OFF, 01=ON)
	00		Turn the split function OFF
	01		Turn the split function ON
10*		00	Send/read the tuning step OFF
		01	Send/read the 100 Hz tuning step
		02	Send/read the 1 kHz tuning step
		03	Send/read the 5 kHz tuning step
		04	Send/read the 9 kHz tuning step
		05	Send/read the 10 kHz tuning step
		06	Send/read the 12.5 kHz tuning step
		07	Send/read the 20 kHz tuning step
		08	Send/read the 25 kHz tuning step
11*		00/20	Send/read Attenuator *(00=OFF, 20=20dB ON)
13	00		Speech all data with voice synthesizer
	01		Speech the operating frequency and S meter level by voice synthesizer
	02		Speech the operating mode by voice synthesizer
14*	01	0000 to 0255	Send/read the AF level *(0000=min. to 0255=max.)
	02	0000 to 0255	Send/read the RF gain level *(0000=min. to 0255=max.)
	03	0000 to 0255	Send/read the squelch level *(0000=min. to 0255=max.)
14*	06	0000 to 0255	Send/read the NR level *(0000=0% to 0255=100%)
	07	0000 to 0255	Send/read inner [TWIN PBT] position *(0000=max. CCW, 0128=center, 0255=max. CW)
	08	0000 to 0255	Send/read outer [TWIN PBT] position *(0000=max. CCW, 0128=center, 0255=max. CW)
	09	0000 to 0255	Send/read CW pitch *(0000=300 Hz, 0128=600 Hz, 0255=900 Hz; 5 Hz steps)
	0A	0000 to 0255	Send/read [RF PWR] position *(0000=max. CCW, 0255=max. CW)
	0B	0000 to 0255	Send/read [MIC] position *(0000=max. CCW, 0255=max. CW)
	0C	0000 to 0255	Send/read [KEY SPEED] level *(0000=6wpm, 0255=48wpm)
	0D	0000 to 0255	Send/read [NOTCH] position *(0000=max. CCW, 0128=center, 0255=max. CW)
	0E	0000 to 0255	Send/read the COMP level *(0000=0 to 0255=10)
	0F	0000 to 0255	Send/read the Break-IN Delay setting *(0000=2.0d to 0255=13.0d)
	12	0000 to 0255	Send/read NB level *(0000=0% to 0255=100%)
	15	0000 to 0255	Send/read the Monitor gain *(0000=0% to 0255=100%)
	16	0000 to 0255	Send/read the VOX gain *(0000=0% to 0255=100%)
	17	0000 to 0255	Send/read the Anti VOX gain *(0000=0% to 0255=100%)
	19	0000 to 0255	Send/read BRIGHT level *(0000=0%, 0255=100%)
15	01	00/01	Read noise or S-meter squelch status *(squelch close)
	02	0000 to 0255	Read S-meter level *(0000=S0, 0120=S9, 0241=S9+60dB)
	05	00/01	Read various squelch function's status *(squelch closed)
	07	00/01	Read the OVF icon status (00=Disappears, 01=Appears)
	11	0000 to 0255	Read PO meter level *(0000=0%, 0143=50%, 213=100%)
	12	0000 to 0255	Read SWR meter level *(0000=SWR1.0, 0048=SWR1.5, 0080=SWR2.0, 0120=SWR3.0)
	13	0000 to 0255	Read ALC meter level *(0000=Min. to 0120=Max.)
	14	0000 to 0255	Read COMP meter level *(0000=0 dB, 0130=15 dB,0241=30 dB)
	15	0000 to 0255	Read Vd meter level *(0000=0 V, 0013=10 V, 0241=16 V)
	16	0000 to 0255	Read Id meter level *(0000=0, 0097=10, 0146=15, 0241=25)
16*	02	00 to 02	Preamp (00=OFF, 01=Preamp 1 ON, 02=Preamp 2 ON)
	12	00 to 03	AGC *(00=OFF, 01= FAST, 02= MID, 03=SLOW)
	22	00 to 01	Noise blanker *(00=OFF, 01=ON)
	40	00 to 01	Noise reduction *(00=OFF, 01=ON)
	41	00 to 01	Auto notch function *(00=OFF, 01=ON)
	42	00 to 01	Repeater tone *(00=OFF, 01=ON)
	43	00 to 01	Tone squelch *(00=OFF, 01=ON)
	44	00 to 01	Speech compressor *(00=OFF, 01=ON)
	45	00 to 01	Monitor function *(00=OFF, 01=ON)
	46	00 to 01	VOX function *(00=OFF, 01=ON)
	47	00 to 02	BK-IN function *(00=BK-IN OFF, 01=Semi BK-IN ON, 02=Full BK-IN ON)
	48	00 to 01	Manual notch function *(00=OFF, 01=ON)

19 CONTROL COMMAND

Remote control (CI-V) information (Continued)

◇ Command table (Continued)

Cmd.	Sub cmd.		Data	Description
16*	4F		00 to 01	Twin Peak Filter *(00=OFF, 01=ON) Can be turned ON only when Mark and Shift are set to 2125 Hz and 170 Hz, respectively.
	50		00 to 01	Dial lock function *(00=OFF, 01=ON)
	56		00 to 01	DSP filter type *(00=SHARP, 01=SOFT)
	57		00 to 02	Manual notch width (00=WIDE, 01=MID, 02=NAR)
	58		00 to 02	SSB transmit bandwidth (00=WIDE, 01=MID, 02=NAR)
	65		00/01	Send the IP+ function setting (00=OFF, 01=ON)
17			p. 19-13	Send CW messages*2
18	00			Turn OFF the transceiver
	01			Turn ON the transceiver*3
19	00			Read the transceiver ID
1A*	00		p. 19-11	Send/read memory contents
	01		p. 19-10	Send/read band stacking register contents
	02		p. 19-12	Send/read memory keyer contents*1
	03		00 to 49	Send/read the selected filter width (AM: 00=200 Hz to 49=10 kHz; other than AM modes: 00=50 Hz to 31/40=2700 Hz/3600 Hz)
	04		00 to 13	Send/read the selected AGC time constant *(00=OFF, AM: 01=0.3 sec. to 13=8.0 sec., SSB,CW,RTTY:01=0.1 sec. to 13=6.0 sec.)
	05	0001	p. 19-9	Send/read SSB RX HPF/LPF settings
		0002	00 to 10	Send/read SSB RX Tone (Bass) level (00=–5 to 10=+5)
		0003	00 to 10	Send/read SSB RX Tone (Treble) level (00=–5 to 10=+5)
		0004	p. 19-9	Send/read AM RX HPF/LPF settings
		0005	00 to 10	Send/read AM RX Tone (Bass) level (00=–5 to 10=+5)
		0006	00 to 10	Send/read AM RX Tone (Treble) level (00=–5 to 10=+5)
		0007	p. 19-9	Send/read FM RX HPF/LPF settings
		0008	00 to 10	Send/read FM RX Tone (Bass) level (00=–5 to 10=+5)
		0009	00 to 10	Send/read FM RX Tone (Treble) level (00=–5 to 10=+5)
		0010	p. 19-9	Send/read CW RX HPF/LPF settings
		0011	p. 19-9	Send/read RTTY RX HPF/LPF settings
		0012	00 to 10	Send/read SSB TX Tone (Bass) level (00=–5 to 10=+5)
		0013	00 to 10	Send/read SSB TX Tone (Treble) level (00=–5 to 10=+5)
		0014	p. 19-9	Send/read SSB TX bandwidth for wide
		0015	p. 19-9	Send/read SSB TX bandwidth for mid
		0016	p. 19-9	Send/read SSB TX bandwidth for narrow
		0017	00 to 10	Send/read AM TX Tone (Bass) level (00=–5 to 10=+5)
		0018	00 to 10	Send/read AM TX Tone (Treble) level (00=–5 to 10=+5)
		0019	00 to 10	Send/read FM TX Tone (Bass) level (00=–5 to 10=+5)
		0020	00 to 10	Send/read FM TX Tone (Treble) level (00=–5 to 10=+5)
		0021	0000 to 0255	Send/read beep gain (0000=min. to 0255=max.)
		0022	00/01	Send/read beep gain limit *(00=OFF, 01=ON)
		0023	00/01	Send/read confirmation beep (00=OFF, 01=ON)
		0024	00	Send/read the band edge beep OFF
			01	Send/read the band edge beep ON (Beep sounds with a default amateur band)
			02	Send/read the band edge beep with user setting ON
			03	Send/read the band edge beep with user setting/TX limit ON
		0025	00 to 02	Send/read the RF/SQL Control setting (00=Auto, 01=SQL, 02=RF+SQL)

Cmd.	Sub cmd.		Data	Description
1A*	05	0026	00 to 05	Send/read the TX Delay setting (HF) (00=OFF, 01=10 ms, 02=15 ms, 03=20 ms, 04=25 ms, 05=30 ms)
		0027	00 to 05	Send/read the TX Delay setting (50 MHz) (00=OFF, 01=10 ms, 02=15 ms, 03=20 ms, 04=25 ms, 05=30 ms)
		0028	00 to 05	Send/read the TX Delay setting (70 MHz) (00=OFF, 01=10 ms, 02=15 ms, 03=20 ms, 04=25 ms, 05=30 ms)
		0029	00 to 05	Send/read the Time-Out Timer setting (00=OFF, 01=3 min., 02=5 min., 03=10min., 04=20 min., 05=30 min.)
		0030	00/01	Send/read quick split set *(00=OFF, 01=ON)
		0031	p. 19-10	Send/read FM split offset –9.999 to +9.999 MHz for HF
		0032	p. 19-10	Send/read FM split offset –9.999 to +9.999 MHz for 50 MHz
		0033	00/01	Send/read split lock set *(00=OFF, 01=ON)
		0034	00/01	Send/read [TUNER] Switch set (00=Manual, 01=Auto)
		0035	00 or 01	Send/read PTT tune set *(00=OFF, 01=ON)
		0036	00 to 02	Send/read RTTY mark frequency (00=1275 Hz, 01=1615 Hz, 02=2125 Hz)
		0037	00 to 02	Send/read RTTY shift width (00=170 Hz, 01=200 Hz, 02=425 Hz)
		0038	00/01	Send/read RTTY keying polarity (00=Normal, 01=Reverse)
		0039	00/01	Send/read speech language (00=English, 01=Japanese)
		0040	00/01	Send/read speech speed (00=Low, 01=High)
		0041	00/01	Send/read S-level speech (00=OFF, 01=ON)
		0042	00/01	Send/read speech with a mode switch operation (00=OFF, 01=ON)
		0043	0000 to 0255	Send/read speech level (0000=0% to 0255=100%)
		0044	00/01	Send/read [SPEECH/LOCK] key function setting (00=Push: SPEECH, Hold down: LOCK, 01=Push: LOCK, Hold down: SPEECH)
		0045	00/01	Send/read the Lock function setting (00=MAIN DIAL, 01=PANEL)
		0046	00/01	Send/read memo pad numbers (00=5 ch, 01=10 ch)
		0047	00 to 02	Send/read main dial auto TS (00=OFF, 01=Low, 02=High)
		0048	00/01	Send/read mic. up/down speed (00=Low, 01=High)
		0049	00 or 01	Send/read quick RIT/ΔTX clear function (00=OFF, 01=ON)
		0050	00 to 02	Send/read SSB notch operation *(00=Auto, 01=Manual, 02=Auto/Manual)
		0051	00 to 02	Send/read AM notch operation (00=Auto, 01=Manual, 02=Auto/Manual)
		0052	00/01	Send/read SSB/CW synchronous tuning function (00=OFF, 01=ON)
		0053	00/01	Send/read CW normal side set (00=LSB, 01=USB)
		0054	00/01	Send/read screen capture by the [POWER] switch (00=OFF, 01=ON)
		0055	00/01	Send/read screen capture image data saving format (00=PNG format, 01=BMP format)
		0056	00/01	Send/read keyboard type (00=Ten-key, 01=Full Keyboard)
		0057	00/01	Send/read calibration marker (00=OFF, 01=ON)
		0058	0000 to 0255	Send/read reference frequency (0000=0%,0255=100%)
		0059	00 or 01	Send/read AF/IF signal output to ACC/USB (00=AF, 01=IF)
		0060	0000 to 0255	Send/read AF output level to ACC/USB (0000=0% to 0255=100%)

19 CONTROL COMMAND

Remote control (CI-V) information (Continued)

◇ Command table (Continued)

Cmd.	Sub cmd.		Data	Description
1A*	05	0061	00/01	Send/read squelch function for the AF signal output to ACC/USB (00=OFF (Open), 01=ON)
		0062	00/01	Send/read beep and speech output setting to ACC/USB (when AF signal output is set) (00=OFF, 01=ON)
		0063	0000 to 0255	Send/read IF signal output level to ACC/USB (0000=0%, 0255=100%)
		0064	0000 to 0255	Send/read MOD input level from ACC (0000=0% to 0255=100%)
		0065	0000 to 0255	Send/read MOD input level from USB (0000=0% to 0255=100%)
		0066	00 to 04	Send/read MOD input connector during DATA OFF (00=MIC, 01=ACC, 02=MIC/ACC, 03=USB, 04=MIC/USB)
		0067	00 to 04	Send/read MOD input connector during DATA (00=MIC, 01=ACC, 02=MIC/ACC, 03=USB, 04=MIC/USB)
		0068	00/01	Send/read the external keypad setting for VOICE *(00=OFF, 01=ON)
		0069	00/01	Send/read the external keypad setting for Memory KEYER (00=OFF, 01=ON)
		0070	00/01	Send/read the external keypad setting for RTTY Memory (00=OFF, 01=ON)
		0071	00/01	Send/read the CI-V transceive setting (00=OFF, 01=ON)
		0072	0000 to 0223	Send/read the transceive CI-V Address for USB to REMOTE in hexadecimal code (0000=00h to 0223=DFh)
		0073	00/01	Send/read the CI-V Output (for ANT) capability (00=OFF, 01=ON)
		0074	00/01	Send/read the CI-V USB port setting (00=Link to [REMOTE], 01=Unlink to [REMOTE]) (Read only)
		0075	00/01	Send/read echo back setting for CI-V operation from USB (00=ON, 01=OFF)
		0076	00/01	Send/read the USB (serial port) function setting (00=CI-V, 01=RTTY Decode)
		0077	00 to 03	Send/read data transfer speed for RTTY decode output (00=4800 bps, 01=9600 bps, 02=19200 bps, 03=38400 bps)
		0078	00 to 02	Send/read transmission control line setting for USB (00=OFF, 01=DTR, 02=RTS) • Different line must be set from both CW keying and RTTY (FSK)
		0079	00 to 02	Send/read CW keying line setting for USB (00=OFF, 01= DTR, 02=RTS) • Different line must be set from both transmission control and RTTY (FSK)
		0080	00 to 02	Send/read RTTY (FSK) line setting for USB (00=OFF, 01=DTR, 02=RTS) • Different line must be set from both CW keying and transmission control"
		0081	0000 to 0255	Send/read LCD unit backlight brightness (0000=0% to 0255=100%)
		0082	00/01	Send/read screen image type (00=A, 01=B)
		0083	00/01	Send/read frequency readout font (00=Basic, 01=Round)
		0084	00/01	Send/read peak hold set for meter *(00=OFF, 01=ON)
		0085	00/01	Send/read memory name indication setting (00=OFF, 01=ON)
		0086	00/01	Send/read manual notch width pop-up indication setting (00=OFF, 01=ON)
		0087	00/01	Send/read PBT shifting value display setting while rotating [TWIN PBT] (00=OFF, 01=ON)
		0088	00/01	Send/read IF filter width and shifting value display setting when the IF filter is switched (00=OFF, 01=ON)
		0089	00 to 03	Send/read screen saver function (00=OFF, 01=15 minutes, 02=30 minutes, 03=60 minutes)
		0090	00/01	Send/read opening message indication (00=OFF, 01=ON)
		0091	p. 19-10	Send/read opening message contents (up to 10-character)
		0092	00/01	Send/read Power ON Check setting (00=OFF, 01=ON)
		0093	00/01	Send/read Display Language (00=English, 01=Japanese)
		0094	20000101 to 20991231	Send/read date setting (20000101=2000/01/01 to 20991231=2099/12/31)
		0095	0000 to 2359	Send/read time setting (0000=00:00 to 2359=23:59)
		0096	p. 19-13	Send/read UTC offset time
		0097	00/01	Send/read scope indication during TX (00=OFF, 01=ON)
		0098	00 to 02	Send/read scope max. hold (00=OFF, 01=ON)
		0099	00 to 02	Send/read scope center frequency set (00=Filter center, 01=Carrier point center, 02=Carrier point center (Abs. Freq.)
		0100	00/01	Send/read scope marker position (FIX Type/ SCROLL Type) setting (00=Filter center, 01 Carrier point)
		0101	00/01	Send/read external monitor signal width (00=Narrow, 01=Wide)
		0102	00 to 03	Send/read averaging function for spectrum scope (00=OFF, 01=2, 02=3, 03=4)
		0103	00/01	Send/read spectrum display type (00=Fill, 01=Fill+Line)
		0104	p. 19-9	Send/read spectrum fill color
		0105	p. 19-9	Send/read spectrum line color
		0106	p. 19-9	Send/read spectrum color for peak hold
		0107	00/01	Send/read waterfall set for spectrum scope (00=OFF, 01=ON)
		0108	00 to 02	Send/read waterfall speed (00=Slow, 01=Mid, 02=Fast)
		0109	00 to 02	Send/read waterfall height when expanded scope is selected (00=Small, 01=Mid, 02=Larger)
		0110	00 to 07	Send/read peak color level set for waterfall of the spectrum scope (00=Grid 1, 01=Grid 2, 02=Grid 3, 03=Grid 4, 04=Grid 5, 05=Grid 6, 06=Grid 7, 07=Grid 8)
		0111	00/01	Send/read scope waterfall marker auto-hide (00=OFF, 01=ON)
		0112	p. 19-9	Send/read scope edge 1 frequencies for 0.03 to 1.60 MHz band
		0113	p. 19-9	Send/read scope edge 2 frequencies for 0.03 to 1.60 MHz band
		0114	p. 19-9	Send/read scope edge 3 frequencies for 0.03 to 1.60 MHz band
		0115	p. 19-9	Send/read scope edge 1 frequencies for 1.60 to 2.00 MHz band
		0116	p. 19-9	Send/read scope edge 2 frequencies for 1.60 to 2.00 MHz band
		0117	p. 19-9	Send/read scope edge 3 frequencies for 1.60 to 2.00 MHz band
		0118	p. 19-9	Send/read scope edge 1 frequencies for 2.00 to 6.00 MHz band
		0119	p. 19-9	Send/read scope edge 2 frequencies for 2.00 to 6.00 MHz band
		0120	p. 19-9	Send/read scope edge 3 frequencies for 2.00 to 6.00 MHz band
		0121	p. 19-9	Send/read scope edge 1 frequencies for 6.00 to 8.00 MHz band
		0122	p. 19-9	Send/read scope edge 2 frequencies for 6.00 to 8.00 MHz band
		0123	p. 19-9	Send/read scope edge 3 frequencies for 6.00 to 8.00 MHz band

Remote control (CI-V) information (Continued)

◇ Command table (Continued)

Cmd.	Sub cmd.		Data	Description
1A*	05	0124	p. 19-9	Send/read scope edge 1 frequencies for 8.00 to 11.00 MHz band
		0125	p. 19-9	Send/read scope edge 2 frequencies for 8.00 to 11.00 MHz band
		0126	p. 19-9	Send/read scope edge 3 frequencies for 8.00 to 11.00 MHz band
		0127	p. 19-9	Send/read scope edge 1 frequencies for 11.00 to 15.00 MHz band
		0128	p. 19-9	Send/read scope edge 2 frequencies for 11.00 to 15.00 MHz band
		0129	p. 19-9	Send/read scope edge 3 frequencies for 11.00 to 15.00 MHz band
		0130	p. 19-9	Send/read scope edge 1 frequencies for 15.00 to 20.00 MHz band
		0131	p. 19-9	Send/read scope edge 2 frequencies for 15.00 to 20.00 MHz band
		0132	p. 19-9	Send/read scope edge 3 frequencies for 15.00 to 20.00 MHz band
		0133	p. 19-9	Send/read scope edge 1 frequencies for 20.00 to 22.00 MHz band
		0134	p. 19-9	Send/read scope edge 2 frequencies for 20.00 to 22.00 MHz band
		0135	p. 19-9	Send/read scope edge 3 frequencies for 20.00 to 22.00 MHz band
		0136	p. 19-9	Send/read scope edge 1 frequencies for 22.00 to 26.00 MHz band
		0137	p. 19-9	Send/read scope edge 2 frequencies for 22.00 to 26.00 MHz band
		0138	p. 19-9	Send/read scope edge 3 frequencies for 22.00 to 26.00 MHz band
		0139	p. 19-9	Send/read scope edge 1 frequencies for 26.00 to 30.00 MHz band
		0140	p. 19-9	Send/read scope edge 2 frequencies for 26.00 to 30.00 MHz band
		0141	p. 19-9	Send/read scope edge 3 frequencies for 26.00 to 30.00 MHz band
		0142	p. 19-9	Send/read scope edge 1 frequencies for 30.00 to 45.00 MHz band
		0143	p. 19-9	Send/read scope edge 2 frequencies for 30.00 to 45.00 MHz band
		0144	p. 19-9	Send/read scope edge 2 frequencies for 30.00 to 45.00 MHz band
		0145	p. 19-9	Send/read scope edge 1 frequencies for 45.00 to 60.00 MHz band
		0146	p. 19-9	Send/read scope edge 2 frequencies for 45.00 to 60.00 MHz band
		0147	p. 19-9	Send/read scope edge 3 frequencies for 45.00 to 60.00 MHz band
		0148	p. 19-9	Send/read scope edge 1 frequencies for 60.00 to 74.80 MHz band
		0149	p. 19-9	Send/read scope edge 2 frequencies for 60.00 to 74.80 MHz band
		0150	p. 19-9	Send/read scope edge 3 frequencies for 60.00 to 74.80 MHz band
		0151	00/01	Send/read audio FFT scope display type (00=Fill, 01=Fill+Line)
		0152	p. 19-9	Send/read the Audio FFT scope waveform color
		0153	00/01	Send/read the Audio FFT scope waterfall display (00=OFF, 01=ON)
		0154	p. 19-9	Send/read the Audio Oscilloscope scope waveform color
		0155	00	Normal selection for contest number style
			01	"190→ANO" selection for contest number style
			02	"190→ANT" selection for contest number style
			03	"90→NO" selection for contest number style
			04	"90→NT" selection for contest number style
		0156	01 to 08	Send/read count up trigger channel (01=M1, 02=M2, 03=M3, 04=M4, 05=M5, 06=M6, 07=M7, 08=M8)
		0157	0001 to 9999	Send/read present number (0001=1 to 9999=9999)

Cmd.	Sub cmd.		Data	Description
1A*	05	0158	0000 to 0255	Send/read CW side tone gain (0000=0% to 0255=100%)
		0159	00/01	Send/read CW side tone gain limit (00=OFF, 01=ON)
		0160	01 to 60	Send/read CW keyer repeat time (01=1 sec. to 60=60 sec.)
		0161	28 to 45	Send/read CW keyer dot/dash ratio (28=1:1:2.8 to 45=1:1:4.5)
		0162	00 to 03	Send/read rise time (00=2 msec., 01=4 msec., 02=6 msec., 03=8 msec.)
		0163	00/01	Send/read paddle polarity (00=Normal, 01=Reverse)
		0164	00 to 02	Send/read keyer type (00=Straight, 01=Bug, 02=Paddle)
		0165	00/01	Send/read mic. up/down keyer set (00=OFF, 01=ON)
		0166	00 to 03	Send/read averaging function for RTTY FFT scope (00=OFF, 01=2, 02=3, 03=4)
		0167	p. 19-9	Send/read RTTY FFT scope waveform color
		0168	00/01	Send/read RTTY decode USOS (00=OFF, 01=ON)
		0169	00/01	Send/read RTTY decode new line code (00=CR,LF,CR+LF, 01=CR+LF)
		0170	00/01	Send/read RTTY TX USOS (00=OFF, 01=ON)
		0171	p. 19-9	Send/read received RTTY text font color
		0172	p. 19-9	Send/read transmitted RTTY text font color
		0173	00/01	Send/read RTTY log function (00=OFF, 01=ON)
		0174	00/01	Send/read file saving format for the RTTY log (00=Text, 01=HTML)
		0175	00/01	Send/read RTTY time stamp set (00=OFF, 01=ON)
		0176	00/01	Send/read RTTY Decode Log Time Stamp (00=Local, 01=UTC)
		0177	00/01	Send/read RTTY frequency stamp (00=OFF, 01=ON)
		0178	00/01	Send/read scan speed (00=Low, 01=High)
		0179	00/01	Send/read scan resume (00=OFF, 01=ON)
		0180	00/01	Send/read auto monitor function setting when transmitting a recorded voice memory (00=OFF, 01=ON)
		0181	01/15	Send/read repeat interval to transmit recorded voice audio (01=1 sec. to 15=15 sec.)
		0182	00/01	Send/read recording mode for QSO recorder (00=TX&RX, 01=RX Only)
		0183	00/01	Send/read recording TX audio for QSO recorder (00=Microphone audio, 01=TX monitor audio)
		0184	00/01	Send/read squelch relation to recording RX audio for QSO recorder (00=Always, 01=Squelch Auto)
		0185	00/01	Send/read QSO record file split function setting (00=OFF, 01=ON)
		0186	00/01	Send/read PTT Automatic Recording function setting (00=OFF, 01=ON)
		0187	00 to 03	Send/read RX audio recording status for PTT Automatic Recording function (00=OFF (records no RX audio), 01=Records the RX audio just before 5 sec., 02=Records the RX audio just before 10 sec., 03=Records the RX audio just before 15 sec.)
		0188	00 to 03	Send/read QSO PLAY Skip time (00=3 sec., 01=5 sec., 02=10 sec., 03=30 sec.)
		0189	00 to 09	Send/read NB depth (00=1 to 09=10)
		0190	0000 to 0255	Send/read NB width (0000=1 to 0255=100)
		0191	00 to 20	Send/read VOX delay (00=0.0 sec. to 20=2.0 sec.)
		0192	00 to 03	Send/read VOX voice delay (00=OFF, 01=Short, 02=Mid., 03=Long)

19 CONTROL COMMAND

Remote control (CI-V) information (Continued)

◇ Command table (Continued)

Cmd.	Sub cmd.		Data	Description
1A*	05	0193	00/01	Send/read the MF band attenuator setting (00=OFF, 01=ON)
		0194	00 to 02	Send/read on-screen keyboard layout (00=English, 01=German, 02=French)
		0195	0000 to 0255	Send/read the Transmit voice level for the VOICE TX function (0000=0% to 0255=100%)
		0196	p. 19-9	Send/read SSB-D TX bandwidth
		0197	00/01	Inhibit Timer at USB connection (00=OFF, 01=ON)
		0198	p. 19-12	Send/read the Front key customize [VOX/BK-IN] setting
		0199	p. 19-12	Send/read the Front key customize [AUTOTUNE] setting
		0200	p. 19-12	Send/read the Front key customize [▲] setting
		0201	p. 19-12	Send/read the Front key customize [▼] setting
		0202	p. 19-12	Send/read the MIC key customize [UP] setting
		0203	p. 19-12	Send/read the MIC key customize [DOWN] setting
		0204	p. 19-9	Send/read scope edge 4 frequencies for 0.03 - 1.60 MHz
		0205	p. 19-9	Send/read scope edge 4 frequencies for 1.60 - 2.00 MHz
		0206	p. 19-9	Send/read scope edge 4 frequencies for 2.00 - 6.00 MHz
		0207	p. 19-9	Send/read scope edge 4 frequencies for 6.00 - 8.00 MHz
		0208	p. 19-9	Send/read scope edge 4 frequencies for 8.00 - 11.00 MHz
		0209	p. 19-9	Send/read scope edge 4 frequencies for 11.00 - 15.00 MHz
		0210	p. 19-9	Send/read scope edge 4 frequencies for 15.00 - 20.00 MHz
		0211	p. 19-9	Send/read scope edge 4 frequencies for 20.00 - 22.00 MHz
		0212	p. 19-9	Send/read scope edge 4 frequencies for 22.00 - 26.00 MHz
		0213	p. 19-9	Send/read scope edge 4 frequencies for 26.00 - 30.00 MHz
		0214	p. 19-9	Send/read scope edge 4 frequencies for 30.00 - 45.00 MHz
		0215	p. 19-9	Send/read scope edge 4 frequencies for 45.00 - 60.00 MHz
		0216	p. 19-9	Send/read scope edge 4 frequencies for 60.00 - 74.80 MHz
		0217	00/01	Send/read PTT Port Function setting 00=PTT Input 01=PTT Input + SEND Output
	06		p. 19-10	Send/read DATA mode setting
	07		00 to 01	Send/read IP+ function setting (00=OFF, 01=ON)
1B*	00		p. 19-13	Send/read repeater tone frequency
	01		p. 19-13	Set/read TSQL tone frequency

Cmd.	Sub cmd.	Data	Description
1C	00*	00	Send/read transceiver's status RX • When CI-V Output (for ANT) (Command: 1A 05 0157) is set to ON, automatically outputs when changed.
		01	Send/read transceiver's status TX • When CI-V Output (for ANT) (Command: 1A 05 0157) is set to ON, automatically outputs when changed.
	01*	00 to 02	00=Send/read the antenna tuner OFF 01=Send/read the antenna tuner ON 02=Send/read to tuning
	02*	00/01	Send/read transmit frequency monitor setting (00=OFF, 01=ON)
	03	p. 19-9	Read transmit frequency • When CI-V Output (for ANT) (Command: 1A 05 0157) is set to ON, automatically outputs when changed.
	04*	00/01	Send/read command to disable to output the antenna controller status frequency and so on from [REMOTE] • Send/read command to enable to output the antenna controller status frequency and so on from [REMOTE].
1E	00		Read number of available TX frequency band
	01	p. 19-9	Read TX band edge frequencies
	02		Read number of user-set TX frequency band
	03*	p. 19-9	Send/read user-set TX band edge frequencies
21*	00	p. 19-13	Send/read RIT frequency
	01	00/01	Send/read RIT setting (00=OFF, 01=ON)
	02	00/01	Send/read ⊿TX setting (00=OFF, 01=ON)
25*		p. 19-13	Send/read the selected or unselected VFO frequency
26*		p. 19-13	Send/read the selected or unselected VFO's operating mode and filter
27*	00	p. 19-14	Read the Scope waveform data • Only when "Scope ON/OFF status" (Command: 27 10) and "Scope data output" (Command: 27 11) are set to "ON," outputs the waveform data to the controller.
	10	00/01	Send/read the Scope ON/OFF status (00=OFF, 01=ON)
	11	00/01	Send/read the Scope wave data output*4 (00=OFF, 01=ON)
	12	00	Send/read the Main or Sub scope setting (00=Main only)
	13	00	Send/read the Single/Dual scope setting (00=Single only)
	14	p. 19-14	Send/read the Scope Center mode, Fixed mode, SCROLL-C mode, or SCROLL-F mode setting
	15	p. 19-14	Send/read the Span setting in the Center mode or SCROLL-C mode Scope
	16	p. 19-15	Send/read the Edge number setting in the Fixed mode or SCROLL-F mode Scope
	17	p. 19-15	Send/read the Scope hold function ON or OFF
	19	p. 19-15	Send/read the Scope Reference level setting
	1A	p. 19-15	Send/read the Sweep speed setting
	1B	00/01	Send/read the Scope indication during TX in the Center mode (00=OFF, 01=ON)

19 CONTROL COMMAND

Remote control (CI-V) information (Continued)

◇ Command table (Continued)

Cmd.	Sub cmd.	Data	Description
27*	1C	00 to 02	Send/read scope center frequency setting in the Center mode (00=Filter center, 01=Carrier point center, 02=Carrier point center (Abs. Freq.)
	1D	p. 19-15	Send/read the Scope VBW setting
	1E	p. 19-15	Send/read the Scope Fixed edge frequencies
	20	00/01	Send/read the Marker Position (FIX Type/ SCROLL Type) setting (00=Filter Center, 01=Carrier Point)
28*	00	00 to 08	Transmits the Voice TX memory content (01=T1 to 08=T8, 0x00=Cancel TX)

* (Asterisk) Send/read data

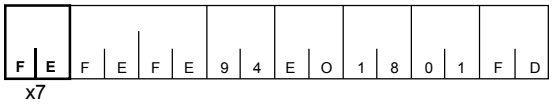
*1 To insert a counter, first clear the other channel's counter.

*2 In the CW mode, if the [TRANSMIT] or an external TX switch is ON, or the Break-in function is ON, a message will be transmitted as CW code when you send it from your PC.

*3 When sending the power ON command (18 01), you need to repeatedly send "FE" before the standard format. The following is the approximated quantity of the repetition.

- 115200 bps: 150 "FE"s
- 57600 bps: 75 "FE"s
- 38400 bps: 50 "FE"s
- 19200 bps: 25 "FE"s
- 9600 bps: 13 "FE"s
- 4800 bps: 7 "FE"s

Example: When using 4800 bps



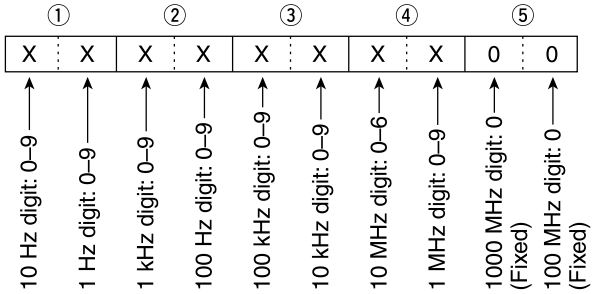
*4 You can only set this item when "Unlink from [REMOTE]" is selected on the "CI-V USB port" screen, and then "115200" is selected on the "CI-V Baud Rate" screen.

Remote control (CI-V) information (Continued)

◇ Data content description

• Operating frequency

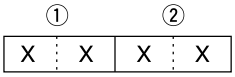
Command: 00, 03, 05, 1C 03



• Operating mode

Command: 01, 04, 06

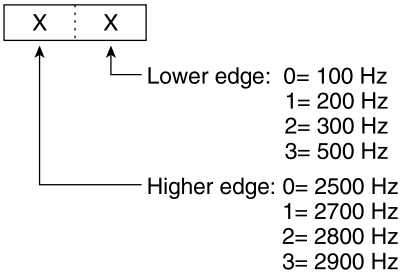
Filter setting (②) can be skipped with command 01 and 06. In that case, “FIL1” is selected with command 01 and the default filter setting of the operating mode is automatically selected with command 06.



① Operating mode		② Filter setting
00: LSB	05: FM	01: FIL1
01: USB	07: CW-R	02: FIL2
02: AM	08: RTTY-R	03: FIL3
03: CW		
04: RTTY		

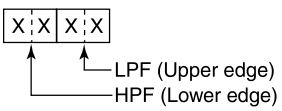
• SSB/SSB-D transmission passband width settings

Command : 1A 050014, 050015, 050016, 050196



• RX HPF/LPF setting for each operating mode

Command : 1A 050001, 050004, 050007, 050010, 050011



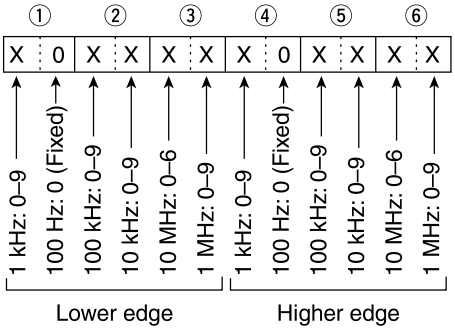
HPF
00: Through
01~20: 100~2000 Hz

LPF
05~24: 500~2400 Hz
25: Through

*The value of the HPF should be smaller than the LPF.

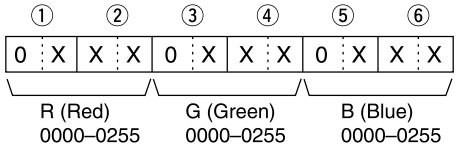
• Bandscope edge frequency settings

Command: 1A 050112 ~ 1A 050150
1A 050204 ~ 1A 050216



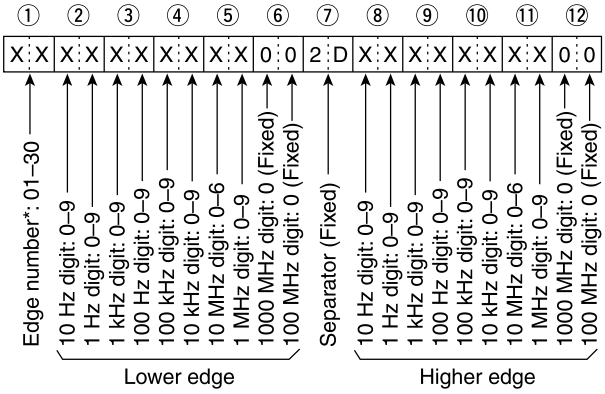
• Color settings

Command : 1A 050104, 050105, 050106, 050152, 050154, 050167, 050171, 050172



• Band edge frequency settings

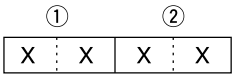
Command : 02*, 1E 01, 1E 03



Remote control (CI-V) information (Continued)

• Band stacking register

Command: 1A 01



① *Frequency band codes*

Code	Freq. band	Frequency range (unit: MHz)
01	1.8	1.800000–1.999999
02	3.5	3.400000–4.099999
03	7	6.900000–7.499999
04	10	9.900000–10.499999
05	14	13.900000–14.499999
06	18	17.900000–18.499999
07	21	20.900000–21.499999
08	24	24.400000–25.099999
09	28	28.000000–29.999999
10	50	50.000000–54.000000
11	GENE	Other than above

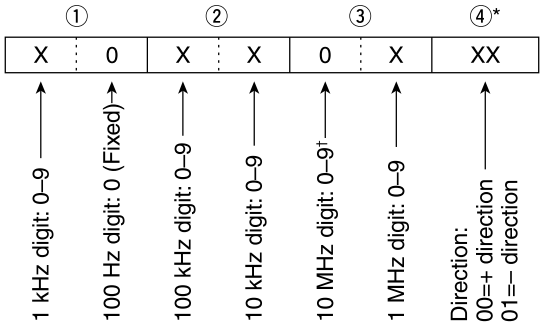
② *Register codes*

Code	Registered number
01	1 (latest)
02	2
03	3 (oldest)

For example, when sending/reading the oldest contents in the 21 MHz band, the code “0703” is used.

• Offset frequency settings

Command : 1A 050031, 050032



*1 There is no need to enter the transverter offset frequency setting.
*2 Transverter offset only. Fix to ‘0’ for split offset setting.

• Codes for character entries

- Character codes— Letters and Numbers

Character	ASCII code	Character	ASCII code
A–Z	41–5A	a-z	61–7A
0–9	30–39		

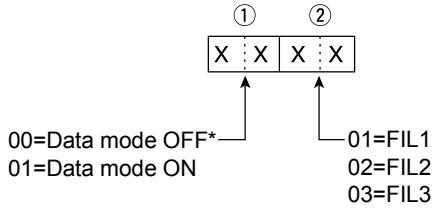
- Character codes— Symbols

Character	ASCII code	Character	ASCII code
!	21	#	23
$	24	%	25
&	26	\	5C
?	3F	”	22
’	27	`	60
^	5E	+	2B
–	2D	*	2A
/	2F	.	2E
,	2C	:	3A
;	3B	=	3D
<	3C	>	3E
(	28	)	29
[	5B	]	5D
{	7B	}	7D
|	7C	_	5F
~	7E	@	40

Command	Set item/selectable characters
1A 00	Memory name All characters are usable.
1A 050091	Opening message Uppercase letters, numbers, symbols (– / . @) and space are usable.

• Data mode with filter width settings

Command : 1A 06

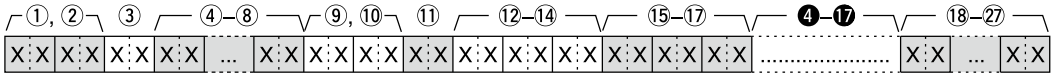


*When 00 is set, also set 00 to ②

19 CONTROL COMMAND

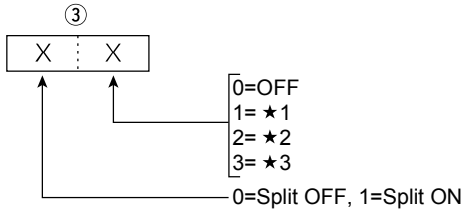
Remote control (CI-V) information (Continued)

• Memory content
Command : 1A 00



①, ② Memory channel numbers
0001–0099: Memory channel 01 to 99
0100: Programmed scan edge P1
0101: Programmed scan edge P2

③ Split and Select memory setting

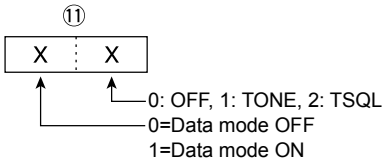


ⓘSet both 0 for P1 and P2.

④~⑧ Operating frequency setting
See "• Operating frequency."

⑨, ⑩ Operating mode setting
See "• Operating mode."

⑪ Data mode and tone type settings



⑫~⑭ **Repeater tone frequency setting**
⑮~⑰ **Tone squelch frequency setting**
See "• Repeater tone/tone squelch settings."

⑱~㉗ **Memory name settings**
Up to 10 characters.
See "• Codes for character entries"

To clear the memory channel contents on 1A 00:
①,②: Memory channel (0001~0099)
③: "FF"
④: None

NOTE:
- The same data as ④–⑰ are stored in ❹–❼.
- When the Split function is ON, the data of ❹–❼ is used for transmit.
- Even if the Split function is OFF, enter the data into ❹–❼ to match your transceiver. We recommend that you set the same data as ④–⑰.

Remote control (CI-V) information (Continued)

• Memory keyer character entries

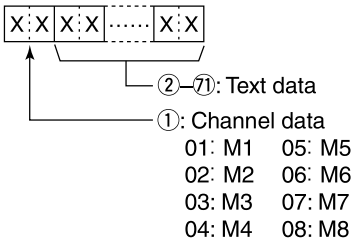
Command: 1A 02

- Character codes

Character	ASCII code	Description
0–9	30–39	Numbers
A–Z	41–5A	Letters
space	20	Word space
/	2F	Symbol
?	3F	Symbol
,	2C	Symbol
.	2E	Symbol
@	40	Symbol
^	5E	Example: to send $\overline{BT}$, enter ^4254
✱	2A	Inserts contest number (can be used for 1 channel only)

• Memory keyer content

Command: 1A 02



• [VOX/BK-IN] setting

Command: 1A 050198

Data	Function
00	VOX/BK-IN
01	PRESET
02	Voice/Keyer/RTTY Memory 1
03	Voice/Keyer/RTTY Memory 2
04	Voice/Keyer/RTTY Memory 3
05	Voice/Keyer/RTTY Memory 4

• [AUTOTUNE] setting

Command: 1A 050199

Data	Function
00	AUTOTUNE
01	PRESET
02	Voice/Keyer/RTTY Memory 1
03	Voice/Keyer/RTTY Memory 2
04	Voice/Keyer/RTTY Memory 3
05	Voice/Keyer/RTTY Memory 4

• [▲]/[▼] setting

Command: 1A 050200, 050201

Data	Function
00	M-CH UP
01	M-CH DOWN
02	PRESET
03	Voice/Keyer/RTTY Memory 1
04	Voice/Keyer/RTTY Memory 2
05	Voice/Keyer/RTTY Memory 3
06	Voice/Keyer/RTTY Memory 4

• MIC Key Customize setting

Command: 1A 050202, 050203

Data	Function
00	No function
01	UP
02	DOWN
03	UP (VFO: kHz)
04	DOWN (VFO: kHz)
05	XFC
06	VFO/MEMO
07	BAND UP
08	BAND DOWN
09	BAND DOWN
10	MODE
11	Voice/Keyer/RTTY Memory 1
12	Voice/Keyer/RTTY Memory 2
13	Voice/Keyer/RTTY Memory 3
14	Voice/Keyer/RTTY Memory 4
15	TS
16	MPAD
17	SPLIT
18	A/B
19	TUNER

Remote control (CI-V) information (Continued)

• Codes for CW message contents

Command : 17 Up to 30 characters

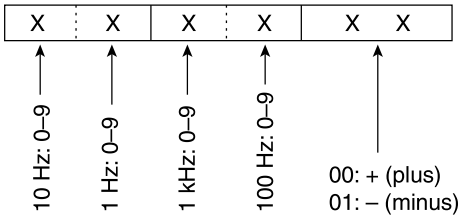
To send CW messages, use the following character codes.

Character	ASCII code	Character	ASCII code
0–9	30–39	’	27
A–Z	41–5A	(	28
a–z	61–7A	)	29
/	2F	=	3D
?	3F	+	2B
.	2E	”	22
–	2D	@	40
,	2C	Space	20
:	3A		

ⓘ“FF” stops sending CW messages.
ⓘ“^” is used to transmit a string of characters with no inter-character space.

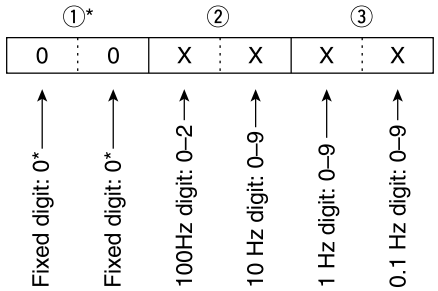
• RIT frequency settings

Command : 21 00



• Repeater tone/tone squelch frequency settings

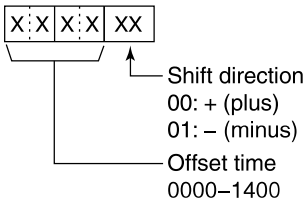
Command : 1B 00, 1B 01



*Not necessary when setting a frequency.

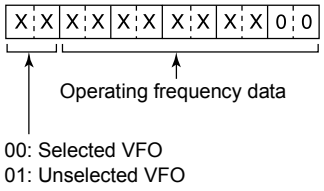
• UTC Offset setting

Command : 1A 05 0096



• Selected or unselected VFO frequency settings

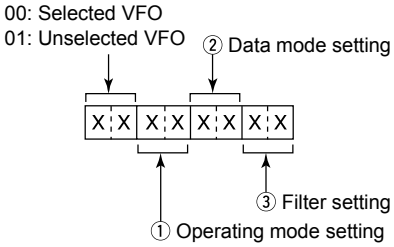
Command: 25



• Selected or unselected VFO’s operating mode and filter settings

Command: 26

Both data and filter settings can be skipped. In that case, “DATA OFF” and the default filter setting of the operating mode are automatically selected.



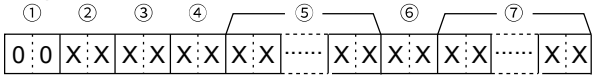
① Operating mode		② Data mode setting	③ Filter setting
00: LSB	05: FM	00: Data mode OFF	01: FIL1
01: USB	07: CW-R	01: Data mode ON	02: FIL2
02: AM	08: RTTY-R		03: FIL3
03: CW			
04: RTTY			

Remote control (CI-V) information (Continued)

• Scope waveform data

Command : 27 00

Outputs the waveform data to the controller



① 00 (Fixed)

② Order of division data (Current): 01~11

③ Division number (Maximum): 11 (USB)

ⓘ When sent through the USB port, the data is divided by 11 and sent in sequential order.

ⓘ The 1st data sends only the wave information (① ~ ⑥) without the waveform data (⑦).The 2nd or later data sends the minimum wave information (① ~ ③) with waveform data (⑦).

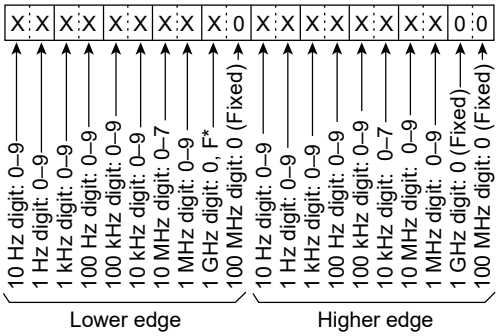
④ Spectrum scope mode data:

- 00 = Center mode scope
- 01 = Fixed mode scope
- 02 = SCROLL-C mode scope
- 03 = SCROLL-F mode scope

⑤ Waveform information

The waveform information is different between Center mode and fixed mode.

- In the Center mode:
  Center frequency and span are sent.
  See below for Frequency data, and the Scope span settings (② ~ ⑥) to the right.
- In the Fixed, SCROLL-C, and SCROLL-F modes:
  Lower edge and higher edge frequencies are sent.



* "F" means that the Lower edge frequency is a negative value.

⑥ Out of range information

- 00 = In range
- 01 = Out of range

ⓘ If the scope data is out of range, the waveform data (⑦) is omitted.

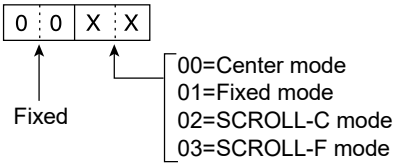
⑦ Waveform data

The transceiver outputs the drawn waveform data. The data range or data length of the waveform data is judged by the controller. (The data range is basically the same as the display size of the scope on the controller.)

Data range	0~160
Data length	475

• Spectrum scope mode settings

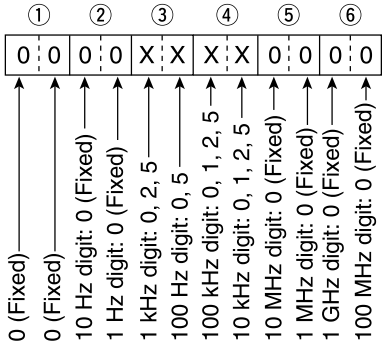
Command: 27 14



• Scope span settings

(in the Center mode and SCROLL-C mode Scope)

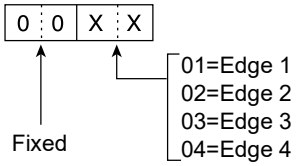
Command : 27 15



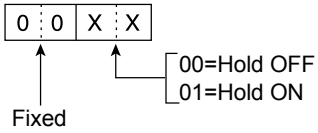
Span (kHz)	
2500	2.5
5000	5
10000	10
25000	25
50000	50
100000	100
250000	250
500000	500

Remote control (CI-V) information (Continued)

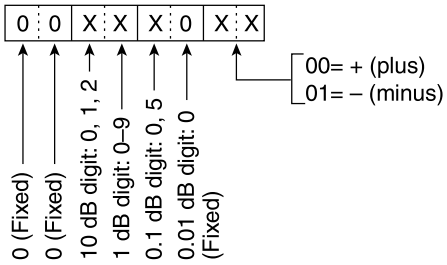
• Scope Edge number settings
(in the Fixed mode and SCROLL-F mode Scope)
Command: 27 16



• Scope Hold settings
Command: 27 17

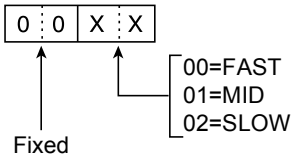


• Scope Reference level settings
Command : 27 19

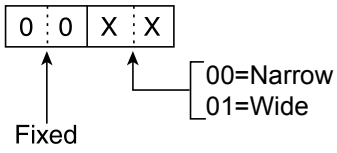


ⓘAdjustable range: –20.0 dB ~ +20.0 dB in 0.5 dB steps

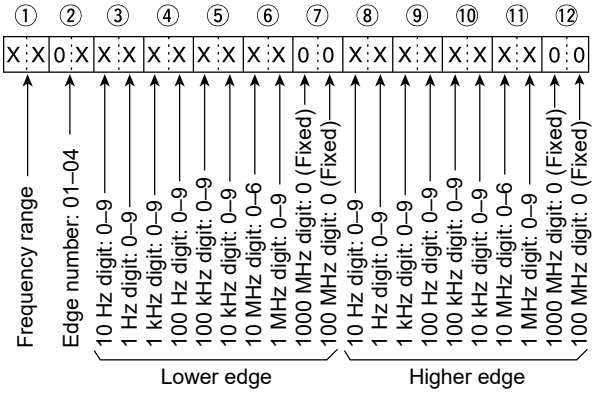
• Scope Sweep speed settings
Command : 27 1A



• Scope VBW (Video Band Width) settings
Command : 27 1D



• Scope Fixed edge frequency settings
Command : 27 1E



ⓘEntry of digits less than 1 kHz is ignored.

① Selectable Frequency ranges

Data	Frequency range (Hz)
01	0.03 – 1.60
02	1.60 – 2.00
03	2.00 – 6.00
04	6.00 – 8.00
05	8.00 – 11.00
06	11.00 – 15.00
07	15.00 – 20.00
08	20.00 – 22.00
09	22.00 – 26.00
10	26.00 – 30.00
11	30.00 – 45.00
12	45.00 – 60.00
13	60.00 – 74.80

② Selectable Edge number: 01 = 1, 02 = 2, 03 = 3, 04 = 4

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ABOUT CE

INSTALLATION NOTES

For amateur base station installations it is recommended that the forward clearance in front of the antenna array is calculated relative to the EIRP (Effective Isotropic Radiated Power). The clearance height below the antenna array can be determined in most cases from the RF power at the antenna input terminals.

As different exposure limits have been recommended for different frequencies, a relative table shows a guideline for installation considerations.

Below 30 MHz, the recommended limits are specified in terms of V/m or A/m fields as they are likely to fall within the near-field region. Similarly, the antennas may be physically short in terms of electrical length and that the installation will require some antenna matching device which can create local, high intensity magnetic fields. Analysis of such MF installations is best considered in association with published guidance notes such as the FCC OET Bulletin 65 Edition 97-01 and its annexes relative to amateur transmitter installations. The EC recommended limits are almost identical to the FCC specified 'uncontrolled' limits and tables exist that show pre-calculated safe distances for different antenna types for different frequency bands. Further information can be found at http://www.arrl.org/.

• **Typical amateur radio installation**
Exposure distance assumes that the predominant radiation pattern is forward and that radiation vertically downwards is at unity gain (sidelobe suppression is equal to main lobe gain). This is true of almost every gain antenna today. Exposed persons are assumed to be beneath the antenna array and have a typical height of 1.8 m.

The figures assume the worst case emission of a constant carrier.

For the bands 10 MHz and higher the following power density limits have been recommended:
10–50 MHz 2 W/sq m

Vertical clearance by EIRP output
1 Watts 2.1 m
10 Watts 2.8 m
25 Watts 3.4 m
100 Watts 5 m
1000 Watts 12 m

Forward clearance by EIRP output
100 Watts 2 m
1000 Watts 6.5 m
10,000 Watts 20 m
100,000 Watts 65 m

In all cases any possible risk depends on the transmitter being activated for long periods. (actual recommendation limits are specified as an average during 6 minutes) Normally the transmitter is not active for long periods of time. Some radio licenses will require that a timer circuit automatically cuts the transmitter after 1–2 minutes etc.

Similarly some types of emission, i.e., SSB, CW, AM etc. have a lower 'average' output power and the assessed risk is even lower.

Count on us!

A7292-4EX-11
 Aug. 2021

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